Hebron

Bull Arm Site
Environmental Protection Plan

for Hebron Project Activities

February 2011

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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 will be built, as will components of the Topsides and the entire platform assembly, at the existing Bull Arm fabrication facility in Bull Arm, Trinity Bay (Figure 1-1).

The Department of Environment and Conservation requires the submission of 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 part of this system.

The EPP is intended to be a working document for use in the field by project personnel and contractors, 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 of the EPP 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 of the EPP outlines environmental protection procedures and contingency plans which are intended to mitigate potential negative effects on the airshed and 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 and include a site waste segregation program;

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

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

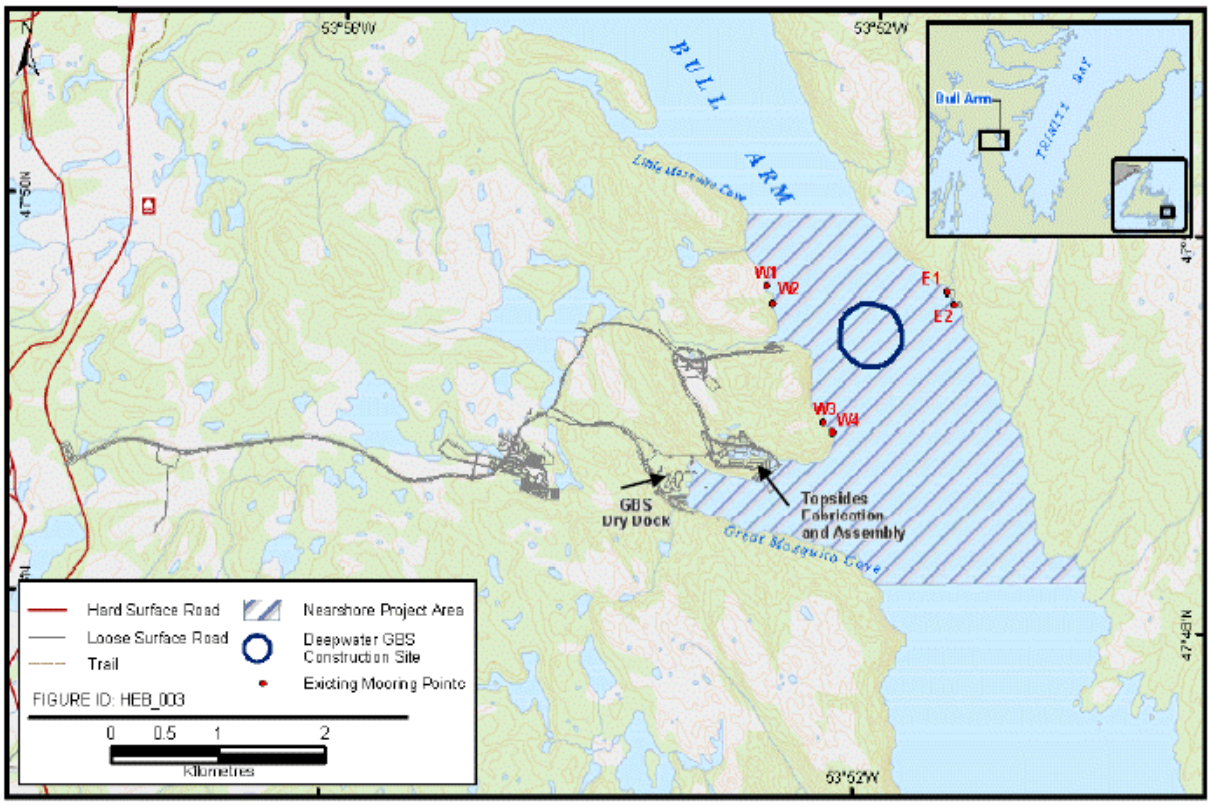

Figure 1 - 1 : Existing Bull Arm Fabrication Site

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 of the Bull Arm site as well as the near-by communities and commercial fishers. These procedures and plans will be implemented during the onshore and near shore construction phase 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.

All Project activities at the Bull Arm site will be governed by prime agreements developed between EMCP and the contractors: Kiewit-Aker Contractors and WorleyParsons Canada Services Ltd.

EMCP, in conjunction with the prime contractors, has developed this EPP, and will ensure it is maintained during the construction phase. EMCP will also monitor the EPP's 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 regularly with provincial and federal regulatory bodies to address environmental issues, and ensure exchange of accurate and timely information, especially concerning permits and authorizations;
- In consultation with its contractors, develop a community consultation program;
- In conjunction with its contractors, implement environmental field programs;
- Develop and deliver, with its main contractors, an environmental orientation and education program for all EMCP, contractor, and subcontractor personnel involved in the construction of the Hebron Gravity Base Production Platform at Bull Arm;
- Support, where necessary, its contractors' applications for government permits, licenses, certificates and authorizations;
- Facilitate and participate, as necessary, in government on-site inspections;
- Implement a procedure of internal environmental review/approval 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' safety and contingency plans; and
- Report on the EPP in accordance with regulatory requirements.

Kiewit-Aker Contractors (KAC) is the Gravity Base Structure (GBS) Front-End Engineering and Design (FEED) contractor (GBS Contractor) and, as such, will construct the GBS at the dry dock and deep water sites. KAC will be responsible for implementing provisions of the EPP relevant to its scope of work, including one or more of 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, tow-out channel enlargement (if necessary), ocean disposal; and
- Establishment of temporary and permanent moorings at the dry dock and deep water sites, tow-out of GBS to deep water site, GBS ballasting, topsides – GBS mating and commissioning; support/transport vessel operation, submergence testing.

WorleyParsons Canada Services Ltd. (WP) is the Topsides Engineering, Procurement and Construction Contractor (**Topsides Contractor**) and will be responsible for implementing provisions of the EPP relevant to its scope of work, including:

- Fabrication of selected topsides modules at the Topsides Fabrication Facility;
- Topsides facilities refurbishment and site services related to operation of the topsides fabrication and assembly site;
- Assembling and integrating all modules (i.e. the Utilities and Process Module; Drilling Equipment Module; Drilling Support Modules; Living Quarters; Flare Boom, Helideck, and Lifeboat Stations) at the Topsides Integration Pier;
- Tow-out of the completed Topsides to the deep water site; and
- Mating and integrating the Topsides with the GBS.

Stakeholders: various provincial and federal government bodies will be involved during the construction phase, 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 EMCP, KAC and WP. This EPP will help ensure compliance with conditions assigned to permits, approvals, authorizations, and licenses for work at site.

The public is interested in seeing that commitments made by EMCP publicly and in the CSR are fulfilled. Accordingly, this EPP will help ensure benefits to the affected communities are realized, and that any negative effects to the environment are appropriately mitigated. As key stakeholders within this group, commercial fish harvesters who use the Bull Arm area for their activities may be directly affected by the Project. 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 EMCP's Environmental Policy (Figure 1-2). Specific objectives of this EPP include:

- Document environmental concerns and appropriate environmental protection procedures pertinent to all personnel involved during all construction 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 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 will be satisfied by all personnel involved at the site; and
- Provide a document with sufficient detail for the effective implementation of proposed environmental protection measures during Project construction activities out of the Bull Arm site.

ExxonMobil's policy is to:

- Comply with all applicable environmental laws and regulations and apply responsible standards where laws and regulations do not exist;
- Encourage 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 their 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 their operations, in cooperation with industry organizations and authorized government agencies;
- Conduct and support research to improve understanding of the impact of their business on the environment, to improve methods of environmental protection, and to enhance their capability to make operations and products compatible with the environment;
- Communicate with the public on environmental matters and share their experience with others to facilitate improvements in industry performance;
- Undertake appropriate reviews and evaluations of their operations to measure progress and to foster compliance with this policy

Figure 1 - 2: EMCP Environmental Policy

1.4 Abbreviations

Abbreviation	Term
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSR	Comprehensive Study Report
EMCP	ExxonMobil Canada Properties
EPP	Environmental Protection Plan
GBS	Gravity Base Structure
JEA	Job Environmental Analysis
ISPS	International Ship and Port Facility Security
KAC	Kiewit-Aker Contractors
MCC	Motor Control Centre
MOF	Mechanical Outfitting Facility
PPT	Parts Per Trillion
RRIF's	Revision Request Initiation Forms
SBR	Sequencing Batch Reactor
TCH	Trans-Canada Highway
T/S	Topsides
UPM	Utilities and Processing Module
WP	WorleyParsons Canada Services Ltd.

1.5 References

Document Number	Title
EMCP, 2010a	The Hebron Project Comprehensive Study Report (CSR), June 2010
NS-G-O-P-A00-PH-00-020- DO	Hibernia Development Project Gravity Base Structure Environmental Protection Plan
NBAG-0169	Hibernia Development Project Platform Construction Environmental Protection Plan, July 1993

1.6 Overview of Setting & Project Activities

1.6.1 Environmental Setting

1.6.1.1 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 TCH. St. John's is approximately 165 km 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 15.40^{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 (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 Bull Arm 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 Great 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 Great Mosquito Cove 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 seaduck populations in the spring. Other water birds may frequent Bull Arm as well, including loons, eider ducks, and murres. Bald eagle nests have also been located along the cliffs, which are important to 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 a rare caribou or wandering black bear. Fur trappers operate in the Bull Arm area, capturing beaver, mink, otter, and fox in the south and otter, mink, fox, and muskrat on the north side. 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 to 27 m. Little Mosquito Cove reaches a maximum depth of only 10 m. The coastline approaching Great Mosquito Cove drops sharply to depths of 30 to 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 to 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 extends from the northwest end of the cove into deeper water (45 m). The bottom drops off sharply from both the north and south shorelines, on the north 14 and 15 m depths can be found less than 10 m from shore. On the south, 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 ranges 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 farther inside the Arm. Some areas may be muddy or exhibit a silt-like texture.

Bull Arm usually freezes over from January through March, but ice may persist for a short time after. 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.

In Bull Arm, many species of fish are common. 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: This is described in more detail in Chapter Five of the EPP.

Certain marine mammals have also been sighted in Bull Arm. These include grey seals, harbour porpoises, minke whales, and pothead whales and concentrations of humpback whales are frequently spotted in Bull Arm, especially during the summer months. Based on COSEWIC's (Committee on the Status of Endangered Wildlife in Canada) 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.

Historic Resources

Bull Arm and the Avalon 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 on Bull Arm, 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 in 1989, during the Hibernia Development Project, have 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 Comprehensive Study Report (CSR), June 2010, and the Hibernia Development Project Platform Construction Site EPP, July 1993 (document reference NBAG-0169).

1.6.2 Bull Arm Schedule

Early works activities (e.g., re-establishment of bund wall, dry dock construction, blasting/dredging) are scheduled to commence in the second half of 2011. GBS construction and Topsides fabrication are expected to commence in 2012. Platform tow-out from Bull Arm is anticipated in 2016.

1.6.3 Existing Site Conditions

The Bull Arm facility encompasses an area of 2,833 hectares and has a 10 km paved internal roadway connected to the Trans-Canada Highway (TCH) (see Figure 1-4); electrical power distribution system connected to the island grid; communications systems; on-site water supply, treatment, and distribution system for potable water, firefighting water, and industrial water; and a stand-alone sanitary waste collection and treatment system. The facility comprises three major fabrication areas and a camp site capable of being re-established for a large construction workforce. The main site areas are as follows:

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 shown in Figure 1-4 still exist. In addition, site-wide utilities, as described further below, still exist at the camp site as well as throughout the entire Bull Arm facility.

Dry Dock Site: This has 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 fabrication, assembly and load-out of the completed topsides platform.

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; there are six on-shore mooring points. The water depth in Bull Arm increases towards the mouth of the arm, where it reaches approximately 250 m, as it enters Trinity Bay.

The facility as it currently exists is shown on Figure 1-4 below. The existing facility is described further in the sections that follow.

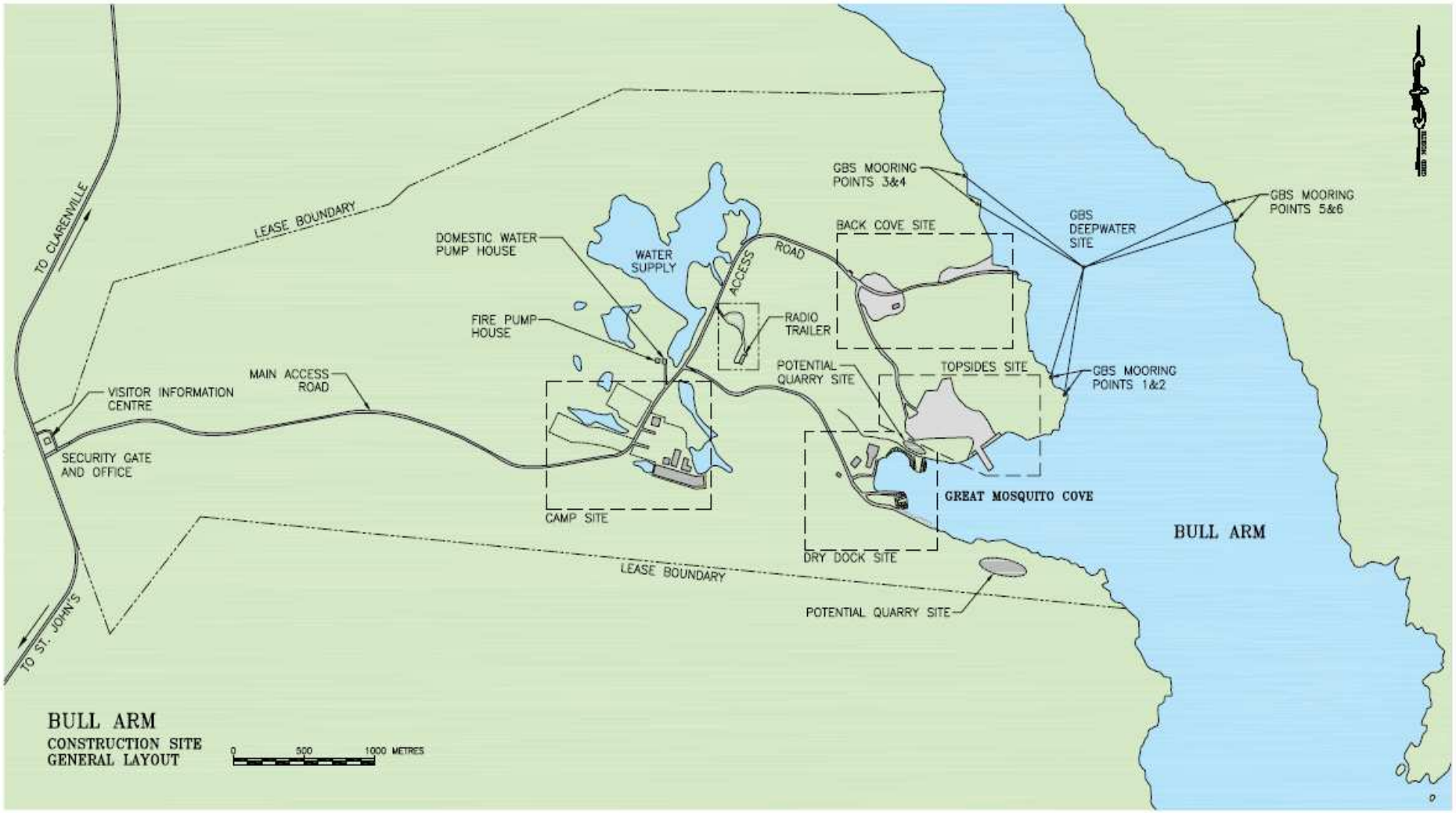

Figure 1 - 3: Existing Bull Arm Site Layout

1.6.3.1 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, as shown on Figures 1-4 and 1-5.

Site Buildings/Facilities

All buildings/facilities at the site are being evaluated with respect to condition: some may be refurbished to meet the Project's requirements.

Electrical Power Distribution System

The existing electrical system at the site consists of a 25kV wood pole 3 phase transmission line, which is connected to the provincial electrical grid.

Water Supply, Treatment, and Distribution System

The existing water supply (named Little Mosquito Pond), which services the entire site, was used in the past for potable water, firefighting water, and process water and is available for continued use, subject to government approval. The system includes an existing water treatment (chlorination) plant, and the water distribution system includes a network of underground water lines and domestic water, fire water, and back cove pump houses.

Sanitary Sewer Collection and Treatment System

Current treatment process is a Cyclic Activated Sludge System (CASS^{TM}) manufactured by Babcock-Transenviro L.P. of Irvine California. The CASS is a proprietary variant of the Sequencing Batch Reactor (SBR) activated sludge process. The SBR is widely used in the region for treatment of municipal and industrial wastewater.

The building contains ancillary equipment associated with the newer SBR treatment process, including blowers, control panel and motor control centre (MCC), 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.

Other Facilities

Several other facilities that currently exist at the camp site are as follows:

- Medical clinic/fire hall;
- Gymnasium/swimming pool;
- Kitchen/dining hall building;

- Tavern/commissary building;
- Generator utility building; and
- Sewage lift station/emergency generator building.

1.6.3.2 Dry Dock Area and Associated Marine Infrastructure

The existing dry dock site includes marine infrastructure and buildings, as shown on Figure 1-5. The existing buildings include the following:

- Sewage Treatment Plant;
- Mechanical Outfitting Facility (MOF);
- Equipment Workshop;
- Carpentry;
- Rebar/Prefab; and
- Batch Plant.

The existing marine infrastructure of the Bull Arm facility is spread out in different areas within the dry dock, Topsides, Back Cove, and deep water sites. The infrastructure associated with the dry dock area is described as follows:

The dry dock where initial phases of GBS construction will take place, is oval shaped and is approximately 40,000 square metres in area, 200 metres in diameter, and 16.5 metres below low tide level. The dry dock is currently open to Bull Arm, but a “bund wall” will be constructed as part of the Early Works Program to isolate the dry dock from the marine environment. There are eight quays located inside and outside of the dry dock. The existing quays are shown on Figure 1-5 and described as follows:

1. GBS Quay: This marginal wharf is a 138 m long gravity structure constructed of precast concrete blocks.
2. FPSO Quay: This is located to the east of the GBS Quay. It is constructed of reinforced concrete caissons, with a short section of vertical sheet piles at the connection with the GBS Quay.
3. Wooden Quay: This is a timber crib structure located outside of the dry dock. It was used as a temporary construction dock for mooring barges and small vessels during initial construction of the dry dock facilities.
4. Aggregate Loading Quay: This is a 54 m long marginal wharf constructed of tied steel sheet piles and with a gravel deck. It is located inside of the dry dock.
5. Dry dock Quay: This is 60 m long wharf that is constructed of round concrete piles and concrete bulkheads located inside of the dry dock.

6. Rebar Load-out Quay: This 39 m long marginal wharf is a tied steel sheet pile structure with timber wheel guards and a gravel deck. It is located inside of the dry dock.
7. Loading Transfer Quay: This is constructed of concrete filled steel piles with timber decking on a steel frame. It has a 12.5 m berth face and is also located within the dry dock.
8. Mooring Quay: This is a 40 m long marginal wharf comprising sheet piles and a rock slope. It represents a part of the former sheet pile cut off wall that was used for the dry dock.

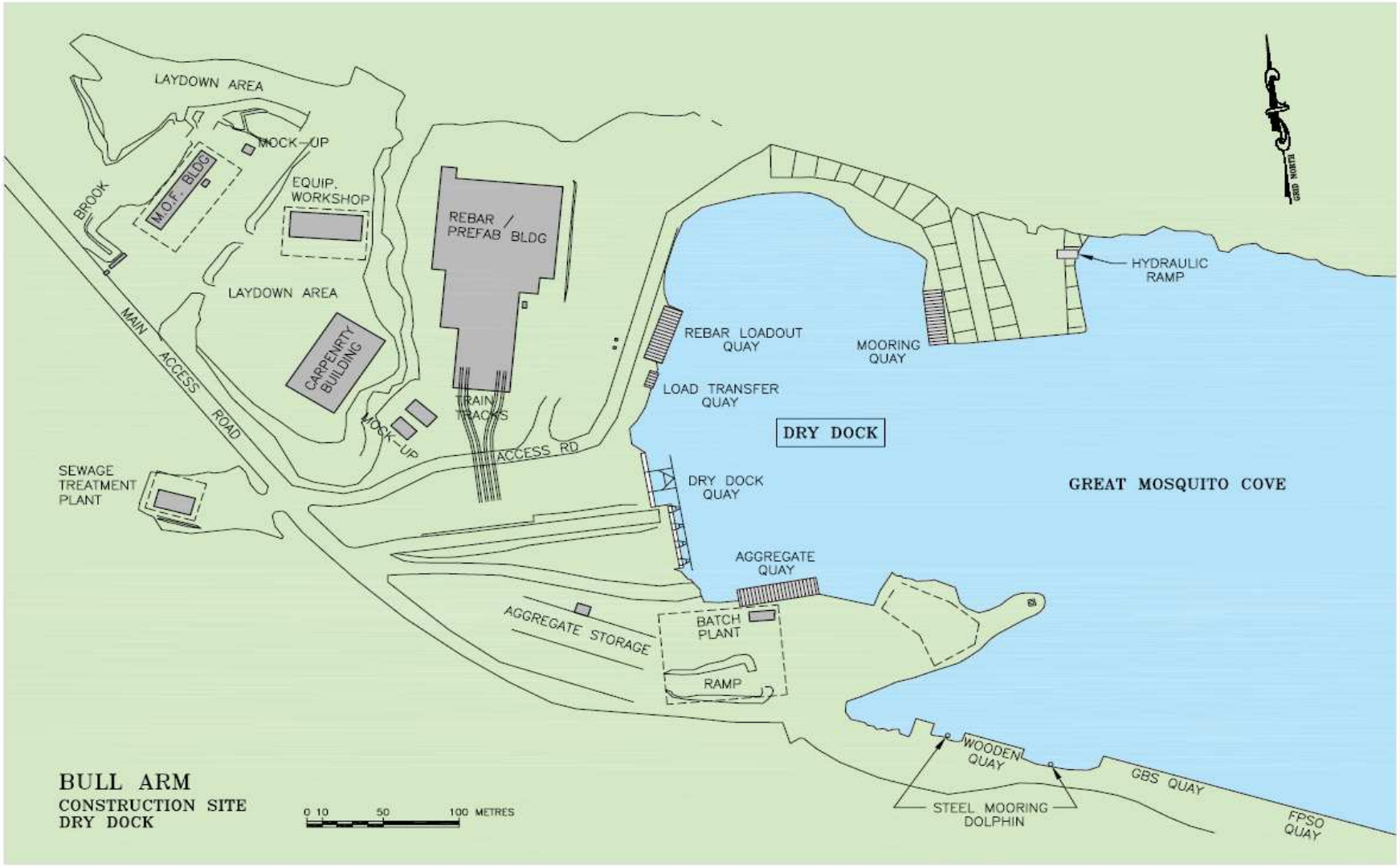

Figure 1 - 4: GBS Dry Dock Area

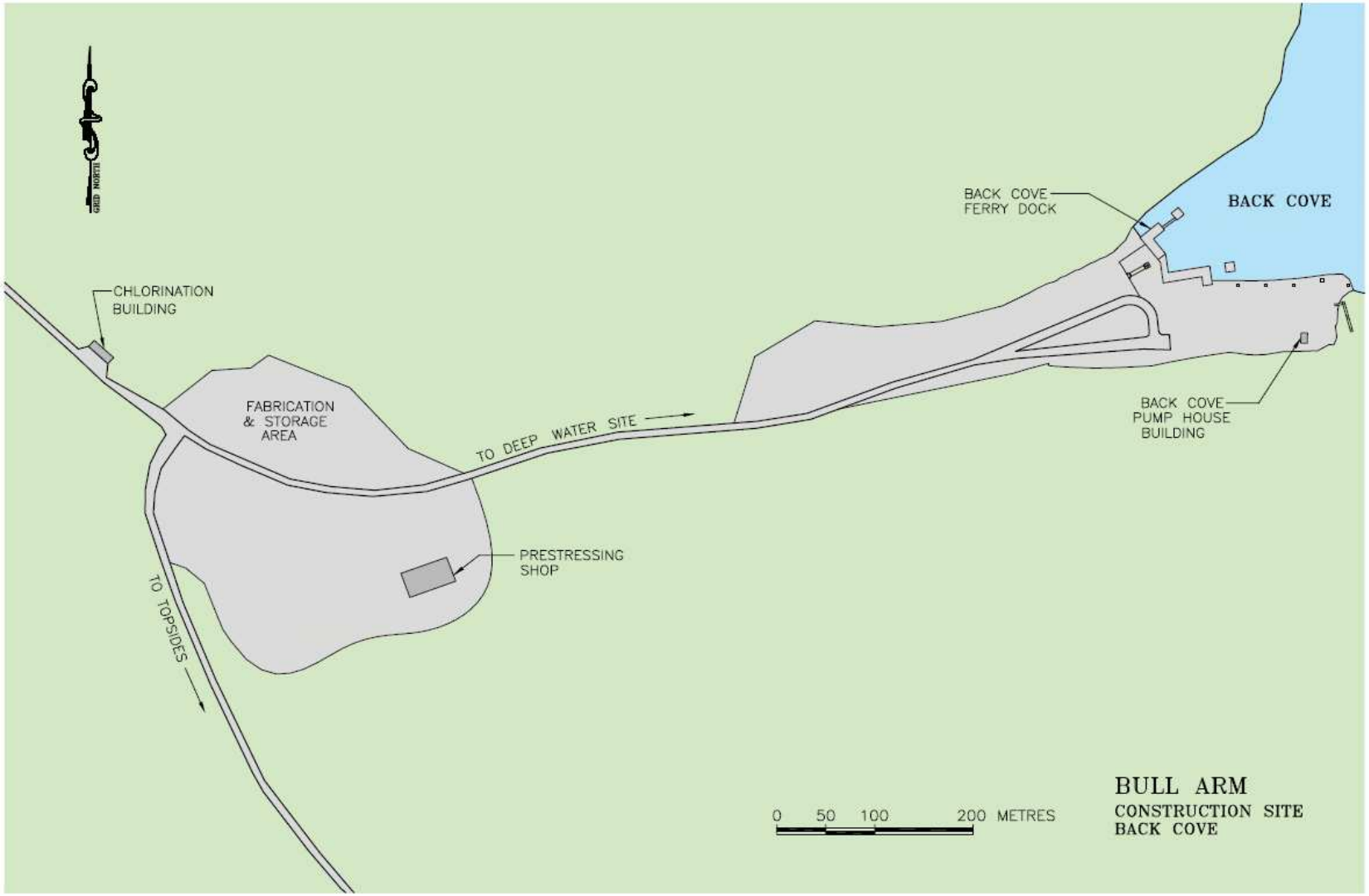

Figure 1 - 5: Back Cove Site

1.6.3.3 Topsides Area

The Topsides area was designed to fabricate, assemble, and commission various modules that comprise the platform Topsides. The site includes several buildings, as shown on the Topsides site layout, Figure 1-7. These buildings are arranged on a two tiered site with the Administration Building located on the upper level and the fabrication facilities and laydown areas located on the lower level adjacent to the Topsides Quay and Topsides Assembly Pier. The Topsides Area has a receiving quay (Topsides Quay) that is 200 metres long with 10 metres of water depth at the face, and a 140 metre long, 47 metre wide Topsides Assembly Pier that is capable of supporting a 40,000 tonne topsides structure. These are also shown on Figure 1-7.

