

Joint venture companies



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Marine Access Traffic Management Plan – Construction

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1. INTRODUCTION

A series of Environmental Management Plans (EMPs) related to specific aspects of the Project have been developed. For Project construction activities taking place within the marine environment, the following EMPs govern the work:

- Marine Activities Plan (MAP)
- Marine Access Traffic Management Plan (MATMP)
- Marine Monitoring Plan (MMP)
- Dredge Environmental Management Plan (DEMP)

The MAP and related EMPs apply to construction activities being undertaken in the marine environment. In addition to the EMPs listed above, the Marine Response Plan (MRP) provides direction on response to marine related incident response, management and recovery.

Figure 1 outlines the structure and interaction of the marine plans.



Figure 1: Marine EMP Structure

A list of acronyms used in the MATMP is provided in Appendix A-1. A list of definitions used in the MATMP is provided in Appendix A-2.

1.1. Purpose

The purpose of the MATMP is to define the environmental management (mitigation and monitoring) requirements for marine transportation activities during Project construction. Where applicable, the MATMP references other EMPs. The MATMP outlines requirements and guides implementation of requirements outlined in the Project permit, approvals, authorizations and certificates

1.2. Objectives

The MATMP outlines requirements and mitigations to address the potential effects on marine transportation and use that were identified in Section 7.4 of the LNG Canada Environmental Assessment Certificate (EAC) Application. The overall goal of the MATMP is to ensure safe shipping and navigation in the marine construction environment,

respect the freedom of navigation by non-Project marine traffic, and minimize any potential impacts associated with marine construction activities on other marine users.

The MATMP outlines:

- Construction activities, including any fish habitat offset plans, which have the potential to interfere with marine navigation
- Identified existing and traditional navigational routes, fishing areas, habitat areas, harvesting areas, commercial shipping use, recreational and tourism use, Aboriginal Groups' use, and any associated timing windows
- Communication methods proposed to inform affected stakeholders and Aboriginal Groups of potential interference because of Construction activities
- Actions to coordinate activities with other marine users, particularly with other industrial activities related to dredging or disposal at sea
- Mitigation measures to reduce disruption of marine navigation because of Construction activities
- Monitoring plans to understand the effects of shipping activities on marine users during Construction

Project commitments are tracked and managed as per the LNG Canada regulatory Compliance Management System (CMS). Appendix D: Mitigation Measures Concordance Table (MATMP) identifies the commitments, statements and considerations relevant to the MATMP.

1.3. Scope and Exclusions

The MATMP addresses marine shipping traffic activities undertaken in support of construction of the LNG Canada terminal.

"The plan does not address ongoing RT marine transportation including all operations and maintenance activities for their aluminum production facilities and power facilities, for which RT remains responsible.

Movement of materials and goods via land, including but not limited to, transportation of materials and equipment from designated lay down areas, management of materials when moored to a berth, and offloading of materials and goods after docking is not governed by the MATMP.

The MATMP does not:

- Absolve LNG Canada or its Contractors from undertaking their own due diligence in relation to environmental and regulatory requirements when conducting work in the marine environment.
- Replace design standards or best management practices (BMPs)
- Include areas outside of the Project Battery Limits (refer Section 1.4 Project Description of the MAP)
- Address Operation activities after commissioning of LNG facility
- Address potential impacts to the terrestrial environment (refer to appropriate EMP and Construction Environmental Management Plan (CEMP)

2.0 RELATED DOCUMENTS

Table 1 contains a list of Project documents referenced within the MATMP. The MATMP and related documents are live documents and any changes to these documents will need to be reflected in this document as applicable.

Document Name	Document Number
Construction Environmental Management Plan (CEMP)	L001-09800-HE-7180-1901
Dredge Environmental Management Plan (DEMP)	L001-07000-HE-7180-3001
Environmental Work Plan Requirements	L001-09800-HE-7180-3002
Marine Activities Plan (MAP)	L001-09800-HX-5880-1903
Marine Response Plan (MRP)	C000-000-HX-5880-0009
Marine Monitoring Plan (MMP)	L001-09800-HE-7180-1904
Vessel Quality Assurance Program	L001-000-QA-6050-0004

Table 1: Project Documents Referenced

3.0 PRINCIPLES OF MARINE TRAFFIC RISK MITIGATION

LNG Canada follows a Goal Zero policy: Zero Injuries – Zero Damage – Zero Spills. To help support this goal, LNG Canada subscribes to the following principles to mitigate the risk of marine transportation:

- Strict adherence to Canadian regulatory requirements by all port users and vessel operators
- Coordination with external project marine traffic stakeholders
- Use of quality marine vessels meeting or exceeding domestic vessel standards as per the Vessel Quality Assurance (VQA) Program for Project construction activities (refer to Section 7.1)
- Manning Project vessels with skilled & competent crews including project specific training/awareness
- Promoting situational awareness through oversight of vessel movements and activities within the Port of Kitimat during construction (including safe speeds, proper lighting and the use of safety zones/areas)
- · Monitoring and prediction of local marine weather to assess effects on project's marine activities
- Effective and timely communication of marine safety critical information to all stakeholders
- Use of Navigation Aids to physically identify high risk areas/safety zones and navigational hazards
- Implementation of the Marine Response Plan which contains among other things contingency planning and Geographic Response Plans (GRPs)
- Marine Incident and Near Miss reporting, including, where necessary, incident investigation to develop Learning From Incidents (LFI) information to share with relevant stakeholders
- Working with federal government to support current marine safety publications and local area information for marine users
- Maintain propose risk assessment, Job Safety analysis, Tool box talk, and permitting system
- Carry our sufficient drills / emergency practices

4.0 ROLES AND RESPONSIBILITIES

LNG Canada and its Contractors, share responsibility for implementing HSSE controls. The following outlines the key roles involved in the development and implementation of the MATMP.

LNG Canada and its Contractors shall disseminate appropriate environmental knowledge as well as an awareness of Project work plans, environmental expectations, commitments, obligations and requirements relevant to their scope(s) of work. Interface management for the Project will meet these requirements by undertaking the following:

- Meeting regularly to discuss Project progress, while highlighting and discussing potential environmental issues
- Confirming appropriate sign-offs and permits are received prior to commencement of various work activities
- Management of tasks within a regulatory compliance management system to ensure compliance
- Completing regular on-site visits to assess and verify performance relevant to on-site daily field monitoring
- Developing Environmental Work Plans (EWPs) as per the EWP requirements

4.1 **Responsibilities and Expectations**

LNG Canada and its Contractors are responsible for compliance with all applicable regulatory requirements as well as the environmental expectations, commitments, and obligations for the Project related to marine transportation.

LNG Canada and its Contractors shall:

- Understand LNG Canada's commitments and responsibilities, and adhere to LNG Canada's requirements
- Ensure compliance with applicable regulatory and permit requirements for Contractors and ensure conformance with adopted standards and process
- Only use marine vessels on the LNG Canada Approved Vessel List which indicates that they meet the Vessel Quality Assurance (VQA) Program requirements
- Report on Contractor environmental compliance through compliance monitoring programs
- Review and/or sign-off of applicable Contractor EWPs and / or activity specific plans
- Investigate and report to applicable regulatory agencies and Aboriginal Groups any incidents / Accidents or Breaches that could lead to serious consequences

Contractors are responsible for ensuring all their workers are informed and are implementing the required mitigation measures, including any required monitoring and reporting. Contractors will include key points of the VQA and MATMP requirements as part of worker site inductions.

Contractors are required to produce their own EWPs, as appropriate, in accordance with bid package(s) scopes of work.

4.2 Rio Tinto

Marine construction for the Project and the Rio Tinto (RT) Port Development Project (PDP) take place in close proximity to one another.

LNGC and RT have agreed to develop a joint shipping protocol that will govern mutual traffic and construction activities in the Port of Kitimat.

4.3 Harbour Master – Port of Kitimat

A Harbour Master is a government official appointed by Transport Canada (TC) that is responsible for enforcing the harbour or port requirements, to ensure the safety of navigation, the security of the harbour and the correct operation of the port facilities. The Canada Marine Act and its supporting Public Ports and Port Facilities Regulations are the principle statutory documents that govern the roles and responsibilities of a Harbour Master in

Canada. A Harbour Master has authority to monitor ships entering or operating within the waters of the port, establish practices and procedures to be followed by vessels, such as traffic clearance processes, mandate use of radio frequencies, and establish traffic control and safety zones. The Port of Kitimat is not currently a public port and therefore it does not have an appointed Harbour Master.

Under the current private port situation it is left to the individual port users to manage their own business and to comply with all statutory requirements.

Following a change in status to a Public Port under the Canada Marine Act and should marine traffic warrant, a Harbour Master may be appointed to the Port of Kitimat at the discretion of TC. Until such a time during the Project construction phase LNG Canada will manage the Harbour Master duties, within its legal authority, in collaboration/cooperation with Rio Tinto and other port users through the Marine Traffic Coordinator (MTC) role described in Section 4.4.

4.4 Marine Traffic Coordinator

Until TC appoints a Harbour Master for the Kitimat Harbour, a Project MTC will manage typical Harbour Master duties, as far as practical and necessary.

The MTC will manage the safe movement of Project vessels within the construction footprint, including temporary anchorages. The MTC is not responsible for activities undertaken outside of Project activities.

A MTC has more limited responsibilities that a Harbour Master, as they do not have regulatory authority under the Canada Marine Act to establish or enforce regulation. MTC can govern only by consensus and agreement, and cannot regulate or prohibit another marine port user outside of Project boundaries. The MTC has no authority over aircraft or vehicles operating within the Port of Kitimat. Project vessels will have contractual / written obligations for the Project that require adherence to MATMP requirements.

Supported by contractual obligations for Project vessels, The MTC will:

- Take measures to maintain order and safety of persons and property within the Port of Kitimat
- Inform and advise safety of navigation by Project vessels
- Inform and advise safety of on-the-water Project activities
- Inform other port users of Project related safety concerns, incidents or marine transportation
- Coordinate where possible ship, vessel and marine construction works and movements with other port users to reduce navigational conflicts.
- Assist and support Project marine emergency response

The MTC is not responsible for activities undertaken outside of Project activities, including those activities undertaken by RT as part of the shipping aspects of their business.

5.0 REGULATORY, PROJECT, AND STAKEHOLDER REQUIREMENTS

Collaboration and consultation with relevant international, federal, provincial, and municipal regulatory Responsible Authorities (RA) will occur to achieve compliance of all applicable legislation. When possible, Project activities will occur in such a manner to avoid or mitigate adverse impacts to the identified social, economic, cultural, and environmental valued components (VCs). VCs are components of the natural and human environment that are considered to have scientific, ecological, economic, social, cultural, archaeological, historical, or other importance.

5.1 **Project Requirements**

Project commitments are tracked and managed per the LNG Canada regulatory Compliance Management System (CMS). Permits and Approvals relevant to the MATMP include:

- EAC # E15-01; in particular Schedule B, Table of Conditions & EA Application, Section 20 summary of mitigation measures
- CEAA Decision Statement, June 17, 2015

Appendix D: Mitigation Measures Concordance Table identifies the commitments, statements and considerations relevant to the MATMP, and includes relevant permit and approval requirements related to marine transportation activities.

5.2 Marine Transportation Regulatory Framework

The management framework for foreign marine shipping activities is determined by a series of international conventions from the International Maritime Organization (IMO) that are also implemented through the Canada Shipping Act, 2001 (CSA 2001) and its supporting regulations.

TC administers several Acts and associated regulations related to marine transportation and supports the administration of many others, including but not limited to:

- Canada Shipping Act, 2001 (2001, c. 26)
- Canadian Environmental Protection Act, 1999* (1999, c. 33)
- Navigation Protection Act (R.S., 1985, c. N-22)
- Pilotage Act (R.S., 1985, c. P-14)
- Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
- Transportation Safety Board Regulations

A different regime applies to Canadian domestic vessels that do not undertake foreign voyages outside of Canadian waters. This creates two separate standards and sets of requirements depending upon the nationality and voyage of the vessel.

5.3 Canada Shipping Act, 2001

Foreign flagged vessels on foreign voyages (outside Canadian waters) to Canada are subject to international conventions and in addition must meet Canadian requirements when in Canadian waters.

