Detailed Project Description

Cedar LNG Project
Liquefaction and Export Terminal

Prepared by:
Stantec Consulting Ltd.
Project: 1232210301
Revision 1
December 6, 2019

Prepared for:
Cedar LNG

CEDAR LNG

Glossary

Cedar LNG Project Area	The area to be utilized by the Project and includes District Lot 99, the northern half of District Lot 309, and marine waters extending approximately 500 m offshore
Front end engineering design (FEED)	The basic engineering design phase which comes after the Pre-FEED and before the start of engineering, procurement and construction (EPC) work. The scope focuses on technical issues/requirements and identifying main costs for construction of a project.
Floating liquefied natural gas facility	A water-based liquefied natural gas production facility that is purpose-built to liquefy and store liquefied natural gas and transfer it to LNG carriers for global export.
Liquefied natural gas (LNG)	Natural gas that has been cooled to approximately -162°C where the methane and other components condense from gas to liquid form. In its liquid state, natural gas takes up 1/600 of the space that the gaseous phase occupies.
LNG Carrier	A marine cargo ship with specialized cryogenic tanks that designed for transporting liquefied natural gas.
LNG facility	Cedar's proposed floating liquefied natural gas facility and marine export terminal
Natural gas	A naturally occurring hydrocarbon gas mixture consisting primarily of methane (typically >98%) plus varying amounts of ethane, propane, butanes, pentanes, higher molecular weight hydrocarbons, hydrogen sulfide, carbon dioxide, water vapor, and sometimes helium and nitrogen.
Nearshore LNG production unit	A permanent jetty-moored floating LNG facility located near shore that operates independently for the purposes of natural gas pre-treatment, liquefaction and storage
Petajoule	A metric unit of energy equal to 10^{15} joules
Preliminary front end engineering design (Pre-FEED)	An engineering study that establishes the design basis, initial project concept, specifications and other technical and operational requirements for a project before starting the FEED.
Tonne	A metric unit of mass equal to 1,000 kilograms

List of Abbreviations

°C	degrees Celsius
BC MEMPR	BC Ministry of Energy, Mines and Petroleum Resources
BCEAA	*British Columbia Environmental Assessment Act*
Cedar	Cedar LNG Export Development Ltd.
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CWHvm1	coastal western hemlock very wet maritime subzone
EAC	Environmental Assessment Certificate
EAO	Environmental Assessment Office
FEED	front end engineering design
FSR	Forest Service Road
GHG	greenhouse gas
ha	hectare
HCA	*Heritage Conservation Act*
IAA	*Impact Assessment Act*
IAAC	Impact Assessment Agency of Canada
INAC	Indigenous and Northern Affairs Canada
km	kilometre
kV	kilovolt
LNG	liquefied natural gas
m	metre
m^3	cubic metre
mm	millimetre
MOF	marine offloading facility

MSRM	BC Ministry of Sustainable Resource Management
MTPA	million tonnes per annum
MW	megawatt
NAICS	North American Industry Classification System
NO_X	nitrogen oxides
PJ	petajoule
PM_{10}	inhalable particulate matter
$PM_{2.5}$	respirable particulate matter
Pre-FEED	preliminary front end engineering design
RDKS	Regional District of Kitimat Stikine
SO_2	sulphur dioxide
SRMP	Sustainable Resource Management Plan

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1.0 Introduction

Haisla Nation, through its wholly owned Cedar LNG Export Development Ltd. (Cedar)[1], is proposing to design, construct and operate the Cedar LNG Project (the Project), a floating liquefied natural gas (LNG) facility and marine export terminal (the LNG facility), including related infrastructure, in Kitimat, British Columbia, Canada (Figure 1).

The Project is a key element of the Haisla Nation economic and social development strategy and will further advance reconciliation by allowing Haisla Nation to—for the first time ever—directly own and participate in a major industrial development in its territory. It is also in keeping with Article 32 of the United Nations Declaration on the Rights of Indigenous Peoples, which states:

1. Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources.
2. States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources.

The proposed LNG facility will process and liquefy approximately 400 to 500 million standard cubic feet per day (11.3 to 14.15 million cubic metres [m^3]) of natural gas into approximately 3 to 4 million tonnes per annum (MTPA) of LNG (averaging between 8,000 and 10,000 tonnes per day), with up to 250,000 m^3 (approximately 108,000 tonnes) of LNG storage capacity (equivalent to approximately 5.97 petajoules [PJ] of energy capacity). The Project will be powered by either connection to the provincial electricity transmission grid via a new 7 to 8 kilometre (km) long transmission line, through self-generation of power onsite using natural gas, or a combination of the two. It is currently anticipated that the feed gas pipeline will be owned and operated by a third party and subject to permitting requirements under the *Oil and Gas Activities Act*. Subject to the negotiation of certain agreements, Cedar intends to receive natural gas from the Coastal GasLink pipeline at a meter station within the vicinity of Kitimat.

[1] It is possible that Cedar will pursue the Project through a limited partnership in which Cedar or its affiliate serves as the general partner and Haisla Nation maintains a majority ownership interest.

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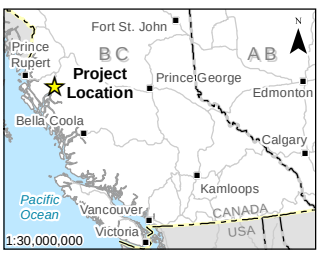

Notes
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2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

- Highway
- Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, Protected Area or Conservancy Area
- Treaty Lands

★ Project Location

0 50 100 150 km

1:4,000,000 (at original document size of 8.5x11)

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CEDAR LNG

Project Location
Kitimat,
British Columbia

Project Number 123221301
Prepared by LTRUDELL on 20191202
Discipline Review by JMUNDY on 20191202

Client/Project/Report
Cedar LNG Export Development Ltd
Cedar LNG Project
Detailed Project Description

Figure No.
1

Title
Project Location

Cedar submitted a Project Description to the British Columbia Environmental Assessment Office (EAO) on August 22, 2019 and an Initial Project Description to the Impact Assessment Agency of Canada (IAAC) on August 30, 2019. Based on its review of the Project Description, the EAO issued a section 10 order under the British Columbia *Environmental Assessment Act* (BCEAA) requiring Cedar to obtain an environmental assessment certificate under section 17 of BCEAA before proceeding with the Project. The EAO submitted a request to the Impact Assessment Agency of Canada (IAAC) for substitution on September 17, 2019.

IAAC posted the Summary of an Initial Project Description of a Designated Project and the EAO's request for substitution to the Canadian Impact Assessment Registry and held a comment period on these documents from September 19 to October 20, 2019. On October 30, 2019, IAAC issued a Summary of Issues to Cedar that outlined the key environmental, social and economic issues that were raised during the comment period.

This Detailed Project Description has been prepared to:

- Provide a summary of the available Project information to enable the IAAC to determine whether an impact assessment is required under the *Impact Assessment Act*.
- Provide information that will assist the IAAC and the federal Minister of the Environment and Climate Change in determining whether the Project can be reviewed through a substituted process led by the EAO.
- Provide other parties (e.g., Indigenous groups, local and regional governments, the public) with information so that they can determine whether they have an interest that would be affected by the Project.
- Provide Cedar's responses to the Summary of Issues provided by IAAC on October 30, 2019 based on feedback received during their public comment period on the Initial Project Description.

This Project Description has been prepared in accordance with the Information and Management of Time Limits Regulations under the IAA. A concordance table is provided in Appendix A.

1.1 Haisla Nation

Haisla Nation are Indigenous peoples of Canada who reside on the northwest coast of British Columbia within the country of Canada. The term "Haisla" means "People at the mouth of the river" and Haisla people have occupied their lands for over 9,000 years. Haisla Nation is the result of the amalgamation of two bands: the Kitamaat of the Douglas and Devastation Channels and the Kitlope of the Upper Princess Royal Channel and Gardner Canal.

The traditional territory of Haisla Nation is approximately four million acres, located in and around Kitimat, British Columbia. The home community of the Haisla people is Kitamaat Village, located at the head of the Douglas Channel on British Columbia's West Coast. Kitamaat Village is home to around 500 of the approximately 1,850 Haisla members and is located 10 km from Kitimat and 65 km from Terrace. Approximately half of the Haisla people are centered around Kitamaat Village (i.e., live in Kitamaat Village or the Kitimat area); the balance of the population resides elsewhere in the traditional territory and in Metro Vancouver. Kitamaat is a Tsimshian word (Gee-tah-maat) meaning "People of the Snow" along with the Kitlope (Geet-lope) people of the rock.

Haisla Nation is governed by Haisla Nation Council, an elected council consisting of ten Councillors and one Chief Councillor. Haisla Nation Council is committed to furthering economic development for the Haisla people. The Haisla Nation Council is recognized as a competent and progressive organization by all agencies with whom they do business.

The Haisla people have lived off the land and water resources of the Douglas Channel and the traditional territory for thousands of years, and protection of those resources for future generations is an important objective for Haisla Nation. Haisla Nation seeks opportunities that are consistent with this objective but that will also provide material economic development for Haisla people. LNG development has been identified as one such opportunity. For many years, Haisla Nation has actively encouraged the development of LNG export facilities in the Douglas Channel. Haisla Nation has worked with the Province of British Columbia, regulatory agencies, proponents such as LNG Canada and Kitimat LNG (Chevron), and associated pipeline transmission companies to facilitate the development of LNG export in Kitimat.

The business philosophy of Haisla Nation is to advance commercially successful initiatives and to promote environmentally responsible and sustainable development, while minimizing impacts on land and water resources, partnering with First Nations and non-First Nations persons, working with joint venture business partners, and promoting and facilitating long-term development opportunities.

This philosophy fits with Haisla Nation's Comprehensive Community Plan entitled duu'duks'wa ci'mo'ca, which means "our vision" in the Haisla language. The Comprehensive Community Plan identifies nine inter-connected community goals required to achieve Haisla Nation's vision of a strong, independent and proud nation that is healthy in mind, body and spirit. These nine community goals are:

- **Housing**—Increase access to healthy, affordable, suitable housing for all members
- **Language and Culture**—Revitalize Haisla language and cultural practices
- **Youth**—Support the growth and development of Haisla children and youth to be strong, successful, and independent
- **Education**—Provide high quality education, capacity building, and employment training for all members
- **Economic Development**—Promote economic development that respects community values and creates employment, and skills development opportunities for members.
- **Elders**—Support Haisla Elders and facilitate intergenerational learning opportunities.
- **Environment**—Protect and steward Haisla Nation's traditional territory, including fisheries and watersheds
- **Health and Wellbeing**—Support physical, spiritual, and emotional health and wellbeing through holistic programs that reflect Haisla culture
- **Community Safety**—Support Haisla Nation members to feel safe and secure in their communities

Throughout the development of the Project, Cedar and the Haisla Nation will work to leverage Project opportunities to advance these goals.

1.2 Project Overview

The proposed Project is an LNG processing and export facility. LNG will be exported pursuant to Licence GL-327 issued by the National Energy Board on May 27, 2016 in favour of Cedar 1 LNG Export Ltd. (a wholly owned subsidiary of Cedar), which permits annual exports of up to 8.55 billion m^3 for 25 years (Cedar may apply to extend to 40 years). The Project will be constructed in one phase and is expected to be operational by the second quarter of 2025.

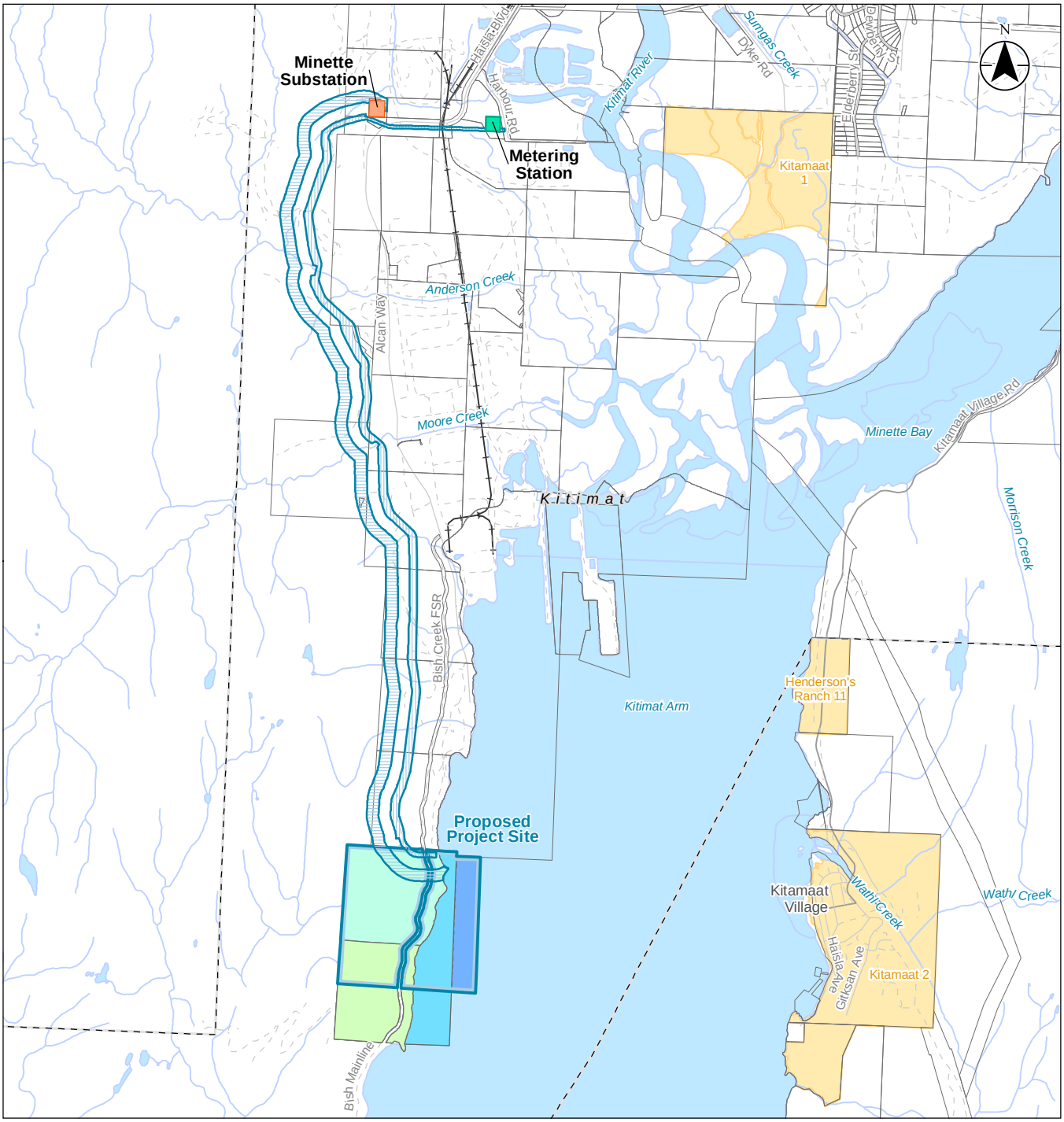
The proposed Project will contribute to the advancement of the LNG sector in British Columbia, promote the use of the cleanest-burning fossil fuel, generate economic opportunities for Haisla Nation and British Columbia-based businesses, and provide long-term revenue generation for local, provincial and national economies to reinvest in health care, education, infrastructure, and other programs. Additional benefits include employment and business opportunities for other Indigenous groups and surrounding community members.