1.6.3.4 Back Cove and Deep Water Site

The Back Cove site has a ferry dock used to access the GBS at the deep water site in the middle of Bull Arm. A general layout of the Back Cove site is shown in Figure 1-6.

Six GBS mooring point structures are positioned along the shores of Bull Arm around the deep water site. The 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 to it with post tensioned rock anchor bolts. A layout showing the six GBS mooring points and deep water site is given in Figure 1-4.

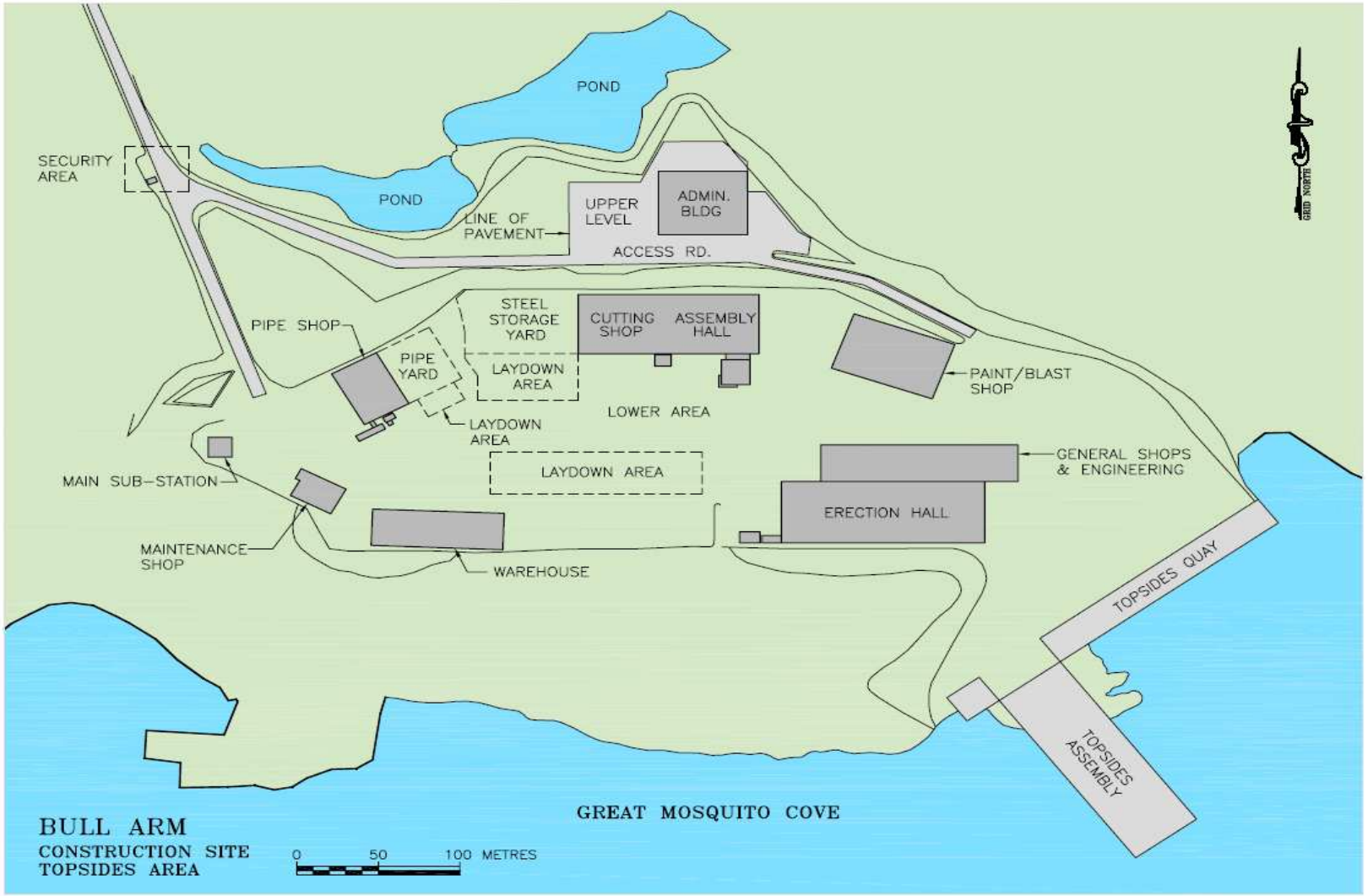

Figure 1 - 6: Topsides Site Layout

1.6.4 Project Phases

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

1.6.4.1 Early Works Program

A significant part of the Early Works Program will involve constructing a "bund wall" to isolate the dry dock area from the marine environment. The bund wall will consist of a rockfill berm and steel sheet piles or alternative materials placed along the berm's centerline to create an impermeable cut-off wall. The berm material is to be quarried and processed from on-site or off-site. There may be blasting and/or dredging to widen and deepen the tow-out channel.

Note: Bund wall is currently being designed and therefore construction methodology has not been finalized.

The material source for the rockfill bund wall is presently undecided. A quarry may be established at the Bull Arm facility. Two prospective quarry sites are located on the north and south sides of Great Mosquito Cove, as seen in Figure 1-4.

Once the bund wall is in place, the dry dock will be de-watered and the access roads rebuilt or replaced and the construction support infrastructure (offices, cranes, laydown areas, etc.) put in place.

Other work during the Early Works Program will focus on refurbishing the Bull Arm facility to enable it to be used without interruption during the Hebron Fabrication period (3 to 4 years). Other work may be required once further site investigation and equipment is mobilized.

The work will be the responsibility of KAC and will essentially consist of the following:

- **Roads/Parking Lots:** Rehabilitate asphalt paved roadways and parking lots;
- **Buildings:** Upgrade and maintain buildings, including associated electrical, mechanical, architectural, structural, and telecommunications systems;
- **Sanitary Sewage:** Flush the sanitary sewers and conduct a camera investigation of their integrity; repair manhole frames, covers, and tops; inspect, upgrade, and reactivate sewage treatment plant;
- **Water Supply:** Evaluate the existing water treatment and fire protection system, flush and re-commission the distribution system, miscellaneous minor repairs;

- **Site Drainage:** Clean out ditching, extend storm sewer to west end of camp site;
- **Electrical Distribution:** Install new emergency generator at the Camp area and switchgear for the deep water site/GBS;
- **Laydown Areas:** Re-grade laydown areas;
- **Telecom (Topsides):** Test and map existing copper and fibre infrastructure, replace obsolete Trunk Radio System;
- **Marine Facilities:** All marine infrastructure required for the project at the Bull Arm facility will require some degree of refurbishment or reinstatement, as described below.

Topsides Area:

- Topsides Quay: Replace wheel guards, grade deck, clean and recoat bollards, possibly install permanent (walkway) access to northern bollard, which is currently inaccessible by land (to ensure worker safety);
- Topsides Pier: Clean and recoat bollards; repair cracks at deck control joints; diving inspection of piles for corrosion; clean and coat piles, install ladders.

GBS Dry Dock Area:

- GBS Quay: Replace wheel guard; grade and resurface deck; clean and recoat bollards, repair fender connections and reinstate fenders at western end;
- FPSO Quay: Replace wheel guard; concrete repairs; clean and recoat bollards; install ladders; repair embedments; conduct detailed above/below water surveys;
- Mooring Quay: Inspections of sheet piles (in dry); install new wheel guards; repair, clean, and recoat bollards; sheet pile/cap repairs; coating, re-grade surface deck, slope protection;
- Rebar Loadout Quay: Inspect sheet piles (in dry); install new wheel guards; repair, clean and recoat bollards; sheet pile/cap repairs; coating, re-grade deck surface and correct drainage;
- Load Transfer Quay: Inspect sheet piles (in dry); install new wheel guards; pile/cap repairs; coating; re-grade deck surface;
- Loadout Quay: Inspect sheet piles (in dry); clean and recoat bollards; repair fenders, install ladders;
- Aggregate Quay: Inspection of sheet pile (in dry); clean and recoat bollards; install new wheel guard; re-grade deck and correct washouts; repair fenders; install ladders; and
- Wooden Quay (dry dock): Construct a new wooden quay.

Back Cove and Deep Water Site:

- Ferry Dock (Back Cove): Demolish existing dock; construct new wooden cribs with ballast; install new wheel guard; install wood fender support; install existing fenders; construct gangways; install new ladders; install new bollard bases; and
- GBS Mooring Points: Clean up debris and rebar; and recondition bearing plates, install capping slabs.

Note: this list was compiled following an engineering assessment. The actual work to be carried out will depend on project needs.

1.6.4.2 Site Operation

Operation of the Bull Arm facility will include provision of site wide services, site security; road/snow clearing; potable water, fire water, and process water; sewage collection and treatment; accommodations and meals; electrical power; telecommunications; and facilities management; etc.

1.6.4.3 GBS Construction at Dry Dock

Dry construction of the GBS may include the installation of concrete or steel partitions, called skirts. If used, these would underlie the GBS base slab and may be prefabricated outside of the dry dock and transported to the dry dock. The base slab, including mechanical outfitting and the cantilevered base slab roof, will be completed and portions of the storage cell walls and ice walls will be constructed in the dry dock. Mechanical and marine outfitting will proceed 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.

1.6.4.4 Topsides Fabrication and Assembly

The Topsides design is based on the concept of an integrated deck, the utilities and production module (UPM). The UPM reduces the amount of inter-module piping, electrical and instrumentation connections and maximizes the extent of pre-commissioning while at the fabrication site. 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.

One or more selected modules will be fabricated at the Topsides site; the remaining will be fabricated at locations other than the Bull Arm facility. It is anticipated that individual modules will have considerable commissioning accomplished prior to integration.

Modules that have been fabricated off-site will be shipped to the Bull Arm facility by marine vessel and offloaded onto the Topsides Assembly Pier for “dry” integration with other modules.

1.6.4.5 GBS Tow-Out to Deep Water Site

Once the base slab, cantilever and lower portions of the walls of the GBS are completed, the dry dock will be cleared of infrastructure and filled with seawater to the level of Great Mosquito Cove. Removal of the bund wall will include rock and potentially sheet pile removal to allow passage of the GBS out of the basin to the deep water site, where it will be moored to allow construction to continue. Disposal of the excavated material at approved locations will also proceed.

1.6.4.6 GBS Construction at Deep Water Site

In order to secure the GBS at the deep water site in Bull Arm, the existing deep water moorings will be used; however, additional moorings may be required. 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. One or two barges will be used to locate construction offices, tool cribs and other support buildings. Another barge will carry the floating concrete batch plant. This will be designed to prevent release of untreated washwater and spoiled concrete into the environment. Washwater will be stored and directed to settling basins, where it will be monitored before the clarified water is discharged to the marine environment.

A series of transport barges will be used to ferry cement, aggregate, reinforcing bars, steel embedment, and mechanical outfitting to the deep water site. These barges will be 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 will be used to transfer personnel from shore to the deep water site and back. A floating water supply pipe will be installed to transfer water to the deep water site. An underwater cable will be installed to transmit electrical power and to provide a communications link to shore.

A final stage in the "wet" GBS construction phase will be to ballast the completed structure using a combination of solid ballast (likely iron ore) and seawater until the required depth is reached. Solid ballast will be brought to the site on bulk carrier barges. A series of conveyors or 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.

1.6.4.7 Topsides Mating and Commissioning

After all fabricated modules have been integrated 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. Hook-up, commissioning, and preparation for the tow-out to the offshore Hebron field will continue over the subsequent one to two month period.

1.6.4.8 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.

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, using high performance tugs in a similar configuration to that used for Hibernia tow-out. 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 site may require 10 to 14 days. However, 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 Bank and near the Hebron field prior to final approach.

1.6.4.9 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 to the NLE&C's satisfaction. An underwater survey of the deep water site will also be undertaken to identify any debris that may be present, followed by removal of such debris.

Decommissioning activities will be carried out in consultation with federal and provincial government agencies. Various stakeholders will also be consulted and kept informed of the work.

1.7 Organization and Responsibilities

EMCP and its 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 Environmental Protection Plan is through a strong

environmental policy and rigorous, self-regulatory environmental compliance monitoring program.

The Project will monitor itself for compliance with laws, regulations, guidelines, permits, authorizations, commitments made in the CSR, contractual commitments, and also with internal environmental policies and standards which are contained or referenced in the 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 will be the Project Environment and Regulatory Team comprised of staff of EMCP, KAC and WP. This team will be fully apprised of the Project's environmental issues and concerns, and the local socio-economic context. In addition, the team will have a comprehensive knowledge of the EPP, all relevant laws, regulations, permits, approvals, guidelines, CSR commitments, and internal environmental policies.

The Project Environment and Regulatory Team will act as the contact with various stakeholders, including regulatory agencies, commercial fish harvesters, and the broader public. Members of the team will obtain all environmental permits and will be in charge of discussions with government bodies or agencies on environmental issues. Key positions having responsibilities for managing and implementing the EPP are summarized below:

EMCP Site Construction Manager: As the senior EMCP representative at site, the Construction Manager directs the onsite EMCP construction and execution, safety and environment and regulatory team; oversees construction planning and progress by the KAC team; as well as providing oversight for overall site operations. The Site construction Manager reports directly to the EMCP GBS Manager.

EMCP Environment and Regulatory Advisor: Primarily based at site, this individual will report directly to the EMCP Site Construction Manager and, functionally, to the to the EMCP Environment and Regulatory Manager on all environmental matters; provide broad advice on environmental matters to the EMCP Construction Manager and Project Environment and Regulatory Team members; and will be responsible for monitoring implementation of the EPP managing various environmental studies, monitoring programs, community interaction and fisheries liaison for Project activities at the Bull Arm site.

Fisheries Liaison Officer: This individual will be based at the Bull Arm site and will liaise with commercial fish harvesters who could be potentially affected by the Project, the GBS and Topsides on-site Environment (and Regulatory) Coordinators, and the EMCP Environment and Regulatory

Advisor. This individual will be responsible to monitor implementation of the Commercial Fisheries Environment chapter of the EPP.

Community Relations Coordinator: This individual will be based at the site and will be a member of the Project Environment and Regulatory Team; participate and arrange appropriate participation by others in the community relations programs; and be 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 the EPP.

KAC Site Construction Manager: As the senior KAC representative at site, the Construction Manager directs the onsite construction and execution, safety and environment and regulatory team. The KAC Construction Manager reports directly to the KAC GBS Project Manager.

KAC Environment and Regulatory Manager: This individual will report directly to the GBS Project Manager, and will liaise with other members of the Project Environmental Team. This individual is responsible for all permits under the GBS construction and site operations contract. The GBS Environment and Regulatory Manager will be fully apprised of the environmental issues and concerns of the Project, and the local socio-economic context. In addition she/he will have a comprehensive knowledge of the EPP, all relevant laws, regulations, permits, approvals, guidelines, CSR commitments, and internal environmental policies.

KAC Environment Coordinator: Based at the Bull Arm site, reporting to the GBS Environment and Regulatory Manager and, on site, to the site KAC Construction Manager, and participating on the Project Environment and Regulatory Team, this individual is responsible for execution of all permits under the GBS construction and site operations contract, and will act as the contact person with regulatory agencies and specialists on site. This individual will also coordinate environmental requirements with GBS engineering disciplines, site operations personnel and specialists.

WP Site Construction Manager: As the senior WP representative at site, the Construction Manager directs the onsite construction and execution, safety and environment and regulatory team. The WP Construction Manager reports directly to the WP Topsides Project Manager.

WP Topsides Environment and Regulatory Manager: This individual will be a qualified environmental specialist, will report directly to the Topsides Project Manager, and will liaise with other members of the Project Environment and Regulatory Team. This individual is responsible for permitting and environmental regulatory compliance. The Topsides Environment and Regulatory Manager will be fully apprised of environmental issues and concerns associated with the Topsides contract, and the local socio-economic context. She/he will also have comprehensive knowledge of the EPP, all relevant laws, regulations, permits, approvals, guidelines, CSR/ commitments, and internal environmental policies.

WP Topsides Environment and Regulatory Coordinator: Based at the Bull Arm site, reporting to the Topsides Environment and Regulatory Manager

and, on site, to the Site Construction Manager, and participating on the Project Environment and Regulatory Team. This individual is responsible for execution of all permits under the Topsides construction and site operations contract, and will act as the contact person with regulatory agencies and specialists on Site. This individual will also coordinate environmental requirements with Topsides engineering disciplines, site operations personnel and specialists.

WP Topsides Environment and Regulatory Advisor: The Topsides Environment and Regulatory Advisor will assist the Environment and Regulatory Manager with preparation of permits applications, regulatory compliance and environmental assessments and reporting. This individual will also coordinate environmental requirements with Topsides engineering disciplines in province.

Site Environmental Monitors: These individuals will monitor on-site Project activities, evaluate the contractors' environmental performance, and assess and interpret environmental protection procedures as set down in this EPP. The site Environmental Monitors will report directly to the Environment (and Regulatory) Coordinator, and interact with other members of the Project Environment and Regulatory Team on environmental procedures and requirements, participate in Project meetings, conduct environmental reviews of drawings, and help to revise and update this EPP.

Provincial, Federal, and Municipal Government Representatives: will visit the site periodically to ensure compliance with applicable government regulations and permits, as per the mandates of their respective agencies. They will provide information and advice directly to the GBS and Topsides Environmental Manager/Coordinator.

Note: Bull Arm project organization and responsibilities are at the early stage of development. Role descriptions highlighted in this section represent current near-term plans and are subject to change as the project progresses.

1.7.1 Mechanisms/Responsibilities for Implementation

Annual Environmental Performance Review

At the end of each construction year the Project Environment and Regulatory Team will participate in an environmental performance workshop to review all work activities that relate to environmental concerns, issues and/or mitigations. The review process will give all parties a chance to evaluate overall environmental performance and compliance with government regulations, permits, and this EPP.

Job Environmental Analysis

For each new work package that has potential for adverse environmental impact, an in-depth Job Environmental Analysis (JEA) will be conducted prior to the work commencing. The intent of the JEA is to identify potential environmental hazards and appropriate mitigation measures as provided in

applicable sections of this EPP. The initial development of JEA documentation will be the responsibility of the individual company or contractor performing the work (See Appendix 1A). Each JEA document shall be formally reviewed by the on-site EMCP Environment and Regulatory Advisor, GBS and/or Topsides Environment and Regulatory Coordinator, Environmental Monitors, front line supervisors and Project design/field engineers. The JEA 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, and may prompt a revision to this EPP.

Weekly Environmental Meetings

Weekly environmental meetings are to be held with the GBS and Topsides Environment (and Regulatory) Coordinators, Environmental Monitors, construction foreman and supervisors to review any environmental issues and/or EPP implementation items. These meetings serve to anticipate and resolve environmental 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 EMCP Environmental Monitors informed of upcoming work activities.

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. Discussion involves the work task assignment for the day and any associated safety or environmental concerns or hazards. These meetings also provide the opportunity to discuss environmental concerns and applicable mitigation measures that apply.

Employee Orientation and Training

As part of the Hebron Project orientation program an environmental site orientation will be presented to all people that arrive at the Project site. New workers at the Project site are presented with general information, rules and procedures to assist them in performing their work safely and with minimal impact on the environment. This site orientation will include 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.

EPP Monitoring

Compliance monitoring is an essential component of the Project site activities. This monitoring occurs on an on-going basis by representatives of the Project Environment and Regulatory Management Team and construction

contractors. Every aspect of the operation is subject to inspection by Environmental Monitors.

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 Environment (and Regulatory) Coordinator. Corrective action 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 Environment and Regulatory 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 Environment and Regulatory 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.

1.7.2 EPP Maintenance

Responsibilities (staff and departmental)

Site Personnel:

- Familiarize themselves with this EPP; and
- Have knowledge of its spill reporting procedures.

EPP Holders:

- Keep copies of this EPP up-to-date by ensuring all revisions are entered on the document's Revision Control Record (provided in Appendix 1B);
- Familiarize themselves and their personnel with this EPP, including all revisions; and
- Initiate changes to improve and update the plan by submitting Revision Request Initiation Forms (RRIF's, provided in 1C) to the EPP Document Control Coordinator.

EPP Document Control Coordinator:

- Manages Document Control System for the EPP;
- Receives RRIF's;
- Forwards RRIF's to the EMCP Environmental and Regulatory Advisor for screening and approval;

- Revises the EPP following receipt of approved RRIF's; and
- Distributes approved revisions to EPP Holders.

EMCP Environmental and Regulatory Advisor:

- Reviews and screens RRIF's;
- Submits screened RRIF's to the EMCP Environment and Regulatory Manager, GBS and Topsides Project Managers;
- Approves RRIF's in consultation with the EMCP Environment and Regulatory Manager, GBS and Topsides Project Managers;
- Forwards approved RRIF's to the EPP Document Control Coordinator;
- Conducts a review of the EPP on an as-needed basis; and
- Determines if EPP Holders and their staff are familiar with the EPP and its procedures.

Initiating Revisions of the EPP

This EPP is a controlled document and revisions may only be processed by the EPP Document Control Coordinator in EMCP's Project Office. It is anticipated that most of the revisions to this EPP will be initiated by the Environmental Team at the site 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 and readers/reviewers may request revisions by forwarding a completed RRIF to the EPP Document Control Coordinator. These RRIF's will be screened and reviewed. Requests that have been approved by senior members of the Environmental Team will be sent to the EPP Document Control Coordinator for processing and distribution to EPP Holders.

EPP Revision Procedures

The EMCP Environmental and Regulatory Advisor 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 Control Sheet that:

- Provides revision instructions; and
- Lists the sections being superseded

An updated EPP Table of Contents will be included with each revision. A revision number and revision date will be added to each revised page. Within two working days of receiving a revision, EPP Holders shall:

- Read the text of the revision;
- Check the Revision Control Sheet 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 Control Record
- Incorporate the revision into the area of responsibility, as appropriate;
- Ensure that their personnel are familiar with the revisions; and
- Acknowledge receipt of revisions by forwarding a signed and dated acknowledgement form to the EPP Document Control Coordinator.

Appendix 1A
Job Environmental Analysis

(Note: In Preparation)

Appendix 1B
Revision Request Initiation Form

(Note: In Preparation)

Appendix 1C
Revision Request Initiation Form

(Note: In Preparation)

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Appendices

2 BIOPHYSICAL ENVIRONMENT

2.1 Purpose

The Biophysical Environment chapter of the Bull Arm site EPP outlines environmental protection procedures and contingency plans which are intended to avoid, minimize and mitigate potential negative effects on the airshed, terrestrial, freshwater and marine environment around the Bull Arm site throughout construction activities associated with the Hebron Project.

2.2 Scope

The Biophysical Environment chapter of the EPP provides details of the environmental protection procedures and contingency plans to be used at the Bull Arm site during construction, at all onshore and marine areas of the site. Activities during construction are described in detail in Chapter One (Section 1.6.3).

Section 8 of this chapter discusses the major site activities that are anticipated , the associated specific needs for environmental protection and introduces a number of mitigation measures, with web links to applicable provincial and federal regulations, policy, guidelines, fact sheets and operational statements. Section 9 contains Contingency Plans for accidental and unplanned events that may affect or be associated with Project activities at the Bull Arm site.

2.3 Objectives

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

2.4 Abbreviations

Abbreviation	Term
ACA	Ammonical Copper Arsenate
ACQ	Amine
ATVs	all-terrain vehicles
CASS^{TM}	Activated Sludge System
CCG	Canadian Coast Guard

Abbreviation	Term
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act
CEPA	Canadian Environmental Protection Act
C-NLOPB	The Canada-Newfoundland and Labrador Offshore Petroleum Board
COSEWIC's	Committee on the Status of Endangered Wildlife in Canada
CSR	Comprehensive Study Report
CSZ	Construction Safety Zones
dB	Decibel
dbh	Diameter breast height
DFO	Fisheries and Oceans Canada
NLE&C	Newfoundland and Labrador Department of Environment and Conservation
ECM	Environmental compliance monitoring
EEM	Environmental Effects Monitoring
EH&S	Environment, Health & Safety
EIS	Environmental Impact Statement
EMCP	ExxonMobil Canada Properties
EPC	Engineering, Procurement and Construction
EPP	Environmental Protection Plan
ERP	Emergency Response Plan
FEED	Front End Engineering and Design
FLO	Fisheries Liaison Officer
GBS	Gravity Base Structure
GHG	Greenhouse Gas
GSC	Government Service Centre
JEA	Job Environmental Analysis
KAC	KIEWIT-AKER Contractors – GBS Contractors
km	Kilometre
kPa	Kilopascal
kV	Kilovolts
m	Metre
m^2	Square metre
MCC	Motor Control Centre
MEG	Monoethylene Glycol
mg/L	milligrams per litre
MODUs	Mobile Offshore Drilling Units
MOF	Mechanical Outfitting Facility
MSDS	Material Safety Data Sheets

Abbreviation	Term
NAFO	Northwest Atlantic Fisheries Organization
NORM	Naturally-Occurring Radioactive Material
OIMS	Operations Integrity Management System
OLS	Offshore Loading System
OWTG	Offshore Waste Treatment Guidelines
PCP	Pentachlorophenol
rms	root mean square
ROV	Remotely-Operated Vehicle
RRIF's	Revision Request Initiation Forms
SAR	Species at Risk
SARA	Species at Risk Act
SBR	Sequencing Batch Reactor
SEIS	Socio-Economic Impact Statement
SSH&E	Safety, Security, Health, & Environment
TCH	Trans Canada Highway
µ eq/L	Microequivalents per Liter
UPM	Utilities and Process Module
UV	Ultra Violet
VECs	Valued Ecosystem Components
WHMIS	Workplace Hazardous Materials Information System
µPa	Micropascal

2.5 References

Document Number	Title
EMCP, 2010a	The Hebron Project Comprehensive Study Report (CSR), June 2010
GD-PPD-026-1	*Leachable Toxic Waste, Testing and Disposal*, policy of the NLE&C Pollution Prevention Division
GDPPD-028-1	*Guidance Documents Dredge Spoils Disposal*, policy of the NLE&C Pollution Prevention Division
NS-G-O-P-A00-PH-00-020- DO	Hibernia Development Project Gravity Base Structure Environmental Protection Plan
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 opposite shore of Bull Arm. (Figure 2-1).The site has a 10 km paved internal roadway connected to the TCH; electrical power distribution system connected to the island grid; communications systems; on-site water supply, treatment, and distribution system for potable water, firefighting water, and industrial water; and a stand alone sanitary waste collection and treatment system. The facility is comprised of three major fabrication areas and a camp area capable of being re-established for a large construction workforce. The main site areas are as follows:

Dry Dock Site: This has 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 fabrication, assembly and load-out of the completed topsides platform.

Deepwater Site: This site is located in Bull Arm with a water depth of 180 m; there are six onshore mooring points. It is supported out of both Great Mosquito Cove and Back Cove. Back Cove is comprised of an industrial area with1, 200 m^2 of shop space and a passenger ferry dock.