Foreign flagged vessels require a Canadian Coasting Trade License to be able to work in Canada's domestic market on local voyages. They will meet international standards with additional license conditions to meet Canadian domestic requirements to ensure a level playing field with domestic marine vessel operators. A Canadian Coasting Trade License is only issued to a foreign vessel operator when there is no equivalent Canadian vessel available for hire.

Canadian flagged vessels that do not go on foreign voyages are subject to Canadian domestic vessel requirements and are required to comply with the CSA 2001 and its supporting regulations, which in most cases exempt them

from the international IMO conventions (Including the 1988 Protocol of the International Convention for the Safety of Life at Sea (SOLAS)). Examples of domestic vessels types that will be used by this project include tugboats, barges, local dredgers, personnel transports, crane barges, rescue craft and small vessels.

All shipping while in Canadian waters, regardless of nationality, size, voyage or type, are subject to the Canadian Collison Regulations (COLREGS) which are based on the "International Regulations for Preventing Collisions at Sea, 1972" with the addition of special Canadian modifications (that only apply while in Canadian waters). The international Regulations are published by the IMO which set out, among other things, the "rules of the road" or navigation rules to be followed by ships and other vessels at sea to prevent collisions between two or more vessels.

All marine vessels employed by the LNG Canada project will adhere to the Canadian COLREGS and it is expected and planned that all non-project related traffic will also adhere to these regulations as well. This is the key regulatory requirement to ensure the safe navigation of all vessels, both project and non-project, in the Port of Kitimat and along the marine route.

5.4 International Maritime Organization

The IMO focuses on the improvement of safety at sea and the prevention of pollution from ships. The IMO is also responsible for international aspects of liability and compensation and the facilitation of international maritime traffic. TC continues to draw and consolidate best practices from its experience, as well as continue to consult with government, industry partners and the international community in developing these international best practices and incorporating them into the Canadian domestic standard where possible and practical.

5.5 Canadian Ratification of International Conventions

Canada has ratified or adopted several IMO Conventions, enabling enforcement of safety and environmental standards in accordance with the CSA 2001. To date, more than 39 IMO Conventions are referenced in the Act, including but not limited to:

- Annexes IV, V, VI of the International Convention for the Prevention of Pollution from Ships (MARPOL) (reducing pollution from sewage and garbage; controlling air emissions from ships);
- International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001 (limits on environmentally harmful paints); and
- International Convention for the Control and Management of Ships' Ballast Water and Sediments (control of aquatic invasive species).

6.0 MARINE TRANSPORTATION ACTIVITIES

Project marine scope consists of the construction of the Marine Offloading Facilities (MOF), and Berth 2 Quay Wall, including ground improvements, construction of an anchor wall system, installation of navigation lights, and dredging works. Construction marine transportation activities, as outlined in the MAP, involve the movement of personnel, provisions, aggregates, equipment and pre-assembled modules into and around the Port of Kitimat, and its approaches, for constructing an LNG Marine Terminal.

6.1 Key Marine Transportation Activities

An overview of key marine transportation activities related to construction, and a brief description of the logistics activities associated with each, is provided in Table 2 below.

Activity	Marine Transportation Activity Description
Personnel Transport	Waterborne transport of personnel from designated staging areas or anchorages to the dredging and construction Dock / areas, MOF, and unmanned barges
Module Delivery	Import of pre-fabricated modules to the MOF; import of LNG Process Facility modules by heavy lift vessels
Construction Equipment Delivery	Import of construction equipment to the MOF or Eurocan facilities
Bulk Material Delivery	Transport of bulk materials, such as aggregates, by tug and barge into and within the Port of Kitimat
Dredging	Movement of dredge equipment and related barges during marine dredge activities within the Port of Kitimat, including the disposal of clean dredgeate through a floating hose to an area 3km south of Kitimat port
Piling	Operation of piling equipment (shore based or vessel based)
Waste Management	Movement of waste by barge, including transport of potentially contaminated soil
Other	Placement of scour protection, ground improvement, placement of navigational aids and monitoring buoys, environmental sampling, etc.

Table 2: Marine Construction and Transportation Activities

Table 3 summarizes Project activities taking place that may impact marine transportation management.

Table 3. Pro	niect Activities	Influencing Marin	e Construction ar	d Transportation i	n Kitimat Arm
	Jeel Activities	minuchenny man			

Activity	Marine Transportation Activity Description
Environmental Monitoring	Personnel vessels for environmental monitoring purposes, including water
	quality monitoring and marine mammal monitoring
Habitat Offset Construction	Construction of marine habitat offsets as per the Marine Habitat Offsetting
	Plan in the Marine Fisheries Act Authorization 15-HPAC-00585 (Marine FAA)
Supporting Activities	Construction support activities, including anchor handling, tug transport,
	barge transport

Movement of materials and goods via land, including but not limited to, transportation of materials and equipment from designated lay down areas, management of materials when moored to a berth, and offloading of materials and goods after docking is not governed by the MATMP.

6.2 Shipping Activities

LNG Canada has control over Project-related vessels operating within the Port of Kitimat only, and may have limited influence over non-Project related vessels within the Port of Kitimat. Because the Port of Kitimat is a private port,

its regulatory limits are undefined at this time. LNG Canada references the original port limits indicated on nautical charts that were last in force in 1999. These limits are displayed as Figure 1.



Figure 1: Port of Kitimat Limits

Each vessel is controlled by its own captain (Master) and crew who have their own authority and discretion to use the safest marine shipping route available to them at the time they are transiting. This means that they will make their own passage planning decisions which could vary slightly.

6.3 Existing Vessel Traffic

On average, over 21,000 vessels per year report to the Marine Communication & Traffic Services (MCTS) as they move throughout the Prince Rupert traffic zone, including large merchant ships, passenger vessels, tankers, tugs, and barges. The existing marine traffic information available in BC is dated 2013 and is based on a cross-check of AIS and PPA data. The marine traffic frequency of deep-sea vessels for 2013 is approximately one transit every three days. On average, the Port of Kitimat received approximately 200 commercial vessels calls per year between 1978 and 2008.

7.0 MARINE TRANSPORTATION MANAGEMENT & MITIGATIONS

Plans and mitigations are in place to minimize the impact of marine shipping during construction on marine navigation, use of traditional fishing and harvesting areas and recreational and tourism use. LNG Canada will achieve this through communication with stakeholders, marine users and Aboriginal Groups and actions to coordinate activities with other marine users. These mitigations were developed as part of the Environmental Assessment process for LNG Canada and are articulated in Section 7.4 of the LNG Canada Environmental Assessment Certificate Application.

Required mitigation measures for marine navigation management are outlined in Appendix D: Mitigation Measures Concordance Table. Specific methodologies for mitigation measures that will be utilised for construction activities will be outlined by the Contractor in an EWP.

7.1 Vessel Quality Assurance Program

The LNG Canada Vessel Quality Assurance (VQA) Program supports mitigation of marine transportation risks by assuring that only marine Project vessels of a high quality are used by the Project. The current VQA Program focusses on early works and construction activities and, although the VQA principles remain the same, a different VQA program will be developed and put in place for Operations.

The primary instrument for implementing the Vessel Quality Assurance Program is the LNG Canada Approved Vessel List created and maintained by the LNG Canada Marine Team. LNG Canada will only use marine Project vessels that are on the approved list. All contracted vessels used on the Project are required to be inspected by an LNG Canada approved marine surveyor, positively vetted to the LNG Canada Vessel Quality Assurance Standard, and approved by LNG Canada before inclusion on the list.

An LNG Canada vessel quality assurance inspection is valid for a period of one year after which the vessel may require re-inspection to remain on the list or may remain on the list following a LNG Canada risk review and mitigation that deems a longer time period is adequate.

7.2 Safety Mitigations

7.2.1 Safe Shipping Workshops

In preparation for Operation, LNG Canada will conduct a minimum of two Safe Shipping Workshops during the construction or pre-commissioning phases, aimed at promoting safe navigation around shipping traffic for mariners. LNG Canada and its Contractors will participate in regional initiatives relating to the management of marine shipping, should there be any such initiatives during the construction phases of the Project.

7.2.2 Marine Traffic Control Protocol

In the absence of a government appointed Harbour Master for the port of Kitimat and the lack of any specific or formal Port of Kitimat marine traffic control protocols, LNG Canada is planning to developing a Marine Traffic Control Protocol (MTCP) within the Port of Kitimat during the dredging and construction phases. The MTCP will be used by the MTC to influence safe marine traffic control within the Port.

7.2.3 Safety Zones

Safety Zones will be used by the LNG Marine Traffic Coordinator to:

- 1. Determine what marine transportation mitigation measures are required for specific zones based on navigational hazards, current project activity risks for planning and control purposes.
- 2. Apply deferent risk mitigations for different areas of the port at the same time.

- 3. Establish project marine boundaries for project activities on the water.
- 4. Advise stakeholder and marine users of activities within each zone as required via the Marine Communications Protocol
- 5. Establish common references and nomenclature in order to improve situational awareness by all port users for improved navigation and collision avoidance.

Safety Zones have been identified for the Port of Kitimat in order to indicate safe distances between non-Project traffic and marine Project activities and associated traffic movements during the construction phase. This is to support the Navigation Protection Act requirements and the public's interest in navigation safety and to demonstrate the Project's commitment to planning and transparency. The Safety Zones divide the Port of Kitimat into easily identifiable areas to assist with risk awareness when critical marine construction transportation activities are underway.

The principle Safety Zones are:

- Construction Safety Zone (Permanent during Construction period) the waters directly around the Rio Tinto and LNG Canada marine berths where dredging and marine works and construction will be taking place
- 2. Anchorage Safety Zone (When used) areas around vessels at anchor in a designated and approved location
- 3. 300m Vessel Safety Zone (Moves with vessel) waters directly surrounding marine construction vessels such as a heavy lift or dredger engaged in operations
- 4. 500m Wide Safety Zone Corridor (Temporary) waters 250m to either side of the intended track of a large vessel delivery modules to the MOF
- 5. 1000m Radius Turning Area Safety Zone (Temporary) waters 500m around a large module carrier that is being rotated 180 degrees by tugs for berthing at the MOF
- 6. Floating Dredge Hose Safety Zone an envelope around the floating dredge hose that goes from the dredging site to the dredge disposal area
- 7. Dredge Disposal Area the designated area within Kitimat Arm for the disposal of uncontaminated dredge material

Figures 3a, 3b, and 3c are maps that illustrate the placement and size of these Safety Zones within the Port of Kitimat. These Safety Zones apply at different times during the construction period:

- Figure 3a depicts the base case Safety Zones, when there are no dredge activities or module carriers arriving or departing.
- Figure 3b depicts Safety Zones when dredging and related Disposal at Sea activities are underway.
- Figure 3c depicts the temporary Safety Zones during the arrival of module carriers.

The Construction Safety Zone will be controlled by the project's MTC, who is responsible for coordinating the LNG Canada Project and Rio Tinto Project vessels operating within the Safety Zone. Non- Project vessels will be requested to keep a safe distance from this area.

The Anchorage Safety Zones are based on the areas within the Port of Kitimat where water depths allow for anchoring (i.e. less than 100m). This will be used by Rio Tinto and other vessel traffic as needed and approved by Vessel Traffic Services.

The Floating Hose Safety Zone is a general area where the hose can be found when deployed. The floating hose will be a linear floating structure that will be present within the Safety Zone envelope indicated by the yellow box in Figure 3b. Location of the floating hose at any given time will be dependent on wind and current. It will be protected by Project guard vessels to warn other marine traffic of its location and minimize impacts to marine vessels operating inside or close to the Safety Zone.

The Safety Zone Corridor will only be in effect when a large ocean going vessel is arriving or departing from the project site delivery modules and construction materials. It follows the same existing process for the arrival and departure of vessels with BC Coast Pilots on board.

Appendix B: provides an example of how Safety Zones and their related Conditions can be applied to the LNG Canada Project.