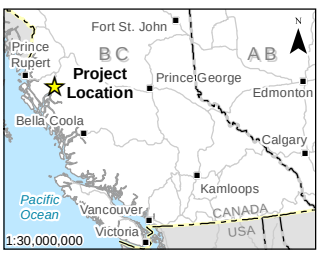
The Cedar LNG Project Area (Figure 2) is the area where Project components and activities (aside from the interconnecting natural gas pipeline and potential electric transmission line) are anticipated to be located. It includes an approximate 500 metre (m) buffer (safety awareness zone) around the anticipated marine facility components. The size of the Cedar LNG Project Area is approximately 130 hectares (ha), which roughly consists of:

- 84 ha of land that encompasses all of District Lot 99 (PID 013-061-267) and the northern portion of District Lot 309 (PID 013-061-089), both owned by Haisla Enterprise Ltd.
- 23 ha of Water Lot A (PID 029-462-142) owned by Haisla Enterprise Ltd.
- 23 ha of submerged Crown land, to encompass the safety awareness zone

There are no current industrial, commercial, project or residential uses on the Cedar LNG Project Area. A portion of District Lot 99 was previously used as a log sort facility. Additional information regarding land ownership and tenures is presented in Section 4.2.

Of the 130 ha area, the facility footprint is approximately 2.7 ha with in-water components comprising 1.8 ha, and land components comprising 0.9 ha. The area of subtidal and intertidal seabed that will be occupied by the footprint of the jetty, small craft vessel berth and potential tug berth is approximately 0.15 ha. The ultimate arrangement of Project components within the Cedar LNG Project Area will be determined through the engineering design process. The first phase of engineering design, the preliminary front end engineering design (Pre-FEED), is scheduled to start in the second half of 2019. Design information from Pre-FEED will be incorporated into the environmental assessment certificate (EAC) application.





Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

- Road
- Local Street
- Resource Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Municipal Boundary
- Parcel Boundary
- Minette Substation

- Cedar LNG Project Area (Approximate Location)
- Pipeline Corridor
- Transmission Line Corridor
- Metering Station

Cedar LNG Project Area

Parcel Owned by Haisla Enterprise Ltd.
- District Lot 309, PID 013-061-089
- District Lot 99, Plan 14740, PID 013-061-267
- Water Lot A, Plan EPP 14217, PID 029-462-142

Proposed Crown Lease
- Conceptual Water Lot (Approximate Location)

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Kitimat, British Columbia

Project Number 123221301
Prepared by TCARDINAL on 20191202
Discipline Review by JMUNDY on 20191202

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Title
Cedar LNG Project Area

Subject to the negotiation of certain agreements, Cedar intends to receive feed gas from the Coastal GasLink pipeline at a meter station within the vicinity of Kitimat. Natural gas will be delivered to the Cedar LNG Project Area by a 20-inch diameter, approximately 8 km long pipeline. The pipeline will follow the shared multi-use corridor established by the Ministry of Transportation and Infrastructure for this purpose. The Douglas Channel, Kitimat LNG and Northern Gateway projects collected baseline data in the vicinity of the shared corridor, and the respective provincial and federal regulatory authorities concluded, based on the findings of the environmental assessment processes for the latter two projects, that the pipelines in the shared corridor would not result in significant adverse environmental effects. It is anticipated that the pipeline will be owned and operated by a third party and constructed separately from the remainder of the Project in order to reduce the number of times construction occurs in the corridor.

The Cedar LNG Project Area will include supporting onshore components, marine infrastructure, and a jetty-moored floating nearshore LNG production unit. A summary of the Project components is provided below, and additional information is available in Section 2.1.

Onshore infrastructure may consist of pipeline receiving and metering facilities, a possible power generation facility (see alternative option discussed in Section 2.1.3), support buildings such as the administration building, maintenance workshop/warehouse and laboratory facilities, site roads, and utility services. The onshore infrastructure complex may also include a facility for unloading and storing mixed refrigerant gases in a liquid state. Unloading and storage of mixed refrigerant gases may also be located on the floating nearshore LNG production unit as a preferred scenario; this decision will be made as engineering design advances and outlined in the EAC application as appropriate. Temporary construction infrastructure (e.g., storage and laydown areas) may also be based onshore within the Cedar LNG Project Area.

A permanent jetty-moored floating nearshore LNG production unit will operate independently for the purposes of natural gas pre-treatment, liquefaction and integrated storage. Pre-treatment is required to remove components that would freeze in the liquefaction process and to meet the required LNG processing specification (e.g., carbon dioxide [CO2], mercury, heavier hydrocarbons, sulphur compounds, water). The train(s) will chill the natural gas to approximately -162 degrees Celsius (°C) when it liquefies, producing LNG for storage and export to global markets. The Project will hold the LNG in storage tanks that will be within the hull of the floating nearshore LNG production unit.

Liquefaction requires notable amounts of heat extraction. This is primarily due to the cooling required to liquefy the natural gas and the heat produced during compression of the refrigerant. The selection of the appropriate cooling medium is an important step in the design of the facility, its liquefaction efficiency and corresponding LNG production. Based on technical and environmental considerations, Cedar has decided to utilize an air-cooling system as part of the main cooling medium in the refrigeration system for the liquefaction process.

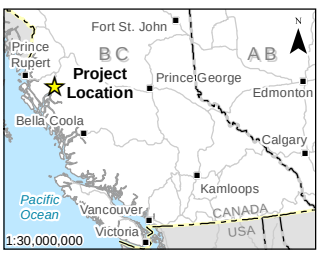
The nearshore LNG production unit will be permanently moored to a marine jetty that will either be constructed on traditional marine piles or as a floating structure permanently anchored to the foreshore. The final design of the jetty structure will be determined as engineering design evolves and will be described in the EAC application. LNG carriers will arrive at the facility and are expected to moor directly alongside the nearshore LNG production unit (preferred option). Alternatively, a separate LNG loading jetty may be constructed for mooring the LNG carrier (see Section 2.1.7). It is anticipated that the LNG carriers will be berthed at the facility for up to 24 hours during loading.

The Project is anticipated to be built to the full 3 to 4 MTPA LNG production capacity in a single project development phase. The nearshore LNG production unit and other facilities are expected to require up to approximately 215 megawatts (MW) of power at peak power demand, which may be supplied from either the provincial (BC Hydro) transmission grid (preferred option), self-generation (alternative option), or a combination thereof.

One hundred percent electrification of the LNG facility requires the removal and separation of heavy hydrocarbons (condensates) from the natural gas. The heavy hydrocarbons are then stabilized and stored either onshore or onboard the nearshore LNG production unit for further handling (offload and transport or combusted onboard for heat and power where applicable). Cedar is committed to developing the Project in a manner that utilizes the maximum amount of electrification possible whilst not introducing further environmental and/or operational risks.

Cedar is currently working with BC Hydro to explore options to power the Project with electricity provided from the provincial transmission grid. In the preferred option, electricity would be supplied to the site via a new electric transmission line constructed from the Minette substation in Kitimat. If that is not feasible, the Project will pursue an alternative option involving onsite power generation (self-generation either onshore or onboard the nearshore LNG production unit). If self-generation of electricity is pursued, approximately 5% to 7% of incoming fuel gas will be diverted to the power plant or direct mechanical drive unit (gas turbine) to produce the power needed for the liquefaction process. For the purposes of the environmental assessment, Cedar will be seeking approval of both options (electrified and self-generation). If it is determined during the environmental assessment that BC Hydro can and will provide power on mutually acceptable terms and within the required timeframe, then Cedar will withdraw its alternative self-generation proposal to the extent applicable.

LNG carriers are anticipated to call at the LNG facility approximately 40 to 50 times annually (an average of approximately one LNG shipment every 7 to 10 days). The average size of LNG carriers anticipated to arrive at the LNG facility will be approximately 180,000 m^3 with the terminal design allowing carriers of up to 216,000 m^3 to moor and load. When transiting to and from the facility, LNG carriers will most likely follow the North Route, a pre-established deep-sea shipping route open year-round (Figure 3).
LNG carriers would enter Canadian waters through Dixon Entrance north of Haida Gwaii, proceed eastward and then southward through Hecate Strait where a Pilot will board at a designated location, and continue their transit into Browning Entrance at the northern extent of Principe Channel. Vessels will follow a route south through Principe Channel before navigating through Nipean Sound, Otter Channel, Lewis Passage, Wright Sound, and Douglas Channel.



Notes
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2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada
* Approximate Location

- Highway
- Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Treaty Lands
- Terrestrial Park, Ecological Reserve, Protected Area or Conservancy Area
- Marine Park, Ecological Reserve, Protected Area or Conservancy Area

- Project Location
- Marine Shipping Route*
- Shipping Route
- 12 Mile Nautical Limit
- National Historic Site of Canada

0 10 20 30 40 50 km

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CEDAR LNG

Project Location
Kitimat, British Columbia

Project Number 123221301
Prepared by TCARDINAL on 20191202
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Client/Project/Report
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Cedar LNG Project
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Figure No.
3

Title
Project-related Marine Shipping Route

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1.3 Project Purpose and Rationale

The Project will contribute to economic reconciliation in British Columbia by recognizing and implementing Haisla Nation's authority over economic development on Haisla Nation-owned lands. Income generated by the Project will be invested in the Haisla community, including helping to advance the goals of the Comprehensive Community Plan (see Section 1.1). In addition, the Project will provide jobs and contracting opportunities for Haisla Nation members, member of other local First Nations, and local community members.

Over the last decade, global demand for LNG has steadily increased in Asia and Europe. According to British Columbia's Natural Gas Strategy, this growth is expected to continue as countries pursue alternatives to diesel and coal to support cleaner electricity generation, heating, and transportation requirements (BC MEMPR n.d.). The Project will help meet the increasing demand, connecting plentiful natural gas resources in the Western Canadian Sedimentary Basin with markets worldwide to reduce global air pollution and greenhouse gases (GHGs) while helping to ensure the development of and fair pricing for those provinces' natural gas resources.

The Project will contribute to the advancement of the LNG sector in British Columbia, promote the use of the cleanest-burning fossil fuel, generate economic opportunities for British Columbia-based businesses by creating fair market values for this provincial resource, and provide long-term revenue generation for local and Provincial economies to reinvest in health care, education, infrastructure, and other programs.

The Project is uniquely positioned to facilitate economic reconciliation objectives for Haisla Nation and the goals of British Columbia's Natural Gas Strategy. Alternatives to the Project, such as an LNG facility in a different location with a different proponent, or a different Haisla Nation-led economic opportunity on Haisla Nation-owned lands, could contribute towards one of these two objectives, but Cedar is not aware of any viable alternatives to the Project that would contribute towards both of these objectives.

1.4 Proponent Information

Contact information for Cedar and the primary contact person for the environmental assessment process is provided in Table 1.

TABLE 1 PROPONENT INFORMATION

Name of the Designated/Reviewable Project	Cedar LNG Project
Name of the Proponent	Cedar LNG Export Development Ltd.
Proponent Corporate Address	500 Gitksan Ave. Haisla PO Box 1101 Kitamaat Village, British Columbia V0T 2B0
Proponent Contact Information	250.639.9361
Company Website	www.cedarlng.com
Company President	Tony Brady, President
Primary Contact for the Project Description	Tony Brady, President 250.639.9361 tbrady@haisla.ca

The information in this Project Description was prepared by the professionals identified in Appendix B.

1.5 Environmental Assessment Regulatory Requirements

As stated in the Introduction to this Detailed Project Description, the EAO has issued a section 10 Order under BCEAA that requires Cedar to obtain a provincial environmental assessment certificate before proceeding with the Project. Cedar has prepared this Detailed Project Description to support the IAAC in its evaluation of whether the Project requires an impact assessment under the IAA. The Project meets the criteria for a designated project in the Physical Activities Regulations under IAA (Table 2). Under BCEAA, the Project meets the criteria for a reviewable project under the Reviewable Projects Regulation (Table 3).

TABLE 2 PHYSICAL ACTIVITIES REGULATIONS CRITERIA

Section	Physical Activity	Relevant Project Component
30	The construction, operation, decommissioning and abandonment of a new fossil fuel-fired power generating facility with a production capacity of 200 MW or more	The Project may include a power generation facility with a peak power demand of up to approximately 215 MW, pending outcome of discussions with BC Hydro
37(d)	A new facility for the liquefaction, storage or regasification of liquefied natural gas, with a liquefied natural gas processing capacity of 3,000 tonnes/day or more or a liquefied natural gas storage capacity of 136,000 m^3 or more	The Project will liquefy between 8,000 and 10,000 tonnes/day of natural gas and include storage of up to 250,000 m^3
52	The construction, operation, decommissioning and abandonment of a new marine terminal designed to handle ships larger than 25,000 deadweight tonnage	LNG carriers greater than 25,000 deadweight tonnage will either moor directly alongside the nearshore LNG production unit or at a separate independent LNG loading jetty

TABLE 3 REVIEWABLE PROJECTS REGULATION CRITERIA

Section	Criteria/ Threshold	Relevant Project Component
Part 4—Energy Projects		
Power Plants (Table 7)	A new facility with a rated nameplate capacity of ≥50 MW of electricity that is a thermal electric power plant	The Project may include a power generation facility with a peak power demand of up to approximately 215 MW, pending outcome of discussions with BC Hydro
Energy Storage Facilities (Table 8)	A new energy storage facility with the capability to store an energy resource in a quantity that can yield by combustion >3 PJ of energy	The Project will include storage of up to 250,000 m^3, which is equivalent to approximately 5.97 PJ

On September 17, 2019 the EAO requested substitution pursuant to the IAA and in accordance with the Canada-British Columbia Impact Assessment Cooperation Agreement. The IAAC conducted a comment period on the Initial Project Description and substitution request from September 19 to October 20, 2019.

The Project is not located in an area that has been the subject of a federal regional environmental study. The Strategic Assessment on Climate Change (Government of Canada 2019) is the only strategic assessment as defined in the Impact Assessment Act (IAA) that is relevant to the Project.

2.0 Project Description

2.1 Project Overview and Components

The key Project components are as follows:

- Feed gas distribution system, including metering, pressure let-down and regulation facilities if required
- Electric transmission line (preferred option; under investigation with BC Hydro)
- Power generation (alternative option if electrification is not feasible)
- Power supply and distribution
- Nearshore LNG production unit, including feed gas processing, pre-treatment and integrated LNG storage
- Marine terminal and jetty (preferred option) or jetties (alternative option)
- Supporting infrastructure

Further details on each of the key components are provided in Table 4 and discussed in the following sub-sections. Design information included herein is conceptual and will be refined as Project design advances.