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 shown in Figure 2-1 still exist. Site wide utilities and/or infrastructure exist (in various states of repair) throughout the Bull Arm facility.

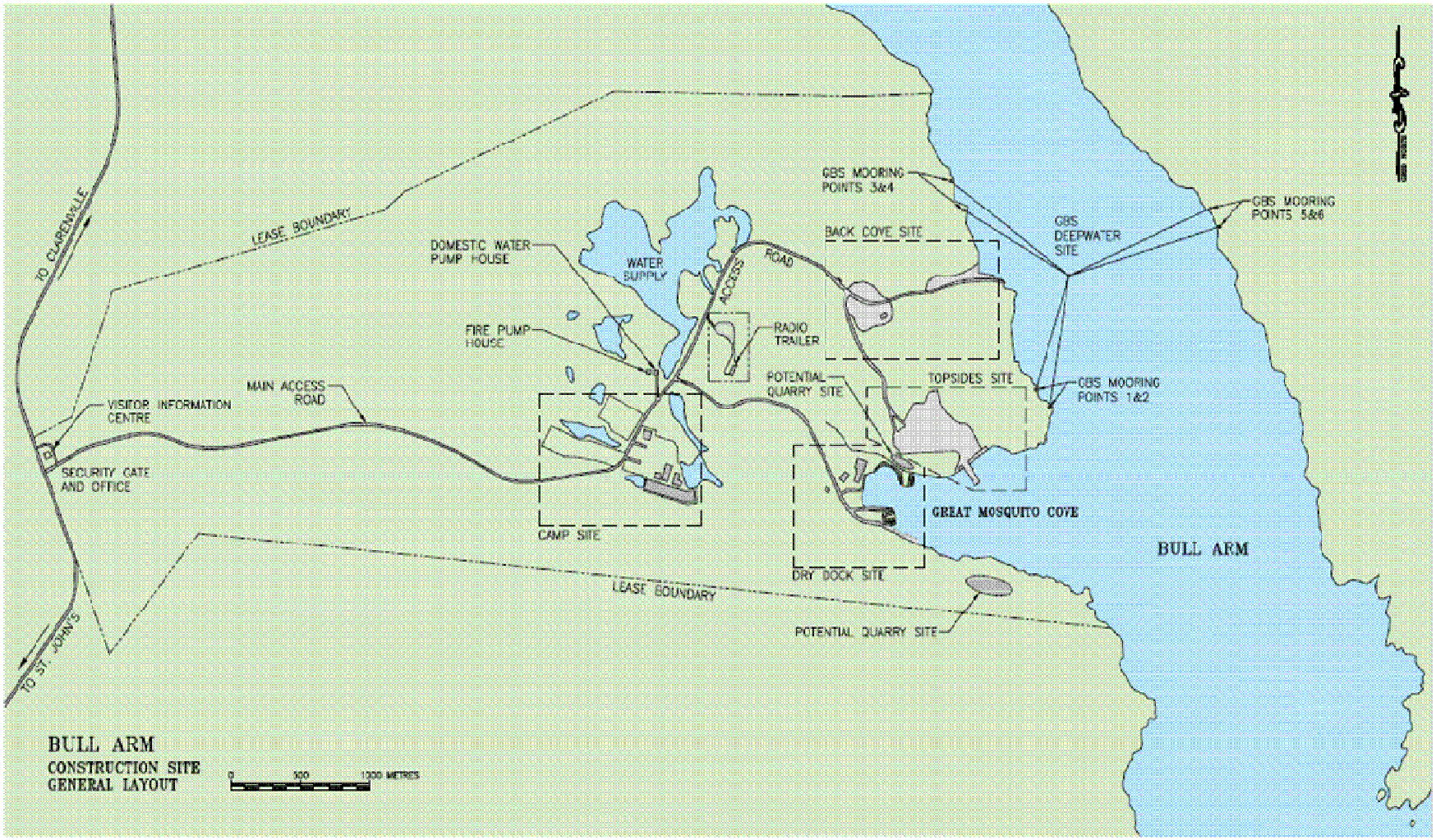

Figure 2 - 1: Existing Bull Arm site

2.6.2 Project Activities

Early works activities (e.g., re-establishment of bund wall, dry dock construction, blasting/dredging) are scheduled to commence in the second quarter of 2011. The construction of the GBS is scheduled to begin in the dry dock in the second quarter of 2012.

Topsides fabrication is expected to take approximately 30 months at a number of different fabrication facilities, with assembly and integration of all modules accomplished on the Topsides pier in Bull Arm. hook-up and commissioning is scheduled to begin during the fourth quarter of 2014.

Platform Tow-out to the offshore location is expected during the second quarter of 2016.

Detailed description of the Project activities planned for the Bull Arm site is provided in Chapter One, Section1.6.3.

2.7 Organization and Responsibilities

The EMCP Senior Project Manager is responsible for providing overall direction for the Project and its environmental management system, including the Bull Arm site EPP. The EMCP Environment and Regulatory Manager reports to the Senior Project Manager and is responsible for directing the EPP.

At the Bull Arm site, the Project Environment and Regulatory Team will obtain and execute permits and approvals, conduct compliance monitoring, provide site Environmental Monitors 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 One, Section 1.7.

2.8 Environmental Protection Procedures

This section comprises the core of the EPP (Biophysical), and provides practical, specific guidance for standard 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 will focus on refurbishing the Bull Arm facility to enable it to be used during the Hebron Fabrication period (3 to 4 years).

Refer to Section 1.6.3.5.1 of this EPP for potential activities associated with the refurbishment of infrastructure and facilities.

Environmental Protection Procedures

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: Relevant Environmental Protection Procedures – Refurbishment of Infrastructure and Facilities

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	•
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	Groundwater Development and Use	
2A.13	Concrete Production	
2A.14	Linear Developments	
2A.15	Vehicular Traffic	•
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	•
2A.18	Surveying	
2A.19	Equipment Operations	•
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Clean-up and Rehabilitation – On-Shore	•
2A.23	Site Clean-up and Rehabilitation – Deep Water Site	
2A.24	Fish Relocation during Dry Dock De-Watering	
2A.25	Sensitive or 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 Procedures identified above, specific conditions of all government permits, approvals, and authorizations shall be strictly adhered to. Refer to specific permits, approvals and authorizations.

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 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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5714
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5715
Water Resources Division	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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5716
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5717
Department of Natural Resources					
Forestry Resources Branch	Commercial Cutting/ Operating Permit	http://www.nr.gov.nl.ca/forestry/permits/licence.stm	Site Clearing and Construction Activities	Forestry Act; Cutting of Timber Regulations	Clarenville (District 2, 3) 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	Clarenville (District 2, 3) 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	Clarenville (District 2, 3) Forest Resources 97 Manitoba Drive, Suite 206 Clarenville, NL A5A 1K3 Tel: (709) 466-7439

Department of Government Services					
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	Building Accessibility Exemption	http://www.gs.gov.nl.ca/licenses/index.html	All Building on Site	Building Accessibility Acts and Regulations	Clarenville 8A Myers Avenue (709) 466-4060 (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	Martha Drake Provincial Archaeologist 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: mdrake@gov.nl.ca
Tourism, Culture and Recreation	Archaeological Investigation Permit	http://www.tcr.gov.nl.ca/tcr/pao/index.html		Historical Resources Act	Martha Drake Provincial Archaeologist 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: mdrake@gov.nl.ca

2.8.1.2 Dry Dock Re-establishment

A temporary dry dock will be re-established in Great Mosquito Cove, at the Bull Arm site. A bund wall will be constructed consisting of a sheet pile or some other impermeable material for a cut-off wall in the centre of a rock-fill dyke (or bund wall) across the cove to form the wall of the basin. It will be protected on the outside faces by a layer of larger rock. The source of quarried material has not yet been identified; however, it may be located at the Bull Arm facility on the north or south sides of Great Mosquito Cove, as shown on Figure 2-1.

Once the bund wall is in place, the dry dock will be de-watered, access roads rebuilt or replaced, and the construction support infrastructure (offices, cranes, laydown areas, etc.) put in place.

Potential activities associated with re-establishing the dry dock are as follows:

- Bund wall construction;
- Quarrying;
- In-water blasting;
- Dredging;
- Ocean disposal of dredged material;
- Dewater dry dock /prepare dry dock area;
- Concrete production (floating batch plant);
- Vessel traffic;
- Lighting;
- Air Emissions;
- Safety zone; and
- Surveys (e.g. geophysical, geological, geotechnical, environmental, Remotely Operated Vehicle (ROV), diving, etc.)

Environmental Concerns

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

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

- Elevated suspended solids;
- Substrate disturbance;
- Loss of subtidal habitat and organisms;
- Potential localized water column contamination;
- Sedimentation;
- Waste disposal;
- Lights;
- Noise (including underwater); and
- Potential physical impacts (e.g. blasting).

Environmental Protection Procedures

Standard Mitigation Measures

Standard Mitigation Measures relevant to the re-establishment of the dry dock are listed in Table 1.3, and presented in Appendix 2A.

Table 2-3: Relevant Environmental Protection Procedures – Dry Dock Construction

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	•
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	Groundwater Development and Use	
2A.13	Concrete Production	•
2A.14	Linear Developments	
2A.15	Vehicular Traffic	•
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	
2A.18	Surveying	

Appendix	Standard Mitigation Measures	Relevance
2A.19	Equipment Operations	•
2A.20	Precasting	•
2A.21	Species at Risk	•
2A.22	Site Clean-up and Rehabilitation – On-Shore	
2A.23	Site Clean-up and Rehabilitation – Deep Water Site	
2A.24	Fish Relocation during Dry Dock De-Watering	•
2A.25	Sensitive or 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 and dredging of the tow-out channel the following mitigation measures shall be implemented:

- Investigate the use of washed rock or in-water sediment control measures for marine infill material to be used to construct the bund wall;
- Chemistry of rock and till material will be tested prior to placement for construction of the bund wall;
- Investigate techniques to reduce sedimentation during dredging operations;
- Minimal movement of barge anchors to reduce re-suspension of sediments;
- Releasing water for hydrostatic testing shall only be permitted when it meets criteria set out in the Fisheries Act (http://laws.justice.gc.ca/eng/F-14/index.html), the Canadian Environmental Protection Act (CEPA) (http://laws.justice.gc.ca/eng/C-15.31/index.html) and the Newfoundland and Labrador Environmental Water and Sewer Regulations, 2003 (http://assembly.nl.ca/Legislation/sr/regulations/rc030065.htm), whichever is the most stringent;
- 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;
- Use of settlement basins and/or containment areas for concrete washwater;

- Use of best practices, continuous improvement programs and best available technology.

In addition to the Environmental Protection Procedures listed above, requirements listed in specific Government permits, approvals and authorizations shall be respected. Refer to specific permits, approvals and authorizations.

Permits and Authorizations

Table 2-4 is a summary of the various permits and authorizations that pertain to the construction of Dry Dock construction.

Table 2-4: Permits, Authorizations and Approvals for Dry Dock 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					
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
Department of Government Services					
Government Services, Lands Division	Certificate of Approval for Waste Management System	http://www.gs.gov.nl.ca/licenses/index.html	Bund Wall Construction and Water Works - Rock Disposal Areas	Environmental Protection Act, 2006	Clarenville 8A Myers Avenue (709) 466-4060 (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	Martha Drake Provincial Archaeologist 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: mdrake@gov.nl.ca
Tourism, Culture and Recreation	Archaeological Investigation Permit	http://www.tcr.gov.nl.ca/tcr/pao/index.html		Historical Resources Act	Martha Drake Provincial Archaeologist 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: mdrake@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 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

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
Transport Canada	Marine Navigation Permits	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
Transport Canada	Marine Traffic Control Authorization	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
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 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

Fisheries and Oceans Canada (DFO)					
Marine Environment and Habitat Management Division	Authorization for Harmful Alteration, Disruption or Destruction (HADD) of Aquatic Habitat	http://www.nfl.dfo-mpo.gc.ca/e0005354	Marine - Wharf and Jetty construction and marine infilling. Freshwater - any in-stream or pond work that will impact fish habitat.	Fisheries Act, Section 35(2)	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Letter of Advice	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Project Referral	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca

DFO	Experimental Fishing Licence	http://www.nfl.dfo-mpo.gc.ca/e0005354	Dry Dock Dewatering	The Fisheries Regulations, Section 52	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
DFO	Release or Transfer of Fish	http://www.nfl.dfo-mpo.gc.ca/e0005354	Dry Dock Dewatering	The Fisheries Regulations, Section 56	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Environment Canada					
Environment Canada	Ocean Dumping Permit for Dredge Spoils	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)	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	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 will include provision of site wide services, such as snow clearing; potable water, fire water, and process water; sewage collection and treatment; accommodations and meals; electrical power; telecommunications; facilities management; security and health services.

Environmental Concerns

The principal environmental concerns associated with site operations are the release of fines into bodies of water, handling and removal of wastes, sewage treatment, effluent discharge, freshwater use, and storm water management.

Environmental Protection Procedures

Standard Mitigation Measures

Standard Mitigation Measures relevant to site operations are listed in Table .2-5, and presented in Appendix 2A.

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

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	•
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	Groundwater Development and Use	
2A.13	Concrete Production	
2A.14	Linear Developments	•
2A.15	Vehicular Traffic	•
2A.16	Works in/around Marine Environment	
2A.17	Construction Camp	•
2A.18	Surveying	

Appendix	Standard Mitigation Measures	Relevance
2A.19	Equipment Operations	•
2A.20	Precasting	
2A.21	Species at Risk	
2A.22	Site Clean-up and Rehabilitation – On-Shore	
2A.23	Site Clean-up and Rehabilitation – Deep Water Site	
2A.24	Fish Relocation during Dry Dock De-Watering	
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 Procedures listed above, the following shall be required during site operations:

- Requirements listed in specific Government permits, approvals and authorizations shall be respected. Refer to specific permits, approvals and authorizations;
- Effluent shall be regularly monitored for the constituents in sections 5 and 6 and Schedules A of the Environmental Control Water and Sewage Regulations, 2003 under the Water Resources Act.
- Potable water shall be regularly monitored as per the Canadian Drinking Water Quality Guidelines.

Permits and Authorizations

Table 2-6 is a summary of the various permits and authorizations that pertain to the construction of site operations.

Table 2-6: Permits, Authorizations and Approvals for Site Operations

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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5717
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5717
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5717
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5717
Water Resources Division	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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5717
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	Water Resources Act, SNL 2002 cW-4.01, Section 58	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5717
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

Department of Natural Resources					
Mines and Energy Branch	Magazine Licence	http://www.nr.gov.nl.ca/mines&en/permits/		Explosives Act	Department of Natural Resources Natural Resources Building 50 Elizabeth Avenue St. John's, NL A1A 1W5
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 St. John's, NL A1A 1W5
Department of Government Services					
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	Certificate of Approval – Storage and Handling of Gasoline and associated products.	http://www.gs.gov.nl.ca/licenses/index.html		Environmental Protection Act	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	Mobile Fuel Storage Tank Relocation	http://www.gs.gov.nl.ca/licenses/index.html	Relocation of tanks at site		Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	Building Accessibility Exemption	http://www.gs.gov.nl.ca/licenses/index.html	All Building on Site	Building Accessibility Acts and Regulations	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070

Government Services	Certificate of Plant Registration for Power, Heat, Refrigeration, Compressed Gas or Combined Plant	http://www.gs.gov.nl.ca/licenses/index.html			Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services, Lands Division	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services, Lands Division	Highway Access Permit	http://www.gs.gov.nl.ca/licenses/index.html	Changes to highway assess/entrance	Urban and Rural Planning Act, 2000	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services, Lands Division	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services, Lands Division	Certificate of Approval for a Waste Management System	http://www.gs.gov.nl.ca/licenses/index.html	Early Works	Environmental Protection Act, 2006	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Department of Transportation and Works					
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 Prince Philip Drive Confederation Building
Department of Human Resources Labour and Employment					
Human Resources Labour and Employment	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	15 Dundee Avenue Mount Pearl, NL A1N 4R6 Tel: (709) 729-2706 Fax: (709) 729-3445
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	Martha Drake Provincial Archaeologist 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: mdrake@gov.nl.ca
Tourism, Culture and Recreation	Archaeological Investigation Permit	http://www.tcr.gov.nl.ca/tcr/pao/index.html		Historical Resources Act	Martha Drake Provincial Archaeologist 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: mdrake@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	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	Transportation of Dangerous Goods Act	Atlantic 1-866-814-1477
Transport Canada	Letter of Assessment for Stream Crossings (NWPA)	http://www.tc.gc.ca/eng/marinesafety/oep-nwpp-guide-2053.htm	(any stream crossings)	Navigable Waters Protection Act	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
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 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
Fisheries and Oceans Canada (DFO)					
Marine Environment and Habitat Management Division	Letter of Advice	http://www.dfo-mpo.gc.ca/habitat/habitat-eng.htm	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca

Marine Environment and Habitat Management Division	Project Referral	http://www.dfo-mpo.gc.ca/habitat/habitat-eng.htm	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@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	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.		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	6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097
Industry Canada					
Industry Canada	Communications Licence	http://www.ic.gc.ca/eic/site/sd-preprod.nsf/eng/h_00023.html	General		Industry Canada 10th Floor John Cabot Building 10 Barter's Hill P.O. Box 8950 St. John's, NL, A1B 3R9 Telephone: 709-772-4866 Fax: 709-772-5093
Industry Canada	Radio Station Licence	http://www.ic.gc.ca/eic/site/sd-preprod.nsf/eng/h_00023.html	Use of radios on site		Industry Canada 10th Floor John Cabot Building 10 Barter's Hill P.O. Box 8950 St. John's, NL, A1B 3R9 Telephone: 709-772-4866 Fax: 709-772-5093

2.8.3 GBS Construction at Dry Dock Site

Once construction of the base slab is complete the reinforced concrete walls above the base slab will be 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.

Potential activities associated with GBS construction at the dry dock are as follows:

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

Environmental Concerns

The principal environmental concerns associated with GBS construction at dry dock will be:

- The release of fines, fuels, hazardous materials, and other deleterious substances into the near shore and marine environment;
- Air emissions.

Environmental Protection Procedures

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: Relevant Environmental Protection Procedures – GBS Construction at Dry Dock

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	
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	Groundwater Development and Use	
2A.13	Concrete Production	•
2A.14	Linear Developments	
2A.15	Vehicular Traffic	•
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	
2A.18	Surveying	
2A.19	Equipment Operations	•
2A.20	Precasting	•
2A.21	Species at Risk	
2A.22	Site Clean-up and Rehabilitation – On-Shore	•
2A.23	Site Clean-up and Rehabilitation – Deep Water Site	
2A.24	Fish Relocation during Dry Dock De-Watering	
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 Procedures identified above, specific conditions of all government permits, approvals, and authorizations shall be strictly adhered to. Refer to specific permits, approvals and authorizations.

Permits and Authorizations

Table 2-8 is a summary of the various permits and authorizations that pertain to the GBS construction at the dry dock.

Table 2-8: Permits, Authorizations and Approvals for GBS Construction at 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 Government Services					
Government Services	Certificate of Approval – Storage and Handling of Gasoline and associated products.	http://www.gs.gov.nl.ca/licenses/index.html		Environmental Protection Act	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	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	Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	Mobile Fuel Storage Tank Relocation	http://www.gs.gov.nl.ca/licenses/index.html	Relocation of tanks at site		Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Government Services	Certificate of Plant Registration for Power, Heat, Refrigeration, Compressed Gas or Combined Plant	http://www.gs.gov.nl.ca/licenses/index.html			Clarenville 8A Myers Avenue (709) 466-4060 (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	Atlantic 1-866-814-1477
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	Transportation of Dangerous Goods Act	Atlantic 1-866-814-1477
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 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
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	6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097

2.8.4 Topsides Fabrication and Assembly

The Topsides design is based on the concept of an integrated deck, Utilities and Process Module (UPM). The UPM will contain the processing and utilities systems, switchgear, instrument rooms, workshops, etc. This module will be transported to the site by a special marine vessel and offloaded onto the Topsides Integration Pier, where remaining Topsides modules will be assembled and integrated with it.

One or more selected modules will be fabricated at the Topsides site; the remaining will be fabricated at locations other than the Bull Arm facility. It is anticipated that individual modules will have considerable commissioning accomplished prior to integration.

Modules that have been fabricated off-site will be shipped to the Bull Arm facility by marine vessel and offloaded onto the Topsides Assembly Pier for "dry" integration with other modules.

Environmental Concerns

The principal environmental concerns associated with Topsides fabrication and assembly will be:

- The release of fines, fuels, hazardous materials, and other deleterious substances into the near shore and marine environment;
- Air emissions

Environmental Protection Procedures

Standard Mitigation Measures

Standard Mitigation Measures relevant to the Topsides fabrication and assembly are listed in Table 2-9, and presented in Appendix 2A.

Table 2-9: Relevant Environmental Protection Procedures – Topsides Fabrication and Assembly

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

Appendix	Standard Mitigation Measures	Relevance
2A.9	Pumps and Generators	•
2A.10	Noise Control	•
2A.11	Blasting	
2A.12	Groundwater Development and Use	
2A.13	Concrete Production	
2A.14	Linear Developments	
2A.15	Vehicular Traffic	•
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	
2A.18	Surveying	
2A.19	Equipment Operations	•
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Clean-up and Rehabilitation – On-Shore	
2A.23	Site Clean-up and Rehabilitation – Deep Water Site	
2A.24	Fish Relocation during Dry Dock De-Watering	
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 Procedures identified above, specific conditions of all government permits, approvals, and authorizations shall be strictly adhered to. Refer to specific permits, approvals and authorizations.

Permits and Authorizations

Table 2-10 is a summary of the various permits and authorizations that pertain to the Topsides fabrication and assembly.

Table 2-10: Permits, Authorizations and Approvals for – Topsides Fabrication and Assembly

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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
Department of Government Services					
Government Services	Compliance Standards – National Fire Code, National Building Code and Life Safety Code	http://www.gs.gov.nl.ca/licenses/building/index.html	All Buildings on Site.	Building Accessibility Acts and Regulations	Government Services P.O. Box 8700 St. John's, NL A1B 4J6 Telephone: 1-709-729-4834 Email: gsinfo@gov.nl.ca
Government Services	Building Accessibility Exemption	http://www.gs.gov.nl.ca/licenses/building/index.html	All Building on Site	Building Accessibility Acts and Regulations	Government Services P.O. Box 8700 St. John's, NL A1B 4J6 Telephone: 1-709-729-4834 Email: gsinfo@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	Atlantic 1-866-814-1477
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	Transportation of Dangerous Goods Act	Atlantic 1-866-814-1477
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		Clarenville 8A Myers Avenue (709) 466-4060 (709) 466-4070
Transport Canada	Navigable Waters Protection Act (NWPA)	http://www.tc.gc.ca/eng/marinesafety/debs-arctic acts-regulations-nwpa-1308.htm	For Construction within Navigable Waters		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

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
Fisheries and Oceans Canada (DFO)					
Marine Environment and Habitat Management Division	Letter of Advice	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Project Referral	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca

2.8.5 Marine Activities

2.8.5.1 Bund Wall Removal, Dredging, and Ocean Disposal

Once the base slab, cantilever and lower portions of the walls of the GBS are completed, the casting basin will be cleared of infrastructure and filled with seawater to the level of Great Mosquito Cove. Removal of the bund wall will include sheet pile removal and dredging (likely by clamshell dredge or dragline) to allow passage of the GBS out of the basin to the deep water site, where it will be moored to allow construction to continue. Disposal of the excavated material at approved locations will also proceed.

Environmental Concerns

The principal environmental concern associated with bund wall removal, dredging, and ocean disposal will be the release of fines, fuel, and other deleterious substances into the marine environment, with consequential effects on fish and fish habitat. The work may also affect activities of commercial fish harvesters in the area.

Environmental Protection Procedures

Standard Mitigation Measures

Standard Mitigation Measures relevant to bund wall removal, dredging, and ocean disposal are listed in Table 2-11, and presented in Appendix 2A.

Table 2-11: Relevant Environmental Protection Procedures – Bund Wall Removal, Underwater Blasting, Dredging and Ocean Disposal

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	
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	Groundwater Development and Use	
2A.13	Concrete Production	

Appendix	Standard Mitigation Measures	Relevance
2A.14	Linear Developments	
2A.15	Vehicular Traffic	
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	
2A.18	Surveying	
2A.19	Equipment Operations	•
2A.20	Precasting	
2A.21	Species at Risk	•
2A.22	Site Clean-up and Rehabilitation – On-Shore	•
2A.23	Site Clean-up and Rehabilitation – Deep Water Site	
2A.24	Fish Relocation during Dry Dock De-Watering	
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 Procedures identified above, specific conditions of all government permits, approvals, and authorizations shall be followed. Refer to specific permits, approvals and authorizations.

Permits and Authorizations

Table 2-12 is a summary of the various permits and authorizations that pertain to bund wall removal, dredging, and ocean disposal.

Table 2-12: Permits, Authorizations and Approvals for – Bund Wall Removal, Underwater Blasting, 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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
Department of Government Services					
Government Services, Lands Division	Certificate of Approval for Waste Management System	http://www.gs.gov.nl.ca/licenses/index.html	Bund Wall Construction and Water Works - Rock Disposal Areas	Environmental Protection Act, 2006	Clarenville 8A Myers Avenue (709) 466-4060 (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	Atlantic 1-866-814-1477
Department of Human Resources, labour and Employment					
Human Resources, Labour and Employment	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
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

Transport Canada	Marine Navigation Permits	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
Transport Canada	Marine Traffic Control Authorization	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
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 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
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 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

Fisheries and Oceans Canada (DFO)					
Marine Environment and Habitat Management Division	Authorization for Harmful Alteration, Disruption or Destruction (HADD) of Aquatic Habitat	http://www.nfl.dfo-mpo.gc.ca/e0005354	Marine - Wharf and Jetty construction and marine infilling. Freshwater - any in-stream or pond work that will impact fish habitat.	Fisheries Act, Section 35(2)	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Letter of Advice	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Project Referral	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca

DFO	Experimental Fishing Licence	http://www.nfl.dfo-mpo.gc.ca/e0005354	Dry Dock Dewatering	The Fisheries Regulations, Section 52	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
DFO	Release or Transfer of Fish	http://www.nfl.dfo-mpo.gc.ca/e0005354	Dry Dock Dewatering	The Fisheries Regulations, Section 56	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Environment Canada					
Environment Canada	Ocean Dumping Permit for Dredge Spoils	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)	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	6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097

2.8.5.2 Marine Vessel Activity and Deepwater Site Construction

GBS Tow-Out to Deep Water Site

When ”dry” construction of the GBS is completed and the Bund wall has been removed, the GBS will be towed out of the basin to the deep water site, where it will be moored to allow construction to continue.

Deep Water Site Construction

Support and transport barges are required at the floating construction site. One or two barges will be used to locate construction offices, tool cribs and other support buildings. Another barge will carry the floating concrete batch plant. This will be designed to prevent release of untreated washwater and spoiled concrete into the environment. Washwater will be stored and directed to settling basins, where it will be monitored before the clarified water is discharged to the marine environment.