Figure 3a: Base Case Safety Zones



Figure 3b: Dredge Activity Safety Zones



Figure 3c: Module Carrier Activity Safety Zones

7.2.3.1 Control (Risk Mitigation) Measures for Safety Zones

Each Safety Zone may require the application of different controls depending upon the activity and risk within them. To facilitate this three condition levels have been determined to allow changes and to facilitate communication to stakeholders as needed. They are colour coded GREEN, ORANGE and RED and assigned number 1, 2 and 3 respectively for identification and differentiation when communicating. The colours chosen follow an intuitive pattern loosely based on traffic lights with orange used instead of yellow as it is more easily identifiable on printed materials. Colour coding supports a visual representation on a map or chart and verbal communication over the radio and can be quickly and easily viewed. The table below outlines how the Safety Zone Conditions are described and an example of Safety Zoning with the Conditions applied for example when dredging activities are being undertaken.

Table 6: Safety Zone Conditions

CONDITION LEVEL	CONTROL	DESCRIPTION
1 – GREEN	Normal	No project specific risk mitigations or controls are applied to the Safety Zone. All marine users follow the established regulatory requirements and best practices of seamen while operating a vessel within the Safety Zone.
2 - Orange	Precautionary	Activities and navigational hazards within the Safety Zone require the project to increase awareness among marine users and recommend additional and specific traffic controls to vessels operating or transiting through the Zone. This may include but is not limited to: a maximum speed, minimized wake, noise reduction, need for increased lookout, and established moving safety zones around working vessels. For safety reasons, communication with MCTS Prince Rupert or LNG Canada's Marine Traffic Coordinator by vessel operators may be necessary when using the Safety Zone. Project vessels may provide safety direction to other users on the water when in close proximity to construction works/activities.
3 - RED	Prohibited	Access to the Safety Zone by non-authorized vessels is prohibited for the safety of all marine users. Approval / Permit for the vessel operator from the LNGC Marine Traffic Coordinator is required to be requested and granted before a vessel may enter the Safety Zone.

Appendix B provides an example of how Safety Zones and their related Conditions can be applied to the LNG Canada Project.

7.2.4 Anchoring

Every vessel of 50 metres or more in length must obtain permission from Vessel Traffic Services in Prince Rupert prior to anchoring in the Port of Kitimat. No vessel shall anchor in such a place or position as to prevent free and unobstructed passage for all vessels to and from the harbour and to and from any wharf in the Harbour. Project related vessels will be required to coordinate their anchoring with the LNG Canada Marine Traffic Coordinator.

While at anchor every vessel shall:

- Maintain a bridge watch
- Keep a listening watch on VHF 16 and VHF 71
- Have the engine(s) on standby

Typically, vessels will proceed directly to an assigned berth at either the LNG Canada or RT marine facilities. In some cases construction vessels may arrive early and it will be necessary for them to anchor within the port limits until a berth is available. Anchorage requests should be made by the vessel operator/agent at least 24 hours prior to their arrival and for vessels on foreign voyages after the 96-hour Notice of Arrival (NOA) has been received. It is understood that some anchorage requests may require immediate assistance due to emergencies, berth delays etc., and this will be considered by VTS on a case by case basis.

In the case of urgent anchorage requirements, a list of minimum vessel information must be provided to Transport Canada as well as to the LNG Canada Marine Traffic Coordinator: This information is necessary to facilitate communication to other stakeholders and for risk review and mitigation for the harbour.

During the winter period, vessels anchoring in the Port of Kitimat area will be requested to use the maximum anchor cable available given their anchorage position. Accordingly, deep-sea vessels would be asked to use a minimum of ten (10) shackles at the waterline to mitigate risk of dragging the vessel's anchor.

Where feasible, vessels will be requested to retain maximum safe ballast on board and maintain required trim to keep the ship's propeller and rudder below the water line while at anchor until a confirmed loading / offloading time

has been arranged. All vessels will be asked to keep their engines on standby when at anchor and be prepared to take appropriate action should weather conditions worsen during winter storms.

7.2.5 Navigational Aids

Project-related vessels will make use of all existing navigational aids to physically identify high risk and navigational hazards, including dredge and marine construction boundaries. Navigational aids will adhere to regulatory requirements. LNG Canada will support the federal government in the installation of any navigation aids determined to be necessary for safety at the new marine terminal during construction.

Upon completion of marine construction, LNG Canada will provide notification and information to the Canadian Hydrographic Service to accurately include the appropriate marine terminal information and berthing locations on future navigational charts.

7.3 Environmental Mitigations

7.3.1 Sensitive Areas

Sensitive areas identified through the Environmental Assessment (LNGC 2014a) are provided in the MAP and include sensitive wildlife habitat for the California Gull, eel grass beds / patches and marine fish habitat.

Environmentally sensitive areas will be avoided by Project-related vessel traffic where feasible. Vessels may be positioned near sensitive areas for the purpose of environmental monitoring and marine mammal observation.

7.3.2 Traditional Use Considerations

Traditional Use Considerations are outlined in Appendix C: Local and Traditional Use, and are taken from the LNG Canada Environmental Assessment Certificate Application; Section 7: Assessment of Potential Social Effects and Section 7.4 Marine Transportation and Use. LNG Canada endeavours to ensure that Project construction activities do not interfere with the activities and travel of Aboriginal Groups.

The construction of the marine terminal and the associated increase in construction traffic could interfere with marine fisheries, including Aboriginal fisheries, or the ability to pursue traditional, spiritual, cultural or recreational activities in the areas along the marine access route. LNG Canada and its Contractors will make all reasonable efforts to ensure that fishing and harvesting areas, recreation, and tourism is not impacted by these activities. This will be achieved by ensuring clear communication between LNG Canada its Contractors and marine users on marine construction timing, shipping schedules, proposed mitigations and related safety zones for vessels entering the Port. More information on the LNG Canada Marine Communications Protocol is available in Section 8.0 of the MATMP.

7.3.2.1 Aboriginal Group Fishing and Harvesting Areas

Harvesting marine resources is an important part of the traditional life for most coastal Aboriginal Groups, with over 40% of meals being traditionally sourced from the sea for some Nations. Marine resources are also heavily relied on to sustain Aboriginal economies. Key species harvested are summarized in Appendix C: Local and Traditional Use.

LNG Canada will adhere to mitigations as outlined in Section 7.0 of the MATMP to support protection of fishing and harvesting areas, including waste management, and avoidance of sensitive areas.

LNG Canada will establish communications with Aboriginal Groups regarding their traditional use information and potential overlap with construction activities in an effort to minimize impacts. More information on the LNG Canada Marine Communications Protocol is available in Section 8.0 of the MATMP.

7.3.2.2 Commercial Fishing and Harvesting Areas

The marine construction transportation route overlaps with commercial Fishery Management Areas, which have variable timing and constraints for harvesting of specific species. Species of relevance to commercial fishing and harvesting along the marine access route is summarized in Appendix C: Local and Traditional Use.

LNG Canada will establish communications with commercial fishing and harvesting groups regarding potential impact of construction activities on access to fisheries, in an effort to minimize impacts. More information on the LNG Canada Marine Communications Protocol is available in Section 8.0 of the MATMP.

7.3.2.3 Recreation and Tourism

Many recreation and tourism uses are identified along the marine access route. These are summarized in Appendix C: Local and Traditional Use. LNG Canada will communicate any Project construction activities that may impact access to recreational or tourism resources. More information on the LNG Canada Marine Communications Protocol is available in Section 8.0 of the MATMP.

7.3.3 Low Sulphur Fuel

Construction vessels will use low-sulphur fuel in compliance with applicable marine emissions standards. Since 01 August 2012, all marine vessels regardless of size or flag have been required to comply with the North American Emissions Control Area (NA-ECA). This is an area that extends 200 nautical miles off the Canadian and US coast baselines and sets the standard, among other things, for the maximum sulphur content permitted for marine fuel. Accordingly, all construction vessels in the Port of Kitimat will be operating within the NA-ECA and therefore may only use low-sulphur fuels (marine diesel included). Since 2015, the maximum sulphur content of ship fuel within the NA-ECA, for both Canadian and foreign vessels, has been 0.1%. This means that domestic marine fuel suppliers in Canada and the USA may only sell fuel to ship owners that meet this requirement.

black lines off the US and Canadian coasts

Figure 4: The North American Emission Control Area boundaries indicated by the

Please Note: Until 31 December 2019, Vessels greater than 400GT operating outside of an NA-ECA may use fuels with a maximum sulphur content of 3.5%. Effective 1 January 2020, the maximum sulphur content of marine fuel reduces to 0.5%. Vessels on foreign voyages may therefore carry fuel onboard with a sulphur content greater



enforcement.

than 0.1% but they are not permitted to burn it within Canadian waters. Transport Canada's Port and Flag State Control Regimes are responsible for compliance and

7.3.4 Sediment Control

Mitigations will be put in place to minimize erosion and sediment disturbance, including minimizing movement of barge anchors to limit sediment disturbance while within the Port of Kitimat. Refer to Section 7.2.4 for additional requirements related to anchoring.

7.3.5 Waste Management

7.3.5.1 Ballast Water Management

Vessels arriving at the marine terminal will comply with legislation and regulations on the management of ballast water. LNG Canada may conduct random audits of vessel logs.

All vessels that are required to have ballast water management are subject to the Canadian Ballast Water Control and Management Regulations under the CSA 2001, which complies with international maritime organization (IMO) guidelines (Marine Environmental Protection Committee [MEPC]). Among other exemptions, the Canadian Ballast Water Control and Management Regulations under the CSA 2001 do not apply to vessels that operate exclusively

in waters under Canadian jurisdiction, or vessels that carry permanent ballast water in sealed tanks such that it is not subject to release.

All vessels subject to Ballast Water Management are required to have a Ballast Water Management Plan that has been reviewed and approved by the vessel's Flag State (country of nationality). Currently, ballast water exchange must be done in deep sea conditions and only clean ballast from segregated ballast tanks will be allowed to be discharged into the Port of Kitimat.

Foreign vessels (i.e. vessels that normally work outside of North American west coast as defined by TC) entering Canadian waters are subject to Port State Control inspections by TC who may review their Ballast Water Management Plan and Records for compliance. Foreign vessels working in Canada under a Coasting Trade License may require review and approval of their Ballast Water Management Plan by TC as determined and required by TC.

7.3.5.2 Biofoul and Anti-Foul Management

Anti-fouling systems for vessels reduce the spread of exotic and / or invasive species and limit the potential toxic effects of substances to marine organisms during ballast water management. Under the CSA 2001, the Vessel Pollution and Dangerous Chemicals Regulations (SOR / 2012-69) apply to all ships in Canadian waters. Division 8, Anti-fouling systems, of the regulation requires that an International Anti-fouling System Certificate in the form set out in Appendix 1 to Annex 4 of the Anti-fouling Systems Convention be in place for vessels of 400 gross tonnage or more for those vessels that are party to the Anti-fouling Systems Convention. Foreign vessels less than 400 gross tonnage are required to keep on board a declaration confirming that the anti-fouling system for the specific vessels may not be subject to the Anti-fouling Systems Convention due to their size/length and/or voyage type and therefore may not be required to have an International Anti-fouling System Convention Certificate.

Contractors will ensure all vessels have a relevant anti-fouling certification / declaration in place and, where warranted, a biofoul management plan within their EWPs.

7.3.5.3 Vessel Generated Solid Waste

All vessels undertaking activities for the Project are to comply with Division 5 of the Vessel Pollution and Dangerous Chemicals Regulations (SOR / 2012-69) under the CSA 2001. The Project site is less than 3 nautical miles (NM) from shoreline; therefore, wastes from Project vessels will not be discharged directly into the marine environment within the Project boundaries. All vessels shall have in place, and make available to LNG Canada (and/or EPC), a vessel-specific waste management plan (WMP) for shipboard waste while in the Port of Kitimat.

The vessel WMP is to be specific to the voyage, size of vessel, number of persons the vessel is certified to carry, and in compliance with the Vessel Pollution and Dangerous Chemicals Regulations (SOR / 2012-69) and the CSA 2001 when the project vessel is within Canadian waters. The WMP will include onboard handling and storage procedures, where waste is to be segregated per type, placed in appropriate containers, secured, and stored in a covered area where possible. All waste generated on board a project vessel within the Port of Kitimat will be stored, pending transport for onshore management. Under normal (non-emergency) operations no waste will be discharged to the marine environment while a project vessel is within Port of Kitimat limits.