The preferred and alternative options for power supply and marine terminal and jetty/jetties layout represent alternative means of undertaking the Project that Cedar will carry forward and evaluate through Project design. Other alternative means that Cedar has considered include the decision to proceed with a floating LNG facility rather than an on-land LNG facility.

TABLE 4 PROJECT COMPONENTS

Component	Capacity and Details
Feed gas distribution system	• Up to approximately 400–500 million standard cubic feet of natural gas per day • On-site natural gas piping to the nearshore LNG production units and power generation facility (if required) • Pipeline isolation valves, metering, pressure let-down and regulation facilities as required
Electric transmission line (preferred option; under investigation with BC Hydro)	• Approximately 7 to 8 km transmission line up to 287 kilovolt (kV), from the existing Minette substation in Kitimat to the Cedar LNG Project Area • If only partial electrification is feasible, may be a lower capacity (e.g., 138 kV, 230 kV) transmission line • Switching station • Transformers • Variable frequency drives • Auxiliary equipment

Component	Capacity and Details

Power generation (alternative option; if electrification is not feasible)	• Up to approximately 215 MW of peak power demand for self-generation
	• Power generation facility, including
	  ○ Gas turbines
	  ○ Steam turbines
	  ○ Heat recovery steam generator
	  ○ Electrical generators
	  ○ Transformers
	  ○ Auxiliary equipment
	• May be located onshore or on the floating LNG unit

Power supply and distribution	• Power Aggregation, including
	  ○ Switching station
	  ○ Transformers
	  ○ Auxiliary equipment
	  ○ Onsite distribution including electric transmission lines
	• Auxiliary equipment

Feed gas processing and pre-treatment facilities	• Located on the nearshore LNG production unit
	• Removes the following elements from the feed gas to prepare for liquefaction:
	  ○ CO_2
	  ○ Mercury
	  ○ Heavier hydrocarbons
	  ○ Water
	  ○ Sulphur compounds

Nearshore LNG production unit including integrated storage	• Approximately 3 to 4 MTPA of LNG production capacity • Permanently moored to a fixed marine jetty • Natural gas, LNG, high-voltage electrical and utilities interface connection • Liquefaction process system • Integral LNG storage

Component	Capacity and Details
Nearshore LNG production unit including integrated storage (cont'd)	• Air coolers • Boil-off gas compression system • Supporting utilities, including potential desalination for domestic and safety purposes • Marine systems • Process controls and safety systems • Safety flares and vent systems • Individual natural gas liquids storage capacity up to approximately 30,000 m^3 (could also be located onshore, pending final design) • LNG storage capacity of up to 250,000 m^3
Marine terminals and jetties	• Jetty for mooring the nearshore LNG production unit (extending out approximately 50 m to 100 m from the foreshore) • Potential second independent jetty for LNG carrier berthing if the preferred side by side loading directly from the nearshore LNG production unit is not pursued • Gas service marine loading arms or hoses for gas supply to the nearshore LNG production unit • Conventional marine loading arms or flexible pipe for transfer of LNG to the LNG carriers and vapour return • Small craft jetty and potential tug basin (if required) • Dedicated material offloading facility (MOF) for heavy equipment and materials, if required
Supporting infrastructure (may be located onshore or on the floating LNG production unit)	• Onshore flare if required • Administration building, maintenance workshop/warehouse, laboratory, and customs/port authority offices as appropriate • Utilities infrastructure, including water withdrawal and treatment and wastewater treatment • Groundwater well(s) (if required) • Stormwater management system • Temporary concrete batch plant if required • Storage and laydown areas • Access roads • Firewater system, including potential freshwater storage • Refrigerant storage • Natural gas liquids storage with up to 30,000 m^3 capacity • Medical services • Perimeter fencing and security as required

2.1.1 Feed Gas Distribution System

The Project will be supplied by a natural gas pipeline terminating within the Cedar LNG Project Area. It is expected that the pipeline will include a land approach as it enters the receiving area, although the exact route is yet to be determined. The natural gas receiving facility will consist of pipeline isolation valves for emergency isolation, a metering station, and pig receiver to ensure a smooth flow of natural gas. The area downstream of metering, as part of the Project, may consist of a feed gas distribution system to the nearshore LNG production facilities, pressure let-down and regulation facilities, power generation (alternative option only), gas processing, and ancillary systems.

Approximately 400 to 500 million cubic feet of natural gas per day will be received at the pipeline receiving facility. If onsite power generation is required (the alternative option), approximately 380 to 475 million cubic feet of natural gas per day will be processed and liquefied, and the remainder (approximately 5 to 7%) will be used to produce self-generated power. Pending the outcome of the power study and discussions with BC Hydro, this volume of gas may be lower or eliminated if power from the provincial grid is integrated into Project design. The preferred option involves full electrification (to the maximum extent possible) such that all natural gas received at the LNG facility is processed and liquefied.

2.1.2 Electric Transmission Line

Cedar is currently working with BC Hydro to explore options to power the Project with electricity provided from the provincial grid. Electricity would be supplied to the LNG facility via an electric transmission line with up to 287 kV capacity constructed from the existing BC Hydro Minette Substation located in Kitimat. The anticipated length of the transmission line is approximately 7 km to 8 km. Where possible, the transmission line will be routed to align with existing utility corridors and roads to the Cedar LNG Project Area.

2.1.3 Power Generation

It is anticipated that the Project will require up to approximately 215 MW of power at peak demand, while construction phase work may need up to 20 MW of power. Power may be supplied from the provincial transmission grid (preferred option), self-generation (alternative option), or a combination thereof. As previously noted, if it is determined that BC Hydro can provide power on mutually acceptable terms during the environmental assessment process, Cedar will withdraw its proposal for self-generation to the extent applicable. The anticipated transmission line corridor for connection to the provincial transmission grid is shown in Figure 4. Aggregation equipment (i.e., a step-down transformer) will be required to step down from 287 kV to the required voltage of 132 or 138 kV.

Should the self-generation option be required, the power generation facility may either be onshore, a temporary self-contained floating power barge, or integrated into the nearshore floating LNG production unit. The size and footprint of the potential onsite power generation facility will depend on the extent to which BC Hydro can provide power on mutually acceptable terms and the amount of power generation required. It would be located wholly within the Project Area and it is anticipated that it would require a footprint of approximately 1.6 ha (100 m by 160 m). It would consist of a number of gas turbines directly coupled to a generator using a small percentage of the incoming feed gas to generate the required power and minimal power aggregation equipment to distribute power directly to the floating LNG production unit at the desired voltage; it is yet to be determined if it would be open or combined cycle.

Should Cedar pursue 100% electrification, emergency backup generators will be required for safety and emergency systems only. These options are currently being evaluated in conjunction with Cedar's initial discussions with BC Hydro.

2.1.4 Feed Gas Processing and Pre-treatment Facilities

The natural gas processing and pre-treatment facilities will be located on the nearshore LNG production unit and will include all the infrastructure associated with the front-end conditioning of natural gas arriving via pipeline to the Cedar LNG Project Area prior to entering the liquefaction process. It is anticipated that the design will consist of a single train of feed gas pre-treatment consisting of two modules, each approximately 35 m by 20 m, capable of processing the 400 to 500 million cubic feet of natural gas per day required for the full nearshore LNG production unit.

Prior to the liquefaction process, the following elements will be removed from the feed gas:

- CO_2
- Mercury
- Heavier hydrocarbons
- Water
- Sulphur compounds

2.1.5 Power Supply and Distribution

As described in Section 2.1.3, power will either be received via a transmission line or self generated or a combination thereof. The electricity will then be distributed to Project components requiring electricity through onsite transmission and distribution lines located within the Cedar LNG Project Area.
To supply Project components with electricity at the correct voltages, the power supply and distribution will also include switching stations, transformers and other auxiliary equipment.

2.1.6 Nearshore LNG Production Units

Feed gas will be transferred from the marine jetty to the nearshore LNG production unit via a flexible pipe transfer system or rigid marine loading arms with articulated joints. The dimensions of the nearshore LNG production unit will be determined during FEED but are expected to be approximately 300 m long by 60 m wide. Approximately 12 m to 15 m of the hull will be below the waterline (vessel draft); the height above water level to the main hull deck of the nearshore LNG production unit will be approximately 25 m.

The natural gas liquefaction process will involve the use of a mixed refrigerant gas to chill the feed gas to approximately -162°C and store it at near atmospheric pressure. The mixed refrigerant will be a blend of hydrocarbons and inert gases and will operate in a closed-loop system with minimal make-up requirements. Make-up refrigerants are expected to be sourced from a commercial operator, and storage will be on the nearshore LNG production unit or onshore.

At this early stage of design, an air-cooling system is proposed as part of the refrigeration system of the liquefaction process. All boil-off and end flash gas will be recovered and either used as fuel gas for self-generation or re-liquefied.

The nearshore LNG production unit will have integrated LNG holding tanks. Total LNG storage is expected to be up to approximately 250,000 m^3. Integrated storage is expected to consist of four or five individual tanks within the hull of the nearshore LNG production unit. LNG will be transferred directly to an LNG carrier from either a separate dedicated loading jetty or side by side loading directly from the nearshore LNG production unit.

The nearshore LNG production units will include the following ancillary systems to support the process requirements:

- Hydraulic oil valve system
- Bilge system—primarily used to drain bilge water from the bilge wells, but will also be used for emergency situations such as flooding to ensure stability of the nearshore LNG production units
- Ballast water system—used to add/remove ballast water to control hull bending, shear forces, trim, and heel while maintaining the stability of the nearshore LNG production unit
- Cofferdam heating system—maintains the structural steel of the nearshore LNG production unit at specified operational temperatures and prevents icing on the inner hull structure
- Freshwater generation (i.e., desalination) and distribution system
- Firewater distribution system
- Nitrogen system—self-generated nitrogen membrane package system fed by air
- Service and instrument air systems
- Inert gas system—used to produce and supply inert gas to replace the tank hydrocarbon gas environment as part of the sequence to achieving an atmospheric condition in the tank for maintenance
- Drain systems
- Emergency backup power generation system
- Grey and wastewater treatment systems
- High voltage electrical and utilities interface connection between onshore infrastructure and the nearshore LNG production unit

The nearshore LNG production unit will have its own automation system, which incorporates an emergency shutdown system for safe and reliable operation. This control systems will be part of an integrated control and safety system for the facility.

The nearshore LNG production unit will have its own dedicated flare system, which will enable the safe depressurization and disposal of hydrocarbon vapour from process, utility, LNG storage, and offloading systems. The flare system is not used during normal operations but may be used during start-up, preparation of equipment for maintenance, plant upset, and emergency and shutdown conditions. The flare is expected to be approximately 145 m above the main deck of the nearshore LNG production unit. An additional flare may be located onshore based on requirements to be determined through Pre-FEED and FEED.

2.1.7 Marine Terminal and Jetties

At its largest, the marine terminal may consist of two LNG jetties and a MOF. One jetty is required for permanent mooring of the nearshore LNG production unit, and one jetty may be required for LNG carrier berthing and loading if the preferred option of direct side by side loading from the nearshore LNG production unit is not pursued. Conceptual jetty layouts are shown in Figure 5. Components of the marine terminals and jetties are expected to include:

- Marine jetty for mooring the nearshore LNG production unit, equipped with pedestrian and vehicle access onto the nearshore LNG production unit
- Marine jetty for LNG carrier berthing and loading (if required)
- Berthing dolphins, mooring dolphins, mooring hooks, mooring bollards, and fenders
- Loading arms or flexible pipe transport system to transport natural gas from land to the nearshore LNG production unit
- LNG and vapour return loading arms or hoses for transfer of LNG to LNG carriers
- Dedicated MOF for heavy equipment and material transfers (if required)
- Small craft jetty and tug basin (if required)

The nearshore LNG production unit jetty will accommodate the loading arms or flexible pipe transfer system, as well as the interconnecting piping, personnel gangway, and crane or ramp for material transfer to the nearshore LNG production unit.

Other marine infrastructure may include a small craft jetty and possibly a tug basin if tugboat(s) are required to be present on stand-by. Infrequent support may also occasionally be required from supply vessels and small work barges (giving access for maintenance).

If required, a MOF will be built as a stand-alone bulkhead or jetty to facilitate roll-on, roll-off transfer of major construction, fabrication, and maintenance equipment as well as any operational equipment required for the Project.

2.1.8 Supporting Infrastructure

Proposed supporting infrastructure will include support buildings, access roads and utilities.

2.1.8.1 ADMINISTRATION, MAINTENANCE, AND SUPPORT BUILDINGS

Buildings for centralized administration and oversight including a main centralised control room for monitoring and controlling the entire project will be constructed either onshore or onboard the nearshore LNG production unit. Maintenance workshops, separate storage warehouses for equipment spares, and a laboratory will also be located onshore as required. Storage facilities will include both enclosed storage facilities and outdoor laydown areas.

Medical facilities will include first-aid stations, medical room(s) with beds and certified first-aid staff, dedicated communications devices for requesting outside emergency aid, first-aid kits, and space for equipment storage.

2.1.8.2 WORKFORCE ACCOMMODATIONS

The construction and operations workforce will be recruited locally to the extent possible. Project construction and operations will require some specialized trades and personnel with relevant qualifications and experience, including positions with LNG experience (particularly in the start-up phase) who will likely be sourced from elsewhere in BC, Canada, or internationally.

During Project construction and operations, it is expected that the workforce will utilize existing accommodations or existing third-party camps available within Kitimat. Workers will travel between these accommodations and the Cedar LNG Project Area by bus or other vehicles where appropriate. During construction it is expected the Project will have a peak workforce of 350 to 500 workers, and during operations it will have 70 to 100 staff.

2.1.8.3 ACCESS ROADS

The Cedar LNG Project Area is adjacent to the Bish Creek Forest Service Road (FSR), which runs between Kitimat and Bish Cove. Bish Creek FSR recently went through an extensive upgrade as part of the Kitimat LNG Project, and further modification of the Bish Creek FSR is not expected as part of the Project.

Roads will be constructed within the Cedar LNG Project Area to provide access from the Bish Creek FSR to the LNG facility and associated infrastructure. A parking area will be provided within the Cedar LNG Project Area.