A series of transport barges will be used to ferry cement, aggregate, reinforcing bars, steel embedment, and mechanical outfitting to the deep water site. These barges will be 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 will be used to transfer personnel from shore to the deep water site and back. A floating water supply pipe will be installed to transfer water to the deep water site. An underwater cable will be installed to transmit electrical power and to provide a communications link to shore

Environmental Concerns

The principal environmental concerns associated with marine vessels will be the release of fuel, hazardous materials, and other deleterious substances into the marine environment; air emissions; effects on commercial fish harvesting, and effects on navigable waters.

Environmental Protection Procedures

Standard Mitigation Measures

Standard Mitigation Measures relevant to marine vessel activity are listed in Table 2-13, and presented in Appendix 2A.

Table 2-13: Relevant Environmental Protection Procedures – Marine Vessel Activity

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	•
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	Groundwater Development and Use	
2A.13	Concrete Production	•
2A.14	Linear Developments	
2A.15	Vehicular Traffic	
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	
2A.18	Surveying	
2A.19	Equipment Operations	•
2A.20	Drilling – Exploration	
2A.21	Precasting	
2A.22	Species at Risk	
2A.23	Site Clean-up and Rehabilitation – On-Shore	
2A.24	Site Clean-up and Rehabilitation – Deep Water Site	
2A.25	Fish Relocation during dry dock De-Watering	
2A.26	Sensitive or Special Areas	
2A.27	Pile Driving	
2A.28	Avifauna Management	
2A.29	Water Supply	

Area-Specific Measures

- In addition to the Environmental Protection Procedures identified above, specific conditions of all government permits, approvals, and authorizations shall be followed. Refer to specific permits, approvals and authorizations;

- The Commercial Fisheries EPP shall be implemented for all marine activities.

Permits and Authorizations

Table 2-14 is a summary of the various permits and authorizations that pertain to marine vessel activity.

Table 2-14: Permits, Authorizations and Approvals for – Marine Vessel Activity

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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
Department of Government Services					
Government Services	Certificate of Approval – Storage and Handling of Gasoline and associated products.	http://www.gs.gov.nl.ca/licenses/index.html		Environmental Protection Act	Clarenville 8A Myers Avenue (709) 466-4060 (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	Atlantic 1-866-814-1477
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 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
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 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
Transport Canada	Application for a Water Lease	http://www.tc.gc.ca/eng/marine-menu.htm	Submit application for anchorage within a Canadian Port		Marine Safety 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
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 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
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
Fisheries and Oceans Canada (DFO)					
Marine Environment and Habitat Management Division	Authorization for Harmful Alteration, Disruption or Destruction (HADD) of Aquatic Habitat	http://www.nfl.dfo-mpo.gc.ca/e0005354	Marine - Wharf and Jetty construction and marine infilling. Freshwater - any in-stream or pond work that will impact fish habitat.	Fisheries Act, Section 35(2)	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Letter of Advice	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Project Referral	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca

2.8.5.3 GBS Construction at Deep Water Site

In order to secure the GBS at the deep water site in Bull Arm it is anticipated that existing deepwater moorings will be used and additional moorings may be required. The "wet" GBS construction process will be similar to the slip-forming completed at the dry dock; however, it will require 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 and a concrete roof slab will be built. This will be followed by construction of the central shaft to support the integrated Topsides facility.

A final stage in the "wet" GBS construction phase will be to ballast the completed structure using a combination of solid ballast (likely heavy iron ore) and seawater until the required depth is reached. Solid ballast will be brought to the site on bulk carrier barges. A series of conveyors or a pumping system will then be used to transfer and drop the ballast into the cells. In the storage cells, the material will be levelled 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.

Environmental Concerns

The principal environmental concerns associated with GBS construction at the deep water site will be the release of fuel, hazardous materials, and other deleterious substances into the marine environment; disturbance caused to commercial fish harvesters; air emissions, effects on navigable waters.

Environmental Protection Procedures

Standard Mitigation Measures

Standard Mitigation Measures relevant to GBS construction at the deep water site are concrete production are listed in Table 2-15, and presented in Appendix 2A.

Table 2-15: Relevant Environmental Protection Procedures – GBS Construction at Deep Water Site

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	•
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	Groundwater Development and Use	
2A.13	Concrete Production	•
2A.14	Linear Developments	
2A.15	Vehicular Traffic	
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	
2A.18	Surveying	
2A.19	Equipment Operations	•
2A.20	Drilling – Exploration	
2A.21	Precasting	
2A.22	Species at Risk	•
2A.23	Site Clean-up and Rehabilitation – On-Shore	
2A.24	Site Clean-up and Rehabilitation – Deep Water Site	•
2A.25	Fish Relocation during dry dock De-Watering	
2A.26	Sensitive or Special Areas	•
2A.27	Pile Driving	
2A.28	Avifauna Management	•
2A.29	Water Supply	

Area-Specific Measures

- In addition to the Environmental Protection Procedures identified above, specific conditions of all government permits, approvals, and authorizations shall be followed.
- The Commercial Fisheries EPP shall be followed for all marine activities.

Permits and Authorizations

Table 2-16 is a summary of the various permits and authorizations that pertain to GBS construction at deep water site. Refer to specific permits, approvals and authorizations.

Table 2-16: 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
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Atlantic 1-866-814-1477
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	15 Dundee Avenue Mount Pearl, NL A1N 4R6 Tel: (709) 729-2706 Fax: (709) 729-3445
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	Transportation of Dangerous Goods Act	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 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

Fisheries and Oceans Canada (DFO)					
Marine Environment and Habitat Management Division	Authorization for Harmful Alteration, Disruption or Destruction (HADD) of Aquatic Habitat	http://www.nfl.dfo-mpo.gc.ca/e0005354	Marine - Wharf and Jetty construction and marine infilling. Freshwater - any in-stream or pond work that will impact fish habitat.	Fisheries Act, Section 35(2)	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Letter of Advice	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca

Marine Environment and Habitat Management Division	Project Referral	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@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	6 Bruce Street Mt. Pearl, Newfoundland A1N 4T3 Tel: (709) 772-5488 Fax: (709) 772-5097

2.8.5.4 Topsides Mating and Commissioning

After all fabricated modules have been integrated 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.

Environmental Concerns

The principal environmental concerns associated with topsides mating and commissioning will be the release of fuel, hazardous materials, and other deleterious substances to the marine environment; air emissions; disturbance to commercial fish harvesters; and effects on navigable waters.

Environmental Protection Procedures

Standard Mitigation Measures

Standard Mitigation Measures relevant to topsides mating and commissioning are listed in Table 2-17, and presented in Appendix 2A.

Table 2-17: Relevant Environmental Protection Procedures – Topsides Mating and Commissioning

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	•
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	Groundwater Development and Use	
2A.13	Concrete Production	
2A.14	Linear Developments	•
2A.15	Vehicular Traffic	•
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	

Appendix	Standard Mitigation Measures	Relevance
2A.18	Surveying	
2A.19	Equipment Operations	•
2A.20	Drilling – Exploration	
2A.21	Precasting	
2A.22	Species at Risk	•
2A.23	Site Clean-up and Rehabilitation – On-Shore	
2A.24	Site Clean-up and Rehabilitation – Deep Water Site	•
2A.25	Fish Relocation during dry dock De-Watering	
2A.26	Sensitive or Special Areas	•
2A.27	Pile Driving	
2A.28	Avifauna Management	•
2A.29	Water Supply	

Area-Specific Measures

- In addition to the Environmental Protection Procedures identified above, specific conditions of all government permits, approvals, and authorizations shall be followed.
- The Commercial Fisheries EPP shall be followed for all marine activities.

Permits and Authorizations

Table 2-18 is a summary of the various permits and authorizations that pertain to topsides mating and commissioning. Refer to specific permits, approvals and authorizations.

2.8.6 Site Decommissioning

After the Hebron Platform has been towed away from the deep water site, the Bull Arm facility will be decommissioned. This will involve removal of materials, equipment, and wastes from the site, followed by a thorough environmental site assessment to identify any potential environmental issues that may need to be resolved or corrected.

Environmental Concerns

The principal environmental concerns associated with site decommissioning will be the release of fuel, hazardous materials, and other deleterious substances to the land and marine environments; air emissions; disturbance to commercial fish harvesters; and effects on navigable waters.

Any debris that may have accumulated on the seabed of the deep water site will need to be identified and removed. This work will be done in consultation

with various 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 Procedures

Standard Mitigation Measures

Standard mitigation measures relevant to site decommissioning are listed in Table 2-18, and presented in Appendix 2A.

Table 2-18: Relevant Environmental Protection Procedures – Site Decommissioning

Appendix	Standard Mitigation Measures	Relevance
2A.1	Storage, Handling and Transfer of Fuel and Other Hazardous Materials	•
2A.2	Sewage Treatment and Disposal	•
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	Groundwater Development and Use	
2A.13	Concrete Production	
2A.14	Linear Developments	
2A.15	Vehicular Traffic	•
2A.16	Works in/around Marine Environment	•
2A.17	Construction Camp	
2A.18	Surveying	
2A.19	Equipment Operations	•
2A.20	Drilling – Exploration	•
2A.21	Precasting	
2A.22	Species at Risk	•
2A.23	Site Clean-up and Rehabilitation – On-Shore	•
2A.24	Site Clean-up and Rehabilitation – Deep Water Site	•

Appendix	Standard Mitigation Measures	Relevance
2A.25	Fish Relocation during dry dock De-Watering	
2A.26	Sensitive or Special Areas	
2A.27	Pile Driving	
2A.28	Avifauna Management	•
2A.29	Water Supply	

Area-Specific Measures

- In addition to the Environmental Protection Procedures identified above, specific conditions of all Government permits, approvals, and authorizations shall be followed;
- The Commercial Fisheries EPP shall be followed for all marine activities;
- Coordination with applicable government agencies for cleanup, if required.

Permits and Authorizations

Table 2-19 is a summary of the various permits and authorizations that pertain to topsides mating and commissioning. Refer to specific permits, approvals and authorizations.

Table 2-19: Permits, Authorizations and Approvals for – Topsides Mating and Commissioning

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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
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	Clyde McLean DOEC, Water Resources Management Division ClydeMcLean@gov.nl.ca (709) 729-5713
Transport Canada					
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 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
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 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
Transport Canada	Application for a Water Lease		Submit application for anchorage within a Canadian Port		Marine Safety 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
Transport Canada	Vessel Safety Inspection Certificate	http://www.tc.gc.ca/eng/marine-menu.htm	Inspection of foreign vessels, tugs and barges must be done before they can work in Canadian Waters		Marine Safety 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
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 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

Transport Canada	Hull, Barge Inspections	http://www.tc.gc.ca/eng/marinesafety/menu.htm	Float Out		Marine Safety 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
Transport Canada	Marine Vessel Classifications Approval	http://www.tc.gc.ca/eng/marine-menu.htm	Float Out		Marine Safety 8 Myer Avenue P.O. Box 368 Clarenville, NL, A0E 1J0 Telephone: 709-466-4515
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
Customs and Revenue	Marine Equipment Inportation Approvals	http://www.tc.gc.ca/eng/marine-menu.htm	Float Out		1-800-461-9999
Fisheries and Oceans Canada (DFO)					
Marine Environment and Habitat Management Division	Authorization for Harmful Alteration, Disruption or Destruction (HADD) of Aquatic Habitat	http://www.nfl.dfo-mpo.gc.ca/e0005354	Marine - Wharf and Jetty construction and marine infilling. Freshwater - any in-stream or pond work that will impact fish habitat.	Fisheries Act, Section 35(2)	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca
Marine Environment and Habitat Management Division	Letter of Advice	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca

Marine Environment and Habitat Management Division	Project Referral	http://www.nfl.dfo-mpo.gc.ca/e0005354	All works affecting fish habitat, i.e., stream crossings, wharf etc.	Fisheries Act	St. John's Office Division Manager Marine Environment and Habitat Management Division 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: Habitat-NFL@dfo-mpo.gc.ca Submitting Proposals / Referrals for Review: XNFLHES@dfo-mpo.gc.ca

2.9 CONTINGENCY PLANS

Contingency plans are being developed for the Bull Arm facility to deal with accidents and unplanned situations. 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 being incorporated into operation of the Bull Arm site during Hebron 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 procedures, 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;
- Pollution of watercourses;
- 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 defence against the possibility of accidental events.

2.9.1 Fuel and Hazardous Material Spills on Land

Environmental Concerns

The 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 (i.e. concrete additives, hydraulic fluids, lubricating oil, solvents, and anti-freeze) are used in relatively small quantities. Storage and transfer is usually limited to double-walled tanks, or 205 litre or smaller containers, 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 Procedures

Personnel Training

All workers employed by contractors and subcontractors shall be required to attend an employee environmental orientation session prior to, or shortly after, commencing work on the Project. All personnel shall be made aware of the WHMIS Regulations and the enactment of these on the Bull Arm site.

Supervisory staff members, including the members of the Project Environment and Regulatory Team, shall be trained as "On-Scene-Commanders" for the purposes of cleaning up a fuel or hazardous materials spill. 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.

A Spill Response Team shall be trained to carry out actual deployment and operation of spill equipment. Practice drills (deployment and communications exercises) shall be conducted to maintain a state of readiness for an emergency.

As appropriate, workers shall be trained and/or certified under the *Transportation of Dangerous Goods Act*.

Prevention

All personnel and supervisors shall conduct daily inspections of equipment such as hoses, safety equipment and containment reservoirs (i.e. tanks, drums, vessels, etc). 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 contractors immediately.

Response

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

1. The individual who discovers the leak or spill shall notify his immediate supervisor and/or an Environmental Monitor and provide as much information as possible. The individual shall make a reasonable attempt to immediately stop the leakage and contain the flow without compromising his/her health and safety or that of others.
2. 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 GBS Environmental Coordinator who shall **immediately** call **911** (the Communications Centre) to report this information. The Coordinator will also immediately inform the on-site EMCP Environment and Regulatory Advisor.

3. Any spill or leak of fuel or hazardous materials in the marine environment or on land shall then be immediately reported to the EMCP Environment and Regulatory Advisor and GBS/Topsides Environment Coordinator. Any spill in-water, and spills greater than 70 L on land, or any amount on land that can enter water frequented by fish shall be reported to the **Canadian Coast Guard** by calling the spill reporting number **(709) 772-2083** or **(800) 563-9089**. 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;
   - Time of spill or leak;
   - 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 - 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, terrain, and soil conditions.

4. The GBS Environment Coordinator or Topsides Environment and Regulatory Coordinator shall proceed to the spill location and will either assume the role of “On-Scene Commander” or coordinate with the On-Scene Commander in place. He/she will assess the situation and direct the cleanup in coordination with the On-Scene Commander as appropriate.
5. The Spill Response Team will be called into action by the On-Scene Commander if he/she deems it necessary.

6. The On-Scene Commander and the GBS Environment Coordinator or Topsides Environment and Regulatory Coordinator (or authorized designate), in consultation with regulatory authorities, shall:
   - Assemble at the spill equipment containers location or as directed by the On-Scene Commander;
   - The On-Scene Commander will brief the Response Team on the spill situation;
   - Assess site conditions and environmental impact of various cleanup procedures;
   - Assess potential for fuel recovery versus burning;
   - All members shall be provided with personal protective equipment (EPP) i.e. life vests, rubber gloves, boots, as appropriate;
   - 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;
   - All contaminated soil in the area will be removed and replaced if appropriate;
   - Deploy on-site personnel to mobilize pumps and empty drums or other appropriate storage to the spill site;
   - 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 in an approved landfill site;
   - The boundaries of the spill area will be marked for future monitoring and clean-up if needed; and
   - Take all necessary precautions to ensure that the incident does not re-occur.

7. Following the spill incident and response, the EMCP Environment and Regulatory Advisor shall be responsible for preparing a written report which shall be sent (as soon as possible and no later than 30 days after the spill) to the GBS and Topsides Environmental Managers/Coordinator and to:

Government Service Centre
Department of Government Services and Lands
2 Masonic Terrace
Clarenville, NL, A5A 1N2

and

Environment Canada, Emergency Response Coordinator,
P.O. Box 5037, St. John's, NL, AIC 5V3

Reports must also be distributed to the EMCP Environmental Monitors.

Resource List

Oil spill equipment shall be maintained on-site at Great Mosquito Cove in a storage facility. Type and quantities of equipment will be determined based on the volume of oil at the site and recommendations from Canadian Coast Guard personnel.

2.9.2 Fuel and Hazardous Material Spills in the Marine Environment

Environmental concern

Fuel and hazardous materials spills in the marine environment may occur during all Project phases at the Bull Arm site. Such spills may occur as part of dredging activity, dry construction of the GBS, Topsides fabrication and integration, GBS and Topsides tow-out to the deep water site, and all activities at the deep water site.

A fuel or hazardous materials spill or accidental release into the marine environment is of great concern because it can negatively impair 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 commercial fisheries.

Environmental Protection Procedures

Personnel Training

All personnel handling fuel and other hazardous materials shall be trained as described in Section 2.9.1. 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 *Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals* (http://laws.justice.gc.ca/eng/SOR-2007-86/index.html) under the *Canada Shipping Act.*

Prevention

The following routine prevention procedures will 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 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; and
- 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.

Response Action

All fuel transfer operations between ship and shore or between ships is to be in accordance with the *Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals* under the *Canada Shipping Act.*

8. The same procedures identified in Section 2.9.1 will apply to spill clean-up and reporting procedures;
9. Any spill or leak of fuel or hazardous materials in the marine environment or on land shall then be immediately reported to the ECMP Environment and Regulatory Advisor and GBS/Topsides Environment Coordinator. Any spill in water, and spills greater than 70 L on land, or any amount on land that can enter water frequented by fish shall be reported to the **Canadian Coast Guard** by calling the spill reporting number **(709) 772-2083** or **(800) 563-9089**. Required pertinent information includes:
   - Name of reporter and phone number;
   - Time of spill or leak;
   - 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 - 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, terrain, and soil conditions.

10. 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 manpower 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 at an approved landfill site; and
    - If feasible and necessary, establish a holding and cleaning facility for oil-fouled birds.

11. The procedure for a shoreline pollution cleanup will include:
    - Assemble at the spill equipment containers location or as directed by the On-Scene Commander;
    - The On-Scene Commander will brief the Response Team on the spill situation;
    - Assess site conditions and environmental impact of various cleanup procedures;
    - Assess potential for fuel recovery versus burning;
    - All members shall be provided with personal protective equipment (EPP) i.e. life vests, rubber gloves, boots, as appropriate;
    - If conditions necessitate/permit deploy the containment boom using the spill response boat;

- 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 drums;
- 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 in an approved landfill site;
- 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; and
- Take all necessary precautions to ensure that the incident does not re-occur.

12. Following the spill incident and response, the EMCP Environment and Regulatory Advisor shall be responsible for preparing a written report which shall be sent (as soon as possible and no later than 30 days after the spill) to the GBS and Topsides Environment and Regulatory Managers/Coordinator and to:

Government Service Centre
Department of Government Services and Lands
2 Masonic Terrace
Clarenville, NL, A5A 1N2

and

Environment Canada, Emergency Response Coordinator,
P.O. Box 5037, St. John's, NF, AIC 5V3

Reports must also be distributed to the site Environmental Monitors.

Resource List

Oil spill equipment shall be maintained on-site at Great Mosquito Cove in a storage facility. Type and quantities of equipment will be determined based on

the volume of oil at the site and recommendations from Canadian Coast Guard personnel.

2.9.3 Wildlife Encounters

Environmental Concerns

Wildlife encounters pose a risk for stress or injury to both the wildlife and site personnel, i.e. moose vehicle collisions. Control measures and environmental protection procedures have been put in place to minimize the risk to wildlife and humans.

Environmental Protection Procedures

Personnel Training

All personnel will be advised during environmental orientation of the appropriate procedures to use in the event of wildlife encounters. All personnel will be instructed in proper waste management, as described in the Waste Management Plan, which will reduce wildlife encounters.

Prevention

Site Environmental Monitors are responsible to ensure that the following procedures 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 Site Environmental Monitors to determine compliance with the Waste Management Plan.

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 ATV, aircraft, or on foot will be made by any person at the Project site;
- Equipment and vehicles will 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 GBS Environmental Manager;
- When animals (e.g. moose, black bear, caribou or otter) pose a threat or a problem in the Project area, the GBS Environment Coordinator will be responsible for all subsequent action. Appropriate response action will be determined by this individual, in consultation with NLE&C's Wildlife Division. All action must comply with NLE&C's regulations and permits;
- The GBS Environment Coordinator will authorize the use of wildlife deterrent measures that include crackers and rubber bullets. These will be tried before lethal means are used;
- A report of the displacement of an animal will be prepared by the GBS Environmental Coordinator and provided to personnel involved. This written report will be submitted to the EMCP Environment and Regulatory Advisor, who will forward it to NLE&C's Wildlife Division.

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 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 procedures shall apply:

13. 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. 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.

14. All work shall cease in the immediate area of the discovery until the Provincial Archaeologist (Martha Drake 709-729-2462), or designate, has been consulted and provides advice on the acceptable procedure to follow. No work shall resume in the area until it is authorized by her.
15. Archaeological materials encountered shall be reported to the GBS Environment Coordinator with the following information:
    - Nature of activity resulting in the discovery;
    - Nature of material discovered;
    - The precise location of the find; and
    - 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 further 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 Procedures

Response Capability

The Bull Arm facility will have an emergency response team consisting of employees working at the site, who will also be trained as fire prevention officers to provide 24-hour coverage for the site. The response team shall be equipped with a pumper truck, emergency vehicle, a 4x4 pickup truck, and other necessary support equipment. The emergency response team will be backed up by a group of volunteer firefighters who have had previous experience prior to working on the site and receive weekly training on site.

Contractors and subcontractors shall also ensure that their personnel are trained in the use of fire fighting equipment.

Prevention

The GBS Environment Coordinator 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:

16. Proper storage and approved disposal of all flammable waste on a regular basis.
17. Approved storage and handling of all petroleum products and other hazardous materials.
18. Smoking and other sources of ignition shall not be permitted within 10 m of areas used to store and handle flammable products and wastes.
19. Making available adequate emergency response resources at the site at all times. Equipment shall be easily accessible, properly maintained and in good condition (in accordance with the manufacturer's recommendations), and all members of the emergency response team shall have received proper training.

Response Action Plan

Non-forest Fires and Explosions

The following procedures shall be followed in the event of a non-forest fire (localized fires /explosions associated with equipment, in buildings, etc):

20. Sound the fire alarm.
21. On-site personnel shall take immediate steps to extinguish the fire using extinguishers or fire hoses.
22. The trained volunteer fire fighters, located on-site, shall respond to all fire alarms and assume responsibility for extinguishing the fire on arrival at the incident site.
23. Should fire threaten surrounding forested areas, the steps outlined below shall be followed.

Forest Fires

24. In the event of a forest fire, the priority shall be to take immediate steps to contain or extinguish the fire.
25. Fire should be reported immediately to the GBS Environment Coordinator, 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;
    - Time of detection of the fire;
    - Size of the fire; and
    - Location of the fire.
26. The RCMP will also be notified immediately.

2.9.6 Vessel Accidents

Environmental Concerns

There exists the potential that vessels involved during construction 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 materials, or other physical/chemical substances are released to the environment during vessel accidents. 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 procedures for both life threatening and potentially polluting situations.

Prevention

The following preventative measures shall be followed:

27. All Project vessels shall travel within the designated Canadian Coast Guard shipping Lane within Trinity Bay and Bull Arm unless alternate instruction is provided by MCC.
28. No Project related vessels shall discharge wastes, bilge water, ballast water, pollutant, or other deleterious substance into Canadian waters. The discharge of garbage (solid galley wastes, food wastes, paper, rags, plastics, glass, metal, bottles, junk or similar refuse) from ships into Canadian waters and waters of the Fishing Zones of Canada is prohibited.
29. All stationary hazards such as moored platforms or vessels shall be clearly marked with buoys.
30. All vessels shall have dedicated on-board safety equipment such as fire extinguishers and life rafts.
31. 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.
32. The Bull Arm facility shall have Marine Traffic Procedures in place that will apply to all Project vessels.
33. Vessel Captains and crews shall comply with all requirements of the vessel management plan.

Response

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

34. 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.
35. 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.
36. 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

37. Project site operations personnel shall frequently check weather forecasts to be aware of approaching storms and bad weather conditions.
38. 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 GBS and Topsides Managers and appropriate action coordinated to protect the integrity of the facilities and equipment. Delay or stoppage of certain activities may be required.

2.10 ENVIRONMENTAL MONITORING AND REPORTING

2.10.1 Compliance Monitoring

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

Site Environmental Compliance Monitoring

During construction activities at the Bull Arm site, as required by regulation, or as may be prescribed in the EPP and consistent with EMCP standards, EMCP will implement an audit and compliance monitoring program. This program 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:

- Section 36 of the federal *Fisheries Act* (http://laws.justice.gc.ca/eng/F-14/index.html) which prohibits the discharge of deleterious substances into any type of water frequented by fish;
- Section 35 of the *Migratory Birds Convention Act*, 1994 (http://laws.justice.gc.ca/eng/M-7.01/index.html), which 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;
- *Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals* (*http://laws.justice.gc.ca/eng/SOR-2007-86/index.html*) *under* the *Canada Shipping Act* (*http://laws.justice.gc.ca/eng/C-10.15/index.html*), which details how fuel transfers between ship and shore or between ships are conducted;
- The *Hazardous Products Act* (*http://laws.justice.gc.ca/eng/H-3/index.html*), which is the basis for Workplace Hazardous Materials Information System (WHMIS), which promotes proper labelling of controlled products and requires workers to receive education and training safe storage, use and handling of controlled products;
- The Authorization for Works or Undertakings Affecting Fish Habitat, issued DFO under the *Fisheries Act*, and the Permit to Alter a Body of Water under the *Water Resources Act* (*http://assembly.nl.ca/Legislation/sr/statutes/w04-01.htm*), which details how infilling will be conducted;
- Ocean disposal requirements under the Canadian Environmental Protection Act (http://laws.justice.gc.ca/eng/C-15.31/index.html);
- NLE&C Guidance Documents Dredge Spoils Disposal GDPPD-028-1 and Leachable Toxic Waste, Testing and Disposal GD-PPD-026-1, which details 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 the Government Service Centre; and
- The NLE&C Environmental Control Water and Sewage Regulations, 2003 (http://assembly.nl.ca/Legislation/sr/regulations/rc030065.htm) 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 mitigative 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 details of the near shore EEM program will be developed in consultation with regulatory agencies and key stakeholders.

2.10.3 Marine Mammals

EMCP will develop a protocol for the monitoring of marine mammals prior to the start of any construction activity. This protocol will be developed in consultation with DFO and KAC, based on recommendations contained in *Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations* (Southall et al., 2007), and may include the following parameters:

- 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;
- The feasibility of using a bubble curtain to reduce sound levels will also be investigated;
- 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;
- 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; and
- 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 construction at the Bull Arm facility. Gasoline, diesel fuel, heating oil, jet fuel, 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.

Environmental Protection Procedures/Regulatory Requirements

The storage of combustible products and dangerous goods, both inside and outside of buildings shall conform to the National Fire Code of Canada, Part 3 Indoor and Outdoor Storage. 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;
- Explosives Act and its Regulations (http://laws.justice.gc.ca/en/E-17/index.html);
- NFDA 30 – Flammable and Combustible Liquids Code; and
- CSA – B139 Installation Code for Oil-Burning Equipment.