7.3.5.4 Vessel Generated Regulated Hazardous Waste

Hazardous wastes are to be managed in accordance with the Vessel Pollution and Dangerous Chemicals Regulations (SOR / 2012-69) under the CSA 2001. The regulations set out specific requirements for transfer of hazardous products to shore facilities, as well as regulating disposal requirements for hazardous waste and marine pollutants under Divisions 2 and 3 of the regulation.

Vessels carrying dangerous goods are subject to separate comprehensive control regime of the Transportation of Dangerous Goods Act and associated regulations. Product listed as dangerous goods under this Act are to be classified, stored, packaged, and handled accordingly.

7.3.5.5 Vessel Generated Sewage and Greywater

All vessels are to comply where applicable with the Vessel Pollution and Dangerous Chemicals Regulations (SOR / 2012-69) under the CSA 2001 for management of sewage and greywater. All sewage is to be held in holding tanks and either treated prior to release or transferred at a port suitable for accepting sewage waste. A marine sanitation device used for treatment of sewage must meet the minimum requirements of regulations presented in Division 4. Only vessels on foreign voyages (subject to MARPOL) with marine sanitation devices may be required to have an International Sewage Pollution Prevention Certificate.

Greywater (i.e. drainage from sinks, laundry, showers, etc.) is required to comply with Division 5 of the Vessel Pollution and Dangerous Chemicals Regulations (SOR / 2012-69) under the CSA 2001, and all vessels must ensure that release of greywater by a vessel at the Project site does not result in the deposit of solids or leave a sheen on the water. Like sewage treatment, vessels with marine sanitation devices must ensure they carry a certificate for the specific device onboard.

If a discharge occurs within the Port of Kitimat, it is to be reported and recorded as per LNG Canada Incident Notification processes, in line with requirements in the Canadian Vessel Pollution and Dangerous Chemicals Regulations (SOR / 2012-69).

7.3.6 Wildlife Management and Mitigations

Marine construction activities will take place within specified wildlife windows. During specified construction activities in the Kitimat Arm, the Marine Mammal Observer (MMO) will be engaged to identify any marine mammals entering the construction area. Criteria around MMO and related stop work procedures is outlined in the Marine Monitoring Plan (MMP).

7.3.6.1 Migratory Birds

Training and education related to mitigation of impact to migratory birds will include:

- Informing vessel staff of applicable seasonal breeding and migratory periods, including:
 - End of March to mid-August for migratory birds (Environment Canada 2014b)
 - January 1 through September 5 for raptors (BC MOE 2012)
- Alerting supervisory staff on berthed vessels to the hazards and potentially high-risk periods for bird strikes caused by deck lighting, particularly on nights when visibility is poor
- Providing information to vessel personnel on how to treat and release marine birds that become grounded on vessel decks

Facility staff will report bird collisions to a member of the Project environmental team, including information on bird species and weather conditions at the time of the incident.

7.3.6.2 Reporting a Marine Wildlife Incident

Incidents involving marine wildlife must be reported to the DFO. Common examples of incidents include:

- An animal being harassed or injured;
- An injured or sick animal exhibiting highly unusual behaviour;
- A live whale, dolphin or porpoise stranded on land;
- A collision between an animal and a vessel, or an animal that appears to have been struck by a vessel;
- An animal that has become entangled in a net or other debris;
- A dead marine mammal or sea turtle;
- An animal that is tagged or branded; or
- A marine mammal or sea turtle seen in an unusual location or a species not commonly seen in BC (see below to report a sighting)

Internal reporting and external incident reporting processes are in place for the Project to ensure internal and external reporting of marine mammal incidents.

7.3.7 Fish Habitat Offsets

Construction of fish habitat offsets, as defined in the Marine FAA 15-HPAC-00585, will be taking place at two sites in Minette Bay (Minette Bay North and Minette Bay South) as indicated in Figure 4. Minette Bay is located at the head of Kitimat Arm in Douglas Channel. The bay is located in the eastern part of the Kitimat River estuary, and extends northeast from the river delta. Construction activities will include creation of salt marsh habitat and rock reef habitat.

The Project will target communication of construction limitations with applicable marine users as per Section 8.0 Marine Communications Protocol.



Figure 4: Fish Habitat Offset Construction – Minette Bay

7.4 Communications

To avoid disruption of marine navigation as a result of marine construction activities, regular communication on Project activities will occur with marine users, including recreationalists, commercial tourism operators, Commercial, Recreational and Aboriginal (CRA) fishers, TC, DFO, Aboriginal Groups, and relevant stakeholders. The Project Team will inform the local community of:

- Timing of marine construction activities
- Marine construction safety procedures, safety zones and restricted navigation areas
- Change of access to the Project footprint and marine environment, potentially affecting access to country foods

Communication will take place via existing processes and procedures, including but not limited to the LNG Canada website, social media, Community Advisory Group, and based on consultation with Aboriginal Groups on their preferred method of communication. More information is available in Section 8.0 Marine Communications Protocol

7.4.1 Automatic Identification System (AIS)

LNG Canada will make best endeavours to have all project vessels installed with an Automatic Identification System (AIS) (or equivalent system) and make use of the systems to communicate to and control vessel traffic within the Port of Kitimat.

7.4.2 Marine Communication and Traffic System (MCTS)

The Canadian Coast Guard Marine Communications and Traffic Services (MCTS) centres provide distress and safety call monitoring and coordinate responses, broadcast maritime safety information (weather and navigational warnings), screen vessels entering Canadian waters, deliver information and advice to regulate marine traffic movement, and take appropriate action to ensure the safe and efficient movement of vessels in Canadian waters.

Project related marine traffic will use the Canadian Coast Guard (CCG) Marine Communication and Traffic System (MCTS) to provide notice of planned arrival time at Triple Island, and encourage Aboriginal Groups and stakeholders to use the system to plan their routing and scheduling.

7.4.3 Vessel Communications

Project Marine Traffic Coordination will be based on positive reporting by project marine vessels using VHF and email/Internet to create a daily and monthly shipping schedule for the Port of Kitimat and cross reference this information with real time observations and near real time vessel information provided by AIS.

7.4.4 Shipping Schedules

Both RT and LNG Canada Project vessels will be required to report to the MTC in advance of arrival with information regarding their vessel type, activity, ETA/ETD times and area of operation.

This information will be used to create the daily and monthly Shipping Schedules which will be communicated to other Port of Kitimat users/stakeholders. Non-project vessels will be encouraged to provide information as well, however, this will be voluntary.

7.4.5 Work Planning and Work Permits

Daily and weekly work planning information will also contribute to planning for vessels needs and movements to minimize conflicts and marine navigational risks. Where feasible, vessel movements will be minimized by coordinating activities with other marine users, particularly with other industrial activities related to dredging, disposal at sea, and environmental monitoring.

Project vessels performing construction work will follow the Project Permit to Work process that includes hazard identification and the employment of risk mitigation measures prior to the activity being undertaken.

8.0 MARINE COMMUNICATIONS PROTOCOL

LNG Canada is committed to communicating with Aboriginal Groups and marine users regarding marine construction activities, and related safety and navigation considerations. This includes communications related to the following:

- Location and timing of marine construction activities that may impact Aboriginal Groups or marine users
- Safety procedures, such as navigation aids and updated navigational charts
- Location of areas where navigation is restricted for safety reasons
- Changes in access to the Project footprint and marine environment potentially affecting access to country foods

LNG Canada is committed to minimizing impacts to Aboriginal Groups' use of the marine environment by considering the location and timing of traditional activities in relation to the timing of marine construction execution.

Building on engagement with First Nations throughout the fall of 2017, and leveraging existing marine communication tools, LNG Canada has developed the following process for communicating with Aboriginal groups and marine users regarding marine shipping traffic during the construction phase of the Project. In order to ensure that communication is appropriate and effective, LNG Canada will continue to meet with First Nations and key stakeholders on a regular basis to evaluate the identified methods for sharing information related to marine shipping traffic. This process will therefore continue to be open to change and improvement, building on any additional input or feedback received from Aboriginal groups and interested marine users throughout Project construction.

8.1 Engagement with Aboriginal Groups

Throughout October and November 2017, LNG Canada provided draft Marine Environmental Management Plans (MEMPs) to all Aboriginal groups, and undertook a series of in-person engagements with Aboriginal groups on these draft MEMPs. As part of this process LNG Canada spoke with each Nation listed below on the topic of communication regarding marine shipping traffic during Project construction. Specifically, the following questions were posed regarding marine communications:

- What marine communications tools are currently being used by community members?
- What are the Nation's preferred methods of communication regarding marine shipping?;
- What specific information about marine construction traffic is the Nation most interested in receiving; and
- Do members currently use, or have they in the past used AIS technology for information about local marine traffic?

Feedback on the topic of marine communications was received from First Nations during the in-person meetings noted above as well as via written comment submissions received throughout November 2017. This feedback can be summarized as follows:

- Aboriginal groups are interested in continuing the development of the Marine Communications Protocol with LNG Canada;
- Aboriginal groups are interested in learning about the types of marine traffic and timing of vessels transiting to site during the construction phase of the Project;
- Aboriginal groups are interested in having marine traffic information shared with them, such as shipping schedules, so that members are aware when vessels pass through their territory;
- Aboriginal groups are concerned that members do not have access to, or use existing marine communications channels such as AIS technology and VHF radio (and that there is no cellular data service from the water); and
- Aboriginal groups are interested in having access to a key contact at LNG Canada for ease of accessing information about marine traffic, as requested by members.

The feedback received has been considered by LNG Canada and has been critical in the development of the process for marine communication with Aboriginal groups and interested marine users during the construction phase of the Project, as articulated below.

8.2 **Process for Communicating with Aboriginal Groups and Marine Users**

As noted above, LNG Canada is committed to ensuring that Aboriginal groups receive information of interest related to marine shipping traffic during the construction phase of the Project. To that end, LNG Canada has developed the following process for communication of Project marine activities.

8.2.1 Shipping Schedule

To share information related to the timing and types of vessels transiting to the Project site with First Nations and interested marine users, LNG Canada will post a weekly shipping schedule online. In addition, LNG Canada will establish an email distribution list so that this schedule can be pushed directly to interested parties that have signed up to receive the schedule by email. This weekly shipping schedule will include information such as vessel names, estimated times of arrival / departure, purpose of visit and types of vessels.

8.2.2 Communication Focal Points

To share information on marine traffic during construction, LNG Canada will assign dedicated focal points of contact for each Aboriginal group and for interested marine users. These focal points will be identified in advance of commencement of marine construction, and will be able to respond to questions and queries related to marine shipping traffic during construction. Each Nation will also be invited to identify a key point of contact for LNG Canada that will receive the weekly shipping schedule as well as any other pertinent information related to shipping. This contact will be able to collate questions and concerns raised by community members and take them to the LNG Canada focal point for response.

8.2.3 Marine Traffic Workshops

LNG Canada is also committed to hosting workshops on marine shipping traffic with First Nations and marine users. These engagement sessions will be held at key points throughout construction, for example in the early stages of the construction phase, in advance of the arrival of heavy lift vessels, and before the commencement of dredging activities at site. These sessions will provide the opportunity to share information and respond to questions and concerns regarding the following:

- Types of vessels Aboriginal groups and marine users can expect to see, as well as their frequency (i.e. heavy lift vessels, barges, etc.);
- Marine safety updates (i.e. marine preparedness, life jacket requirements, marine radio communication, etc.);
- The effectiveness of the Marine Communications Protocol (in order to ensure that Aboriginal groups and marine users are receiving the information they require regarding marine shipping traffic); and
- Other tools for communicating information related to marine shipping traffic that will be employed by LNG Canada (see below).

8.2.4 Use of Existing Marine Communication Tools

Aboriginal groups and other marine users will be encouraged to review and / or utilize the following tools, in order to stay informed about shipping traffic during the construction phase of the LNG Canada Project. Key existing marine communications tools that will be used by LNG Canada and its Contractors include the following:

 Reporting and Call in Points to Vessel Traffic Services – Project marine traffic will contact Canadian Coast Guard through MCTS Prince Rupert using VHF radio to provide their vessel information to Vessel Traffic Services. Aboriginal groups and other marine users are encouraged to monitor these VHF radio channels in order to also receive this information for their awareness and action (as required). Call-in-points are listed in the Radio Aids to Marine Navigation publication and are also indicated on Canadian Hydrographic Charts. These VHF radio channels are reliable sources of information for receiving real time vessel courses, speeds, Estimated Time of Arrivals (ETAs) and intentions, supplementing the information provided directly to Aboriginal groups and marine users by the LNG Canada focal points.