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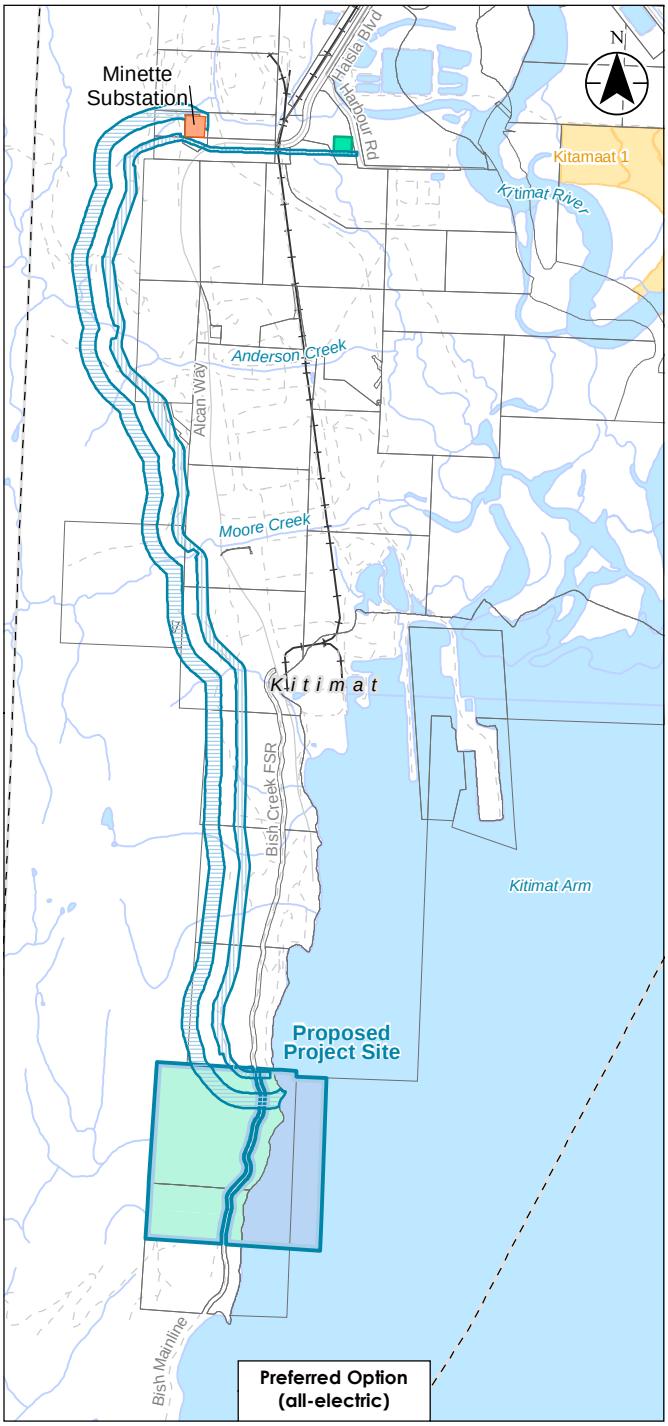

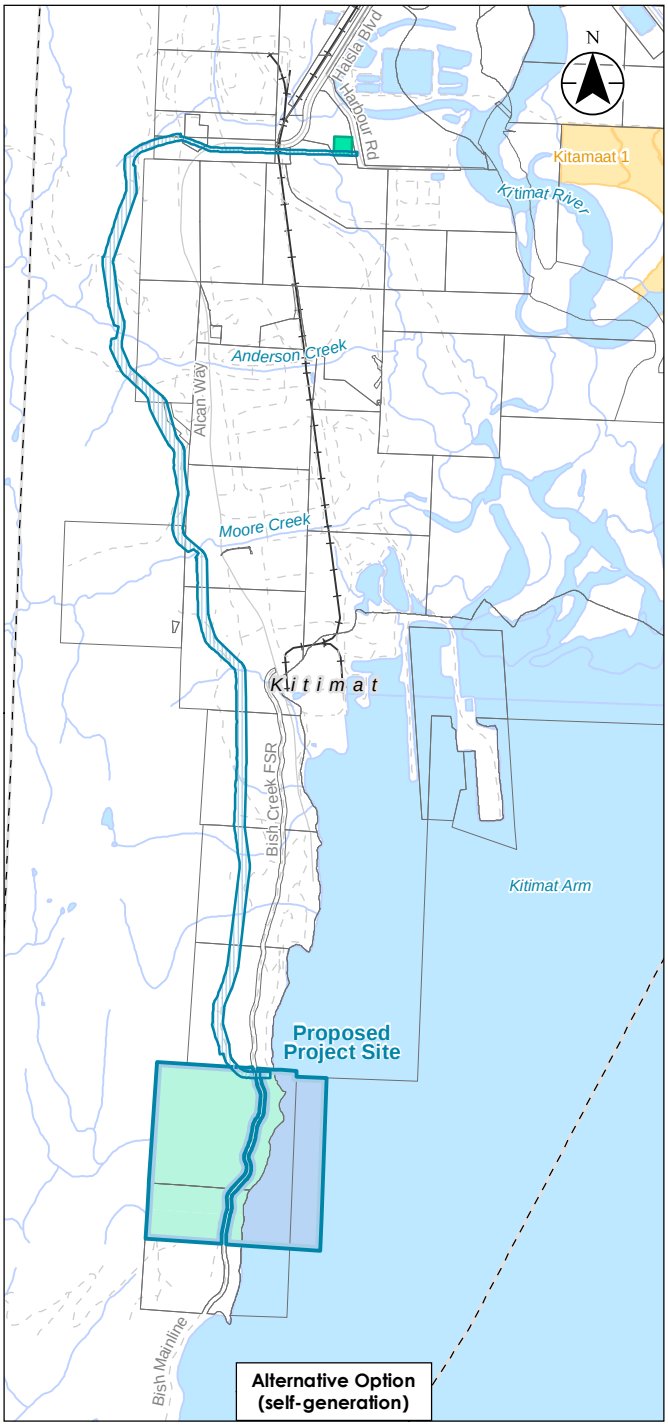

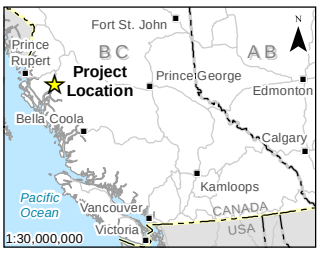

Railway
Watercourse
Waterbody
First Nations Reserve
Municipal Boundary
Parcel Boundary
Minette Substation

Cedar LNG Project Area*
Land Area
Water Area
Pipeline Corridor
Transmission Line Corridor*
Proposed Metering Station

0 0.5 1 1.5 2 km
1:50,000 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada
* Approximate Location

Stantec

CEDAR LNG

Project Location
Kitimat, British Columbia

Project Number 123221301
Prepared by TCARDINAL on 20191202
Discipline Review by JMUNDY on 20191202

Client/Project/Report
Cedar LNG Export Development Ltd
Cedar LNG Project
Detailed Project Description

Figure No.
4

Title
Project Layout – Power Generation Options

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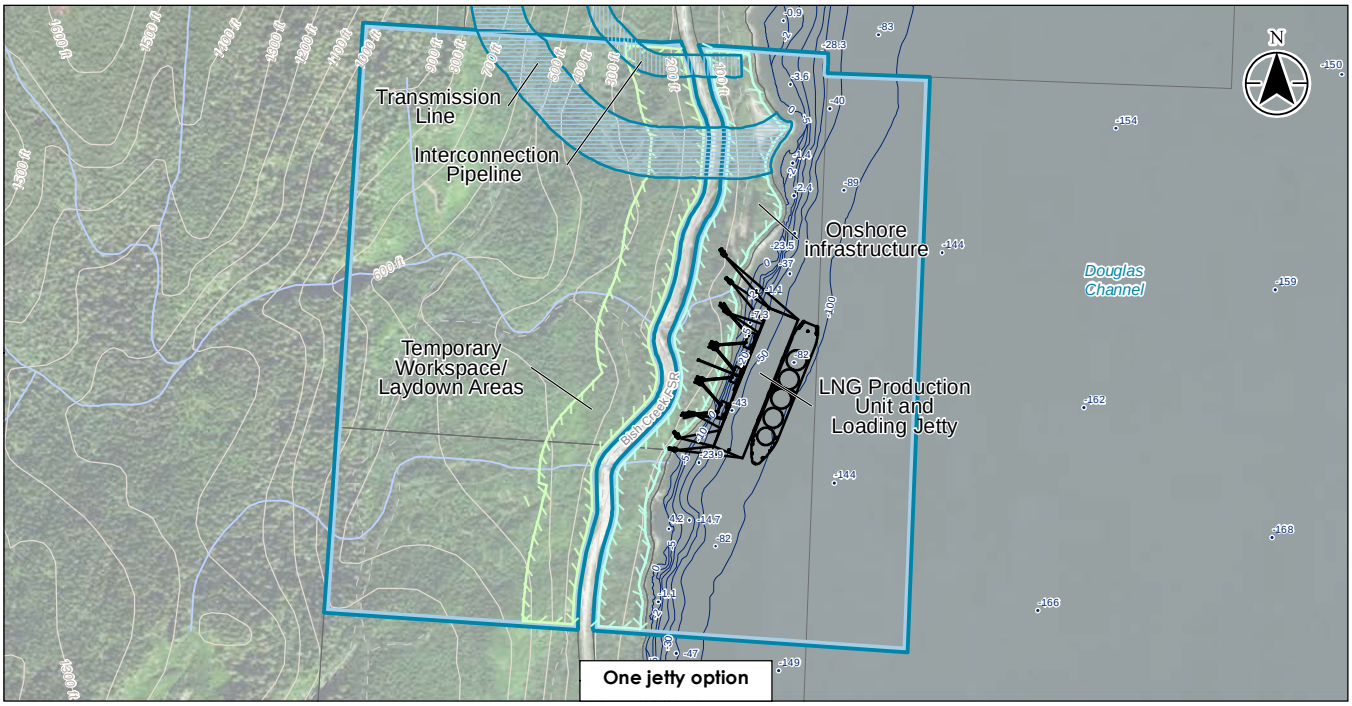
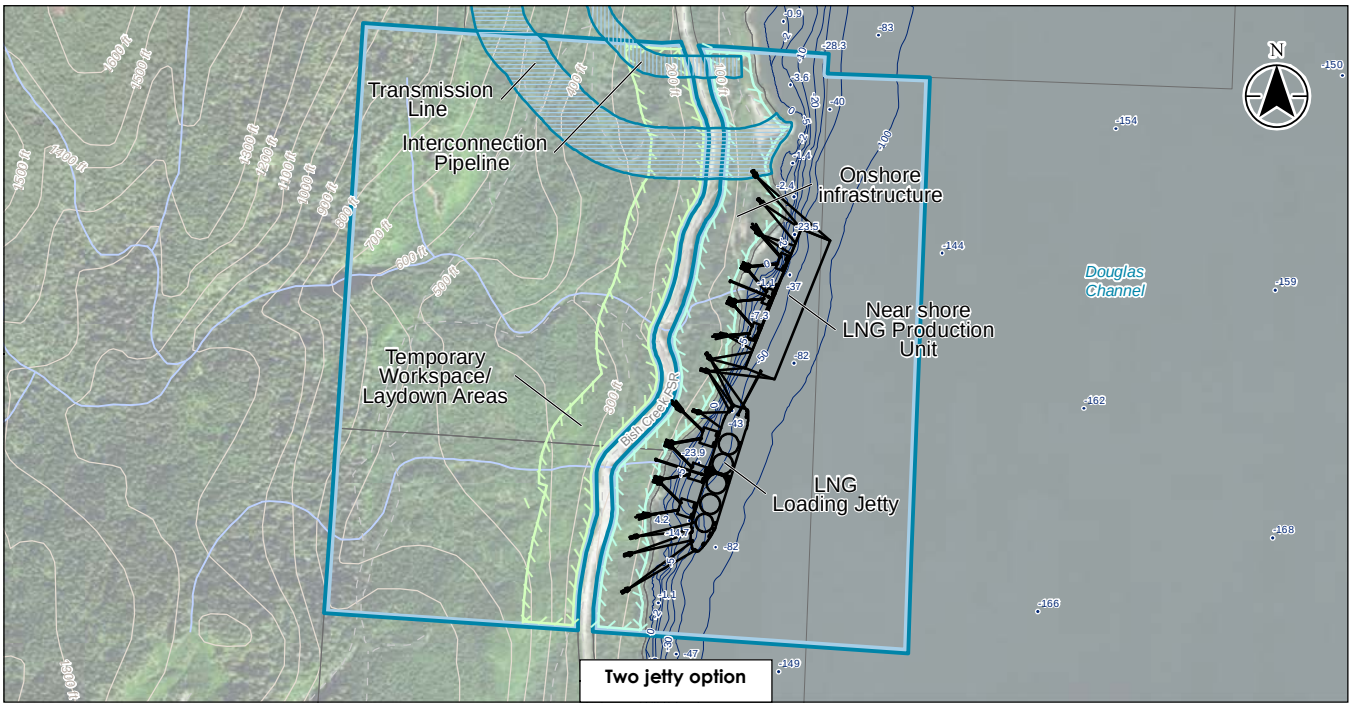
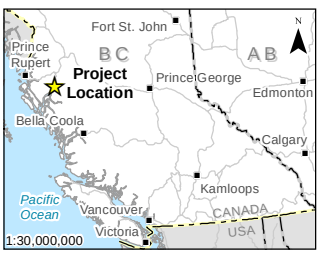






- Resource Road
- Topographic Contour
- Bathymetric Sounding
- Bathymetric Contour (metres at chart datum; CHS 3908 Kitimat Harbour)
- Watercourse
- Parcel Boundary
- Marine Terminal Layout
- Cedar LNG Project Area*
- Pipeline Corridor
- Transmission Line Corridor*
- Onshore Infrastructure*
- Temporary Workspace/ Laydown Areas*

0 0.1 0.2 0.3 0.4 0.5 km

1:15,000 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada; Canadian Hydrographic Service
3. Imagery: ESRI World Imagery
* Approximate Location

Stantec

CEDAR LNG

Project Location
Kitimat, British Columbia

Project Number 123221301
Prepared by LTRUDELL on 20190708
Discipline Review by JMUNDY on 20190708

Client/Project/Report
Cedar LNG Export Development Ltd
Cedar LNG Project
Detailed Project Description

Figure No.
5

Title
Project Site Layout – Jetty Options

2.1.8.4 UTILITIES

Water and wastewater facilities will be required to support workers at the LNG facility. Water may be supplied either through desalination or from a freshwater source (either stream or groundwater). Cedar may investigate the possibility of withdrawing water from the unnamed creek that runs through the Cedar LNG Project Area or from groundwater wells located within the Cedar LNG Project Area.

It is currently expected that potable water will be transported to the LNG facility by truck; however, Cedar may investigate the feasibility of treating water. Should potable water be treated as part of the Project, this activity will be assessed as part of the EAC application.

Wastewater is expected to be stored, pumped and disposed of at a licensed facility; however, Cedar may investigate treating and discharging the wastewater under an *Environmental Management Act* permit. Should potable water be treated as part of the Project, this activity will be assessed as part of the EAC application.

2.2 Project Activities

2.2.1 Construction

Construction activities will include site preparation as well as the construction and installation of Project components described in Section 3.1. Construction activities will be refined as design progresses, but are currently anticipated to consist of the following:

- Unloading of materials and equipment from trucks and barges
- Clearing and grubbing of areas not already cleared for previous industrial activity
- Blasting and grading, where required, to accommodate Project infrastructure (if required)
- Construction of the water supply system (either desalination, freshwater or a combination), including intake, treatment, and distribution
- Installation of storm water management, erosion prevention, and sediment control measures
- Mobilization and construction of onshore components, including administration buildings, supporting infrastructure, electrical transmission, external power reception, laydown areas, customs areas, and warehouses
- Mixing of concrete at an onsite batch plant (if required)
- Construction of marine jetties
- Construction of access roads within the Cedar LNG Project Area
- Installation of perimeter fencing and onshore access/security gates
- Permanent mooring of the nearshore LNG production unit
- Construction of electric transmission line (preferred option; under investigation)
- Connection of utilities (e.g., electrical, controls, gas, water) to the nearshore LNG production unit

- Potential rehabilitation or stabilization of areas not required for the operations phase
- Generation of electricity for construction activities (e.g., using portable generators)
- Waste disposal and recycling in accordance with applicable legislation
- Decommissioning of any temporary facilities

Construction activities may occur up to 24 hours per day, seven days per week.