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 (CSA) (http://laws.justice.gc.ca/eng/C-10.15/index.html); and
- Supporting legislation, including the Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals (http://laws.justice.gc.ca/eng/SOR-2007-86/index.html).

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

- Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products published by the Canadian Council of Ministers of the Environment (CCME);
- *Storage and Handling of Gasoline and Associated Products Regulations, 2003 (GAP regulations)* (http://assembly.nl.ca/Legislation/sr/regulations/rc030058.htm); and
- in the case of tanks smaller than 2500 litres and connected to heating appliances, the *Heating Oil Storage Tank Systems Regulations, 2003 (HOST regulations)* (http://assembly.nl.ca/Legislation/sr/regulations/rc030060.htm) under the *Environmental Protection Act* (http://assembly.nl.ca/Legislation/sr/statutes/e14-2.htm) shall be respected for storing and handling petroleum or a derivative of it.

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

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

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 Transportation of Dangerous Goods Act (TDGA) (*http://laws.justice.gc.ca/eng/T-19.01/index.html*) and supporting legislation. All trucks entering the Site transporting materials regulated by TDGA 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 require by the above-noted Act. Security staff and the GBS Environmental Manager shall be trained in the requirements of the Act.

Storage of Fuel and Other Hazardous Materials

The following conditions shall apply to the storage of fuels and other hazardous materials.

- On-land storage of petroleum products and other hazardous liquids shall be in above-ground, double-walled tanks. Provisions in the GAP regulations regarding dyke construction shall be followed for all GAP and HOST storage tank systems.
- For storage of waste oils, other waste petroleum products, and spent hazardous materials, consult the *Waste Management Plan, Section 9.2.1.1*.
- The floating concrete batch plant barge, power barge and other support barges shall be equipped with on deck double-walled fuel storage tanks. The batch plant barge shall also have a below-deck storage tank that supplies fuel to the on-deck day-tank and generator.
- Petroleum products and other hazardous materials shall only be handled by persons who are trained and qualified in handling these materials, as per Section 5 of the Workplace Hazardous Materials Information System. WHMIS regulations (http://assembly.nl.ca/Legislation/sr/regulations/rc961149.htm) shall be implemented to ensure proper handling and storage is achieved.
- Storage units for petroleum products and other hazardous materials shall be clearly marked and barricaded 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 fire fighting equipment.
- 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 be dipped weekly, including a water dip, and the data recorded. This data shall be reconciled with the metered delivery of fuels to these storage tanks. The task of dipping the tanks falls to the Materials Control

personnel. These records shall be provided weekly to the GBS Environmental Manager, and shall be 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 shall comply with provisions of this EPP.
- Smoking shall be prohibited within 10 m of all areas used to store petroleum products and other hazardous materials.
- Hot Work Permits shall be required before undertaking welding or torch cutting 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 the KAC Environment Coordinates
- Weekly inspections of all petroleum product and other hazardous materials storage areas shall be documented.
- Refueling or servicing of mobile equipment on land in areas other than the main fuel storage site shall not be allowed within 30 m of a watercourse **except** at a specifically designated refueling site where conditions will allow for containment of accidentally spilled fuel.

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 trained qualified person. 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 onto land or into the water.
- Hoses or pipes used for fuel transfer shall be equipped with properly functioning and approved check valves, 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.
- Fuel transfer operations between ship and shore or between ships shall be conducted in accordance with the *Canada Shipping Act - Oil Pollution Prevention Regulations.* Two-way communication shall be maintained between the supply vessel 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*.

- If fuel transfer operations take place between sunset and sunrise, lighting shall be provided at the offloading and loading points.
- 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, KAC Environment Coordinator shall be notified.
- The need for a containment boom will be considered each time a vessel is being fuelled.

Equipment Fuelling

The following procedures shall apply to the fuelling of heavy construction 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 of hydraulic and fuel systems on machinery. Leaks shall be repaired immediately.
- Fuelling or servicing of mobile equipment on land shall not be allowed within 30 m of watercourses, bodies of water or ecologically sensitive areas.
- Fuelling attendants shall be trained in the requirements under the spill contingency plan.

Hazardous Materials (WHMIS)

Use of hazardous materials must comply with WHMIS and 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 waste and is subject to the provisions of the *Waste Management Plan.*

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 Material Safety Data Sheets (MSDS). WHMIS regulations are in force throughout the Bull Arm facility, as are provisions of the *Transportation of Dangerous Goods Act*. 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 *Waste Management Plan*.
- Material Safety Data Sheets must be available on-site prior to receipt of any hazardous materials.

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 of by the GBS Environment Coordinator. 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 the *Waste Management Plan.*

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, etc shall be respected.

1.2 SEWAGE TREATMENT, DISPOSAL AND COMPLIANCE TESTING

Introduction

Secondary treatment will be provided for all sewage originating from the site through the re-establishment of an existing sewage treatment plant. 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 sewage treatment facility located at the Bull Arm site, a Certificate of Approval shall be obtained from the Department of Government Services and Lands and NLE&C.

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 Provincial Standards, guidelines, and *Water Resources Act, Environmental Control Water and Sewage Regulations, 2003* (http://assembly.nl.ca/Legislation/sr/regulations/rc030065.htm), Schedules A and B.
- The health inspector with the Government Service Centre (GSC) is the approved authority for sewage flows less than 1000 gallons; 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 dumping station at the Bull Arm Camp sewage treatment/disposal facility. All human fecal waste must be contained and disposed in a manner that meets all environmental and health requirements. Any concerns must be brought to the immediate attention of the EH&S Supervisor.

Monitoring at the Sewage Treatment Plant

As a condition of sewage treatment plant approvals from the Water Resources Division of NLE&C, the treated effluent will be monitored in order to determine compliance with Provincial regulations. The frequency of sampling and the constituents to be sampled will be identified by NLE&C in the sewage treatment plant certificate of approval.

Disposal of Sewage Sludge

Sewage sludge, which accumulates at the bottom of the plant, must be pumped out at least twice per month. Disposal of this material shall comply with provisions of the Waste Management Plan.

Certain kitchen practices are critical to ensuring proper functioning of the sewage treatment plant. The Waste Management Plan provides the provisions for the proper disposal of kitchen waste.

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 Procedures

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

- Permits to Quarry shall be obtained from the Department of Natural Resources before quarries are established. Quarry activity will be undertaken in compliance with these quarry permits and shall adhere to all other relevant regulatory requirements.
- Quarry areas shall be developed in a controlled manner so as to minimize potential environmental effects. The following protection procedures 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 metre 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;
  - 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, Environmental Code of Practice for Open Burning, and the 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; and

- 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 25 milligrams per litre more than was in the water originally;
- 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 Procedures

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:

- 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. See the DFO Factsheet entitled Streambank Stabilization (http://www.nfl.dfo-mpo.gc.ca/e0005524).

- 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 Procedures

The following measures shall be taken to mitigate potential effects of dust:

- Dust from construction activities shall be controlled where possible by using frequent applications of water. Waste oil and calcium chloride shall not be used for dust control, only approved dust control agents will be used.

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 Procedures

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.
- Dewatering of trenches shall make use of measures to minimize and control the release of sediment laden water through the use of filtration (see DFO Factsheet entitled *Filter Fabric* (http://www.nfl.dfo-mpo.gc.ca/e0005519)), erosion control devices, settling ponds (see DFO

Factsheet entitled *Effects of Silt on Fish and Fish Habitat* (http://www.nfl.dfo-mpo.gc.ca/e0005459)), straw bales, geotextiles or other devices.

1.7 DEWATERING – WORK AREAS / DRY DOCK

Introduction

The GBS dry dock site is situated in Great Mosquito Cove. 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. To re-establish a dry dock, the inner cove will be enclosed by a rock bund wall, which includes a row(s) of sheet piles, and will be dewatered. Dewatering of the dry dock will be subject to DFO approval.

Environmental Concerns

The major concerns associated with dewatering are sedimentation and direct fish mortality and/or habitat destruction for freshwater and marine fish species. To develop restriction and control on dewatering activities from earthworks, a protocol has been established to ensure that dewatering is conducted with minimal impact on natural watercourses, bodies of water, or ecologically sensitive areas.

Environmental Protection Procedures – Work Areas

- Filtration or other suitable measures, such as settling ponds, silt fences and dykes, shall be implemented for sediment removal and turbidity reduction in water pumped from work areas before discharging (see DFO Factsheet entitled Filter Fabric (http://www.nfl.dfo-mpo.gc.ca/e0005519) and Temporary Settling (Detention) Basins (http://www.nfl.dfo-mpo.gc.ca/e0005554)).
- Where possible, 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.).
- Discharged water shall be encouraged to follow natural surface drainage patterns.

Environmental Protection Procedures – 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. In addition, any effluent directed out of the project site shall be tested for total suspended solids and hydrocarbons (if there are visible signs of hydrocarbon contamination) before being discharged to any watercourse, waterbody or other ecological sensitive area. Effluent discharge shall comply with Schedules A and B 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*).

- 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.

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.

Environmental Concerns

Project vessel traffic may 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.

Environmental Protection Procedures

- All vessel activities will be governed in accordance with Sections 5 and 6 of the Pollutant Discharge Reporting Regulations (*http://laws.justice.gc.ca/PDF/Regulation/S/SOR-95-351.pdf*), Sections 17, 51 and

87 of the Regulations for Prevention of Pollution from Ships and for Dangerous Chemicals (http://www.canlii.org/en/ca/laws/regu/sor-2007-86/latest/sor-2007-86.html) and Section 5 of the Vessel Traffic Service Zones Regulations (http://laws.justice.gc.ca/PDF/Regulation/S/SOR-89-99.pdf) as required by the Canada Shipping Act, 2001 (http://laws.justice.gc.ca/en/C-10.15/FullText.html).

- KAC will establish Construction Safety Zones (CSZ) at the Great Mosquito Cove site and later at the deep water site in Bull Arm. EMCP will establish an overall Project agreement with commercial fishers using the Bull Arm area that addresses safe operations and compensation.
- Marine traffic associated with Project construction will use designated routes.
- EMCP and KAC will consult with the area fish harvesters to discuss and agree on an appropriate Vessel Traffic Management Plan 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 Project vessels via marine radio to facilitate information exchange with fisheries participants and Fisheries Liaison Officer. 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 office 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 and within Bull Arm, see Canadian Hydrographic Chart L/C4851;
  - Notify the Bull Arm site office 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 adequate oil spill response equipment to handle an accidental release of product into the environment; and
  - Notify the Canadian Coast Guard and the Bull Arm site office of any releases or spills of substances (emergencies) immediately and identify the location.

- No Project-related vessels will discharge wastes or bilge water into surrounding waters. The discharge of garbage from ships into Canadian waters and the waters of the Fishing Zones of Canada is prohibited.
- 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* (http://www.tc.gc.ca/media/documents/acts-regulations/c.r.c._c._1416-regulations.pdf) under the *Canadian Shipping Act*.
- All vessels will comply with the *Canadian Shipping Act*, 2001 Ballast Water Control and Management Regulations SOR/2006-129 (http://laws.justice.gc.ca/eng/SOR-2006-129/index.html).
- All vessels must comply with the Hebron Project Waste Management Plan.

1.9 PUMPS AND GENERATORS

Environmental Concerns

A variety of water pumps, hoses and generators will be in frequent use in many areas of the construction site and the support and supply for remote work camps. Environmental concerns are associated with any accidental spills or chronic leaks contaminating bodies of water.

Environmental Protection Procedures

- Oils, grease, gasoline, diesel, or other fuels shall be stored at least 100 m from any surface water.
- Drip pans shall be placed underneath pumps and generators. Absorbent material will be kept at all sites where pumps and generators are in use.
- Hoses and connections on equipment located near bodies of water shall be inspected routinely for leaks and drips.

All leaks shall be reported immediately to the GBS or Topsides Environment Coordinator or Site Monitor. Upon detection of a leak, 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 construction and operation activity 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 Procedures

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.
- Low level flying of aircraft should be avoided in areas where wildlife, particularly caribou, 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 Procedures

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 NLE&C and the Department of Government Services and Lands, Sections 5 and 7 of the *Explosives Act* (http://laws.justice.gc.ca/eng/E-17/index.html), and Sections 5, 6, 7 and 15 of the *Transportation of Dangerous Goods Act* (http://laws.justice.gc.ca/eng/T-19.01/index.html). 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 and the Temporary Magazine License shall be obtained prior to drilling and blasting.
- Use of explosives shall be restricted to authorized personnel who have been trained in their use.
- There shall be separate magazines on site for explosives and for dynamite blasting caps. All temporary magazines for explosive storage shall have the appropriate approvals.
- 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 EH&S Supervisor.

- 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 EH&S Supervisor.

Blasting in Close Proximity to Bodies of Water

- If blasting is necessary within a waterbody, it shall be undertaken in compliance with the required Water Resources permits from the NLE&C, and DFO guidelines (http://www.nfl.dfo-mpo.gc.ca/e0005460). Reference shall also be made to "*Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters*" (Wright and Hopky, 1998). A copy of this reference shall be kept at the EH&S office at the project site and made available to all contractors.
- 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 reviewed with one of the local DFO officers 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.
- 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. See DFO Fact Sheet – Blasting and Fish Habitat Protection (http://www.nfl.dfo-mpo.gc.ca/e0005460).
- Blast holes must be stemmed with sand or gravel to grade or to streambed/water interface to confine the blast.
- Ammonium nitrite based explosives must not be used in or near water due to the production of toxic by-products.
- If concentrations of fish or marine mammals are detected in the area, described blasting may proceed only when 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.

Additional mitigative measures for blasting in close proximity to bodies of water include but are not limited to:

- The installation of bubble/air curtains. 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 needed to adequately monitor the zone. Monitoring techniques and results of acoustic modelling will be reviewed and approved by DFO prior to blasting operations.

Monitoring for Marine Mammals

EMCP and KAC will develop a protocol for the monitoring of marine mammals prior to the start of any construction activity. This protocol will be developed in consultation with DFO and shall include the following parameters:

- 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;
- The feasibility of using a bubble curtain to reduce sound levels will also be investigated;
- Received sound levels of 180 dB 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
- 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; and
- 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 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. Liquid wastes 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 would 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 Procedures

- Washwater from the cleaning of mixers, mixer trucks and concrete delivery systems shall be directed to a closed system rinsing/settling basin.
- In the event that water from the closed settling system is to be released, it shall be tested prior to release, for parameters related to any concrete additives to be used in the production of concrete (e.g., total hydrocarbons, sodium hydroxide), pH, and total suspended solids. The water to be released shall also meet the limits specified by E&C in Schedules A and B of the *Environmental Control Water and Sewage Regulations* (http://www.assembly.nl.ca/Legislation/sr/Regulations/rc030065.htm) and shall adhere to those portions of the *Fisheries Act* that relate to fish habitat protection and pollution prevention (Sections 34 to 42) (http://laws-lois.justice.gc.ca/en/F-14/FullText.html). Release shall be via runoff control procedures.
- If water to be released does not meet discharge criteria, it will be further treated until these discharge criteria have been met.
- The settling basin shall be cleaned on an as required basis to ensure that the retention capacity is maintained at all times.
- An onsite interim holding/processing area for off-spec or excess concrete will be designated and approved. Final disposal will be at an approved facility.

Batch Plant Operation from a Barge

- Floating batch plant will be designed to prevent release of untreated washwater and spoiled concrete into the environment.
- Washwater will be stored and directed to settling basins, where it will be monitored before the clarified water is discharged to the marine environment.
- Following the initial inspection and prior to each batch plant operation, the batch plant and barge shall be inspected by the EH&S Supervisor and/or environmental monitors for potential environmental risks.
- A spill containment boom shall be deployed around the barge until it is removed from the location.
- All batch plant workers must be familiar with oil spill response procedures. Spill response equipment must be on the barge at all times. All fuel spills will be handled in accordance with Section 2.9.1 and 2.9.2.
- In the event of a spill, all batch plant 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 2.9.6 – 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 Procedures

In addition to environmental protection procedures stated below, reference may be made to Gosse et al., 1998, pp84-88.

Pipeline Development

Pipelines such as those for sedimentation pond discharge shall be constructed above ground and follow the access roads. All exterior surface pipelines with the potential to freeze shall be gravity self-draining to containment or employ other protection measures to prevent spillage to the environment. The environmental protection procedures for road construction as outlined above shall be used for pipeline construction where applicable.

Transmission Line Development

- Wood, pressure-treated with pentachlorophenol (PCP) or ammonical copper arsenate (ACA), shall not be used. Alternatives to wood will be preferred, or where necessary wood treated with either ACQ (amine) or Copper Azole.
- Vegetation control along the transmission line shall use mechanical methods of brush control rather than chemical (herbicides).

Drainage

Drainage discharge locations shall be determined in consultation with the EH&S Supervisor.

- Roads shall be adequately ditched so as to allow for good drainage.
- Roadside ditches shall discharge onto vegetated or forested areas, never directly into a watercourse.
- 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 located during snow removal operations or if they become covered from debris accumulation.
- Reference should be made to DFO Fact Sheet – Ditching (http://www.nfl.dfo-mpo.gc.ca/e0005516) and Gosse et. al. (1998) – Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland and Labrador (http://www.dfo-mpo.gc.ca/Library/240270.pdf).

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 any construction related operation, 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. Typically, vehicles ranging in size from all-terrain vehicles (ATVs) to heavy equipment, all of which can result in ground disturbance, may be used during access road construction.

Environmental Protection Procedures

- ATVs shall not be allowed on the site except as required by the Contractor 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 *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 shall be established and 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.

1.15 WORKS IN/AROUND MARINE ENVIRONMENT

Environmental Concern

Works required to take place in the marine environment will include the re-establishment of the dry dock, construction of a bund wall, the partially constructed GBS will be floated out of the dry dock and towed to the deep water site, where it will be moored for final construction. The principle environmental concerns from marine construction include the release of fines and wood preservatives to the water and substrate, and disturbance to fish and fish habitat. Marine construction activities can also disturb near shore terrestrial habitat and cause seabirds, waterfowl and marine mammals to avoid the area.

Environmental Protection Procedures

- Infilling will be conducted in strict compliance with the Letter of Advice or Authorization for Works Undertakings Affecting Fish Habitat, issued by DFO under Sections 34 to 36 of the *Fisheries Act* (http://laws.justice.gc.ca/eng/F-14/index.html), the Permit for the Alternation of a Waterbody under the Newfoundland and Labrador *Water Resources Act* (http://www.assembly.nl.ca/legislation/sr/statutes/w04-01.htm), and the Federal *Navigable Waters Protection Act* (http://laws.justice.gc.ca/eng/N-22/index.html).
- 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. 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.
- The operation of heavy equipment will be confined to dry, stable areas.
- Infilling will be done in compliance with the *Navigable Waters Protection Act* authorization.
- 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 control sedimentation into the marine environment during infilling.
- 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.

- All vehicles must be clean and in good repairs. 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 XX) will be in place and appropriate emergency spill equipment available on-site.

1.16 CONSTRUCTION CAMP

Environmental Concerns

There is an existing construction camp area at the Bull Arm site which will require additional infrastructure as well as upgrades to existing infrastructure. Additional clearing of vegetation and site grading may be required for the siting of buildings and associated infrastructure. There is the potential for site erosion and the introduction of sediment into local bodies of water. These activities will result in terrestrial habitat alterations and noise disturbances to wildlife in the area.

Environmental Protection Procedures

- 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.
- 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 prone 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 Procedures

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 (Attachment A.1), 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.
- 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 KAC Environment Coordinator.

- 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

- All Terrain Vehicles (ATVs) will not be allowed off the right-of-way except as approved by the KAC Environment Coordinator.
- No attempt to harass or disturb wildlife will be made by any person. Should significant numbers of caribou occupy the area of activity, work must cease and the EH&S Supervisor notified immediately.
- No motorized vehicles will enter the areas designated as sensitive without notification and approval of the KAC Environment Coordinator.
- 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 KAC Environment Coordinator
- 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 construction, which are potential sources of noise, air emissions, and potential 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 Procedures

- All approvals, authorizations and permits for project activities will be followed.
- Noise control procedures will be put in place during construction (Attachment A.10).
- 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 use 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. 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 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 from a barge of suitable size.

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 Procedures

- All drilling activity should 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 the KAC Environment Coordinator and/or environmental monitors.
- The diamond 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.
- Following the initial inspection and prior to each drill mobilization, the drill rig and barge shall be inspected by the KAC Environment Coordinator and/or environmental monitors for potential environmental risks.
- All fuel, lubricants and other hydrocarbons shall be stored, handled and transported according to Attachment A.3 - 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. If snow conditions permit, a snow/ice berm may be constructed around the drill rig to contain any surface contamination arising from daily operations.
- Disposal of drilling materials and all solid wastes shall be undertaken according to Attachment A.6 – Solid Waste Handling and Disposal.
- Drilling equipment must have muffled exhaust to minimize generated noise.
- Drilling of boreholes shall be conducted in compliance with all conditions of the Exploration Approval for the work required under the Mineral Regulations.
- 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 KAC Environment Coordinator in consultation with the drilling foreman.
- All drill workers must be familiar with oil spill response procedures. Spill response equipment must be on the barge at all times. All fuel spills will be handled in accordance with Section 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.
- 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 precast plant 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 Workplace Hazardous Materials Information System (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 (pH 9.0) under the Provincial Water and Sewage Control 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 Procedures

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

Storage and of Use 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 an 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 routinely (at least monthly or as directed by the Environmental Team) for parameters related to concrete additives to be used in the production of concrete, or form oil. The settling basin effluent discharge will meet contaminant levels specified in Schedules A and B of the Provincial *Environmental Control Water and Sewage Regulations*, 2003 (http://www.assembly.nl.ca/Legislation/sr/Regulations/rc030065.htm) and will adhere to those portions of the Federal *Fisheries Act* that relate to *Fish Habitat Protection and Pollution Prevention* (Sections 37 – 42) (http://laws.justice.gc.ca/eng/F-14/page-5.html#anchorbo-ga:s_34).
- The settling basin will be cleaned as directed by the Environmental Team to ensure that the retention capacity is maintained at all times.

1.21 SPECIES AT RISK

A species at risk is defined as a species which is extirpated, endangered, threatened or of special concern. A number of species at risk exist in or can migrate within project areas, and may be affected by project activities:

Marine Fish Species:

- Wolffish Species:
  - Northern Wolffish, Anarhichas denticulatus;
  - Spotted Wolffish, *Anarhichas minor;*
  - Atlantic Wolffish, *Anarhichas lupus.*
- Shark Species:
  - Porbeagle, *Lamna nasus;*
  - Blue Shark, *Prionace glauca;*
  - Shortfin Mako, *Isurus oxyrhinchus;*
  - White Shark, *Charcarodon charcarias;*

– Basking Shark, *Cetorhinus maximus.*

Marine Bird Species:

- Red Knot, Calidris canutus;
- Ivory Gull, Pagophila eburnean.

Marine Mammal Species:

- Fin Whale, Balaenoptera physalus;
- Blue Whale, Balaenoptera musculus;
- Killer Whale, Orcinus orca;
- Right Whale, Eubalaena glacialis;
- Harbour Porpoise, Phocoena phocoena.

Sea Turtle Species:

- Leatherback Sea Turtle, *Dermochelys coriacea.*

Environmental Concerns

A significant concern regarding species at risk is that activities related to project development and operation will result in a decline in abundance or a change in distribution of an at-risk population. Natural repopulation may not occur if numbers decrease at too high a grade or avoidance of an area becomes permanent.

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 Sewer Regulations* (http://www.assembly.nl.ca/Legislation/sr/Regulations/rc030065.htm), 2003.
- Following procedures under pertinent DFO factsheets, such as *Effect of Silt on Fish and Fish Habitat* and *Blasting – Fish and Fish Habitat Protection* (http://www.nfl.dfo-mpo.gc.ca/e0005361).
- 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* (http://www.assembly.nl.ca/legislation/sr/statutes/e14-2.htm) and Division 3 – Disposal at Sea of the *Canadian Environmental Protection Act* (http://laws.justice.gc.ca/eng/C-15.31/index.html).

- Monitoring of project activities in accordance with sections 37 to 42 of the *Fisheries Act*, namely *Fish Habitat Protection and Pollution Prevention* (http://laws.justice.gc.ca/eng/F-14/index.html).
- Adherence to guidelines and regulations presented within Sections 37 to 42 of the *Species at Risk Act* (http://laws.justice.gc.ca/eng/S-15.3/index.html) and the Provincial *Endangered Species Act* (http://www.assembly.nl.ca/legislation/sr/statutes/e10-1.htm).
- Adhere to the *Statement of Canadian Practice on Mitigation of Seismic Sound in the Marine Environment* (http://www.dfo-mpo.gc.ca/oceans-habitat/oceans/im-gi/seismic-sismique/statement-enonce_e.asp)

Environmental Protection Procedures

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 *Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals* (http://laws.justice.gc.ca/eng/SOR-2007-86/index.html) under the *Canada Shipping Act*. On land, proper storage of oils is important to inhibit leakage or seeping into the marine environment. 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* http://assembly.nl.ca/Legislation/sr/regulations/rc030060.htm, and the *Used Oil Control Regulations* http://assembly.nl.ca/Legislation/sr/regulations/rc020082.htm under the Provincial *Environmental Protection Act* (http://www.assembly.nl.ca/legislation/sr/statutes/e14-2.htm).

The following measures should also be implemented to reduce the impact on species at risk:

- 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.
- 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. whales and birds) are observed within 500 m.
- 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 reviewed with one of the local DFO officers in advance of work in close proximity to bodies of water.

- Ammonium nitrite based explosives must not be used in or near water due to the production of toxic by-products.
- If concentrations of fish or marine mammals are detected in the area, described blasting may proceed only when 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.
- Detonation of small scaring 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.
- Following DFO's *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/water-eau/explosives-explosifs/index_e.asp).
- Use of settlement basins and/or containment areas for concrete washwater.
- EPP to address discharge of all chemicals to the marine environment.
- Treatment of washwater from batch plants prior to discharge/disposal.
- If an at-risk marine mammal or sea turtle is detected within a designated zone, pile driving/blasting will not occur until the animal(s) have left the safety zone, or it has not been re-sighted for 30 minutes.
- Silt curtains will be used where appropriate to control sedimentation into the marine environment during infilling.
- ATV use shall comply with *All-Terrain Vehicle Use Regulations* (http://www.assembly.nl.ca/Legislation/sr/Regulations/rc961163.htm). Where possible, the use of ATVs and vehicles shall be restricted to designated trails, thus minimizing ground disturbance.
- All equipment will be serviced and fuelled on land at least 30m from the marine environment or in designated areas designed for spill containment.
- All equipment will have muffled exhausts to minimize noise.

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 Great Mosquito Cove 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* (http://www.env.gov.nl.ca/env/env_protection/ics/guidancedocv.1.01external.pdf).

1.23 SITE CLEANUP (MARINE DEEP WATER SITE)

Clean-up activities will include removal of debris at the deep water site. Erosion control measures will be implemented where appropriate.