- Pacific Pilotage Services Project marine vessel operators that need pilot services will be required to contact, order and pickup/drop off pilots as required. The Pacific Pilotage Authority provide information on their website regarding the vessels that have ordered and are carrying pilots. This information can be accessed by the public so that marine users and Aboriginal groups can know which vessels have pilots or have ordered pilots. The pilots onboard project vessels also have access to marine VHF radio and will be using the appropriate marine VHF channels to communicate information to Vessel Traffic Services, as well as to other marine craft. Other marine users are encouraged to use the marine VHF radio on their vessels to improve marine navigational safety.
- Marine Incidents and Marine Response All vessels associated with Project construction will be required to report Marine Occurrences to the Transportation Safety Board when and if they occur, and will usually do so via CCG coastal radio stations (i.e. MCTS Prince Rupert). In the event of an emergency such as for Marine Search and Rescue, these vessels may also contact the Joint Rescue Coordination Centre (JRCC) Victoria in order for JRCC to initiate and coordinate a response. The CCG via MCTS Prince Rupert would, for example, relay any marine emergency SAR communications messages to other marine users (including Aboriginal groups) using existing radio channels as published in the Radio Aids to Marine Navigation. Other incidents such as marine spills or collisions would also be communicated to marine users via the CCG coastal radio station on the appropriate marine VHF channels.
- Automatic Identification System (AIS) Project vessels fitted with AIS transceivers will automatically
 communicate their own vessel information to other vessels and shore stations that are also fitted with AIS
 transceivers (so long as those vessels are within their VHF radio range). The information received by the
 Project's AIS transceiver located onshore next to the Kitimat marine terminal will also upload AIS
 information it receives to the internet to allow the general public to see the marine vessel traffic that is
 within the Port of Kitimat.

8.3 **Process for Providing Feedback on Marine Communications**

As noted above, LNG Canada will adopt an adaptive management process for the Marine Communication Protocol. As such, interested parties will be encouraged to use the LNG Canada Community Feedback process to provide input and feedback to the Project regarding its process for communicating information related to marine communications. This feedback and input will be considered and will help to make the Protocol more effective throughout Project construction.

In addition to the above process for direct communication with Aboriginal groups and marine users regarding marine shipping traffic, LNG Canada will ensure that marine contractors and subcontractors utilize a series of marine communications methods and tools during the construction phase of the Project.

LNG Canada is committed to maintaining open and transparent relationships with First Nations, and ensuring that Aboriginal groups are receiving information of interest related to marine shipping traffic during Project construction. To that end, the Project will use all of the mechanisms noted above to share information and to facilitate receiving feedback from Aboriginal groups and other local marine users with respect to the effectiveness of the Marine Communication Protocol and/or any adverse effects related to marine navigation. LNG Canada will employ an adaptive management approach to this process, in order to ensure that the methods for communicating and the information provided stay appropriate and adequate throughout Project construction.

9.0 MONITORING, REPORTING AND RECORD KEEPING

Marine construction activities in Kitimat Arm will be monitored by a combination of LNG Canada Environmental Monitors (EMs) and third party contracted EMs. Monitoring will take place to document compliance with regulatory requirements, conformance with approved plan requirements, and identify opportunities for improvement.

9.3 Conformance Monitoring

EMs will assess conformance to, and ensure activities are being performed, in accordance with the marine EMPs and CEMP requirements. EMs will have the authority to stop Project work that does not comply with or is immediate danger of not complying with:

- The terms and conditions of the Environmental Assessment Certificate (EAC) or Canadian Environmental Assessment Agency (CEAA) Decision Statement
- The mitigation measures described in the various EMPs required by the EA Certificate
- Any approval, authorisation, or other regulatory requirements applicable to the Project of LNG Canada

The frequency of inspection will be dependent on the activities and their inherent environmental risk with respect to applicable activity aspects; it can be continuously monitored or periodically inspected.

9.4 Monitoring Effects on Marine Users

LNG Canada will monitor effects on marine users as a result of Project construction through the Community Feedback Process. Concerns and complaints regarding impacts of construction will be addressed in accordance with LNG Canada policies outlined in the Feedback Process.

Impacts to marine users will also be monitored by tracking vessel traffic, as well as safety and environmental performance in and around the construction area. Performance indicators will be developed and built into the LNG Canada HSSE Management System and related performance reporting.

9.5 Reporting

EPC and Contractors are required to report any findings, non-compliances and non-conformances, and selfcreated corrective action plans in a report to LNG Canada. Any reports that are required to be sent to external agencies, such as regulators, will be submitted to LNG Canada if related to Company-owned permits. Contractors may only submit reports on behalf of LNG Canada at the written request of LNG Canada.

9.6 Record Keeping

All records, checklists, inspection reports, including any non-compliances or non-conformances and corrective action plans are to be maintained. Records shall be and remain legible, identifiable, and traceable. Records may be kept in hard copy if an electronic copy is also kept.

9.7 MATMP Review and Update

Scheduled reviews of the EMPs will be undertaken at a minimum annually. Should any deficiencies be found during the scheduled reviews, updated EMPs will be issued as required and outdated copies of the EMPs will be collected for archive.

The MAP will be implemented using an adaptive management approach. The adaptive management approach is based on an interactive process that allows for new information to be incorporated as it becomes available, is responsive to feedback received from stakeholders and First Nations through construction, and identifies and updates the relevant plans with new mitigations, if it is evident that such new mitigations are required. LNG Canada will continuously re-evaluate mitigation and monitoring measures throughout the marine construction phase, to verify that construction activities are consistent with regulatory approvals and legislative requirements. In addition, corrective or preventative actions may be identified, resulting in amendments to individual environmental management plans to ensure ongoing effectiveness, as well as regulatory and permit compliance.

10.0 REFERENCES

- LNG Canada, 2014, Environmental Assessment Certification Application LNG Canada Export Terminal, September.
- LNGC, 2014a. Environmental Assessment Certificate Application. Produced by Stantec. September 2014.
- Canadian Ballast Water Control and Management Regulations SOR/2011-237 (Transport Canada, 2011). Minister of Justice, May 25 2015.

APPENDIX A: ACRONYMS, ABBREVIATIONS AND DEFINITIONS

A-1 ACRONYMS AND ABBREVIATIONS

BC	British Columbia
BMP	Best Management Practices
CCG	Canadian Coast Guard
CEAA	Canadian Environmental Assessment Act
CEMP	Construction Environment Management Plan
CRA	Commercial, recreational, or Aboriginal (used in relation to fishery activities, or fish that support such a fishery)
CSA 2001	Canada Shipping Act, 2001
DFO	Fisheries and Oceans Canada
DWT	Dead weight tonnage
EA	Environmental Assessment
EAC	Environmental Assessment Certificate
EMP	Environmental Management Plan
EPC	Engineering, procurement, construction
EWP	Environmental Work Plan
GRP	Geographic Response Plan
IMO	International Marine Organization
LNG	Liquefied Natural Gas
LNG Canada	LNG Canada Development Inc.
MAP	Marine Activities Plan
MARPOL	International Convention for the Prevention of Pollution from Ships
MCTS	Marine Communications and Traffic Services
MEPC	Marine Environmental Protection Committee
MMP	Marine Monitoring Plan
MOF	Marine Offloading Facilities

MRP	Marine Response Plan
MATMP	Marine Access and Traffic Management Plan
NA-ECA	North American Emissions Control Area
PPRA	Pacific Pilotage Authority
RT	Rio Tinto Canada
SOLAS	International Convention for the Safety of Life at Sea
тс	Transport Canada
VCs	Valued Components
WMP	Waste Management Plan

APPENDIX A-2: DEFINITIONS

Contractor	Contractor is defined to include EPC and its contractors and related sub-contractors, as well as LNG Canada contractors and related sub-contractors
Corrective Actions	Steps that are taken to remove the causes of an existing nonconformity. In general, the CA process can be thought of as a problem solving process.
Environmental Work Plan	Activity level work plan, developed by Contractors, which links EMP and regulatory requirements into a plan for implementation
Management System	A network of interrelated elements. Elements include responsibilities, authorities, relationships, activities, functions, processes, practices, procedures, and resources.
	A management system uses these elements to establish policies and objectives and to develop ways of applying these policies and achieving these objectives.
Prevention of Pollution	To prevent pollution means to avoid, reduce, or control the creation, emission, or discharge of contaminants or waste materials. Pollution must be prevented in order to reduce adverse environmental effects.
Quarantine waste	Quarantine waste is defined as material or goods of quarantine concern, as determined by the Quarantine Act (2005). It is currently unknown what imports to the LNG Canada project site will be quarantined (dependent on screening undertaken by the Health Canada and Canadian Border Services Agency), and may result in being considered a waste stream.
Timing Window	Periods of time when activities can be conducted with reduced risk to fish and wildlife, and fish and wildlife habitat. They are also referred to as "windows of least risk", and define the period of time when activities may be permitted to occur. Timing windows for the marine environment are provided by DFO.
Valued Components	Components of the natural and human environment that are considered to have scientific, ecological, economic, social, cultural, archaeological, historical, or other importance.

APPENDIX B: EXAMPLE APPLICATION OF SAFETY ZONES AND CONDITIONS

The figure below provides an example of Safety Conditions applied to Safety Zones while dredging and related dredgeate disposal activities are underway.



APPENDIX C: LOCAL AND TRADITIONAL USE

Local and Traditional Use

The expansion of the marine terminal and the associated increase in shipping traffic could interfere with marine fisheries, including Aboriginal fisheries, or the ability to pursue recreational activities in the areas along the marine access route. Information included in this section is intended to inform the implementation of the mitigation measures set out in Section 7.4, and increase awareness of project contractors and suppliers accessing the site in Kitimat via the marine access route of the variety and types of users they will encounter along the way.

The following information has been compiled by LNG Canada and is based on the LNG Canada Environmental Assessment Certificate Application; Section 7: Assessment of Potential Social Effects; Section 7.4 Marine Transportation and Use; and Part C: Aboriginal Groups Information Requirements. For the full section, please see the LNG Canada application.

Fishing Areas

DFO manages all marine fisheries. The marine access route overlaps with Fishery Management Areas (FMAs) 4, 5, and 6. FMA 4 extends north to the BC-Alaska border and south to Porcher Island. FMA 5 continues south from FMA 4 and includes the Inside Passage (down to Wright Sound), Principe Channel (down to Otter Channel), and the near shore areas off Banks Island (down to the southern edge of Banks Island). FMA 6 encompasses all of Douglas, Devastation, Whale, and Squally channels, and Wright and Caamaño sounds.

<u>Salmon</u>

Salmon fishing using gill nets, purse seines, and troll gear occurs throughout the marine access route. Commercial fishing can occur between May and October, but will vary according to the time of local runs, distribution, and health of salmon stocks. The length of time the salmon seine or gill net fisheries are open can vary from several weeks to several days. In FMAs 4 to 6, salmon fishing usually begins in early June and starts to slow by September (DFO 2013b; Stantec Consulting Ltd. 2014). Gill nets must be actively fished and cannot legally be left unattended (Marine Community Consultation 2014, pers. comm.).

Pacific Herring

The herring fishery yields multiple products (e.g., spawn on kelp, roe, food, and bait). These are harvested using different gear types (e.g., seine, drift nets, and hand rigs). Fishing locations exist around Browning Entrance and to the west of Goshen Island. Since 2008, the herring fishery has been closed in FMA 6 to protect stocks, with limited catches taken in FMA 4 and FMA 5 (DFO 2013c; Stantec Consulting Ltd. 2014).

Geoduck Clams

Geoducks are collected by divers using high-pressure water jets for removing them from soft substrates (DFO 2013d). Geoduck harvesting areas occur in Estevan Sound, Principe Channel, and along the west side of the islands north of Browning Entrance. The dive fishery makes use of packer boats that collect, process, freeze, and land the catch from multiple fishing vessels. A packer might service 10 to 20 fishing boats and provides efficiencies to the entire dive fleet (Marine Community Consultation 2014, pers. comm.).