Dredging for the safe arrival, berthing, and departure of LNG carriers is not expected to be required at this time, therefore disposal at sea is not being proposed. Similarly, removal of marine sediments to accommodate the jetty/jetties or nearshore LNG production unit is not expected. If at any point during Project development dredging and/or disposal at sea become necessary, Cedar will advise the appropriate authorities and any associated effects will be considered in the EAC application.

The nearshore LNG production unit will be built in a qualified offshore shipyard and towed or propelled under its own power to the Cedar LNG Project Area for installation and commissioning.

Construction materials will be transported to the Cedar LNG Project Area using existing land access roads and marine transportation routes. The method of transporting materials to and from the Cedar LNG Project Area will be dictated by practicality and is anticipated to employ a combination of marine, rail and vehicle transportation modes.

During construction, road access will be the primary transport means for ad-hoc deliveries of small tools and consumables, earthmoving equipment via low-bed trucks, and movement of the construction workforce between the Cedar LNG Project Area and Kitimat. It is anticipated that the number of movements by road could be on average up to approximately 10 to 15 movements per day (60 to 90 per week); a more specific breakdown will be developed as design progresses and presented in the EAC application.

It is anticipated that marine access will be the primary transport means for most major materials and heavy equipment used to construct the supporting marine and land-based infrastructure for the Project. These materials and equipment will be transported to site by deep sea marine vessels and/or marine barges via pre-existing marine shipping routes and offloading at the Project site. It is anticipated that during peak construction the number of marine vessel movements for this purpose could be on average in the range of approximately one to three movements per day (6 to 18 per week). Further details and breakdown will be provided in the EAC application

2.2.2 Operations

The operations phase will include operation of Project components described above to produce, store, and ship LNG to international markets. Project-related activities during the operations phase are expected to include the following:

- Start-up and commissioning support
- Delivery of natural gas via the feed gas distribution system
- Power generation (if required)

- Power aggregation and distribution to Project components, including the nearshore LNG production unit
- Gas reception and treatment in gas processing units on the nearshore LNG production unit
- Liquefaction of natural gas at the nearshore LNG production unit
- Storage and offloading of LNG at the nearshore LNG production unit
- Mooring, loading and transit of LNG carriers, including the assistance of tugs
- Water collection, treatment and use
- Wastewater, storm water, and process water treatment and disposal
- Waste disposal and recycling in accordance with applicable legislation
- Import of liquid refrigerant gases (by land or sea)
- Planned and unplanned maintenance
- Marine shipping along the marine access route from the Triple Island Pilotage Station, south through Principe Sound, east and northeast into Douglas Channel to Kitimat Arm

2.2.3 Decommissioning

The decommissioning phase will include removal of the nearshore LNG production unit for either re-use elsewhere or for full decommissioning and scrapping or recycling at a dedicated facility. Onshore infrastructure and facilities will be removed, vacated, and the Cedar LNG Project Area restored as appropriate in accordance with Haisla's development plans and applicable regulatory requirements. The Project has an expected operational lifespan of at least 25 years, and Cedar may apply to extend the export licence for the Project to 40 years.

2.2.4 Physical Activities Incidental to the Project

Potential physical activities incidental to the Project are anticipated to include:

- Laydown areas and temporary workspace
- Borrow pits
- Shipping

Laydown areas and temporary workspace may be required to support Project construction and borrow pits may be required to provide fill for the site. The configuration of these areas will be established as FEED progresses.

LNG produced by the Project will be offloaded from the nearshore LNG production unit to LNG carriers via either direct side by side loading from the nearshore LNG production unit itself (preferred option) or a dedicated loading jetty, which is designed to accommodate LNG carriers with capabilities ranging from 125,000 m^3 to 216,000 m^3. Cedar anticipates that the average LNG carrier calling at the facility will have a capacity of approximately 180,000 m^3, which will result in approximately 40 to 50 shipments of LNG per year (an average of one LNG shipment every 7 to 10 days).

The LNG carriers will be escorted and berthed with the assistance of tugs. The number, size, and arrangement of tugs to potentially escort and berth the LNG carriers will be determined during FEED.

LNG carriers bound for the Project are expected to be boarded by BC Coast Pilots at or near the Triple Island Pilotage Station. Loaded LNG carriers would follow the same route back out to the Pacific Ocean.

The LNG carriers will be operated by a third party with custody of the LNG transferred at the nearshore LNG production unit; however, Cedar will have the ability to require implementation of specific mitigation measures by the LNG carriers through contractual requirement.

2.2.5 Gas Transportation Services

Subject to the negotiation of certain agreements, Cedar intends to receive feed gas from the Coastal GasLink pipeline at a meter station within the vicinity of Kitimat. Natural gas will be delivered to the Cedar LNG Project Area by a 20-inch diameter, approximately 8 km long pipeline.

2.3 Project Schedule

The proposed Project schedule is outlined in Table 5. This schedule is contingent on regulatory approvals, First Nations consultation, and a positive final investment decision by Cedar's Board of Directors. Construction of the Project is currently planned to occur in one phase, scheduled to start in 2022 and continue until 2025. Construction may include activities occurring 24 hours a day, seven days a week. Operation of the LNG facility is expected to begin in 2025 and continue for the Project's lifespan of 25 years or more (with extension of the export licence).

TABLE 5 PROPOSED PROJECT SCHEDULE

Project Phase	Project Activity	Timing
Project Studies	Geotechnical Field Program	Q2/Q3 2020
	Engineering and technical desktop studies	Q3 2019-Q4 2020
	Commencement of Pre-FEED	Q3 2019
	Commencement of FEED	Q4 2020/Q1 2021
Environmental Assessment	Submit Project Description	August 2019
	Existing conditions field studies	Q3 2019 to Q3 2020
	Application preparation	Q3 to Q4 2020
	Application submission	Q1 2021
	Screening and review	Q1 2021 to Q3 2021

Project Phase	Project Activity	Timing
Financing	Final investment decision range	Q1 to Q3 2022
Construction	Construction start date	Q3 2022
	Start-up and commissioning	Q2 2025
Operations	First shipment of LNG from the facility	Q3-Q4 2025
	Operations and maintenance commencement	Q3 2025
Decommissioning and Abandonment	Decommissioning and reclamation	2050 to 2065
	Abandonment	2050 to 2065

The environmental assessment schedule outlined in Table 5 approximates the milestones identified as part of the provincial and federal environmental assessment processes. The actual duration of each stage of the process will depend on several factors, including the scope of the assessment, direction from the EAO and IAAC, and the resolution of issues raised during the environmental assessment process.

2.4 Project Capital Costs and Employment Estimates

The estimated capital cost for the Project is $1.8 billion to $2.5 billion (all cost estimates in 2019 Canadian dollars). The capital cost estimate includes the construction and commissioning of the natural gas liquefaction trains, a floating LNG storage, marine terminal, and all supporting infrastructure required. The estimated approximate average annual operating cost is anticipated to be $55 million to $75 million, excluding the annual purchase of natural gas supply. The estimated decommissioning costs for the Project are anticipated to be in the range of $112 million to $150 million.

The Project will require an estimated peak workforce in the Kitimat area of approximately 350 to 500 people at the peak of construction. Project construction is expected to generate up to 2,000 person-years of employment.

During operations, the Project will directly employ an estimated 70 to 100 people in ongoing full-time roles. The Project will create additional indirect jobs in the local community and elsewhere through suppliers of goods and services. Cedar’s intent is to have Haisla members trained and working in full time employment roles to further benefit the Nation.

3.0 Emissions, Discharges and Waste

Construction and operation emissions, discharges and wastes will be managed to meet requirement of applicable guidelines, policies, and regulations. The emissions, discharges, and wastes from the Project are expected to include:

- Atmospheric emissions, including air, noise and light emissions
- Solid, liquid and hazardous wastes

3.1 Atmospheric Emissions

During construction, the primary sources of air emissions will be power generation with portable generators, construction equipment, and vehicle traffic. Construction equipment is anticipated to include fuel-driven machinery such as excavators, backhoe loaders, bulldozers, and trenchers. Vehicle traffic is expected to include pickup trucks, dump trucks, and barges used to transport construction materials to site. Air emissions are also expected from vegetation clearing and site preparation (e.g., GHG emissions from removal of vegetation, dust, burning of slash piles). Dust effects are expected to be local and temporary in nature, with measures such as road watering during dry conditions to limit the spread of dust beyond the Project boundaries. Construction is also anticipated to result in noise and light emissions. The primary sources of construction noise include blasting (if required), pile installation (if required), site clearing, and operation of heavy-duty construction equipment. Construction noise is expected to be localized, with construction activities occurring up to 24 hours per day, seven days per week.

During operation, the primary sources of air emissions will include the acid gas removal unit, the flare system, self-generation power supply (depending on selected power supply option), and shipping. The acid gas removal unit removes and incinerates (via a thermal oxidizer) acid generating components of the gas stream (hydrogen sulphide and CO_2) before the natural gas is liquified. The flare system disposes of gas in upset, maintenance, and emergency situations. In the alternative option, natural gas fired turbines will combust natural gas to supply power to the Project. LNG carriers and other marine support equipment will operate at the marine terminal. Fugitive emissions are also anticipated. During operation, the primary noise sources will be process facility equipment, such as the gas turbines and compressors, air coolers, and vehicle and vessel traffic.

Atmospheric emissions during decommissioning are expected to be similar to construction emissions, as similar equipment will be used.

The GHG emissions produced by the Project will be dependent upon the availability of power from the provincial grid. Cedar has estimated the Project's GHG emissions under two power scenarios following the approach in Section 3.1 of ECCC's Draft Strategic Assessment of Climate Change, where:

Net GHG Emissions = Direct GHG Emissions + Acquired energy GHG emissions
- Transferred surplus energy GHG emissions
- CO_2 captured and stored
- Avoided domestic GHG emissions

If the full amount of power required by the Project is available, the Project's net GHG emissions are estimated at approximately 186,060 tonnes of CO_2 equivalent (CO_2e) per year, as follows:

Net GHG emissions (100% electrification) = 168,000 (Direct) + 18,060 (Acquired via BC Hydro)
- 0 (Transferred surplus)
- 0 (CO_2 captured and stored)
- 0 (Avoided domestic GHG emissions)

= 186,060 tonnes of CO_2e

If Cedar is required to self-generate 100% of its power, the Project's net GHG emissions are estimated at approximately 840,800 tonnes of CO_2e per year, as follows:

Net GHG emissions (100% self-generation) = 840,800 (Direct) + 0 (Acquired)
- 0 (Transferred surplus)
- 0 (CO_2 captured and stored)
- 0 (Avoided domestic GHG emissions)

= 840,800 tonnes of CO_2e

Cedar will report emissions in accordance with the *Greenhouse Gas Industrial Reporting and Control Act* and associated regulations.

Project emissions sources will be managed through adherence to best management practices, regulatory requirements, and guidelines. An environmental management system will be developed to oversee emission compliance requirements during Project operations, including any accidents or malfunctions. Monitoring for atmospheric emissions is expected to be required under Project permitting through the *Environmental Management Act*.

Typical atmospheric emissions and sources, and the phase(s) of the Project in which they are expected to occur are presented in Table 6.

TABLE 6 ANTICIPATED ATMOSPHERIC EMISSION AND THEIR SOURCES

Atmospheric Emissions	Source locations	Project Phase
GHGs (CO_2, methane, nitrous oxide)	• LNG Facility • Marine Terminal • Supporting Infrastructure	• Construction • Operation • Decommissioning • Accidents and Malfunctions
Nitrogen oxides (NOx)	• LNG Facility • Marine Terminal • Supporting Infrastructure	• Construction • Operation • Decommissioning • Accidents and Malfunctions

TABLE 6 ANTICIPATED ATMOSPHERIC EMISSION AND THEIR SOURCES

Atmospheric Emissions	Source locations	Project Phase
Sulphur dioxide (SO_2)	• LNG Facility • Marine Terminal • Supporting Infrastructure	• Construction • Operation • Decommissioning • Accidents and Malfunctions
Carbon monoxide	• LNG Facility • Marine Terminal • Supporting Infrastructure	• Construction • Operation • Decommissioning • Accidents and Malfunctions
Inhalable particulate matter (PM_{10}; diameter less than 10 µm)	• LNG Facility • Marine Terminal • Supporting Infrastructure	• Construction • Operation • Decommissioning • Accidents and Malfunctions
Respirable particulate matter ($PM_{2.5}$; diameter less than 2.5 µm)	• LNG Facility • Marine Terminal • Supporting Infrastructure	• Construction • Operation • Decommissioning • Accidents and Malfunctions
Hydrogen sulphide	• LNG Facility • Marine Terminal • Supporting Infrastructure	• Operation • Accidents and Malfunctions
Volatile organic compounds	• LNG Facility • Supporting Infrastructure	• Construction • Operation • Decommissioning • Accidents and Malfunctions
Noise	• Mobile construction equipment • Pile installation • Blasting • Vehicle and vessel traffic	• Construction • Decommissioning

TABLE 6 ANTICIPATED ATMOSPHERIC EMISSION AND THEIR SOURCES

Atmospheric Emissions	Source locations	Project Phase
Noise	• Flare (maintenance or emergency) • Vehicle and vessel traffic • Gas turbines • Gas compressors • LNG carriers and LNG carrier loading • Air Coolers	• Operation
Light	• Building and work area lighting • Vehicles, vessels and construction equipment	• Construction • Decommissioning • Operation
	• Facility lighting • Marine vessels • LNG carriers and tugs • Flares	• Operation

3.2 Solid, Liquid and Hazardous Waste

Solid, liquid and hazardous waste emissions during the life of the Project are summarized in Table 7. Accidental releases will be managed through development and implementation of a spill response and emergency response procedures.