Environmental Protection Procedures

Divers will survey the sea bed and remove any debris that is left behind after the tow-out of the GBS.

1.24 FISH RELOCATION DURING DRY DOCK DE-WATERING

Environmental Concerns

The major concerns associated with dewatering at the dry dock site are sedimentation and direct fish mortality and/or habitat destruction for freshwater and marine fish species. Stresses on the fish themselves must be kept to a minimum to avoid mortality during catch and release.

Environmental Protection Procedures

- Siltation control structures (i.e., silt curtains, cofferdams, and/or sediment fences) will be constructed prior to beginning any activities involving disturbance of the soil, work along the shoreline or near areas of high runoff potential.
- The team should begin to capture fish before pumping begins, if the site conditions allow.

- If pumping is required to reduce water depths for the removal of fish, a mesh net should be placed around the water intake so that fish are not entrained into the pump, as per DFO Factsheet, Freshwater Intake End-Of-Pipe Fish Screen (http://www.nfl.dfo-mpo.gc.ca/e0005531).
- Any water directed out of the project site shall be tested for total suspended solids and hydrocarbons (if there are visible signs of hydrocarbon contamination) before being discharged to any watercourse, waterbody or other ecological sensitive area.
- The salvage plans shall be project specific and shall contain step by step dewatering and fish salvaging procedures for all facilities and project features.
- To minimize fish stress and mortality, adequate personnel must be available for fish salvage activities. Operations should also be as quick and efficient as possible, without harming the fish.
- DFO should be contacted to specify all fish handling equipment required for handling fish during dewatering. All equipment should be in good condition and pre-positioned before dewatering begins.
- If necessary, refer to Schedule I of the *Species at Risk Act* (http://laws.justice.gc.ca/eng/S-15.3/index.html) or *Fisheries Act* (http://laws.justice.gc.ca/eng/F-14/index.html).

Removal Procedure

- The removal procedure established by the contractor shall meet DFO regulations.
- The removal procedures shall be established by the contractor and submitted to DFO for approval prior to any dewatering of areas from which fish species are to be relocated.
- All fish species relocated should be transferred to an undisturbed portion of the watershed.
- All pumps used in dewatering or extracting water from fish bearing areas shall have appropriate screening devices as per DFO Fact Sheet, Freshwater Intake End-Of-Pipe Fish Screen (http://www.nfl.dfo-mpo.gc.ca/e0005531).

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.

Eelgrass has been recently 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

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

1.26 PILE DRIVING

Environmental Concerns

Pile driving involved in the construction of the bund wall, produces impulsive sound levels high enough to temporarily disturb marine birds 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.
- For sea turtles, the 180 dB zone will be used.
- The use of a bubble curtain around pile driving activities will be considered 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

Chief 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* (http://laws.justice.gc.ca/eng/M-7.01/index.html).
- 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* (http://laws.justice.gc.ca/eng/S-15.3/index.html) or *Endangered Species Act* (http://www.assembly.nl.ca/legislation/sr/statutes/e10-1.htm).
- 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* (http://assembly.nl.ca/Legislation/sr/reg_570.htm)

and *Canadian Environmental Protection Act* (http://laws.justice.gc.ca/eng/C-15.31/index.html).

- Environmental Protection Procedures
- Occasional surveys and monitoring programs.
- 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 are 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.
- 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.

1.28 WATER SUPPLY

Environmental Concerns

Construction 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* (http://hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php). 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, if used, should be properly screened to avoid entrainment of fish, as per DFO Factsheet *Freshwater Intake End-of-Pipe Fish Screen* (http://www.nfl.dfo-mpo.gc.ca/e0005531).
- 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* (http://www.assembly.nl.ca/legislation/sr/statutes/w04-01.htm).
- Water used for human use and consumption is healthy, clean, and free of contaminants.
- Environmental Protection Procedures
- 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.

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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 EPP provides waste management procedures 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 phase of the Project at the Bull Arm site. Waste management at site will be reviewed on an annual basis throughout the construction phases and updated as necessary 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 phase at the Bull Arm site, in accordance with EMCP's 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;
- 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 site personnel (including: contractors, subcontractors/vendors and visitors);
- Maximize the efficient use of resources;
- Avoid costly clean-up after construction is complete; and
- Prevent and reduce adverse impacts on fish and fish habitat.

General strategies that will be adopted to achieve the objectives are:

- **Proactive Procurement Policy:** Tender/Bid documents during the EPC phase 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 will be examined for all materials that are hazardous to handle, generate hazardous wastes 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 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 generation in the process. A list of site chemicals will periodically be reviewed by site environmental personnel and be re-evaluated for alternative chemicals that could be substituted for existing ones;
- **Waste segregation:** All site Contractors and Subcontractors, including Catering and the Site Services Contractor will be required to implement category-wise segregation of all waste streams to make it easier to reuse, recycle, recover (3 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. A site orientation on recycling will be provided in the site orientation and by the KAC and/or WP site Environmental Coordinator to all Contractors, Subcontractors and employees regarding recycling responsibilities. All waste categories will be analyzed and the principals of the following 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;
- **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, 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 Temporary Waste Transfer Station and the Site Services Contractor will arrange for transportation to a licensed facility for possible recovery, treatment and disposal as required.

3.4 Abbreviations

Term	Definition
CBSA	Canadian Border Services Agency
C&D	Construction and Demolition Debris
NLE&C	Newfoundland and Labrador Department of Environment and Conservation
EMCP	ExxonMobil Canada Properties
EPC	Engineering, Procurement and Construction
EPP	Environmental Protection Plan
EWM	Eastern Waste Management
GBS	Gravity Base Structure
HWSA	Hazardous Waste Storage Area
KAC	Kiewit-Aker Contractors
MMSB	Multi-Materials Stewardship Board
MRF	Materials Recovery Facility
RHB	Robin Hood Bay
TDGS	Transport of Dangerous Goods
WHMIS	Workplace Hazardous Materials Information System
WMP	Waste Management Procedures

3.5 References

Document Number	Title
CAHE-SA-SRENV-00-000-0001	The Hebron Project Comprehensive Study Report
GD-PPD-026-1	Leachable Toxic Waste, Testing and Disposal
GDPPD-028-1	NLE&C Guidance Documents Dredge Spoils Disposal
NBAG-0169	Hibernia Development Project Platform Construction Environmental Protection Plan
GD-PPD-046.2	NLE&C Guidance Documents for Municipal Solid Waste Transfer Stations
GD-PPD-050.2	NLE&C Guidance Documents for Construction and Demolition Waste Disposal Sites
GD-PPD-059	NLE&C 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	NLE&C Asbestos Waste Disposal Summary
Version 1.01	NLE&C 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 the materials currently going to disposal by 2015;
- Eliminate open burning by 2012;
- Phase out unlined landfills by 2020;
- Full province-wide modern waste management by 2020; and
- Reduce number of waste sites by 80% by 2020.

The strategy, which is administered by Department of Municipal Affairs and regulated by Department of Environment and Conservation (NLE&C), will establish a waste diversion program, establish waste management regions, develop modern standards and technology, maximize economic and employment opportunities, and assist with a public education program.

EMPC 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[1]

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

EWM has been established to oversee the modernization of a solid waste management system for the Eastern Region including 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 EWM 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 the work of the Committee. 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. Beginning October of 2010, Robin Hood Bay (RHB)_will be accepting waste in three streams, including recyclable containers, fibres and general waste. It is anticipated that a composting facility will be constructed and operated to accept organic waste (fourth stream) from the entire Eastern Region. Firm details have not yet been announced, however it is expected that this will happen within the next two to three years.

Additional information can be found at www.easternwaste.ca or Curb It Recycling St. John's, Newfoundland:Home www.curbitstjohns.ca

3.6.3 Multi-Materials Stewardship Board[2]

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.

[1] *Eastern Waste Management Committee. www.easternwaste.ca/about-us*

[2] Multi-Materials Stewardship Board, www.mmsb.nf.ca/who.asp

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

- The Used Beverage Container Recycling Program;
- The Tire Recycling Program;
- The Used Oil Recycling Program;
- Household Hazardous Waste Collection Program; and
- Residential Backyard Composting Program.

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;
- Water Resources Act - Provincial;
- Storage and Handling of Gasoline and Associated Products Regulations - Provincial;
- 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 ;
- Operation, Maintenance and Inspection of Tank Facilities Guidelines', API-2610;
- Provincial Waste Management Strategy;
- Eastern Waste Management's Regional Strategy; and

- Hebron Project Comprehensive Study Report.

3.7 Organization and Responsibilities

The GBS and Topsides Contractors will be required to submit detailed waste management plans which adhere to this chapter of the Bull Arm site EPP. These plans will be reviewed and approved by the EMCP Environment and Regulatory Team. As stated in Chapter One, the principal agents of the self-regulatory environmental compliance monitoring program will be the Project Environment and Regulatory Team comprised of staff of EMCP, KAC and WP.

3.8 Waste Management Procedures

These waste management procedures will address 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 and includes garbage, refuse, sludge from a sewage treatment plant and water treatment plant. The types of solid wastes considered in this category include inert or non-hazardous wastes of various kinds, such as; cans, filters, belts, scrap metals, sewage sludge, domestic garbage, etc. or hazardous wastes such as; used oils, solvents, paints, used/unused chemicals, old batteries and chemical based sludge from water and wastewater treatment plants, and explosives that are no longer usable.

3.8.1 Waste Characterization and Waste Quantities

Based on existing 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 T/yr with an additional 325,000 L/yr of hazardous waste. The following table estimates the percentage of total waste by sector:

Table 3 - 1 : Anticipated waste streams during construction

Waste Stream	Percentage by Weight
Camp/Office Waste	43%
Metals	30%
Construction and Demolition (C&D) Waste	27%
Total[1]	100%
Note: [1] *Does not include Hazardous Waste*	

Table 3 - 2 : Anticipated hazardous and special waste streams during construction

Hazardous and Special Waste Stream	Percentage by Volume
Special Waste	7%
Waste Oil	19%
Ships Bilge Waters	74%
Total	100%

3.8.1.1 Camp/Office Waste

It is difficult to characterize the domestic waste stream, however to quantify the volume of waste we will utilize generation percentages similar to those identified in the Municipal Waste Stream. Most waste classified as domestic waste will be generated from the camp facilities and general offices. It is estimated that there will be approximately 3,000 workers on-site at peak construction.

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 Waste	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 Gravity Based Structure, the following is an estimate of C&D Waste:

Table 3 - 4 : Anticipated construction and demolition (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

3.8.1.3 Hazardous Waste

Using the volumes obtained during construction of the Hibernia Gravity Based Structure, the following is an estimate of Hazardous Waste generation:

Table 3 - 5 : Anticipated hazardous waste during construction

Hazardous and Special Waste Stream	Percentage	Estimated Waste (L/yr)
Special and Hazardous Waste to Landfill	7%	85,000
Waste Oil	19%	239,200
Ships bilge Water for treatment	74%	936,000
Total	100%	1,260,200

3.8.2 Treatment and Disposal Plan

The prevention, reduction and recycling practices outlined in section 3.0 will minimize wastes generated during construction of the project.

Waste containers will be appropriately labeled and hazardous wastes 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 Restricted/Hazardous Wastes

Hazardous waste generation is a “Cradle to Grave” responsibility by the generator. Therefore, during construction, it is primarily the individual contractors and their subcontractors who will implement the plan as outlined, in accordance with their contractual and legal obligations, under the direction and supervision of the Contractor’s Environment (& Regulatory) Coordinator and in coordination with the Site Services Contractor.

During construction, individual contractors will be responsible for collecting their hazardous wastes in acceptable leak proof containers within their workshops and yard areas. The individual contractors shall be responsible for all labour and costs associated with disposal of their hazardous wastes, including: preparation, provision of suitable shipping containers, manifests or any other requirements of Federal/Provincial TDGS regulations, loading and shipping to an off-site licensed disposal facility. The Site Services Contractor will periodically collect and transport these waste products to designated hazardous waste storage areas, after ensuring that they are properly labeled (with the generator’s name and contents). The containers will be temporarily stored until the Site Services Contractor can arrange for off-site shipment to a licensed facility for disposal.

Manifests will be compiled by the generators of the hazardous waste in accordance with all TDGS requirements and will accompany hazardous wastes when they are transported for treatment and disposal to approved facilities. Information on the manifests will include type of waste, generators name, waste classification, amount shipped, how the material is contained and facility to which it is being transferred. During construction the Contractor's Environment (& Regulatory) Coordinator and Site Services Contractor will be responsible for ensuring that individual generating contractors prepare manifests as necessary and accompany hazardous wastes when they are picked up or dropped off at the Hazardous Waste Storage Area.

Note:

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

Table 3 - 6 : 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. Ship off-site.	Ship Off-site to a Licensed Facility for recycling or destruction	Used Oil Control Regulations under the Environmental Protection Act Storage and Handling of Gasoline and Associated Products Regulations, 2003 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 Fire Prevention Flammable and Combustible Liquids Regulations under the Fire Prevention Act, 1991 Canadian Environmental Protection Act and Regulations	Generating Contractor / Subcontractor
Contaminated or Expired Fluids	Collect and store in drums at the Hazardous Waste Storage Area (HWSA). Ship off-site.	Ship Off-site to a Licensed Facility for recycling or destruction	Storage and Handling of Gasoline and Associated Products Regulations, 2003 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 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	Store canisters in separate drums at the TWTS. 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	Generating Contractor / Subcontractor

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
			Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations Canadian Environmental Protection Act and Regulations	
Contaminated Soils	Leave in-situ and analyse (rush) sample. Consult Regulations. Ship off-site or dispose at approved landfill or approved disposal site.	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
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
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	Reduce / Ship contents to Licensed Off-site Facility Off-site for disposal.	Transportation of Dangerous Goods Act and Regulations Reference Material for the WHMIS Requirements of the Hazardous Products Act and Controlled Products Regulations	Generating Contractor / Subcontractor

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
	Contractor.		Fire Prevention Flammable and Combustible Liquids Regulations under the Fire Prevention Act, 1991 Canadian Environmental Protection Act and Regulations	
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 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 Canadian Environmental Protection Act and Regulations	Generating Contractor / Subcontractor
Explosives (expired or contaminated)	In accordance with all regulatory standards, protocols, good practices.	Reduce, destroy, ship off-site	Transportation of Dangerous Goods Act and Regulations Canadian Environmental Protection Act and Regulations	Contractor
Other:				
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
Tyvex Suits/Rags	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
Domestic Wastes:				
Food	Collect in plastic bags. Take directly to 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 Site Services Contractor. Place in storage bin and ship off-site to a licensed recycling facility or	Recycle	Waste Diversion Regulations, 2005 Under the Environmental Protection Act Provincial Waste Management Strategy Curb It Recycling St. John's, Newfoundland : Home	Generating Contractor / Subcontractor & Site Services

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
	Regional Waste Management Facility, when required.			
Plastics	Store plastic type's #1, 2,3,5,6 and 7 in a roll off bin. Triple rinse containers containing toxic (i.e. bleach and cleaning supplies) material. Other plastics of non-toxic materials to be included with regular waste and transported to landfill.	Recycle/Landfill	Waste Diversion Regulations, 2005 Under the Environmental Protection Act Waste Management Regulations, 2003 under the Environmental Protection Act Curb It Recycling St. John's, Newfoundland : Home	Generating Contractor & Site Services
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 Curb It Recycling St. John's, Newfoundland : Home	Catering Contractor / Subcontractor & Site Services
Metal Cans	Contractors store dry materials for collection by Site Services Contractor. 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 Curb It Recycling St. John's, Newfoundland : Home	Generating Contractor / Subcontractor & Site Services
General Camp Wastes	Collect and store in compactor bin. Ship off-site to Robin Hood Bay Regional Landfill Site.	Landfill	Waste Diversion Regulations, 2005 Under the Environmental Protection Act Waste Management Regulations, 2003 under the Environmental Protection Act Curb It Recycling St. John's, Newfoundland : Home	Camp Catering & Site Services
Inert Bulk Wastes:				
Passenger and light truck 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	Drain and collect residual fluids and store in laydown area. Ship off-site via licensed metals recycler.	Recycle		Generating Contractor / Subcontractor
Bulk Construction Debris	Stockpile in designated laydown area. Reuse/Recycle where possible. Ship off-site to Regional	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
	Landfill Site.			
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
Scrap Steel / Wire / Aluminum	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
Sandblast Residue	Collect at source. Store in drums at the storage area. Test sample for hazardous content. Ship to HW facility if Hazardous or Ship off-site to landfill if non-hazardous.	Landfill		Generating Contractor / Subcontractor
Reject Concrete Batches	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
Organic Wastes:				
Sewage Sludge	Collect sludge from Sewage Treatment Plant as necessary. Haul off-site by licensed contractor.	Landfill		Site Services
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
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

Waste Type	Site Handling/Shipping Methodology	Treatment or Disposal Strategy	Applicable Regulations/Permits/Information	Primary Responsibility
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 Abatement Contractor.	Landfill		Generating Contractor / Subcontractor
Note: ** Asbestos waste is not expected to be located on-site, or expected to be used during construction, however it is mentioned in the event that it is identified.*				

3.8.2.1.1 Petroleum Waste Stream

Petroleum based wastes generated on industrial construction sites are primarily comprised of: used engine and hydraulic oil, oil from various site generators, used degreasing solvents, contaminated or expired diesel. 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

The generating contractor will be solely responsible for the associated cost of handling/shipping/disposal of their waste oil. The Contractor is encouraged to initiate acceptable recycling/disposal options for waste oil off-site wherever practical.

During construction, the Site Service's Contractor 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 "Operation, Maintenance and Inspection of Tank Facilities Guidelines", API-2610 and any additional provincial registration requirements.

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 will either be stored separately or with waste engine oil in appropriate containment tanks. 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 Contractor's Environment (& Regulatory) Coordinator.

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 destruction.

Used Oil Filters

The generating contractor is responsible for all labour and costs associated with disposal of their used oil filters including: preparation, provision of suitable shipping containers, manifests or any other requirements of Federal/Provincial TDGS regulations, loading and shipping/trucking of the packaged filters to an off-site licensed disposal facility. Regular checks will be made by the Contractor's Environment (& Regulatory) Coordinator to ensure proper records are maintained for stored/disposed of filters. A final record of disposal from the designated licensed facility will be required from the Contractor.

Soil Contaminated with Petroleum Products

The WMP emphasize and facilitate a reduction of soil 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 in large construction projects and hydrocarbon contamination of soil is the result. Extra vigilance must always be practiced when working in proximity to streams or water bodies as laid out in the Biophysical Chapter of the Hebron EPP. Contractors are to document all incidents, take immediate corrective action, and report immediately to the Contractor's Environment (& Regulatory) Coordinator.

It is expected that the majority of contaminated soils will have to be disposed of off-site. The Contractor will be responsible for labour and other miscellaneous costs associated with satisfactory on-site storage at their maintenance yard, for shipping and off-site disposal.

Note:

The Contractor should be able to substantially reduce the amount of contaminated soil through education programs, equipment maintenance, operational techniques and manual "pick and shovel" excavation of land based spills wherever possible. The Contractor will provide the Site Services Representative with progressive and final record of disposal from the off-site licensed facility.

3.8.2.1.2 Chemicals and Miscellaneous Hazardous Wastes

It is not expected that Contractors will generate large amounts of certain chemical wastes during construction of the project. Processing of the various anticipated chemical wastes are described below.

Glycol

Glycol is used in vehicles, heavy equipment and possible on 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 de-icing fluid will be sprayed 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 affects on the surrounding environment; therefore, collection/containment of de-icing fluid will not be conducted.

Contractors are responsible for all labour and costs associated with disposal of waste glycol, including: site preparation, provision of suitable shipping containers, manifests or any other requirements of Federal/Provincial TDGS regulations, barge loading and shipping of waste glycol to an off-site licensed disposal facility. A final record of disposal or recycle/reuse from the designated licensed facility will be required from the contractors.

Waste Batteries

The bulk of used batteries generated during construction are primarily the lead acid type.

The contractors are responsible for all labour and costs associated with disposal of used lead/acid batteries from maintenance of equipment. Including: site preparation for shipping, provision of suitable shipping pallets or containers, manifests or any other requirements of Federal/Provincial TDGS 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 collection drums and removed from site by licensed recycling/disposal contractor.

Aerosol Cans

The use of aerosol cans on-site will be discouraged, however; during construction cans will be collected separately in marked containers at the accommodations complex, kitchen and several Contractor work areas. 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 collection drums and removed from site by a licensed recycling/disposal contractor. To comply with the waste minimization policy it is intended that aerosol cans be substituted wherever possible with refillable type pump/spray bottles.

Paints

Waste paint will be waste exchanged if possible. Water based paint will replace oil based paint, alkyd, or epoxy wherever possible. 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 the Contractors, 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 construction, solvents will be used as a degreasing agent in the maintenance shops, generator enclosures and utility services buildings. These degreasing solvents are usually quite toxic petroleum based chemicals; however, non-toxic citrus-based alternatives will be encouraged as substitutes where only moderate degreasing or cleaning is required. 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 construction. Contractors who generate the waste solvents are responsible for disposal in an environmentally safe manner. The containers will be shipped off-site to a licensed recycling/disposal facility. Industrial parts washers/solvent recyclers are available and

contractors are encouraged to use them to reduce the amount of waste solvent generated.

Laboratory Chemical Wastes

During construction, materials testing, environmental and explosives mixing 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, and back-hauled to an approved treatment/disposal facility off-site. Individual Contactors are responsible for their own chemical wastes.

Explosives

The Contractor 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, the Contractor will notify the Contractor's Environment (& Regulatory) Coordinator prior to taking action.

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 first aid areas. All 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 first aid centre until they can be removed to an 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 transported off-site.

3.8.2.2 Inert/Non-Restricted Waste

3.8.2.2.1 Conveyor Belts and Tires

Conveyor belts and tires have limited life and when no longer usable, contribute to inert solid waste generation.

Arrangements will be pursued for a tire and conveyor exchange program with the vendors and investigation to find alternative uses for old conveyor belts and tires will be ongoing. Some suitable alternate uses for tires are for 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 Contractor's yard and transported to an approved off-site landfill area or shredding facility.

3.8.2.2.2 Vehicles, Equipment and Machinery

Vehicles and equipment will be shipped off-site for reuse/recycle when they are no longer useable. While awaiting back shipping, unusable vehicles or their metallic parts will be stored in a designated section at one of the site laydown areas. All fluids will be drained/collected, properly stored and disposed of.

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.

3.8.2.2.3 Construction and Demolition Waste

Much of the construction will be of modular design and completed in several phases. When construction is complete and they are no longer required, some components and any other readily salvageable materials such as electrical cables and 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 into an approved landfill as C&D waste.

Waste Lumber and Formwork

During the construction phase, small pieces of broken untreated lumber will be collected and disposed in an approved C&D landfill.

Larger pieces of untreated lumber will be stored in a laydown area for potential reuse. Contractors will be informed to reuse this lumber material as much as possible or wherever feasible. When no longer usable, suitable wood waste may be shipped off-site for reuse and the unusable portion shipped to landfill.

Scrap Metal

Scrap metals will be generated during the construction phase. The waste stream consists of ferrous and nonferrous scrap metals of various types, which have low recycling price and are hard to recycle. 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 will be collected by a licensed metals 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.

Sandblasting Residues

During construction, sandblasting operations will be carried out to prepare some metal surfaces for coatings. During sandblasting activities, the surrounding areas will be shrouded for dust control and all residual materials resulting from the sandblasting will be collected by the generating Contractor and temporarily stored in drums at the HWSA. The sandblasting residues, if determined through analysis are hazardous, will be shipped off-site for final disposal at a licensed HW facility. If the sandblasting residue is deemed non-hazardous it will be transferred to the regional landfill site.

Concrete Batch Plant and Off-spec or Surplus Production

Waste concrete from clean out of cement trucks and pumps, off-spec or surplus production will first be considered for reuse rather than dumped whenever practicable. To this end, in the event that off-spec or surplus concrete cannot be reused it will be disposed of in an area designated for concrete disposal.

As noted above, disposal of small amounts of "waste" concrete or other amounts will be done on-site at an approved disposal area, if absolutely necessary. The KAC Environment Coordinator shall be advised of all such disposals and the volume of each.

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.

3.8.2.2.4 Solid Domestic Wastes

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

During construction, collection will be available at various locations on-site. All solid domestic waste, where possible, will be segregated into one of 5 categories, including:

- Compostable Waste (Food Waste);
- Recyclable Containers (Plastics 1, 2, 3, 5, 6, and 7 and Metal Cans);
- Beverage Containers;
- Fibre Waste – Paper and Cardboard;

- Garbage.

  Compostable (Food Wastes)

  Most of the food wastes will be generated in the kitchen and dining areas of the construction 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 the camp site. This material will be placed in a storage bin.

  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.

Note:

Compostable waste shall be shipped with residual waste until the Eastern Regional Composting Facility is constructed and operational; however it is still recommended that source separation of organics will be implemented immediately on assumption of the site lease to avoid confusion in the future.

  Plastics 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 (i.e. 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, what effect the rinse water will have on the sewage treatment plant.

  The Materials Recovery Facility (MRF) located at the Regional Waste Management Facility at Robin Hood Bay is set up to process plastics with a material container code of 1, 2, 3, 5, and 7. Plastic material container codes are located on a plastic container and identified as the following:

Number	Code Identification	Plastic Type
1		Polyethylene Terephthalate
2		High-Density Polyethylene
3		Polyvinyl Chloride
5		Polypropylene
6		Polystyrene
7		Other

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 the RHB facility 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.

Note:

Refundable Beverage Containers: When required arrangements can be made to have the containers transported to a local recycling depot for refund, with proceeds donated to the area schools under the MMSB's "Get to Half at School Program."

Corrugated Cardboard and Paper

Non Hazardous Fibre 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 Site Services Contractor and shipped to a fibre recycling center.

Reduction in cardboard waste will be achieved by avoiding extensive packaging as part of the project's procurement and shipping policy.

3.8.2.2.5 Other Wastes

Sewage Sludge

All sewage sludge, originating from the sewage treatment plant will be collected by a pumper truck and transported to licensed treatment facility. The Site Services Contractor will carry out sewage sludge disposal on a regular basis.

Bilge Waste Water

Under no circumstances shall bilge water be discharged into the ocean. Such wastes shall be collected by a pumper truck and disposed of at a licensed facility.

International Waste

International Waste may be off loaded from an international source (namely ships), upon inspection and approval of the Canadian Border Services Agency (CBSA). Coordination between the receiving site, i.e. Topsides Contractor or GBS Contractor and the CBSA will be required prior to off loading.

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 Recycling Bins

3.8.4.1 Beverage Containers

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

Blue bin recycling containers are recommended for use 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) will be clearly labeled **BEVERAGE CONTAINERS ONLY** and be placed in the following areas around the site:

- Kitchen;
- Recreation areas;
- General office;
- Medical facility;
- Deep water/dry dock site;
- Topsides site;
- Security building;
- Accommodation areas.