Red Sea Urchins

Red sea urchins are collected from the seafloor by scuba divers. Urchin diving is most concentrated in Principe Channel but occurs close to shore as divers are limited to shallow depths (DFO 2013e). Packer boats are used (see geoduck clams above; Marine Community Consultation 2014, pers. comm.).

Pacific Halibut

Pacific halibut are caught using hook and line and long-line gear (DFO 2013f) generally outside the RSA in deeper waters. A single unit of long-line gear, called a "skate" is typically 400 m in length. Multiple skates can be connected and fished together as a single long line set (Marine Community Consultation 2014, pers. comm.).

Dungeness Crab

Crabs are harvested using traps that cannot be retrieved more than once per day (DFO 2013g). Commercial traps are generally fished over soft bottoms in depths between 5 m and 100 m. Identified crab fishing grounds have little overlap with the marine access route and are concentrated northwest of the Banks Island and west of Porcher Island.

Sea Cucumbers

Sea cucumbers are collected by scuba divers in water generally shallower than 20 m (the safe technical limit for this means of harvesting; DFO 2012b). Sea cucumber diving occurs throughout Principe and Douglas Channels, but occurs close to shore. Packer boats are used similar to the harvesting of geoduck clams (Marine Community Consultation 2014, pers. comm.).

Prawns and Shrimps

Prawns and shrimps are harvested using traps and trawl gear (DFO 2013h, 2013i). The use of traps occurs along most of the marine access route south of Browning Entrance, whereas shrimp trawls are concentrated in areas east of Triple Island. Prawn-trap gear is generally placed close to shore and away from the shipping corridor (Marine Community Consultation 2013a, 2013b, 2014, pers. comm.).

Groundfish

The commercial groundfish fishery is comprised of seven different fishing sectors (e.g., trawl, halibut, sablefish, inside rockfish, outside rockfish, lingcod, and dogfish) that use trawl and non-trawl gear types. Groundfish trawling is prohibited along most of the marine access route (DFO 2013f), but some trawl and long lining occurs north of Browning Entrance and around Triple Island.

<u>Octopus</u>

Divers collect giant Pacific octopus by hand with the aid of liquid irritants to drive them from their dens. No tools other than a collection bag are permitted (DFO 2011). Octopus harvesting areas have limited overlap with the marine access route. In Douglas Channel, FMA subarea 6-2 is closed from commercial octopus harvesting and is reserved for Aboriginal fishing practices (Stantec Consulting Ltd. 2014).

Commercial Shipping Use

On average, over 21,000 vessels per year report to the Marine Communication & Traffic Services (MCTS) as they move throughout the Prince Rupert traffic zone, including large merchant ships, passenger vessels, tankers, tugs, and barges. Trends that are more specific to the Project's marine access route can be inferred from the Pacific Pilotage Authority (PPA) and District of Kitimat datasets because these data only include ships travelling to and from the port of Kitimat.

On average, 203 commercial vessel visits occurred for the port each year, with up to 102 of those vessel visits piloted by the PPA. Not all vessels are required to carry BC Coast Pilots onboard. For example, domestic vessels less than 10,000 gross registered tonnes are not required to carry a BC Coast Pilot but do visit the port. When this occurs, vessels are recorded in the District of Kitimat dataset but not by the PPA (NOTE: PPA vessel movement data were converted to number of vessel visits by dividing the number of movements by two because a vessel visit will always have an inbound and outbound portion to its trip; this provides an estimate of the number of vessel visits piloted by the PPA). A review of vessel attribute data (e.g., length overall, DWT, draft, beam) from the PPA dataset show that commercial vessels travelling to Kitimat were up to 225 m long and were rated to carry over 70,000 DWT. Ship traffic generally increased from 1978 until 1993, when it peaked at 279 vessels. Peak traffic occurred between 1987 and 1995, with an average of more than 250 vessels visits per year in 2008.

Aboriginal Use

There are seven Aboriginal Groups whose traditional territories and/or use overlaps with the marine access route: Gitga'at First Nation, Gitxaala Nation, Haisla Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams First Nation, and Metlakatla First Nation.

Existing and Traditional Navigational Routes

Aboriginal groups located along the marine access route travel the waters throughout their traditional territory and routes are selected based on weather and water conditions, and the ability to stop and hunt, gather or fish along the way. While they may stay closer to shore in inclement weather, there are times when they are crossing the channels, and/or fishing in the middle of the channel.

LNG Canada vessels transiting the marine access route should expect to see a variety of vessels sizes and types both travelling and harvesting in the channel and along the shoreline.

Aboriginal Fishing

Harvesting marine resources is an important part of traditional life for most coastal Aboriginal Groups, with over 40% of meals being traditionally sourced from the sea for some Nations. Marine resources are also heavily relied on to sustain Aboriginal economies (Gregory et al. 2011). Key species harvested are listed in Table AC1: Marine Species Harvested by Aboriginal Groups.

Fish	Invertebrates	Marine Plants	Marine Mammals and Birds
Sable fish	Abalone	Sea grass	Seal
Lingcod	Chitons (various spp.)	Seaweed	Killer Whale
Kelp greenling	Clams	Kelp (spp.)	Seagull (and eggs)
Cod (red, black, grey)	Cockles		Sea Lion
Flounder	Crab		Sea Otter
Hake	Mussels		Whale
Halibut	Octopus		Duck
Herring (and eggs)	Prawns/Shrimps		Geese
Needle fish	Scallops		
Eulachon	Sea cucumber		
Rockfishes (including red snapper)	Barnacle		
Salmon (all species)	Sea urchin		
Steelhead	Sea anemone		
Bullhead	Sea prune		
Turbot	Sea slipper		
Skate	Rock Oyster		
Pilchard or smelt			
Pollock			
Dogfish			

Table AC1: Marine Species Harvested by Aboriginal Groups

SOURCE: Smith (1999, 2008); Lax Kw'alaams First Nation (2004); Gregory et al. (2011); Robinson (2012); Metlakatla Fisheries 2013; Powell (2013); Calliou Group (2014a); Crossroads Cultural Resource Management (2014); DM Cultural Services 2014; Metlakatla First Nation 2014; The Firelight Group (2014); DM Cultural Services (2015); Inglis Consulting (2015).

Some of the most desired seafood items include eulachon, salmon, herring eggs, crab, seaweed, abalone, mussels, black cod, shrimp, prawns, halibut, clams, and cockles (Gregory et al. 2011; Kitselas Community Engagement 2014, pers. comm.; Metlakatla Community Engagement 2014, pers. comm.). Cockles and seaweed are generally not available from the market and must be sourced locally.

Sockeye salmon are the primary salmon species targeted by Aboriginal Groups, with this species making up to 98% of their annual catch (DFO 2013a, DFO 2013b). Catch data also indicate that groundfish such as halibut, lingcod, and rockfish are caught (DFO 2013a).

Fishing techniques used to harvest marine species for food, social, and ceremonial purposes are wide ranging but generally rely on modern techniques, including specialized boats and gear. Namely, commercial grade seine nets are used for salmon, long lines for groundfish, and traps for prawns and crabs. Other harvesting techniques include hand picking for seaweed and clams, and use of kelp and tree boughs for harvesting herring eggs (Kitselas Community Engagement 2014, pers. comm.).

DFO spatial data on Aboriginal fishing locations were supplemented with information obtained during meetings with Aboriginal Groups (e.g., community engagements). Overlap of DFO-identified Aboriginal fishing grounds and the marine access route occurs at Hartley Bay, Otter Channel, and Browning Entrance. Additional, smaller fishing areas are scattered along the marine access route, with specific locations identified by individual Aboriginal Groups as described below.

Gitga'at First Nation

The marine environment provides a way of life for Gitga'at First Nation, providing traditional foods, market-based income, employment, and more (Gill and Ritchie 2011; Gregory et al. 2011). The waterways that intersect with or are near the marine access route, Douglas Channel lower Grenville Channel, Wright Sound, Lewis Passage, Cridge Passage and Otter Channel, are major resource harvesting areas (Inglis Consulting 2015).

Historically, three of the main Gitga'ata villages are located along the marine access route, one of which is Hartley Bay, the main community today. The waterways and five other key Gitga'ata resource harvesting areas are located whole or in part along the route and are central to the cultural and economic identity and well-being of the Gitga'at First Nation.

Waterways are essential as year round travel routes for Gitga'ata members to access the various land resource harvesting areas within their territory. Most of the areas for harvesting of sea bird eggs, berries, edible and medicinal plants and for hunting are accessible only by boat. Gitga'ata people frequently travel close to the shorelines in search of alder driftwood for use in smokehouses, and for deer hunting.

The five key resource harvesting areas identified by Gitga'at include Kitkitata Inlet, Kiskosh Inlet, Hartley Bay and Environs, Fin Island and northwestern Gil Island, and Union Pass, Union Bay and southeastern Pitt Island and Otter Channel. These key harvesting areas are accessible only by boat (Inglis Consulting 2015).

Marine species, especially fish and shellfish, are extremely important, not just for subsistence but also for cultural and spiritual reasons. Herring, eulachon, salmon, snapper, cod, trout, halibut, flounder, and a variety of different rockfish are important fish species. Abalone, clams, cockles, octopus, prawns, scallops, shrimps, chitons, and sea urchins are important resources, many of which are collected from the intertidal zone (Satterfield et al 2011). Many Gitga'at people consume traditional foods, with up to 40% of meals being traditionally sourced (Gregory et al. 2011).

Some of the most valuable fisheries include pink, chum, coho, and sockeye salmon; geoduck; and red urchin. For the Gitga'at people, these fisheries usually comprise 99% of the total wholesale value of all their fisheries combined (for the years 1996 to 2007; Gregory et al. 2011).

Critically important foods to Gitga'at First Nation are those that are most widely shared or distributed amongst kinship networks and those that are central to the seasonal group events in Hartley Bay for activities like harvesting, processing, drying, smoking, and freezing foods (Satterfield et al. 2012: 40).

Gitga'at First Nation has identified several harvested resources as "mainstays of Gitga'at culture and way of life," including salmon, halibut, and cedar (GFN 2013a). Table AC2 summarizes additional information on current use by Gitga'at First Nation.

Use Category	Targeted Species	Identified Use Locations		
Hunting	Seal and sea lions	Throughout marine access route, including around Ferrant		
		Island, Fin Island, and Hartley Bay		
	Deer and mountain goat	Throughout marine access route, including along Douglas		
		Channel shorelines, from Kishkosh and Old Town		
	Moose	Around Old Town		
	Black bear	Throughout the marine access route, various locations along		
		the shipping lanes		
	Duck	Throughout the marine access route, commonly hunted around Old Town Kishkosh Inlet		
	Goose	Throughout the marine access route, including Old Town and Kishkosh Inlet		
Fishing	Salmon	Throughout the marine access route, specific locations are		
		Hartley Bay, Old		
		Town, along rivers and creeks feeding into Douglas		
		Channel, and Union Pass		
	Halibut and cod	Throughout the marine access route, including areas around		
		Hartley Bay		
Crab		Throughout the marine access route, especially around		
		islands and in inlets and bays		
Herring		Throughout the marine access route,, most use of herring is		
		harvest of eggs		
	Shrimps and Prawns	Throughout the marine access route, specifically Douglas		
		Channel and associated inlets		
	Octopus, sea cucumber, chiton	Throughout the marine access route, various locations along		
		the shipping lanes		
Marine Harvesting	Various shellfish	Throughout the marine access route, extensively		
Terrestrial	Seagull eggs	In and around Otter Channel, Otter Pass and Estevan Sound		
Harvesting				
Trapping	Small fur-bearing animals	Throughout the marine access route, specific locations		
	(beaver, marten, fisher, land	along Kitimat Arm		
	otter, mink, weasel, muskrat)			
Vegetation	Terrestrial plant food harvesting	Throughout the marine access route, especially near past		
Gathering	(berries, crab-apples, wild rice,	and present settlements. Seagull eggs were collected near		
	various tubers, and roots)	water on Campania Island.		
	Marine plant harvesting Includes	Throughout the marine access route, including areas around		
	seaweed and kelp	Otter Channel,		
		Otter Pass and Estevan Sound		
	Food harvesting medicine	Throughout the marine access route, especially near past		
		and present settlements		

Use Category	Targeted Species	Identified Use Locations
Transportation	None specified	Throughout the marine access route, and throughout the
		shipping lanes

Source: Satterfield et al. 2012; Gitga'at First Nation 2013b

Gitxaala Nation

Gitxaala Nation's cultural identity is tightly linked to its ability to access its territory and harvest marine resources (Calliou Group 2014a)

Gitxaala Nation has a predominantly marine-based economy and harvest many species, but it has a special reliance on halibut and abalone for trading and consumption during feasting. Feasting is a very important activity that relies heavily on the availability of traditional foods (The Firelight Group 2014). Other species used for trade include dried seaweed and shellfish, which are often traded in return for eulachon grease, because euchalon is not currently fished in Gitxaala Nation territory. Gitxaala Nation also harvests salmon, cockles, clams, seals, and herring roe-on-kelp (The Firelight Group 2014).