TABLE 7 ANTICIPATED SOLID, LIQUID AND HAZARDOUS WASTES FOR THE PROJECT

Waste Type	Waste Examples	Project Phase
Solid Waste	• Soil and material excavated from Project footprint • Organic waste (vegetation, biomass materials) • Wastes from shipment of project components, including packing materials • Wastes from construction of Project components, including wood, metal, and concrete • Domestic waste	• Construction • Decommissioning
	• Domestic waste • Municipal waste • Waste absorbents • Paper / metal waste	• Operation

TABLE 7 ANTICIPATED SOLID, LIQUID AND HAZARDOUS WASTES FOR THE PROJECT

Waste Type	Waste Examples	Project Phase
Liquid Waste	• Storm water • Hydrostatic test waste • Sanitary wastewater	• Construction • Decommissioning
	• Storm water runoff • Treated sanitary wastewater • Effluent run off • Industrial wastewater from gas dehydration process • Ballast water discharges • Brine from desalination system	• Operation
Hazardous Waste	• Treated sewage • Medical waste • Contaminated soil	• Construction • Decommissioning
	• Chemical waste • Sewage • Mercury absorbent • Contaminated soils • Waste absorbents • Miscellaneous waste such as batteries, filters, etc.	• Operation • Accidents and Malfunctions

A waste management plan will be developed as part of the Construction Environmental Management Plan. Non-hazardous solid wastes will be recycled, reused, or collected in a central secure area on site and then disposed of in a licensed waste receiver facility. Hazardous liquid and solid waste will be collected in a secure, enclosed location and transported offsite to a licensed hazardous waste facility. Options for hazardous waste disposal are currently being evaluated.

Precautionary measures will be implemented to avoid uncontrolled runoff of non-hazardous waste liquids into adjacent waterbodies. Waste will be managed and treated in compliance with applicable federal and provincial regulatory requirements, and permits will be obtained in accordance with the *Environmental Management Act*. This includes process water from construction and operation activities, stormwater, and ballast water.

4.0 Project Location, Land and Water Use

The Cedar LNG Project Area is located within District Lot 99, DL 309 and the portion of the Water Lot A fronting those properties (Figure 2). The land and water lot are within the asserted traditional territory of Haisla Nation and are owned in fee simple by an affiliate of Haisla Nation. A portion of the Cedar LNG Project Area is submerged Crown land for which Cedar anticipates obtaining a lease. These lands are within the municipal boundaries of the District of Kitimat and zoned for industrial and port development by the District of Kitimat's Official Community Plan.

The site is approximately 10 km southwest of Kitimat's town centre. The nearest residential area to the Project is Kitamaat Village, located approximately 3 km directly east across Kitimat Arm. Coordinates for the approximate centre of the Cedar LNG Project Area are:

- LAT/LONG 53.974972 -128.698639
- Degrees, minutes, and seconds (DMS) 53°58'29.9"N 128°41'55.1"W
- UTM (NAD83) Zone 9 Easting 519765.90 Northing 5980779.08

Industrial development in Kitimat has included or currently has proposed to include:

- Rio Tinto Aluminum smelter (existing)
- Methanex methanol facility (closed/decommissioned)
- Eurocan pulp and paper mill (closed/decommissioned)
- Kitimat LNG export terminal (proposed)
- LNG Canada export terminal (under construction)
- Pacific Traverse Energy liquefied petroleum gas export terminal (proposed)

4.1 Project Access

Kitimat is approximately 650 km northwest of Vancouver by air, approximately 640 km west of Prince George, 210 km east of Prince Rupert, and 60 km south of Terrace by provincial highways. The closest airport is the Terrace-Kitimat Regional Airport. Highway access from Prince George to the project is by Highway 16 to Terrace, and then Highway 37 south to Kitimat. Once Highway 37 enters the Kitimat townsite, it turns into Haisla Boulevard. Haisla Boulevard then turns into Alcan Road. From Alcan Road, Bish Creek FSR connects directly to the Cedar LNG Project Area. As noted above, the Bish Creek FSR has been recently upgraded as part of the Kitimat LNG Project.

4.2 Land Ownership and Tenures

The Cedar LNG Project Area is located on privately owned lands and adjacent water lots as well as submerged Crown land. A review of land ownership has been completed for the upland and nearshore components of the LNG facility and associated marine infrastructure, as well as for transmission line and pipeline corridors (Table 8). No federal land is proposed for use in carrying out the Project.

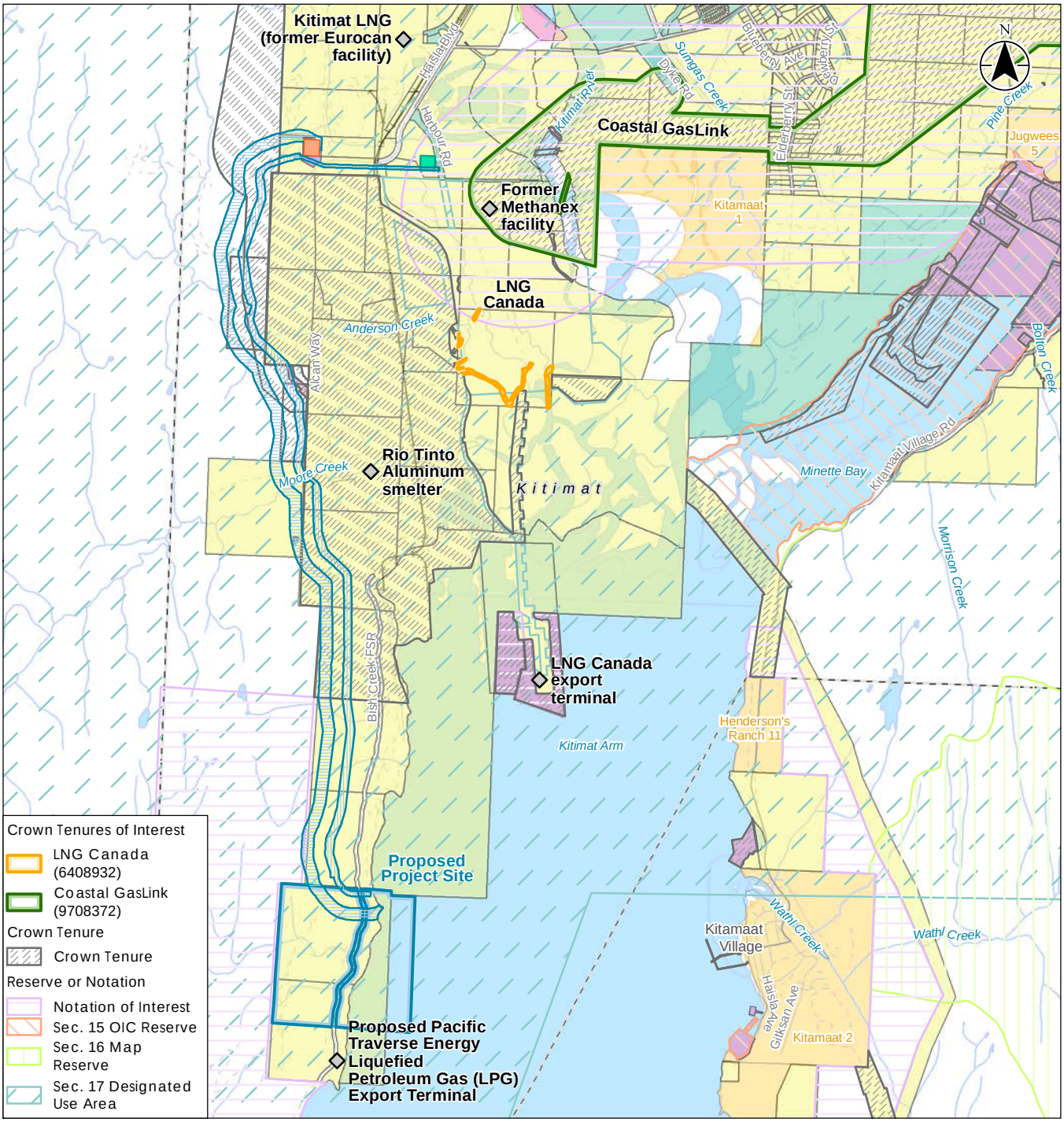
TABLE 8 LAND OWNERSHIP

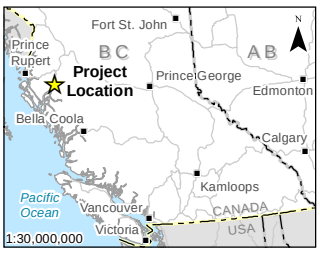
Project Component	Type	PIN	PID	Parcel Class	Legal Description / District Lot
LNG facility	Private	-	013-061-267	Subdivision	DL 99, Plan 14740
	Private		013-061-089		DL 309, Land District 13
Marine infrastructure	Private	-	029-462-142	-	Water Lot A, Plan EPP 14217, DL 5469
	Crown Waters	-	-	-	-
Transmission line and pipeline corridors	Private	-	004-336-887	Subdivision	DL 6050
	Private	-	004-336-976	Subdivision	DL 6051
	Private	2572810	004-337-191	Subdivision	DL 7596
	Private	-	007-736-649	Subdivision	DL 6050, DL 6053, DL 6054, DL 6057
	Private	-	007-745-249	Subdivision	DL 6051
	Crown Agency	-	010-128-174	Subdivision	DL 6051
	Private	-	013-061-127	Subdivision	DL 88
	Private	-	013-061-186	Subdivision	DL 89
	Private	-	013-061-208	Subdivision	DL 90, DL 91
	Private	2382130	013-061-232	Subdivision	DL 97
	Private	-	013-085-352	Subdivision	DL 91
	Private	2381640	013-085-395	Subdivision	DL 92
Transmission line and pipeline corridors cont'd	Private	2382680	013-085-549	Subdivision	DL 102A
	Private	-	013-085-638	Subdivision	DL 187
	Crown Provincial	90023378	015-704-807	Interest	
	Private	-	030-237-939	Subdivision	DL 187, DL 6050
	Crown Agency	-	030-641-438	Subdivision	DL 6051

Tenures, licenses, reserves in the Cedar LNG Project Area and transmission line corridor and their uses are presented in Table 9 and on Figure 6. No Agricultural Land Reserve, range, guide outfitting, or mineral tenures are within proximity of the Project.

TABLE 9 LAND TENURES, RESERVES, AND NOTATIONS

Category	Crown Lands File	Tenure Type and Description
Utility (electric power line)	0260382	Statutory right of way (or easement)
Utility (electric power line)	6408847	Temporary licence
Transportation (roadway)	9635729	Temporary permit
Utility (gas and oil pipeline)	9708372	Temporary licence
Reserve (industrial)	6408539	Section 16 Map Reserve
Notation of interest (First Nations)	6408408	Notation of interest
Reserve (industrial)	6406661	Section 17 Designated Use Area
Utility	7409630	Notation of interest





Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada
* Approximate Location

- Road
- Local Street
- Resource Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Municipal Boundary
- Parcel Boundary
- Minette Substation
- Industrial Development
- Cedar LNG Project Area*
- Pipeline Corridor
- Transmission Line Corridor
- Proposed Metering Station

Land Ownership
- Crown Agency
- Crown Provincial
- Federal
- Municipal
- Private

0 0.5 1 1.5 2 km
1:50,000 (at original document size of 8.5x11)

Stantec

CEDAR LNG

Project Location
Kitimat, British Columbia

Project Number 123221301
Prepared by LTRUDELL on 20190708
Discipline Review by JMUNDY on 20190708

Client/Project/Report
Cedar LNG Export Development Ltd
Cedar LNG Project
Detailed Project Description

Figure No.
6

Title
Cedar LNG Project Area and Surrounding Land Ownership and Tenures

4.3 Planning Context and Zoning

Cedar reviewed various requirements, policies, objectives, and management directions apply to the use of lands, marine areas, and natural resources in the vicinity of the Cedar LNG Project Area and transmission line corridor. Because Project design is still conceptual, a 100 m buffer was applied to the area of interest. The applicability of these requirements and recommendations has been reviewed in consideration of the location of Project components and physical activities.

4.3.1 Proximity to Parks and Federal Lands

Table 10 shows the proximity of the Project to parks and surrounding federal lands (within 55 km; also see Figure 3). Figure 7 identifies key environmental features in the vicinity of the Project, including environmentally sensitive areas such as critical habitat for species at risk, known occurrences of listed species, and Wildlife Habitat Areas. The Project footprint does not overlap with any lands outside of British Columbia or Canada.

TABLE 10 PARKS, FEDERAL AND RESERVE LANDS IN PROXIMITY TO THE PROJECT

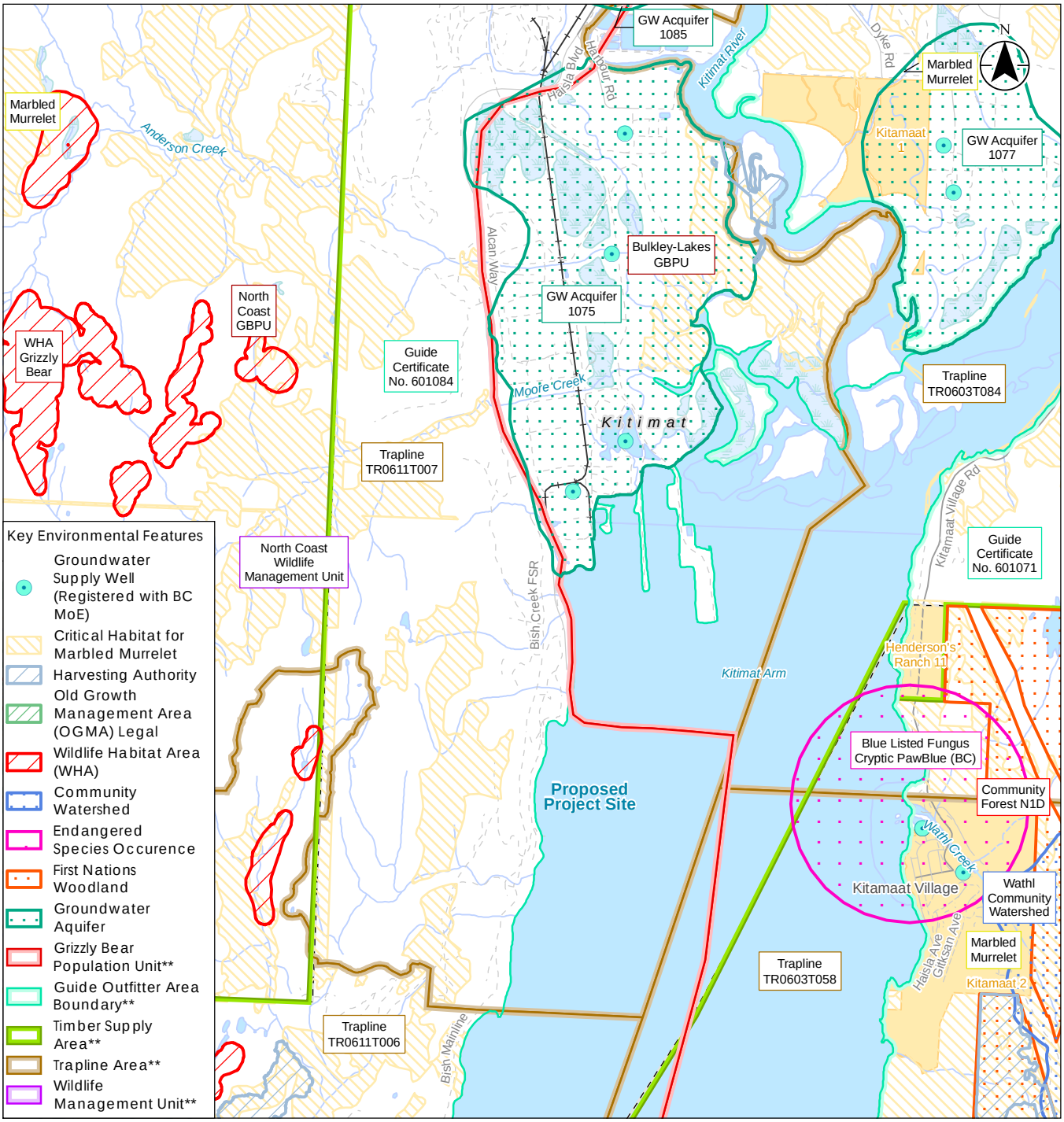
Parks and Federal Lands	Distance to Cedar LNG Project Area (km)
Provincial Parks—Class A	
Kitimat River Park, Nalbeelah Creek Wetlands Park, Gitnadoiks River Park, Dala-Kildala Rivers Estuaries Park, Dala-Kildala Rivers Estuaries Park, Eagle Bay Park, Eagle Bay Park, Foch-Gilttoyees Park, Coste Rocks Park, Coste Rocks Park, Foch-Gilttoyees Park, Sue Channel Park, Sue Channel Park, Weewanie Hot Springs Park, Weewanie Hot Springs Park	10 to 30
Lakelse Lake Wetlands Park, Lakelse Lake Park, Atna River Park, Hai Lake - Mount Herman Park, Lower Skeena River Park, Owyacumish River Park, Exchamsiks River Park, Morice Lake Park	32 to 53
Regional Parks	
Radley Park, Riverlodge Recreation Ball Park, Chilko Park, Radley Park, Radley Park, Coghlin Park View Point, Heron St Park, B2 Park (x2), Angle St Park, Raley St Park, Clague Mountain Park, Hirsch Creek Park	1 to 6
Ferry Island Recreation Area, Tetrault Park, Elk's Park, Duncan Kerr Memorial Park, Riverside Park, Geo Little Park, Upper Geo Little Park, Thornhill Community Grounds	53 to 55
Protected Areas	
Conservancies - Stair Creek Conservancy, Ecstall Headwaters Conservancy, Stair Creek Conservancy, Crab Lake Conservancy, Khtada Lake Conservancy, Bishop Bay-Monkey Beach Conservancy, Bishop Bay-Monkey Beach Conservancy, K'waal Conservancy, K'waal Conservancy, Alty Conservancy	34 to 54