3.8.4.1.1 Fibre Recycling Containers

The majority of fibre waste will be produced in the kitchen area and the general office complexes. Fibre recycling containers are recommended for use for the collection of fibre. Each fibre bin will be clearly labeled FIBRE MATERIAL ONLY and be placed in areas around the site such as:

- Kitchen;
- Recreation areas;
- General office;
- Medical facility;
- Deep water/dry dock site;
- Topsides site;
- Security building;
- Accommodation areas.

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. There are many different methods and combinations of methods for solid waste transfer.

During the early stages of construction, an area will be established for the temporary handling of wastes, including recyclable waste, organic waste, mixed waste, construction and demolition waste and hazardous waste. The proposed Temporary Waste Transfer Area should be sited and operated so as to create no environmental or health hazard and no nuisance and would include the following:

- Temporary Waste Transfer Laydown Area;
- C&D Storage and Metals Storage Area;
- Hazardous Waste Storage Area.

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; and
- A distance approved in consultation with the Fire Commissioner's Office.

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

3.8.4.3.1 Temporary Waste Laydown Area

During early construction, an area or areas shall be designated to hold fully contained transportable containers for the temporary storage of the various waste streams. The area will be segregated from other site facilities and will provide storage space and protection for non-hazardous waste material before it is hauled to its final 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 will accommodate several individual stockpile areas. Stockpiles will be segregated based on type of C&D waste. When required, C&D waste material will be hauled to the Robin Hood Bay Regional Waste Disposal Site for final disposal.

During construction, individual contractors will be responsible for collecting their wastes in acceptable containers within their workshops or laydown areas. The Site Services Contractor will periodically collect and transport these waste products, to store at the C&D waste 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 with in the container.

3.8.4.3.3 Hazardous Waste Storage Area

Packaged and placarded hazardous wastes generated by individual Contractors will be temporarily stored in the HWSA.

During early construction a HWSA will be established within the confines of an approved designated area. The HWSA will “storage vault” designed to provide a high standard of protection for site personnel and the surrounding environment.

Individual contractors will be responsible for collecting their hazardous wastes in acceptable leak proof containers within their workshops or laydown areas. The Site Services Contractor will periodically collect and transport these waste products, to storage at the Temporary Waste Transfer Station after ensuring that they are properly labelled (with the generator’s name and contents). The containers will be temporarily stored until they are removed from site on an as needed basis to a licensed facility for disposal.

The HWSA will be cleared of snow periodically throughout the winter and prior to spring melt.

3.8.4.4 Waste Transport and Disposal

It will be the responsibility of the Site Services Contractor to arrange that waste be hauled 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:

- General/Mixed Waste shall be picked up at the Temporary Waste Laydown and transported to the Robin Hood Bay Regional Waste Management Facility for processing and/or disposal;
- Organic Waste shall be picked up at the Temporary Waste Laydown Area and transported to a licensed composting facility or to the Robin Hood Bay Regional Waste Management Facility;
- Recyclable Beverage Containers shall be picked up at the Temporary Waste Laydown Area and transported to a local green depot with deposit refunds donated to a local school or other charitable organization;
- Recyclable Containers (plastics 1,2,3,5,6 and 7 and metal containers) shall be picked up at the Temporary Waste Laydown Area and transported the Robin Hood Bay Regional Waste Management Facility;
- Recyclable Fibre Stream shall be picked up at the Temporary Waste Laydown Area and transported to the Robin Hood Bay Regional Waste Management Site or to a licensed fibre recycling facility;
- Construction and Demolition Debris that is unacceptable for reuse or recycling shall be removed from the C&D Waste Storage area. Once loaded C&D waste will be transported to the Robin Hood Bay Regional Waste Management Site or other licensed facility for final disposal;
- Recyclable Metals shall be collected by a licensed metal recycler from the C&D waste storage area where it can be transported and prepared for recycling;
- Restricted/hazardous waste shall be collected and transported to a licensed hazardous waste disposal site under all applicable laws and regulations.

3.8.5 Training

All operational personnel involved in the handling of hazardous wastes will be fully trained for ‘Personal Safety and Protection’; they will also be trained in emergency response. Responsibilities for waste management and operation of the HWSA will be assigned to the Site Services Contractor during construction. The contractor 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 policy 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 Surveillance Monitoring

The Site Services Contractor as well as the Contractor's Environment (& Regulatory) Coordinator 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. During construction, the Contractor's Environment (& Regulatory) Coordinator and Site Services Contractor will perform weekly 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 the spill kits. This inspection will assist in evaluating the capacity of the Temporary Waste Management Area and to plan any modifications to the system.

3.8.7 Decommissioning

The design and operation of the Waste Laydown Area and C&D storage area shall take into consideration the requirements of progressive closure and decommissioning and future use of the site.

A decommissioning summary report describing the condition of the site flowing closure/decommissioning and describing any future environmental concerns. Upon termination of operations, the site shall be rehabilitated to the satisfaction of NLE&C.

3.9 Contingency Planning

3.9.1 Improper Disposal

Any improperly disposed materials identified by the Environment (and Regulatory) Coordinator, or site Environmental Monitors, will be recorded and discussed with the Contractor. For example, recyclable material should not be disposed of with residual waste headed for the landfill. Hazardous wastes will not be disposed with regular waste, but will be stored in approved storage containers until they can be shipped to licensed facilities off-site. By keeping site Contractor access restricted to the trained Site Services Contractor personnel, a high degree of control is provided.

3.9.2 Fire

Oxidizing, reactive, or flammable materials will not be disposed with the regular waste. In case of an accidental disposal, the on-scene coordinator will be notified immediately and the emergency response unit will be

dispatched 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.

3.9.3 Oil Contaminated Waste

In the event of an oil spill, used or unused, oil contaminated debris shall be collected in double bags and placed in liquid tight containers. This debris should be kept together and segregated from the regular waste stream until it can be transported to an approved landfill site or treatment facility.

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4 SOCIO-ECONOMIC ENVIRONMENT

4.1 Purpose

This Socio-Economic Environment chapter of the Hebron Project Bull Arm Site EPP provides detailed guidance to all organizations and personnel involved with Hebron Project construction and fabrication 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 timely, accurate 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 this Socio-Economic EPP covers all activities anticipated during the construction phase 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 chapter:

- 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 Project's 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 public about plans and policies so that they can be confident about corporate intentions and the impacts of the Project; and
- 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 chapter of the EPP will regularly be reviewed and updated.

4.4 List Of Acronyms and Glossary

Table 4-1: List of Acronyms

AcronymTerm	Description
ACOA	Atlantic Canada Opportunities Agency
APEC	Atlantic Provinces Economic Council
CNA	College of the North Atlantic
CIHI	Canadian Institute for Health Information
CMHC	Canada Mortgage and Housing Corporation
C-CORE	Centre for Cold Ocean Resources Engineering
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
CSR	Comprehensive Study Report
EMCP	ExxonMobil Canada Properties
EMO	Emergency Measures Organization
EOI	Expression of Interest
EPP	Environmental Protection Plan
EPC	Engineering, Procurement, Construction
FEED	Front End Engineering and Design
GDP	Gross Domestic Product
GBS	Gravity Base Structure
INTRD	Department of Innovation Trade & Rural Development
JEA	Job Environmental Analysis
KAC	KIEWIT-AKER Contractors
NLDHCS	Newfoundland and Labrador Department of Health and Community Services
NLDE	Newfoundland and Labrador Department of Education
NLDF	Newfoundland and Labrador Department of Finance
MA	Newfoundland and Labrador Department of Municipal Affairs
NLHC	Newfoundland and Labrador Housing Corporation

NLNU	Newfoundland and Labrador Nurse's Union
NLRC	Newfoundland and Labrador Refining Corporation
NLREDA	Newfoundland and Labrador Regional Economic Development Association
NOIA	Newfoundland and Labrador Oil and Gas Industries Association
PRAC	Petroleum Research Atlantic Canada
R&D	Research and development
RCMP	Royal Canadian Mounted Police
REDB	Regional Economic Development Board
SEIS	Socio-Economic Impact Statement (and Sustainable Development Report)
TCH	Trans-Canada Highway
VEC	Valued Environmental Component
WHSCC	Workplace Health, Safety and Compensation Commission

Table 4-2: Glossary

Term	Defininition
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 and 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

Term	Definition
	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 Offshore Oilfield 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
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 an offshore structure

4.5 References

Citation	Reference
CAHE-SA-BRZZZ-00-000-0001	EMCP (ExxonMobil Canada Properties). 2010. *Hebron Project Socio-Economic Impact Statement and Sustainable Development Report*. (in preparation)
CAHE-SA-SRENV-00-000-0001	EMCP (ExxonMobil Canada Properties). 2010. *Hebron Project Comprehensive Study Report*.
CAHE-ED-BPZZZ-00-000-0001	EMCP (ExxonMobil Canada Properties). 2010. *Hebron Project Canada-Newfoundland and Labrador Benefits Plan* (in preparation)
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

The existing Bull Arm Site will be refurbished and the dry dock reestablished. The GBS will be built in the dry dock, moving to the deep water site to be completed. Selected Topsides components will be fabricated at the Bull Arm Site. Others will be fabricated offsite and will be transported to the Bull Arm facility. All modules and components will be integrated at the pier. Hook-up and commissioning activities with the fully integrated Topsides will begin at

the pier prior to float out and mating with the GBS at the deepwater site, and continue after mating. A detailed description of Site activities is in Chapter One, section 1.6.

Figure 4-1 shows the anticipated labour force requirements for Project work in the Province, i.e. Bull Arm as well as other potential locations in the province. The anticipated employment requirement estimates represent the current best estimates as per the Project forecast performed in the 4th Quarter 2010. These data are subject to change in response to the development of detailed design and schedule during Front End Engineering and Design (FEED). Information on the Project employment requirements will be communicated to various stakeholders as the information becomes available.

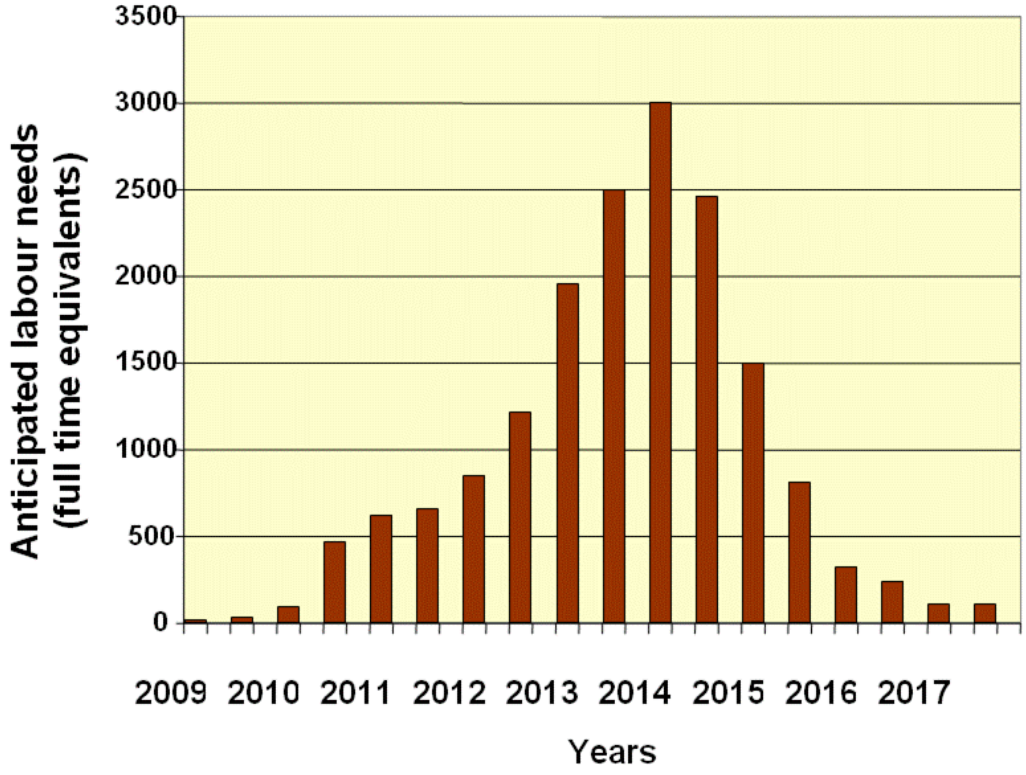


Figure 4 - 1 : Anticipated Employment Requirements, Hebron Project, 2009-2017

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

- GBS concrete;
- Structural Trades;
- Project and Construction Management;
- Mechanical Trades;
- Piping Trades;

- Civil and Structural Engineering;
- Surface Protection; and
- Electricians.

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

- Civil Management;
- General Management;
- Mechanical Management; and
- 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, an area generally encompassing the Isthmus of Avalon and as far west as Clarenville as shown on Figure 4-3 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.

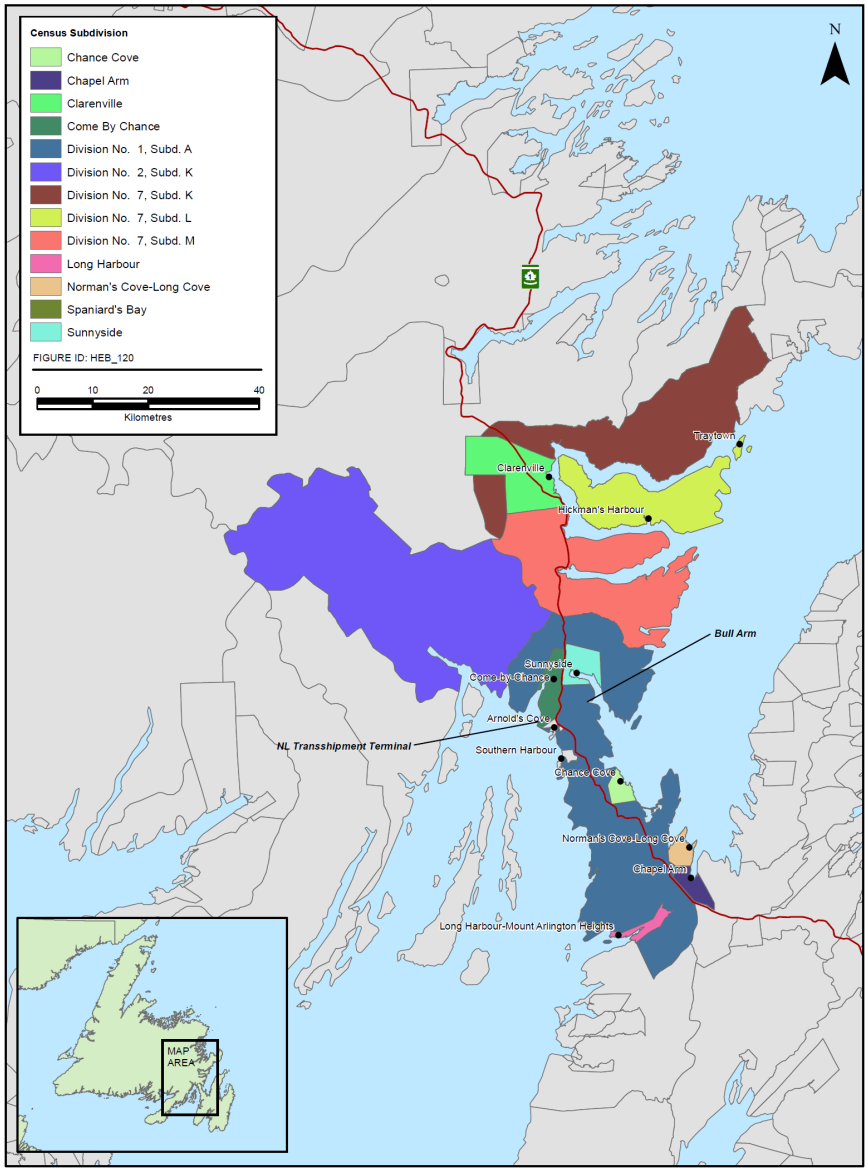


Figure 4 - 2: Area within 50 km Radius of the Bull Arm Site

4.6.2.1 Economy and Demographics

Overall, the provincial economy has performed well since 1996, with significant growth in GDP 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 depended since joining Confederation in 1949.

According to a Major Project Inventory compiled by the Atlantic Provinces Economic Council (APEC, 2010 *in* EMCP, 2010a), 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 2009, the population had increased further to 508,925.

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, totalling over $1 billion each year.

Bull Arm Area

The Isthmus area has and 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 employed, at peak, about 5,800 workers (HMDC, 1996 *in* EMCP, 2010a). In 2009, the provincial energy corporation, Nalcor Energy, assumed ownership of the Bull Arm facility through its company, Nalcor Energy- Bull Arm Fabrication.

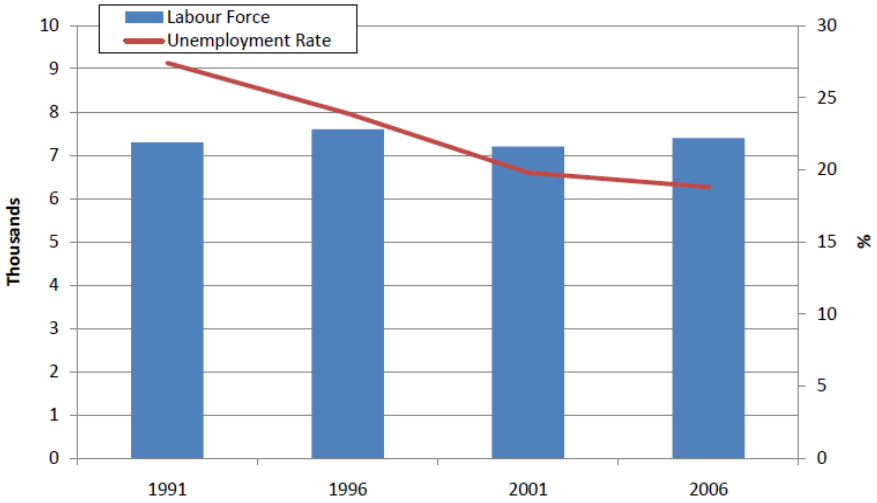
From 1999 to 2009 the Bull Arm facility has been used extensively by the oil industry to fabricate, install, construct, test, and/or inspect various systems, components, modules, and rigs. This included work to support the Terra Nova and White Rose projects, as well as work on the Henry Goodrich semi-submersible and Grand Banks drilling rigs.

The Newfoundland Transshipment Terminal employs 49 people and spends about $9.5 million annually on goods, services, and salaries from local companies and personnel.

Also on the Isthmus, North Atlantic Refining operates a 115,000 barrel per day refinery at Come-by-Chance. The refinery employs approximately 700 people and its operations add $160 million per year to the provincial economy, including $76 million in employee wages and benefits and $84 million in local business procurement (North Atlantic Refining Website, 2009).

In April 2009 Vale began construction of a $2 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 are scheduled for 2013, with an expected permanent workforce during operations of 450 (Vale Website, 2010 *in* EMCP, 2010a).

Each of these large projects has had a positive influence on the area's unemployment rate and labour force (see Figure 4-4), despite negative effects brought about by structural changes in the fishery following the cod moratorium.



Source: Statistics Canada, 1991; 1996; 2001; 2006a.

Figure 4 - 3: 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 insofar as more people are employed, and successive rounds of employee and business expenditures generate employment and income multiplier effects in the local and provincial economies. However, particular socio-economic effects can be both positive and negative where different segments of society are differentially affected. 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 will be greatly influenced by EMCP's Canada-Newfoundland and Labrador Benefits principles, policies and procedures, including its Diversity 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 Eastern School District is currently the largest district in the Province, with approximately 41,000 students and over 3,000 teachers in 121 schools (NLDE, 2010a *in* EMCP, 2010a). This District covers the area of Clarenville and east, which includes the Burin, Bonavista, and Avalon peninsulas (NLDE, 2004 *in* EMCP, 2010a).

Post-secondary education and training in the Province is provided primarily through Memorial University (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, 2009c *in* EMCP, 2010a).

Bull Arm Area

In 2008-09, there were nine primary and secondary schools in the Isthmus 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, 2010a). The CNA campus in Clarenville has approximately 250 full-time, 50 part-time and 400 Continuing Education students registered each year (CNA Website, 2010).

The Project could result in a peak employment demand in the order of about 3,000 people working at the Bull Arm site. It is anticipated that most of the workforce will live on site. However, some may re-locate to the area with their families. The Hebron Project is not expected to result in a substantial population increase in the Bull Arm area: this will be monitored by the Project.

The Bull Arm area's past experience suggests that with advance notice from EMCP in respect to labour force demands, labour sourcing and accommodation arrangements, local education and training authorities 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 is only one certified childcare facility in the Isthmus area and it is located in Clarenville (NLDHCS, 2009a *in* EMCP, 2010a). It currently operates at full capacity with 23 children and there is a waiting list of 75 people.

4.6.2.3.2 Health and Community Services 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 (NLNU, 2009 *in* EMCP, 2010a).

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 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 (NLRC 2007 *in* EMCP, 2010a).

In 2009, the Dr. G.B. Cross Hospital had 47 acute care and 15 long-term care beds. It provides a range of medical specialty services to the area. There is no psychiatric institution in the area. While the Cross Memorial Hospital does not provide formal psychiatric in-patient services, patients can be admitted to the medical-surgical service.

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, 2010a). In August 2009, there were seven family physicians practicing in Clarenville, along with one nurse practitioner. There was one family physician in Come-By-Chance and one in Arnold's Cove. (L. Browne, pers. comm. *in* EMCP, 2010a).

The Hebron Project is not expected to place high levels of demand on the local health and community services system. EMCP will perform an assessment of local health care services and monitor Project demands to ensure there are no undue demands and pressures on the system. As well, the Project will provide medical services at the Bull Arm site.

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 2009, 22 uniformed RCMP officers and three District Assistants served Clarenville and the surrounding area, including most of the Avalon Isthmus area. Notwithstanding the presence of the Hibernia and Terra Nova projects at Bull Arm, there have not been any substantial changes in policing requirements in the area in the last 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, personal offenses and traffic incidents, especially impaired driving. However, these increases were in keeping with the level of activity in the area and the police were able to adapt to the situation. 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. Similar to the Hibernia Project, the great majority of the Hebron Project workforce will be accommodated in an on-site camp at Bull Arm.

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, 2010a). The Fire Department in Clarenville has a total of 31 volunteer firefighters (W. Porter, pers. comm.; Clarenville Fire Department Website, 2009 *in* EMCP, 2010a).

The provincial government also has in place the Emergency Measures Organization (EMO) 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 (NLDMA, 2009a *in* EMCP, 2010a).

4.6.2.3.4 Recreation Services and Facilities

Bull Arm Area

The Isthmus Area contains a range of recreational facilities, many of the larger ones in the Clarenville-Shoal Harbour area. These include a stadium, softball fields, a sports complex, a community centre, 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 Bear Mountain Hiking Trail. The Town and the provincial government invested $15 million to build a new Events Centre. The Centre,

which officially opened in January 2010, includes a theatre, an ice rink, indoor walking tracks, curling sheets and community meeting rooms to host conferences and conventions. An outdoor track and a soccer field are also being built next to the Event Centre. (Town of Clarenville Website, 2006; G. Gosse, pers. comm.; The Packet, 2010 *in* EMCP, 2010a).

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, 2010a).

4.6.2.4 Community Physical Infrastructure and Services

4.6.2.4.1 Housing

In 2009, housing starts in the Province totaled almost 3100 units. This level was relatively high in a historical context of the Province and performance was much better than nationally, where housing starts decreased by almost 30% (NLDF, 2010 *in* EMCP, 2010a).

The current surge in house prices in the Province since 2008, according to the Canada Mortgage and Housing Corporation (CMHC), 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, 2010a). 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, 2010a).

Bull Arm Area

Between 1996 and 2006, the number of occupied dwellings in the Isthmus of Avalon increased by 7.7% (Statistics Canada, 1996; 2001, 2006a *in* EMCP, 2010a). Most of the change was in Clarenville-Shoal Harbour.

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, 2010a).

More recent data for Clarenville show that by December 2009, average sale prices had increased to $135,020, further illustrating that price increases are not solely related to oil-related development or limited to the St. John's area.

Average monthly rents in the area also vary considerably over time and among communities. The general trend has been one of decreases between 1996 and 2006. However, with the commencement of the Vale smelter project demand for rental accommodation and rents are expected to rise.

In 2009, the Newfoundland and Labrador Housing Corporation (NLHC) had 30 non-profit rental units and eight rental subsidies in Clarenville. Arnold's Cove has 11 non-profit rental units and two rental subsidies. There are four non-profit rental units in each of Come-by-Chance and Goobies.

Project consultation has found that there is some interest and some capacity in communities near the Bull Arm site to provide accommodation for Project workers in order to avail of the associated economic benefits. However, there also remains concern about the potential disruption associated with large numbers of temporary residents. There is also office space available (in Clarenville in particular) and also some industrial/commercial lands.

During the Hibernia project, several Norwegian families lived in Clarenville for a number of years, making a positive contribution to diversity in the community. During other, smaller projects at the Bull Arm site, there was no on-site camp and workers were either local or found local rental accommodation, contributing to the local economy through purchasing day-to-day goods and services.

Both large projects in the Isthmus area, the Vale project at Long Harbour and the Hebron Project, plan to use on-site camps to avoid the problems of insufficient accommodation in the communities and the potential adverse effects on communities. EMCP will continue to work with the community and business to develop and monitor its management strategies regarding housing.

4.6.2.4.2 Ports, Airports and Roads

Bull Arm Area

The Bull Arm facility is an ISPS accredited port and will receive materials throughout the Project from local, national and international locations.

The Bull Arm site has a helicopter landing pad, primarily for emergency uses. In addition, the Clarenville Airstrip, located about 8 km north of Clarenville off Route 230, is a 4000 ft (1219 m), 75 ft (23 m) wide, un-serviced, paved runway that is owned by the provincial government. Thorburn Aviation Limited operates a private float plane operation at Thorburn Lake, located a short distance west of Clarenville.

Primary access to the Bull Arm site is by the Trans-Canada Highway (TCH), a federal-provincial highway system that was completed in 1971.

Most of the TCH's construction is a provincial responsibility. The Province decides on the design, construction, safety standards and financing of highways under its jurisdiction. Since 2001, the Government of Canada has committed over $808 million in funding to improve segments of the highway system.

With the federal-provincial "Roads for Rails" funding agreement of the late 1980s there have been significant upgrades to the TCH within the Province, including the Isthmus area.

The upgrades included widening, resurfacing, paved shoulders, intersection improvements, adding passing lanes and upgrading to a four lane divided controlled access standard in areas of higher traffic volumes. In addition two overpasses were constructed in recent years (at Chapel Arm/Long Harbour and Arnold's Cove/Refinery interchanges), and the Come-By-Chance/Sunnyside overpass is currently under construction.

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 Avalon Isthmus area, 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 Trans-Canada Highway. Based on experience with previous projects at the Bull Arm site, increases in traffic volume, speeding and impaired driving remain a concern.

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 and St. John's, and light industrial land such as is found in industrial estates.

Bull Arm Area

The Bull Arm site represents the most significant industrial lands in the Isthmus Area that are relevant to the offshore petroleum industry. The site comprises three main areas: the dry dock site, the fabrication and assembly yard, and the construction camp / administration area. The dry dock site, which underwent some modifications in 1999 and 2005, encompasses 140,000 m^2 and the fabrication and assembly yard is a 120,000 m^2 area. In 2009, site ownership was transferred to Nalcor Energy and the site is operated through Nalcor Energy- Bull Arm Fabrication.