Fishing locations were identified by Gitxaala Nation (Calliou Group 2014a), but traditional and commercial harvesting locations were not distinguished. Salmon are fished along the entire marine access route except for the section around Otter Channel, north of Hartley Bay to the southern end of Maitland Island, and at the very head of Kitimat Arm north of Clio Bay. Some fishing locations, such as those where seine nets are used, are passed down from generation to generation and "belong to," and are used by one person only. Fishing locations for halibut and sablefish overlap with the marine access route in Principe Channel. Many other groundfish fishing sites do not. Clams and cockles harvesting sites potentially exposed to the marine access route include those on the west sides of Gurd, Goschen, Dolphin, and Spicer Islands north of Principe Channel, areas in Principe Channel, Otter Channel, and at the junction of Grenville Channel at Wright Sound.

Gitxaala Nation harvest seaweed, clams, cockles, abalone, octopus, and kelp species by hand along the shoreline. Harvesting times are limited by season and tide height. "Low tide" is considered a tide lower than 4ft., a "zero tide" was any tide less than 1ft., and "high tide" is a tide 4ft and higher. Much of shoreline harvesting is best done at low or zero tide days, and occurs at different times of the year for different species. For example, Gitxaala Nation estimates that they have 31 days per year to harvest seaweed, but it cannot be harvested at night or in the rain according to cultural harvesting protocols. Fifty-seven days are suitable to collect clams and cockles, with some members collecting at higher tides but with reduced efficiency (Calliou Group 2014b). Any vessels entering the marine access route should be aware that at low or zero tides there may be people harvesting along the shoreline, and extra care should be taken to minimize vessel speeds and increase look-outs for other small vessels, particularly if the tide is occurring at night. Table AC3 summarizes additional information on current use by Gitxaala Nation.

Use Category	Targeted Species	Identified Use Locations
Hunting	Harbour Seal	Present in the marine access route around Goschen Island and Principe
		Channel
	Sea Lion	Present in the marine access route around Goschen Island
	Deer	Present in the marine access route around Goschen Island, Principe and
		Otter channels, and in Wright Sound
	Mountain Goat	One identified area in Port Stephen's in Principe Channel
	Duck	Present in the marine access route in areas around Goschen,
		Gurd,McCauley and Dolphin islands and the northwest portion of Banks
		Island
	Goose	Present in the marine access route in areas around Goschen, Gurd ,and
		Dolphin islands and the northwest portion of Banks Island
	Swan	Present in marine access route in areas around Goschen, Gurd, and
		Dolphin islands

Table AC3: Gitga'at First Nation Current Use

Use Category	Targeted Species	Identified Use Locations
Fishing	Salmon	Present in the marine access route; reported in areas west of Porcher
		Island; Principe, Otter, and Douglas channels; south of Fin Island and
		Wright Sound, as well as along Stephen's Island and the Tree Knob group
	Halibut and cod	Present in the marine access route; specific locations around Goschen
		Gurd and Dolphin islands
	Fulachon	Specific locations of current fishing are restricted to areas outside the
		marine access route, south of Hawkesbury Island and coastal waters west
		of Aristazabal Island
	Herring	Present in the marine access route; specific locations are Goschen Island
		and Principe Channel
	Prawns	Present in the marine access route, specific location is Principe Channel
	Octopus and other	All around Dolphin Island, all around Banks Island, north end of Principe
	invertebrates	Channel, north of Anger Island, Otter Passage
	Greenling, rock	Present in marine access route; reported in areas around Goschen Island,
	fish and other	Principe and Otter channels, and South of Fin Island
Marine	Shellfish	Present in the marine access route: reported in areas west of Banks
Harvesting		Island, Principe Channel, and Otter Channel, south of Fin Island and
		Wright Sound
Trapping	Mink	Specific locations in the marine access route restricted to Otter Channel
		and west Porcher Island
Vegetation	Marine food	Throughout the marine access route, specific locations around Goschen,
Gathering	harvesting (kelp	Dolphin, and Gurd Islands, throughout Principe Channel, and in Otter
	and seaweed)	
Cultural areas	None specified	sacred places occur in the marine access route and surrounding areas,
		north Banks Islands, throughout Principe Channel, along the northwest
		corner of Banks Island, around Port Simpson, Anger Island, Otter
		Passage, Otter Channel, between Gil and Campania islands, between Gil
		and Fin islands, through Wright Sound, and around Ferrant Island.
Transportation	None specified	Throughout the marine access route, with a particularly high concentration
– marine		of travel up Principe and Petrel Channels and to Dolphin Island
navigation		
Camps –	None specified	Of the current camps associated with the Gathering Strength Canoe
canoe		Journey along Douglas Channel, two are in the marine access route, and
Transportation	None specified	In 2012, the Gathering Strength Cance journey included Dolphin Island
		and travelled routes along Greenville Channel, through Write Sound, and
journeys		along the Douglas Channel
Sites and	None specified	Two current reported camp sites occur on Petrel Channel, in Keecha 11,
Settlements		along Principe Channel. Past settlements and sites exist throughout
		Principe channel, the west side of Banks Island, the northwest side of
		Campania Island, Calamity Bay and in the areas surrounding Dolphin,
		Goschen, Gurd and Porcher Island

Source: Calliou 2011, Calliou 2014c

Haisla Nation

Haisla Nation appears to use all wa'wais (traditional territories) to gather traditional foods during different times of year. Preference is to fish close to Kitamaat Village using small skiffs. However, decreasing seafood availability has forced members of Haisla Nation to travel greater distances to harvest marine resources. Shoreline harvesting of clams and cockles occurs primarily during nighttime tides. Eulachon fishing has not occurred in Haisla Nation territory for the past three years because of low eulachon returns. Some stocks, however, do appear to be rebuilding, and there is presently a fishery on Kemano River with the possibility of another opening on Kitimat River if recovery continues (Powell 2013). Traditional Haisla Nation harvesting areas identified in Powell (2013) are listed in Table AC4, indicating in which wa'wais mussels, cockles, or clams are harvested in. Additional Haisla Nation harvesting is identified in Table AC5.

	Shoreline Harvesting Activities			
Wa'wais (Traditional Harvesting Area)	Mussels	Cockles	Clams	Sheltered From Vessel Wake
Kitamaat Village Area	✓			N/A
Clio Bay and Mud Bay				Yes
Coste Island	✓	~		Partially
Eagle Bay	\checkmark	~	~	Yes
West side of Maitland Island				N/A
Sue Channel, East Maitland, North Hawkesbury, and Loretta Islands	~	~	✓	Partially
Bish Creek or Bees		~		Partially
Elmsley Cove south to Jesse Falls	✓	~		Partially
Jesse Lake and Upper Jesse Creek				Yes
Echo Bay	\checkmark			Partially
Miskatla Inlet	✓	~	~	Yes
East side of Giltoyees Inlet	✓	~	~	Yes
West side of Giltoyees Inlet	✓	~	~	Yes
Foch Lagoon and, River and Lake	✓	~	~	Yes
Upper Foch Creek	✓	~	~	Yes
Drumlummon Bay	\checkmark	~	~	Partially
Blue Jay Falls to Drumlummon Bay ^a	~	~	~	N/A
Gander Island				Partially
Percentage of Wa'wais used or sheltered	83	67	50	83

Table AC4: Location	of Haisla Nation	Shoreline	Harvesting	Activities

SOURCE: Powell (2013)

Table AC5: Haisla Nation Harvesting in Marine Access Route

Use Category	Targeted Species	Identified Use Locations
Hunting	Seal	The mouth of the Kitimat River estuary; the flats around the Kitimat
		River estuary; Minette Bay from the east shoreline; Coste Rocks (off
		the southeast corner of Coste Island [Louis Point]), the rock reef in
		Emsley Cove

Use Category	Targeted Species	Identified Use Locations
	Deer	Throughout their territory; specific identified locations are around Kitamaat Village; active or decommissioned logging roads; Maitland Island, Loretta Island, Coste Island, and Rix Island specifically for "island deer" herds
	Moose	Throughout their territory; specific identified location around Kitamaat Village and active or decommissioned logging roads
	Black bear and grizzly bear	Throughout terrestrial areas within the marine access route; specific identified location around Kitamaat Village and active or decommissioned logging roads; flats between Anderson and Moore creeks; various locations along the marine access route
	Duck	Usually hunted in saltwater before they group to move to lakes and inland areas during the winter; specific locations are flats between Anderson and Moore creeks; various locations along the shipping lanes
	Canada Goose	Reported for Yaksda wa'wais and along the shipping lanes; specific locations are higher elevations before they learn to fly
	Quail	Reported for Yaksda wa'wais and along the shipping lanes
Fishing	Salmon	Throughout the marine access route, reported in <i>C'imoca and Wohlstu, Yaksda</i> , and <i>Simgas and Zagwis wa'wais</i> . Major spawning streams are Kitimat River and its tributaries, streams along Douglas and Principe channels, and in Banks, Stephens, and Porcher islands.
	Halibut and cod	Throughout the marine access route, specific locations around Kitimat Arm
	Crab	Throughout the marine access route, especially around islands and in inlets and bays
	Herring	Throughout the marine access route, specific locations around Kitimat Arm
	Shrimps and Prawns	Throughout the marine access route, specific locations around Kitimat Arm
	Trout	Rivers along Kitimat Arm, and the Douglas Channel
Marine Harvesting	Shellfish	Throughout coastal areas of the marine access route
Trapping	Small fur-bearing animals (beaver, marten, fisher, land otter, mink, weasel, and muskrat)	Throughout the marine access route, specific locations along Kitimat Arm
Vegetation Gathering	Berries, crabapples, wild rice, various tubers, and roots	Throughout the marine access route, no specific record available
	Seaweed and kelp	Throughout coastal areas of the marine access route, specific locations along the outer coastline of the Douglas Channel
	Food harvesting medicine	Throughout the marine access route, especially near past and present settlements
Transportation - trails	NS	Throughout terrestrial areas of the marine access rout
Transportation	NS	Throughout the marine areas of marine access route specific
– marine		locations are Kitimat Arm, Douglas Channel, and throughout the
navigation		coastal shipping lanes

Use Category	Targeted Species	Identified Use Locations
Transportation	NS	Along Grenville Channel and the Skeena River
– canoe		
journeys		

SOURCES: Powell 2011, Powell 2013

Kitselas First Nation

Kitselas First Nation relies on marine and freshwater resources, including clams, seaweed, and herring (Smith 1999 and 2008), among others. Kitselas First Nation have identified are along the marine access route that they access for fish harvesting, including areas along the west side of Porcher Island south towards Browning Entrance and the north end of Principe Channel (Pulla, 2015). Clam and seaweed harvesting sites are also identified around Dolphin and North Porcher islands, and in Kitkiata Inlet. Other important fishing areas exist on the northwest side of Fin Island (used to catch sable fish using long lines), "mink trap"—the area between Anger and Pitt Islands (used to catch salmon by gill nets), the southeast side of McCauley Island, and the southwest side of Pitt Island (used to catch prawns and crabs by traps). Fishing for salmon using gill nets in Principe Channel has reportedly been prohibited since the 1980s. Halibut long lines are fished by setting gear parallel to shore, following the contours of the bottom. Long-line gear is not fished in the centre of the channel (Kitselas Community Engagement 2014, pers. comm.).