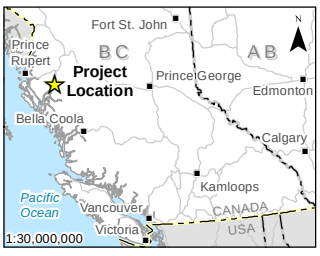
TABLE 10 PARKS, FEDERAL AND RESERVE LANDS IN PROXIMITY TO THE PROJECT

Parks and Federal Lands	Distance to Cedar LNG Project Area (km)
Ecological Reserves—Williams Creek Ecological Reserve, Skeena River Ecological Reserve	45, 49
Protected Areas—Jesse Falls Protected Area, Jesse Falls Protected Area, Foch-Gilttoyees Protected Area, Foch-Gilttoyees Protected Area, Gitnadoiks River Protected Area, Exchamsiks River Protected Area, Brim River Hot Springs Protected Area, Brim River Hot Springs Protected Area	17 to 55
First Nation Reserve Lands*	
Kitamaat 1*, Kitamaat 2*, Henderson's Ranch 11*, Walth 3*, Jugwee 5*, Bees 6*	1 to 5
Kitasa 7*, Kuaste 8*, Tosehka 12*, Tahla 4*, Giltoyees 13*, Ja We Yah's 99*, Kildala River 10*, Misgatlee 14*	10 to 29
Alastair 82, Alastair 80, Tsemknawalqan 79, Lakelse 25*, Iakwulgyiyaps 78, Lakgeas 87, Psacelay 77, Ksames 85, Klakelse 86, Crab River 18*, Gitandoiks 76, Gitandoiks 75, Dzagayap 74, Dzagayap 73, Kstus 83, Zimagord 3, Alder Creek 70, Kitkahta 1, Kulspai 6*, Kitsumkaylum 1, Iakvas 68, Gill Island 2, Salvus 26, Kstus 84, Quaal 3a, Kasika 71, Kasika 72, Quaal 3	31 to 55
Fisheries and Oceans Canada	
Kitimat Hatchery, Kitimat	1
Kildala River Field Camp, Kitimat	2
Kitimat Boathouse Moorage and Storage, Kitimat	3
Small Craft Harbour—Kitamaat Village, Kitamaat 2	3
11 Coast Guard marine navigation aids and communication sites, Kitimat, Kitimat-Stikine C (Part 2), Skeena-Queen Charlotte C	7 to 51
Royal Canadian Mounted Police	
Kitimat Detachment, North District, Kitimat	3
Community Office, Terrace	54
Terrace Detachment, North District, Terrace	54
Other Federal Lands	
Transport Canada Kitimat NDB/SUPU (air transportation), Kitimat	2
Transport Canada Terrace Radio Range Site (NDB), Kitimat-Stikine C (Part 1)	38
Canada Post—Kitimat	3
Canada Post—Terrace	54
Business Development Bank of Canada—Nash Building, Terrace	54

TABLE 10 PARKS, FEDERAL AND RESERVE LANDS IN PROXIMITY TO THE PROJECT

Parks and Federal Lands	Distance to Cedar LNG Project Area (km)
Public Services and procurement Canada—Office, Terrace	54
Public Services and procurement Canada—Warehouse, storage and workshop	54
Public Services and procurement Canada—Office, Terrace	54
*Haisla Nation, Metlakatla First Nation, and Kitselas First Nation control and administer First Nation land as defined in subsection 2(1) of the First Nations Land Management Act	





Road
Local Street
Resource Road
Railway
Watercourse
Waterbody
Wetland
First Nations Reserve
Municipal Boundary

0 0.5 1 1.5 2 km

1:50,000 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada
*Approximate Location
**Boundary will not be visible if it is beyond the extent of the data frame.

Stantec

Project Location
Kitimat,
British Columbia

Project Number 123221301
Prepared by LTRUDELL on 20190708
Discipline Review by JMUNDY on 20190708

Client/Project/Report
Cedar LNG Export Development Ltd
Cedar LNG Project
Project Description

Figure No.
7

Title
Key Environmental Features

4.3.2 District of Kitimat

Development activities within the municipal boundaries of the District of Kitimat are subject to restrictions set out in Kitimat Municipal Code Bylaw Part 9 (Planning). The Project overlaps land use Zones M1 and G5 (limited to portions of the pipeline and transmission line). Zoning requirements for M1 and G5 are provided under Part 9, Division 6—Industrial Zoning and 7—Greenbelt Zoning of the Kitimat Municipal Code. Lands zoned M1 are intended for manufacturing purposes[2] while lands zoned G5 are intended for forestry uses[3]. Detailed zoning information is available from the District of Kitimat.

4.3.3 Kalum Land and Resource Management Plan

Approved in 2001, the Kalum Land and Resource Management Plan (Kalum LRMP) provides land and resource management direction for the Kalum Timber Supply Area, Tree Farm License 41—Skeena Cellulose, and Tree Farm License 41—Skeena Sawmills, including the communities of Terrace, Kitimat, Kitamaat Village and other surrounding rural communities (PBC 2019a). The Kalum LRMP encompasses an area of 2.2 million ha. Since its approval the plan has been updated to account for changes resulting from the Nisaga'a Treaty (2006), a Government Action Regulation Order establishing mountain goat ungulate winter range (2012), and a Government Action Regulation Order establishing moose ungulate winter range (PBC 2019a).

The Kalum LRMP establishes three categories of management direction: General Resource Management, Resource Management Zone, and Protected Areas (BC Ministry of Sustainable Resource Management [MSRM] 2002). On its own, the Kalum LRMP is not a legal planning document; however, various recommendations have been legalized through the issuance of the Kalum Sustainable Resource Management Plan (SRMP), established under a Land Use Objectives Regulation Order.

Implemented in 2006, the Kalum SRMP legally establishes wildlife areas for coastal tailed frogs and ungulate winter range for mountain goats and moose within the Kalum Timber Supply Area and Tree Farm License 1 and 41 (PBC 2019b). The Kalum SRMP encompasses an area of 1.6 million hectares in northwestern British Columbia. Since 2006 the Kalum SRMP has been updated to fulfill the Gitanyow Recognition and Reconciliation Agreement (2012), amend Objective 10 to better protect the Skeena Islands, and to improve consistency with old growth management areas established under the *Oil and Gas Activities Act* and the *Forest and Range Practices Act* (PBC 2019b).

[2] Permitted uses listed in Section 9.6.2.1 of the Kitimat Municipal Code include: abattoir, agriculture, brewery, cidery, construction camp, distillery, log booming, manufacturing, marine activities, meadery, processing of animal products, restaurants, storage, transportation, temporary uses in accordance with Part 9 Division 8, winery.

[3] Permitted uses listed in Section 9.7.10.1 of the Kitimat Municipal Code include: agriculture, forestry, including harvesting, tree planting, and portable sawmills, detached residence with not more than two dwelling units, temporary uses in accordance with Part 9, Division 8. Permitted accessory uses include: bed and breakfast, home businesses address, home occupation, temporary uses in accordance with Part 9, Division 8.

4.3.4 Pacific North Coast Integrated Management Area

Encompassing an area of 102,000 km^2 the Pacific North Coast Integrated Management Area (PNCIMA) is one of five national Large Ocean Management Areas managed under Canada's Oceans Action Plan (DFO 2017, PNCIMA 2017). Within the PNCIMA, ecosystem-based management guides marine activities and resource development. In the near term, five plan priorities have been identified: governance arrangements for implementation; marine protected area network planning; monitoring and adaptive management; integrated economic opportunities; and, tools to support plan implementation (current tools include 'risk assessment tools' and 'cumulative effects framework'; PNCIMA 2017).

4.3.5 Marine Plan Partnership for the North Pacific Coast

The Marine Plan Partnership for the North Pacific Coast (MaPP) is a partnership initiative between the Province of British Columbia and 16 member First Nations that is implementing marine use plans for the MaPP region (divided into four subregions: Haida Gwaii, North Coast, Central Coast, and North Vancouver Island; MaPP 2019). MaPP Plans provide recommendations for marine management, uses, activities, and protection and are intended to inform economic development and stewardship of British Columbia's coastal marine environment (MaPP 2019).

The North Coast Marine Plan covers an area extending from Portland Inlet in the north to the south end of Aristazabal Island and is bounded by the coastal boundaries of the Kitimat-Stikine and North Coast Regional Districts to the east and the Haida Gwaii MaPP plan area to the west. Over this area the North Coast Marine Plan prescribes four[4] overarching themes, 14[5] topic-specific general management directions, and subdivides the plan into three management zones (general, special, and protection) that together guide sustainable management of marine resource and activities (MaPP 2017).

4.3.6 First Nation Marine Plans

The Cedar LNG Project area is located within the traditional territory of the Haisla Nation. Marine use planning is currently under development that would cover this area.

Shipping activities are located within the management areas of several First Nation marine use plans. These plans include:

- Haisla Nation—marine use planning is currently under development
- Interim Land and Marine Resource Plan of the Allied Tsimpshian Tribes of Lax Kw'alaams Band
- Metlakatla Draft Marine Use Plan
- Kitsumkalum Marine Use Plan

[4] Ecosystem-based management, governance, cumulative effects assessment, and climate change adaption and mitigation

[5] Compliance and enforcement; monitoring; marine protection; marine pollution' marine response; tenured activities: land policies and procedures; tenured activities: renewable energy; tenured activities: shellfish and marine plant aquaculture; tenured activities: marine-based forestry operations; tourism and recreation; marine fisheries economy; economic well-being; heritage sites and First Nations cultural areas; First Nations resource use and management.

- Gitxaala Marine Use Plan
- Gitga'at Marine Use Plan

Publicly available information on these plans is limited.

4.4 Water Use

The Cedar LNG Project Area is not located near a municipal water supply. Freshwater for process and potable water as well as potential make-up water for the power generation facility (if required) will be supplied using desalination, groundwater, surface water, or a combination thereof. The estimated flow required for the Project is expected to be up to approximately 0.25 m^3/s. Potential options for water sources are still being determined. Freshwater may be stored on-site with storage capacity based on demand and supply (e.g., firewater demand for occupied buildings). Depending on the source, water for domestic use may require on-site treatment to comply with drinking water standards. Alternatively, potable water may be brought to the site via barge or truck.

5.0 Regulatory Context

5.1 Past and Present Environmental Studies in the Region

Several LNG and marine projects in the Kitimat area have initiated or completed federal and provincial environmental assessments. These include:

- LNG Canada Export Terminal (received its EAC and positive federal decision in 2015; currently under construction)
- Rio Tinto Terminal A Extension (received its EAC in 2015; currently under construction)
- Kitimat LNG (received its EAC in 2006, substantially started construction in 2015 and currently pursuing a complex amendment under BCEAA with a request for substitution under the *Canadian Environmental Assessment Act, 2012*)
- Northern Gateway Pipelines (subject to an environmental assessment by Review Panel between 2006 and 2014; project was rejected by the federal government in 2017)
- Douglas Channel LNG (initiated a screening under the *Canadian Environmental Assessment Act*, but did not meet requirements under the Regulations Designating Physical Activities once the *Canadian Environmental Assessment Act, 2012* was enacted)

The LNG Canada environmental assessment included consideration of three proposed LNG terminals, a proposed oil refinery, and a proposed oil export terminal in Kitimat, and marine transportation associated with proposed projects in both Kitimat and Prince Rupert. The EAO Assessment Report did not identify any significant cumulative effects as a result of the LNG Project in combination with other past, current and reasonably foreseeable projects.

The Kitimat LNG and Northern Gateway projects both assessed potential environmental effects of pipelines in the same shared corridor that is proposed for the pipeline providing feed gas to the LNG facility. Both environmental assessments concluded that the pipelines would not result in significant adverse environmental effects and that they could proceed with permitting.

In addition, the BC Ministry of Environment commissioned a study of the Kitimat Airshed to learn about potential effects to human and environmental receptors from acidifying emissions related to proposed development in the region (ESSA Technologies et al. 2014). The Kitimat Airshed Study considered the existing Rio Tinto aluminum smelter as well as four proposed LNG terminals, a proposed oil refinery, gas turbine powered electrical generation facilities, and associated marine transportation and provides an evaluation of potential cumulative effects to the Kitimat Airshed under various development scenarios. Based on this study, the BC government concluded that “with proper management, Kitimat’s airshed can safely accommodate new industrial growth” (BC ENV 2014).

In 2014, the Ministry of Transportation and Infrastructure initiated the Kitimat West Douglas Channel Corridor Analysis to inform land use planning and permitting decisions related to infrastructure requirements for proposed projects in on the west side of Douglas Channel in Kitimat. This study included input from the Kitimat LNG Project (Chevron), the Northern Gateway Project (Enbridge), and Rio Tinto. The pipeline alignment selected for the Project was informed by this study. See Appendix C for a summary of environmental studies applicable to the West Douglas Channel pipeline corridor.