Other industrial and commercial lands in the area are concentrated in Clarenville and Arnold's Cove. Clarenville has recently 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, 2010a).

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. However, as there has been little growth in the economy of the region no significant development has occurred in the past few years (W. Slade, pers. comm. *in* EMCP, 2010a).

4.7 Organization and Responsibilities

4.7.1 Environment and Regulatory Team/Community Relations Coordinator

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 and Regulatory Team comprised of staff of EMCP, KAC and WP and the on-site Community Relations Coordinator. 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 Coordinator and/or the Project Environment and Regulatory 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 Environment and Regulatory Team and the Community Relations Coordinator are described in Section 1.7, Chapter One of the EPP.

Day to day management of the socio-economic aspects of the EPP will be by the Community Relations Coordinator, supported by EMCP and Contractor Benefits personnel located in St. John's and Bull Arm. The Community Relations Coordinator duties include:

- Establishing and/or facilitating working committees, in conjunction with the Project Environment and Regulatory Team;
- Identifying current and potential issues; facilitating resolution;
- Undertaking and/or facilitating data collection to monitor key concerns;
- Developing and implementing information and orientation programs; and
- Facilitating ongoing and annual review of effects management.

EMCP, KAC and WP 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. It is anticipated that members of local communities and interest groups will participate in liaison committees (described below).

These activities will be ongoing throughout the life 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; and
- Ensure that all Project personnel are familiar with the Project, Project-related issues of concern, 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. There is on-going communication with regulatory agencies concerned with benefits monitoring.

The Project's Community Relations personnel will monitor community understanding and acceptance of the Project and will ensure that monitoring of selected socio-economic indicators is undertaken.

The Community Relations personnel will be guided by the following objectives:

- Provide the medium through which communities can voice their interests and concerns;
- Provide accurate and relevant information to communities to facilitate discussion and planning; and
- Relay the Project's position on environmental, socio-economic and other community based issues, as appropriate.

4.8.1.2 Community and Fisheries Liaison

Liaison will include an ongoing process of direct consultation with individuals and groups. The Project will work with local groups to establish effective liaison mechanisms:

It is anticipated that a Community Liaison Committee (or equivalent) will be established, comprising local community representatives and leaders. It will 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 would be 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 Coordinator, supported by EMCP's on-site Environmental and Regulatory Advisor.

Fisheries liaison is carried out through a Bull Arm Area Fishers' Working Group, representing the fishers with the greatest potential of being affected by Project activities. The working group consists of representatives of the area Fishers' Committees (representing Trinity Bay communities of Sunnyside, Chance Cove, Bellevue, Thornlea, Normans' Cove-Long Cove and Chapel Arm). It will address Project/fishing interations in Great Mosquito Cove, Bull Arm and Tickle Bay.

4.8.1.3 Communication Initiatives

The primary focus of the Project's information programming will be the local communities. However, the initiatives will also serve to provide Project effects 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 will be implemented include the following:

(A) Information Centre

The location and hours of operation of the Information Centre will be publicized in the region, with interested individuals and groups being 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.

(B) Hebron Website

A Project "newsletter" will be provided electronically and updated regularly on the Hebron Project website. It will give Project information with the intent of building an awareness of the construction process at Bull Arm. The newsletter will report on activities and also respond to questions and concerns.

The newsletter format is anticipated to be relatively simple and will be produced every quarter through the Community Relations Coordinator. Hard copies will also be distributed to Project personnel, identified community sites (e.g. local libraries), and to the general public through the Information Centre.

(C) Off-Site Presentations

Not all interested individuals and organizations will be able to visit the Site but will nonetheless be interested in the progress of the Project. Project personnel will therefore be available, time permitting, for presentations to interested groups and organizations at their request.

4.8.1.4 Monitoring and Reporting

Monitoring programs will be 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 will be reported in a timely fashion both internally and to relevant government agencies and community groups, in order that prompt action can be taken to correct any problems that may arise.

Monitoring and reporting procedures will be established with the appropriate regulatory agency/agencies, primarily the Canada-Newfoundland and Labrador Offshore Petroleum Board. Commitments under the EPP, such as a mandatory Orientation Program, will also be monitored.

Community attitudes towards the Project will 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 will help identify possible problems in advance so that they can be addressed.

4.8.2 Management of Effects on Community Social and Physical Infrastructure and Services - Actions

4.8.2.1 Introduction

Strategies will be 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 work camp to house most of the 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 will provide 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 throughout Project planning and design work, and in site policies. To ensure that the Site is self-sufficient with respect to normal health and safety, a comprehensive Safety, Health & Security management system, including all required emergency preparedness and response processes and equipment, will be established as well as a comprehensive health management plan.

- Workers will be introduced to site health and safety requirements and expectations immediately upon reporting for work, in the site Orientation Program.
- A Site Specific Health Plan will be 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 Health Plan will provide details of health management on site, including a properly staffed and equipped site medical clinic. It is not anticipated that the Project will place undue demands on the regional health facilities.

- Where demand for additional services is likely to arise from the Project, advance planning will be facilitated through continuing liaison.
- The Project will 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, health and safety are an integral part of Hebron Project planning and execution. The following policies and procedures will be in place at the Bull Arm site:

- An overall site security plan will be in place for the Bull Arm site, both on land and for the marine areas, including having ISPS designation for the port areas;
- Zero tolerance for drugs;
- An on-site helicopter landing pad for emergencies;
- The Bull Arm site will have 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. In addition, there will be regular liaison with local fishermen, the Canadian Coast Guard and other appropriate agencies to update them on marine operations and discuss marine safety concerns; and
- A marine traffic management system will be implemented at the Site.

In addition, there will be:

- On-going liaison with the RCMP in the Isthmus area to ensure that appropriate information is available and exchanged to address any policing issues that may arise; and
- 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);
- The Site Emergency Preparedness and Response Plan provides a systematic process for planning and responding to emergencies to minimize the impacts to people, the environment, and assets in an emergency situation.

This Site Emergency Preparedness and 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;
- Identifies requirements for a structured program of simulations, drills, and exercises for the various types of emergencies;
- Identifies required lifesaving and emergency response equipment and personnel transportation methods;
- Provides an onsite Incident Command Center (telecommunications equipment, computers, implementation procedures / tools, etc.);
- Provides a communications protocol and supporting communications equipment for internal and external communications;
- Addresses requirements for emergency egress routes;
- Identifies muster areas for the assembly and accountability of personnel;
- Identifies evacuation procedures for personnel;
- Describes available internal and external resources for technical and logistical support by the work site, Project level, and corporate Emergency Response Organizations;
- Provides a process for the activation of mutual aid or regional response teams; and
- Establishes assessment processes and key performance indicators to measure the effectiveness of Emergency Preparedness and Response.

4.8.2.4 Housing

The strategy of using a self-contained workcamp on site to accommodate the bulk of the workforce 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.

- The Bull Arm site will have on-site housing for a significant proportion of Project personnel, and this should mitigate negative effects on the local housing market;
- EMCP will work with its FEED/EPC contractors to study the full range of catering, retail, personal services, recreation, entertainment, daycare and other requirements of the housed workers;
- EMCP and its contractors will work 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; and

- Estimates of the total numbers of workers and families likely to move into local communities and requiring off-Site accommodation will be provided to regulatory agencies, the Newfoundland Housing Corporation (NLHC), Canada Mortgage and Housing Corporation (CMHC) and local municipalities on an agreed basis.

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 to build and assemble a GBS platform 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's intent is to ensure, through its plans and policies, an enduring positive contribution to the communities and residents of the Province, including those in the Bull Arm area.

EMCP's overall intent is 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 approximately 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 will be specified in the Canada-Newfoundland and Labrador

Benefits Plan to be filed as part of the Development Application. 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; and
- 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 will be in place during the construction phase:

- 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;
- Employ 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 will begin in 2011 and are anticipated to continue through 2016. Hebron anticipates approximately 3,000 jobs during peak construction activity, providing

experience that will increase long term trades and engineering capacity in the Province.

The local workforce gained considerable experience during the building of the first GBS at Bull Arm during 1991 – 1997 but much of this workforce has scattered during the intervening years. Actions to address Project commitments to employment opportunities during Hebron Project construction activity at Bull Arm include:

- Early identification of staffing demands and supply;
- Active planning to address human resource planning and the gap between demand and supply;
- Early and 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;
- EMCP will monitor main contractors' employment, training and diversity initiatives; and
- The Hebron Project website offers information to assist identification of employment opportunities through:
    - Providing a Bidders List for major contracts;
    - Advertising employment opportunities within EMCP; and
    - Offering work-term employment to co-op students from Memorial University and the College of the North Atlantic.
    - Provide links to recruitment pages of FEED contractors websites

4.8.3.4 Diversity

It is the responsibility of EMCP to develop and oversee the implementation and ongoing execution of a Diversity Plan to meet the regulatory and contractual requirements of the Project.

Successful implementation of the Diversity Plan's components will require a full commitment not only from EMCP but also its main contractors. EMCP will;

- Ensure that both FEED/EPC contractors hire a Diversity Coordinator;
- Conduct diversity awareness training for employees during the construction phase; and
- Monitor contractors' compliance with the Diversity Plan which will be part of the commercial terms of their contracts with EMCP. Procedures will be put into place to deliver and effectively monitor compliance with the standards set.

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 has 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. Project senior management team presented initial information about the Project and the procurement process to the business community very early in the Project planning, in April 2009, hosting 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 Island.

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 include:

- During the construction phase, a dedicated Supplier Development Lead, reporting to the Business Services Manager, will be responsible for supplier development initiatives; and
- Pre-construction, EMCP will establish and maintain a construction phase contracts and procurement office with EMCP and the main FEED/EPC contractors co-located to provide a single point of contact.

EMCP is committed to using such initiatives as:

- Participating in industry conferences and workshops, such as those organized regularly by 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 will continue to be 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 supplier information sessions and workshops with main contractors' procurement personnel to advise of Project requirements. These events will also explain contracting strategies, size of work packages, EOIs and pre-qualification processes, and how the major work packages will be bid and evaluated;
- Holding a reverse trade show focused on EPC work;
- Co-locating the majority of EMCP and FEED/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 FEED/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 will be used by EMCP and its contractors and suppliers; where feasible other local databases will be integrated into the Project database; and
- 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 will 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; and
- 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 FEED/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, EOIs, RFPs contract awards through such means as the Project website, NOIA and BIDS;
- Use EOIs to solicit local interest in opportunities;
- Participate in community information sessions as requested by the site Project Environment and Regulatory Team.

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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, demonstrates an understanding of commercial fisheries in the Bull Arm area and identifies measures to be implemented at the Bull Arm site to enhance operational safety and mitigate potential adverse impacts from the Project on commercial fish harvesting operations.

5.2 Scope

The Commercial Fisheries chapter of the EPP provides environmental protection measures to be implemented by the Project over the life of the Hebron Project construction activities at the Bull Arm facility. It introduces 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 in the immediate Project area, considered to be Bull Arm and Tickle Bay.

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; and
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 this 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; and
- Ensure that all commitments expressed by EMCP and its contractors to minimize commercial fishery impacts will be satisfied by construction personnel.

5.4 Abbreviations

Abbreviation	Term
CCG	Canadian Coast Guard
CEAA	Canadian Environmental Assessment Act
CSR	Comprehensive Study Report
CSZ	Construction Safety Zone
DFO	Fisheries and Oceans Canada
EMCP	ExxonMobil Canada Properties
EPP	Environmental Protection Plan
GBS	Gravity Base Structure
KAC	Kiewit-Aker Contractors
MTP	Marine Traffic Procedures
MTS	Marine Traffic System
UPM	Utilities and Process Module

5.5 References

Document Number	Title
NS-G-O-P-A00-PH-00-020	Hibernia Development Project Platform Construction Environmental Protection Plan
EMCP, 2010a	The Hebron Project Comprehensive Study Report
NB-G-F-P-T00-XH-00-001 D3	Hibernia Development Project *Marine Traffic Procedures for Bull Arm Vessel Traffic Route, Trinity Bay, Newfoundland* (revision D3, 13 Aug 1996)

5.6 Overview

5.6.1 Project Description

The Hebron Project's GBS will be constructed at the Bull Arm Site as will some of the Topsides modules. The full Topsides will be assembled at the Site and mated with the GBS at the deep water site in Bull Arm. Construction and fabrication activities are anticipated to take place from winter 2011 through 2016. A more detailed Project description is provided in Chapter One of the EPP.

Potential effects on fishing activities during the Hebron Project construction will be primarily concentrated in Bull Arm and, more specifically, at Great Mosquito Cove and the proposed 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, during tow 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;
  - Topsides fabrication and assembly; and
  - Associated tug and barge movements.
- Deep Water Site:
  - GBS tow-out and construction to final height;
  - Associated tug, barge and passenger ferry movements;
  - Noise and light associated with construction;
  - Topsides tow-out and mating; and,
  - Platform hook up
- Early stages of platform tow-out from the deep water site; and
- Bull Arm Site demobilization.

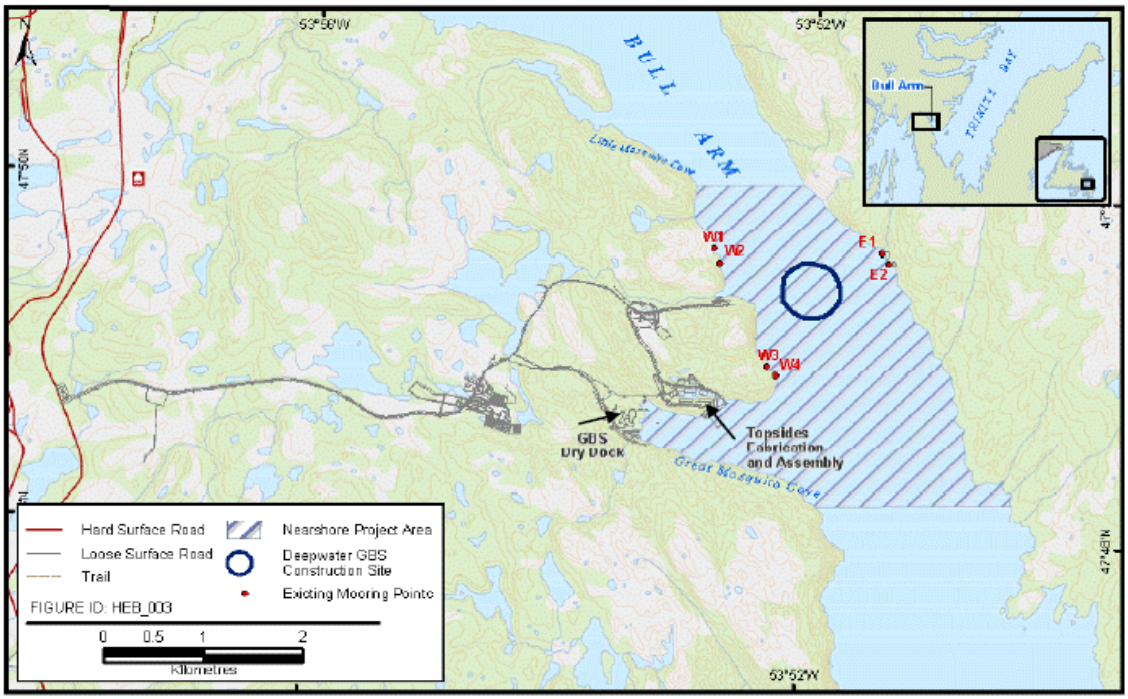

Figure 5 - 1: Bull Arm Fabrication Site

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.

A total of 35 fishing enterprises from these communities, employing 70 to 80 individuals, 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.

Over the past decade, overall landings have fluctuated from year to year, ranging from a peak of 3,200 tonnes in 2000 to a low of 1,500 tonnes in 2002. Despite these ups and downs, the general trend has been one of relative stability.

For the period 2004 to 2008, the average yearly catch was about 2,142 tonnes, and the value of the harvest averaged slightly over $1 million annually. During this period capelin, mackerel and herring represented nearly 90 percent of the average annual catch by weight, and accounted for nearly 50 percent of the value. Crab and lobster contributed a further 44 percent of the area's annual fishing income, although the total catch by weight of these two species was less than 6% of all species combined.

The *Hebron Project Comprehensive Study Report,* Chapter 8, describes the commercial fisheries in the Bull Area in detail and assesses the potential effects of the Project on the fisheries. During all phases of construction at Bull Arm, potential interactions between the Project and commercial fish harvesting activities are possible. 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:

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 Gravity Base Structure (GBS) is moored at the deepwater 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 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,* such as outlined in Section 5.7.2.5 of this document.

5.7.2 Roles and Responsibilities

5.7.2.1 EMCP's Role

EMCP is firmly committed to minimizing interference with, and disturbance to, established fishing operations in the vicinity of the construction Site and will establish appropriate compensation programs in consultation with the area fish harvesters. Preparation and implementation of the Commercial Fisheries chapter of the EPP is a joint responsibility of EMCP and its contractors.

EMCP will:

- Establish 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;
- Continue to work with area fishers to implement mitigative and compensatory policies and operating practices contained in the Fisheries Code of Practice 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 area fishers and contractors throughout the Project;
- Monitoring effects on the commercial fisheries environment in the vicinity of all sites during the work; and
- Monitor implementation of the Fisheries Code of Practice and mitigation/ compensation measures mutually agreed among EMCP, area fishers and contractors.

5.7.2.2 Fisheries Liaison Officer

The Fisheries Liaison Officer will be based at the Bull Arm Site and be the Single Point of Contact (SPOC) for the commercial fishers to obtain accurate and timely information about Project activities and to report any concerns. The role of the Fisheries Liaison Officer includes:

- Monitoring implementation of the Fisheries Code of Practice;
- Participating on the Project Environment and Regulatory Team;
- Day to day liaison with the KAC Marine Operations group to ensure accurate information is available to the fishers and that KAC Marine Operations is aware of current fishing activity;
- Ensure Site Management is aware of fisheries issues;
- Participate in orientation programs as needed;
- Participate in incident investigation associated with fishers, e.g. gear damage;
- Participate in meetings with the Bull Arm Area Fishers' Working Group;
- To prepare and maintain records of all meetings with area fishers and fisheries liaison groups; and
- To keep EMCP fully informed of all meetings and consultations with fishers' groups.

5.7.2.3 Contractors' Role

In addition to the general EPP commitments outlined in other chapters, the specific roles and responsibilities of the GBS and Topsides contractors are:

- To participate with EMCP in the development and implementation of a Fisheries Code of Practice, including rules and procedures for the management and control of Project-related marine traffic and fishing vessels;
- In consultation with the Fisheries Liaison Officer, to hold regular scheduled briefings on upcoming Project activities and undertake on-going consultation with area fishers concerning the timing and location of these activities in order to minimize disruption to the established fishery;
- To ensure that contractors senior managers, general workers and site-based marine captains and crews participate in orientation programs designed to familiarize them with the Marine Traffic Procedures (MTP), commercial fisheries concerns and potential effects of Project activities;
- To provide information regarding the MTP, commercial fisheries concerns, and potential effects of Project activities to non-contractor vessel masters bringing materials to the Site; and
- 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 Fisheries Code of Practice;
- Making best efforts to maintain their established fishing activities; and
- Participation as appropriate in Project/fisheries liaison programs.

5.7.2.5 Fisheries Code of Practice

EMCP promotes the concept of a *Fisheries Code of Practice* as the primary component of its overall approach to protecting the commercial fisheries environment. This Code will constitute the general framework within which the Project and the fishing industry will work together in the Bull Arm area during Hebron Project construction.

The proposed Code 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 Safety Zone and the marine traffic "rules of the road" for the movement of Project vessels. The principles and mechanisms contained in the *Fisheries Code of Practice* are a guide for coordinating and managing relations between the Project and local fishers over the life of the Project.

The Fisheries Code of Practice will:

- Describe marine traffic procedures, vessel telecommunications facilities, and marine traffic reporting procedures;
- List rules of-the-road for designated traffic lanes to be used by Project vessels and fishing vessels, including the designated vessel traffic lane in Trinity Bay and any other lane(s) established by consultation;
- List requirements and restrictions for the Safety Zone;
- List rules-of-the-road and regulations governing project vessel movements within traffic lanes and the Safety Zone, including speed limits and right-of-way procedures;
- Describe 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;
- Identify and describe the relevant rules and regulations that all foreign-registered Project vessels will be required to carry and abide by;
- Describe procedures for monitoring vessel movements in traffic lanes and the Safety Zone, including mechanisms to deal with any infractions (by Project-related or fisheries vessels) of the marine rules-of-the-road;
- Describe procedures for communicating advance notices of Project vessels' intent to use traffic lanes;
- Describe procedures for dealing with emergency situations in the marine traffic sector;
- Provide contingency plans and procedures which may be required to remove gear or fishing vessels from certain locations, on a temporary basis;
- Describe procedures for emergency use of the Safety Zones by fishing vessels;
- Provide rules and practices to facilitate movement of fishing vessels over anchor chains; and
- Include a gear and vessel damage compensation program.

5.7.2.6 Compliance Monitoring

The fisheries liaison structures and reporting mechanisms will provide the information for the Project's compliance monitoring program. The *Fisheries Code of Practice* will be the main vehicle for managing and monitoring operational interactions between Project activities and commercial fishing operations since it will be used to coordinate and manage the movement of all Project vessels within the traffic lane and the Safety Zone. The Marine Traffic Procedures will provide the technical resources for monitoring all Project vessel activities on a day-to-day basis.

5.8 Managing the Project: Fisheries Interface: Actions

5.8.1 Introduction

This section of the EPP describes the specific actions and mechanisms that will be 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 will be ensured through the following:

- EMCP will employ the services of a dedicated local area Project Fisheries Liaison Officer (FLO). The role of the FLO is to maintain continuous communication between fishers and Project personnel and contractors at Bull Arm regarding the daily construction and fisheries activities in the Project Area;
- EMCP will work with the Bull Arm Area Fishers' Working Group, established prior to the start of construction activities. The Working Group, comprised of representatives of the FFAW Fisheries Committees from the six communities in the Bull Arm area will facilitate communications between Project construction activities at Bull Arm and local fisheries activities in the area;
- KAC as Site Marine Operations will establish a marine communication protocol that will include provisions for notification of activities outside the established Safety Zone and other Project information that may be warranted. Such information will be exchanged via established mechanisms such as Notice to Mariners and the FLO;
- Policies and procedures developed jointly among EMCP, the Contractors and the Bull Arm area commercial fishers will provide the basis for communications and operations in the Bull Arm area during the Hebron Project work and will comprise an important component of the Fisheries Code of Practice.

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 2011 – 2016 construction period. The following measures will be put in place:

- Prior to starting marine activities at the Bull Arm site, EMCP, the Contractors and the area fishers will develop and agree a Fisheries Code of Practice for the Bull Arm area. The Code of Practice encompasses the marine traffic management procedures that will be in place during the Hebron Project work at Bull Arm;

- Buoys will be re-established marking the vessel traffic lane in the bottom of Trinity Bay and Bull Arm as indicated on the Canadian Hydrographic Services chart of Trinity Bay Southern Portion and appropriate notices to mariners will be issued;
- Before the start of marine activities in Great Mosquito Cove, a Safety Zone will be established. ExxonMobil Canada Properties (EMCP) and the GBS Contractor will consult with fishers regarding the establishment of the Safety Zone. All fisheries activities will be excluded from this Safety Zone area, between 2011 and 2016, for safety reasons and to allow platform construction activities to take place in a safe, efficient and timely manner;
- When the partially-completed GBS is ready to be towed to the deepwater site within Bull Arm, another Safety Zone will be established around that marine construction site. During construction activities at the deep water site, estimated to be approximately 2 years, fishers will be unable to fish within the Safety Zone;
- The Fisheries Liaison Officer will actively engage fishers throughout all phases of project activities to keep them informed as to the timing of and locations of Safety Zones. In addition, the Fisheries Liaison Officer, and Project Environment and Regulatory Team, in consultation with local fishers, will implement mitigations to reduce disruption to established fish harvesting activities;
- During the tow-out of the completed platform from the Bull Arm deep water site, there will also be a temporary exclusion/Safety Zone around the Hebron Platform and the ships tending it. However, this will be of short duration and will be continually moving;
- While the establishment of the Safety Zones will create a temporary loss of access to fishing grounds, they serve as key mitigations to avoid or prevent impacts and to help ensure the safety of workers, fishers and other marine users.

5.8.4 Fishing Vessel Operations

The Fisheries Code of Practice and Fisheries Liaison Officer will be the primary means for ensuring fishing vessels continue to operate safely and effectively as possible during the Project. Measures will include:

- Containing most Project activities within the Safety Zones and/or Construction Zone as marked on the chart will reduce the potential for interference with day-to-day fishing operations.
- For any activities that do occur outside these areas, several further mitigations will be established to minimize impacts on fishing vessel operations, primarily consultation and communication through established protocols.
- All Project-related vessels will be required to travel within this lane. The presence of 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 the Fisheries Liaison Officer;

- KAC, as Site Marine Operations, in consultation with local fishers will implement a traffic management plan for Bull Arm. This plan should facilitate marine communications between fishers, Project vessels and other users in the area.

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 mitigative measures will be undertaken:

- EMCP and KAC will consult with fishers in the area regarding the timing of potential in-water blasting activities and the implementation of monitoring programs. To the extent possible, in-water blasting will be avoided and/or planned to avoid interference with key finfish (e.g. herring, mackerel) harvesting activities;
- Safety Zones will be established in consultation with Project Area fishers. The separation of construction and fishing activities as a result of the Safety Zone and the bund wall itself will provide some sound attenuation between construction activities and fisheries operations beyond the boundary of the Safety Zone;
- Prior to the start of marine construction activities, EMCP will model underwater noise associated with underwater blasting in order to identify and assess geographic extent beyond the Safety Zones;
- Depending on the placement of fishing gear in relation to the noise source, the effects 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 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 will be in place:

- The establishment of the construction Safety Zones will reduce the likelihood of conflicts with gear because, with the exception of vessels delivering materials by sea via the Traffic Lane, and a limited number of other operations, most construction-related activities will be confined to these two areas;
- The vessel traffic lane for the approach to Bull Arm, Trinity Bay will be re-established. All Project vessels will be required to travel within this lane, and therefore should minimize the opportunity for gear conflicts in other areas;

- A gear and vessel damage compensation program will be in place for Hebron Project activities
- The on-site Fisheries Liaison Officer will provide a single point of contact to facilitate communications regarding gear loss/damage or other compensation claims pursuant to a fisheries compensation program.
- 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 equipment or materials that might pose a potential hazard to future fishing activities. Such hazards will be removed during site demobilization.

5.8.7 Emergency Procedures and Contingency Plans

- Contingency plans for vessel accidents, fuel or hazardous materials spills, or incidents requiring search and rescue operations will be in place. These procedures will be developed as a component of the Fisheries Code of Practice.

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 EMCP's Marine Traffic Procedures. However, the Collision Regulations (http://laws.justice.gc.ca/eng/C.R.C.-C.1416/page-1.html) shall take precedence over any instructions contained in these procedures.