Kitsumkalum First Nation

Kitsumkalum First Nation harvests many marine species in its traditional territory, using over 80 identified areas for traditional harvesting. Harvested species include, in particular, salmon, cod, halibut, and dogfish. Contemporary fishing methods are now primarily used by Kitsumkalum First Nation fishers.

Lax Kw'alaams First Nation

Lax Kw'alaams First Nation uses its traditional territory for fishing and eco-tourism. Important fish habitats identified by Lax Kw'alaams First Nation include kelp beds, estuaries, tidal flats, and rocky reefs. Important areas identified include Big Bay, the Khutzeymateen, Lucy Island, west of Digby Island, and Stephens Island (Lax Kw'alaams First Nation 2004). The places most heavily used to harvest include Dundas Island (boat harbour) and Stephens Island. Other locations used by Lax Kw'alaams First Nation are Zayas Island (for spring salmon), Porcher Island (for roe-on-kelp), north arm to Grenville Channel and Kinkolith (for cockles), Red Bluff on the Nass (for eulachon), Canoe Pass (for groundfish), Bernie Island, Finlayson, Melville Island, Work Channel, and Steamboat Pass. Many of these fall outside of the marine access route for the project.

Metlakatla First Nation

Metlakatla First Nation members participate in traditional practices and activities that intersect with or take place near the marine access route for transportation, resource use including fishing, harvesting marine resources, hunting, trapping, and food and medicinal plant collection areas, non-consumptive use, spiritual and culturally significant uses and habitation. (DM Cultural Services Ltd. 2015). Members of the community are also active participants in commercial fisheries (Metlakatla First Nation 2014). Aboriginal fishing occurs primarily away from the marine access route in the Tree Nob Group, around Melville and Lucy Islands, North of Stephens Island, and along the inner coast in areas such as Duncan Bay, Tugwell and Kinahan islands, and around Flora Banks (Metlakatla Community Engagement 2014, pers. comm.). Travel routes have also been denoted in this region (DM Cultural Services Ltd. 2015) as Metlakatla members move around the area to access, harvest and transport resources or move to different spiritual, cultural or habitation sites. Both Stephens Island and Melville Island were denoted as islands with significant gathering campsites and village sites, although the shores of these islands are some distance from the transit route of LNG carriers. The Tree Nob group is used to harvest clams, cockles, abalone, lingcod, and rockfish. Lucy Island is a preferred area to fish for halibut and collect shellfish, and Duncan Bay is used to harvest herring roe on kelp. Salmon fishing occurs along the inner coastline as the fish travel to their spawning grounds. Modern gill nets that are approximately 400 m long are used.

Recreation and Tourism

Recreational Fishing

Recreational fishing refers to non-commercial fishing and includes sport fishing and fish caught by private recreationalists and by a commercial recreation venture. Recreational fishing licenses are issued by DFO and are required before harvesting any marine species. In the tidal and non-tidal waters of BC, salmonids are the most sought after species (DFO 2012a). Recreational fishing areas along the marine access route are concentrated in Kitimat Arm, around Hartley Bay, and north of Porcher Island.

Cruise Ships

Cruise ships bound for Alaska use the open waters of Hecate Strait or the more confined waters of the inside passage (an area that overlaps with the marine access route). However, use of the inside passage requires assistance of two BC Coast Pilots and is not preferred because of cost and longer overall travel times to reach Alaska (Spalding 2013, pers. comm.).

In 2005, more than 300 transits were made using the inside passage for travelling to Alaska (MacConnachie et al. 2007), with considerably fewer trips in 2013. The Cruise Line International Association (2013) reported 71 trips through Laredo Channel in 2013, of which 50 also went through Principe Channel. Twenty-one transits were therefore made through Grenville Channel (and were generally made by ships travelling south). Vessels travelled between 14 knots and 21 knots (Cruise Line International Association 2013).

Ferry Service

Two BC ferry routes intersect the marine access route: 1) Prince Rupert to Port Hardy (and return trip); and 2) Prince Rupert to Skidegate (and return trip). Given the current schedule, they will cross the marine access route approximately 450 times per year (BC Ferries 2013; Stantec Consulting Ltd. 2014).

The Metlakatla and North Co-Corp ferry services depart from Prince Rupert and services Metlakatla, Kitkatla, Hartley Bay and Oona River. While it primarily travels Grenville Channel, and would only potentially interact with vessels in the marine access route around the area of Wright Sound and north to Hartley Bay.

Marine-Accessible Parks

Several parks overlap with the marine access route. Most parks are accessible by boat only, and many offer sheltered bays for anchoring or going ashore; however, there are no docks, and visitors must access the sites using the beach.

Recreational Boating Routes

Project shipping traffic and recreational vessels have the most potential for interaction in Wright Sound where one recreational boating route intersects the marine access route and where another parallels the marine access route for approximately 85 km in Douglas Channel between Kitimat and Wright Sound. Interviews with residents revealed that most mariners use Devastation Channel (up to 90%; Parsons 2013, pers. comm.) because of its sheltered nature (Hittel 2013, pers. comm.; Wakita 2013, pers. comm.; Wakita 2013, pers. comm.; Waker and Peacock 2013, pers. comm.).

Anchorages and Scuba Dive Sites

In the Kitimat area, 329 anchorages and safe boat havens have been identified, and approximately 37 dive sites also exist in the area. Several of the known anchorage areas and dive sites were confirmed during consultation. For example, Coste Island is used by the Kitimat SCUBA Dive Club (Wakita 2013, pers. comm.). Overall, sites appear scattered throughout the region and show no pattern or clustering along the marine access route.

Sea Kayaking

Sea kayaking routes were compiled by the BCMCA and assigned to categories of relative importance, with one additional kayak crossing area identified during consultation (Hickman 2013, pers. comm.). Sea kayakers are most likely to interact with commercial shipping traffic in Wright Sound and around Triple Island.

Marinas and Moorage Facilities

Five operating marinas and moorage facilities (i.e., small craft harbours [SCH]) were identified in the LSA:

- MK Bay Marina
- Minette Bay Marina
- Kitamaat Village SCH
- Hartley Bay SCH
- Kitkatla Bay SCH

Summary of Vessel Observations

Vessel density (observations/hectare/day) was calculated for five different traffic zones by dividing the number of observations by the associated area and search time. Calculations are made for two different subsets of the data (see Stantec Consulting Ltd. [2014] for further details):

- fishing related data—includes all observed commercial and recreational fishing vessels and floating fishing gear
- recreational and tourism related data—includes all non-fishing recreational power and sail vessels (military and coast guard vessels, and aircraft are not included)

Table AC6: Commercial, Recreational, and Aboriginal Fishing Vessels or Gear Observed

Traffic Section	Number of Observations	Density (Obs./ha/day)		
Commercial and Recreational Fishing Ves	sels or Gear Observed			
1: Head of Kitimat Arm	3	0.026585		
2: Douglas Channel	28	0.000514		
3: Wright Sound	84	0.000702		
4: Principe Channel	2	0.000011		
5: Browning Entrance to Triple Island	28	0.000041		
Recreational Vessels (Non-fishing Power and Sail) Observed				
1: Head of Kitimat Arm	2	0.017723		
2: Douglas Channel	57	0.001047		
3: Wright Sound	101	0.000844		
4: Principe Channel	17	0.0000927		
5: Browning Entrance to Triple Island	27	0.0000398		

SOURCE: see Stantec Consulting Ltd. (2014) vessel survey data for further details.

APPENDIX D: MITIGATION MEASURES CONCORDANCE TABLE (MATMP)

Source & Reference	ENVIRONMENTAL CATEGORY	Mitigation Measure	EMP	Section
EAC Application Mitigation 5.2-8	General	Construction vessels, supporting tugs, and LNG carriers and assist tugs will use low-sulphur fuel in compliance with applicable marine emissions standards (IMO 2008)	MATMP	7.3.3
CEAA Decision Statement Condition 7.1 EAC Application Mitigation 7.5-8	EMP Development	The Proponent shall develop and implement, in consultation with Aboriginal groups, a communication protocol for all phases of the Designated Project. The communication protocol shall include procedures and practices for sharing information and facilitating communication between the Proponent and the Aboriginal groups and other local marine users on the following: - Location and timing of Designated Project-related construction activities; - Location and timing of traditional activities by Aboriginal groups; - Safety procedures, such as navigation aids and updated navigational charts; - Location of areas where navigation is restricted for safety reasons; - operational speed requirements under the Canada Shipping Act, 2001 or its regulations, and general schedules of the operation of LNG carriers associated with the Designated Project; and - ways in which to provide feedback to the Proponent on adverse effects related to navigation experienced by Aboriginal groups and other local marine users Inform the local community and Aboriginal Groups of changes in access to the Project footprint and marine environment potentially affecting access to country foods	MATMP	8.0
EAC Application Mitigation 5.6-12	Wildlife Management	Supervisory staff on berthed vessels will be alerted to the hazards and potentially high-risk periods for bird strikes caused by deck lighting, particularly on nights when visibility is poor. Staff will be informed of the applicable seasonal and daily migratory periods. Facility staff will report bird collisions to a member of the Project environmental team, including information on bird species and weather conditions. Vessel personnel will be provided with information on how to treat and release marine birds that become grounded on vessel decks (Black 2005)	MATMP	7.3.6.1
EAC Application Mitigation 5.8-9	Water / Sediment Quality	Movement of barge anchors will be minimised to limit sediment disturbance	MATMP	7.3.4
EAC Application Mitigation 5.8-5	Waste Management - Vessel	Vessels arriving at the marine terminal will comply with legislation and regulations on the management of ballast water. LNG Canada may conduct random audits of vessel logs. No ballast will be discharged until compliance has been determined. Only clean ballast from segregated ballast tanks will be allowed to be discharged into the sea at the marine terminal	MATMP	7.3.5.1
EAC Application Mitigation 7.3-3	Marine Transportation	Project related marine traffic including LNG carriers will use the Coast Guard Marine Communication and Traffic System (MCTS) to provide notice of planned arrival time at Triple Island, and encourage Aboriginal Groups and stakeholders to use the system to plan their routing and scheduling	MATMP	7.4.2
EAC Application Mitigation 7.4-1	Marine Transportation	Conduct, at a minimum, two safe-shipping workshops aimed at promoting safe navigation around shipping traffic for mariners prior to Operations	MATMP	7.2.1
EAC Application Mitigation 7.4-2	Marine Transportation	Use of safety zones which specify "no go" areas around the marine terminal for the safety of public marine traffic, during construction and operation	MATMP	7.2.3
EAC Application Mitigation 7.4-3	Marine Transportation	Support federal government in installation of any navigational aids determined to be necessary for safety on the new marine terminal where required	MATMP	7.2.5
EAC Application Mitigation 7.4-4	Marine Transportation	Provide notification and information to the Canadian Hydrographic Service to accurately include the appropriate marine terminal information and berthing locations on future navigational charts	MATMP	7.2.5
EAC Condition 17 Marine Transportation	EMP Development	Develop, in consultation with TC and DFO, a marine activities plan for Construction with the objective of mitigating and monitoring impacts to marine users. The plan must: - Set out the means by which the marine transportation measures related to Construction in the Mitigation Table under the heading "marine transportation & use" (section 7.4) will be implemented; - Identify Construction activities, including any fish habitat offset plans, that have the potential to interfere with marine navigation; - Identify existing and traditional navigational routes, fishing areas, habitat areas, harvesting areas, commercial shipping use, recreational and tourism use, Aboriginal Groups' use, and any associated timing windows; - Specify mitigation to reduce disruption of marine navigation as a result of Construction activities; and - Specify activities to monitor the effects of the Holder's shipping activities on marine users during Construction.	MATMP	1.2
EAC Condition 17 Marine Transportation	EMP Development	Develop, in consultation with TC and DFO, a marine activities plan for Construction with the objective of mitigating and monitoring impacts to marine users. The plan must: - Specify actions to inform affected stakeholders and Aboriginal Groups of potential interference with marine navigation as a result of Construction activities; - Specify actions to coordinate activities with other marine users, particularly with other industrial activities related to dredging or disposal at sea;	MATMP	8.0