5.2 Federal Financial Support

No federal funding is anticipated for the proposed Project.

5.3 Permits, Licenses, Approvals and Authorizations

This Project will be provincially regulated. In addition to an EAC and positive federal Decision Statement, the Project will require a range of other approvals, including from the Oil and Gas Commission and other regulatory agencies (Table 11).

There is a comprehensive permitting process for pipelines in British Columbia that will apply to the feed gas pipeline. The primary permit required is a Pipeline Permit under the *Oil and Gas Activities Act* (OGAA), issued by the BC Oil and Gas Commission (OGC). This will require that the construction and operation of the pipeline meets or exceeds the requirements of the Environmental Protection and Management Regulation under OGAA and the associated Environmental Protection and Management Guideline (OGC 2018). Environmental matters that the OGC considers when deciding whether a Pipeline Permit will be issued include water values, riparian values, wildlife and wildlife habitat, old growth management, resource features, and cultural heritage resources. Permits issued by the OGC under OGAA include legal environmental requirements for operation of oil and gas activities, including operating requirements related to water quality, stream and wetland crossings, invasive plants, forest health, soil conservation, and restoration requirements.

In addition to permitting required under OGAA, the proposed pipeline would be subject to a robust local, provincial and federal regulatory regime relating to the protection of environmental, social, economic, heritage and health matters. Key legislation that would be applicable to the feed gas pipeline include:

- *Oil and Gas Activities Act* and regulations
- *Environmental Management Act* and regulations
- *Water Sustainability Act* and regulations
- *Heritage Conservation Act*
- *Wildlife Act*
- *Fisheries Act* and regulations
- *Migratory Birds Convention Act* and regulations
- *Species at Risk Act* and regulations
- *Navigation Protection Act* and regulations
- *Workers Compensation Act* and regulations
- District of Kitimat Official Community Plan
- Kitimat Municipal Code

In addition to these statutory requirements, design standards published by CSA and key environmental guidelines published by the OGC that will apply to the design and operation of the project include:

- CAN/CSA Z662:19—Oil and Gas Pipeline Systems
- British Columbia Noise Control Best Practices Guideline (OGC 2009)
- Environmental Protection and Management Guideline (OGC 2019)

The requirements of this list of legislation, bylaws and guidelines apply to almost every potential valued component that are could be considered in the environmental assessment phase.

A preliminary analysis of the pipeline route indicates that almost 63% of the pipeline right-of-way will be located on private fee-simple lands with the remainder (just over 37%) being located on provincial Crown or municipal lands. All federal legislation and most of the provincial legislation is applicable to both private property and Crown lands. Cedar will work with the owners of the private property to determine the appropriate environmental protection requirements where aspects of the provincial legislation is not applicable.

TABLE 11 ANTICIPATED KEY PERMITS AND APPROVALS

Permit	Legislation	Receiving Party	Trigger(s)
Federal			
Export License	*National Energy Board Act—Part VI (Oil and Gas)*	National Energy Board (NEB)	Required to export and sell LNG product outside of Canada
Decision Statement	*IAA*	IAAC	Required for projects that exceed the thresholds in the Physical Activities Regulations (see Section 1.5).
Canadian Register of Vessels	*Canada Shipping Act*	Transport Canada	Required for vessels > 15 gross tonnes used for commercial purposes, that require marine mortgages, have an engine of 10 hp (7.5 kw) or more. A vessel is mandated to be registered if it is not a pleasure craft; is wholly owned by qualified persons; is not registered, listed or otherwise recorded in a foreign state. May be applicable to the nearshore LNG production unit.
Coasting Trade License	*Coasting Trade License Act*	Transport Canada	Required to bring a foreign flagged vessel into Canadian waters.
Marine Facility Security Assessment and Security Plan	Marine Transportation Security Regulations	Transport Canada	Required for marine facilities located in a maritime zone of Part 1 of the *Oceans Act*. This regulation applies to Canadian vessels of over 100 tonnes; carrying over 12 passengers; or towing a barge astern or alongside or pushing ahead if the barge is carrying certain dangerous cargoes.
Aeronautical Obstruction Clearance	Canadian Aviation Regulations	Transport Canada	Required to address issues such as marking, lighting and use of tall cranes that may at times require aeronautical obstruction clearance. This clearance specifies the location of new structures that may pose a hazard to aviation.
Explosives Transportation Permit	*Explosives Act*	Natural Resources Canada	Required for the transportation of explosives via flatbed trailer truck.
Explosives User Magazine License	*Explosives Act,* Explosives Regulation	Natural Resources Canada	Required if planning to use Type E & I explosives
Approval Letter	Explosives Regulation	Natural Resources Canada	Required for employees who will be working with explosives.
Radio License	*Radio Communication Act*	Industry Canada	Required if planning on using radio frequencies and major communication method
Scientific Fish Collection	Fishery Regulations and Management of Contaminated Fisheries Regulations	Fisheries and Oceans Canada (DFO)	Required if collecting federally regulated fish (e.g., undertaking a fish salvage).
Request for Review (under Section 35)	*Fisheries Act*	Fisheries and Oceans Canada (DFO)	Required for work being conducted in or near water bodies that support the productivity of relevant fisheries.
Ministerial Authorization	*Fisheries Act*	Fisheries and Oceans Canada (DFO)	Required if *Request for Review* (above) triggers the need for a paragraph 35(b) authorization. Not currently anticipated based on limited interaction between marine infrastructure and marine fish and fish habitat.
Notice to the Minister	*Navigation Protection Act*	Transport Canada (NPP)	Required for all proposed works (other than a designated work) on Navigable Waters.
Approval to Interfere with Navigation	*Navigation Protection Act*	Transport Canada (NPP)	Required if Notice to Minister (above) determines significant interference is likely to occur from proposed works.
Provincial			
EAC	*Environmental Assessment Act*	EAO	Required for projects that exceed the thresholds in the Reviewable Projects Regulation (see Section 1.5).
LNG Facility Permit	LNG Facility Regulation	BC Oil and Gas Commission (OGC)	Required to move forward with development of any LNG facility.
Modular Units			Required when planning to construct a modular unit.
Modular Units from Outside BC			Required when bringing in modular units constructed outside of BC.
Investigative Use Permit	*Land Act*	OGC	Required to assess suitability of the area for proposed project. Grants temporary access to Crown land sites for data gathering and testing
License of Occupation			Required if planning to occupy Crown land for over two years, to be used for oil and gas activities.
Temporary Occupation of Crown Land			Required for oil and gas activity on Crown land.

TABLE 11 ANTICIPATED KEY PERMITS AND APPROVALS

Permit	Legislation	Receiving Party	Trigger(s)
Section 10 Use Approval for short term water use	*Water Sustainability Act*	OGC	Required for diversion or use of water for up to 24 months from single or multiple sites.
Section 11 Approval for changes in and about a stream		OGC	Required if construction and operation may create changes in and about a stream.
Water Licence		OGC	Required to acquire long-term water rights to divert and use water.
Section 12 Alteration to Site	*Heritage Conservation Act*	OGC	Required for any alteration to an archaeological site once the inspection and investigation are complete.
Road Permit	*Oil and Gas Activities Act*	OGC	Required for use of roads on private land to carry out oil and gas activities.
Aggregate Operations and Borrow Pit Approval		OGC	Required for excavation/use or clay, rock or similar materials. for construction or maintenance of oil and gas infrastructure that are not sourced from a borrow pit.
Waste Discharge Permit (Water)	*Environmental Management Act;* Oil and Gas Waste Regulation	OGC	Required to discharge waste into the environment, as a Schedule 1 activity. Code of practice authorization is required to discharge waste into the environment as a Schedule 2 activity
Waste Discharge Permit (Air)	*Environmental Management Act;* Oil and Gas Waste Regulation	OGC	Required to discharge waste into the environment, as a Schedule 1 activity. Code of practice authorization is required to discharge waste into the environment as a Schedule 2 activity
Sewage Discharge Authorization	*Environmental Management Act, Public Health Act*	Ministry of Environment and Climate Change	Required for discharges to ground (>22.7 m^3/d) and most discharges to water and reclaimed water uses requiring authorization under the *Environmental Management Act*.
Alternative Safety Approach Plan	*Safety Standards Act*	Technical Safety BC	Required for projects that deviate from CSA code.
Design Registration		Technical Safety BC	Required for specific pressure equipment.
Operating Permit		Technical Safety BC	Required when operating or maintaining equipment identified under the Safety Standards General Regulations (i.e., typically includes industrial plants).
Installation Permit		Technical Safety BC	Required for all LNG facilities moving forward to ensure safe operation and design of facilities.
Class 8 Special Type Operating Permit		Technical Safety BC	Required for all LNG facilities moving forward to ensure safe operation and design of facilities.
Municipal/Regional			
Building Permit	*Kitimat Municipal Code*	District of Kitimat	Required for construction of buildings within District of Kitimat land.
Development Permit		District of Kitimat	Required if the project conflicts with rules in the Municipal Code or Official Community Plan or is located within a development permit area.
Zone Amendment	*Official Community Plan*	District of Kitimat	Required to amend the type of zoning where LNG facility is to be built (i.e., if not in an industrial zone).
Application for Health Approval	*Public Health Act*	Northern Health Authority	Required when obtaining an operating permit for a public water system or water hauling truck (general service – industrial).
Holding Tank Permit	*Sewerage System Regulation*	Northern Health Authority	Required if planning to establish sewage holding tank. Holding tanks are regulated under Section 4 and 5 of the BC Sewerage System Regulation.
Section 7 Approval for water supply system construction	*Drinking Water Protection Act*	Northern Health Authority	Required if planning to construct own water supply system on site. Construction permit required for a new or modification to a water supply system. "Minor" construction can be applied for if construction is an extension to service a single lot with a pipe diameter ≥ 75 mm or to service up to five lots.
Section 8 Approval for water supply system operation		Northern Health Authority	Required after construction is complete in order to operate water supply system on site.

6.0 Environmental Setting

Existing conditions in the Cedar LNG Project Area and transmission line corridor are well understood and have been characterized through numerous previous projects and studies. Section 5.1 provides a summary of past and current environmental studies in the area. Cedar will conduct site-specific environmental studies to validate existing information.

The following sections provide an overview of the natural, biological and human environment setting in the vicinity of the Project.

6.1 Natural Setting

6.1.1 Climate and Air Quality

Kitimat is located within an area that is influenced by Pacific maritime air streams that result in mild wet winters and cool moderately humid summers. Small seasonal temperature differences are experienced. Temperatures hover around freezing in winter and seldom exceed 30°C in summer.

Mean annual precipitation in the Kitimat area ranges from 2,200 to 2,400 millimetres (mm). Daily precipitation maximums generally occur in October and December and are in the range of 129 to 145 mm. The average annual wind speed reported at the Kitimat townsite climate station is 18 km/h. The windiest month is March with average wind speeds of 20 km/h. The prevailing winds are from the south or southwest in summer and from the northwest in winter (Environment Canada 2011).

Air quality in the Kitimat area is generally very good due to prevailing winds. Air quality in Kitimat is influenced nearby industrial facilities. Due to the industrial history of Kitimat, local air quality and meteorological data have been extensively monitored for more than 20 years. There are currently four active monitoring stations in or near the Kitimat townsite and Kitamaat Village. At one location near the Rio Tinto site, SO_2, NO_x, PM_{10}, $PM_{2.5}$, hydrogen sulphide, and ozone are monitored on a continuous basis.

6.1.2 Greenhouse Gases

GHG emissions from industry are federally and provincially monitored in Canada. At a federal level, GHG emissions are reported via the GHG Reporting Program under section 46 of the *Canadian Environmental Protection Act, 1999*, and GHG emissions within British Columbia are reported by the *Greenhouse Gas Industrial Reporting and Control Act*. Both laws require industrial facilities to report their annual GHG emissions if they emit more than 10,000 tonnes of CO_2e per year. Those annual reports are then included in the provincial and national GHG inventories alongside other emission categories.

British Columbia's current (2017) GHG inventory does not include the category of LNG facilities (Government of British Columbia 2019); however, such oil and gas emissions can be considered under the industry category. Provincial inventory emissions indicate 40% are from the industry section, 38% from the transportation sector and 22% from building sector.

GHG reduction targets within British Columbia have been legislated since 2007 under the *Greenhouse Gas Reduction Target Act*. GHG targets are set as 40%, 60% and 80% below the 2007 GHG emission levels by 2030, 2040 and 2050, respectively. In 2014, British Columbia implemented the *Greenhouse Gas Industrial Reporting and Control Act* which establishes a GHG emission intensity benchmark for LNG facilities of 0.16 tonnes CO_2e/tonne LNG produced.

6.1.3 Acoustic Environment

The existing acoustic environment within the Cedar LNG Project Area is characterized by variable sound from the natural environment such as wind, waves and marine and terrestrial wildlife, as well as anthropogenic sound. Sources of anthropogenic sound include marine traffic, air traffic, and other human activity. The closest residential houses are approximately 3 km east of the LNG facility in Kitamaat Village.

Noise levels in the area are generally consistent with rural areas. However, noise levels to the north, near Kitimat, are influenced by nearby industrial facilities.

6.2 Biological Setting

6.2.1 Freshwater and Aquatic Resources

Several watercourses are present in the Cedar LNG Project Area and along the pipeline and transmission line corridors, including Moore Creek, Anderson Creek and Beaver Creek. These streams and their tributaries flow into the Kitimat River estuary and Kitimat Arm. Most of the watercourses in the Cedar LNG Project Area are inhabited by fish. Fish species that support commercial, recreational and/or Indigenous fisheries include coho salmon (*Oncorhynchus kisutch*), chinook salmon (*O. tshawytscha*), chum salmon (*O. keta*), pink salmon (*O. gorbuscha*), coastal cutthroat trout (*O. clarkii clarkii*), rainbow trout (*O. mykiss*), and Dolly Varden (*Salvelinus malma*). None of these species are listed under the *Species at Risk Act*, and coastal cutthroat trout are provincially blue-listed. Habitat at the watercourse crossings may provide spawning, rearing or overwintering habitat that support the productivity of relevant fisheries.

6.2.2 Marine Resources

The Project is located within a coastal fjord containing turbid surface waters and hypoxic (low oxygen) deep water. Sediment loading occurs from major watercourses in the area such as the Kitimat River. The foreshore environment in the Cedar LNG Project Area is a mixture of bedrock, sand and gravel, beyond which steep and rocky walls lead to approximately 100 m depth where the substrate changes to soft sediment.

Kelp (e.g., bull kelp, *Nereocystis luetkana*) and eelgrass (*Zostera spp.*) species form important seasonal habitat for fish and invertebrates and are likely to be found within the Cedar LNG Project Area. Important estuarine habitat occurs north of the Cedar LNG Project Area and migratory fish species such as Pacific salmon (*Oncorhynchus spp.*) and Pacific eulachon (*Thaleichthys pacificus*) pass through during spawning migration and juvenile out-migrations. Pacific herring (*Clupea pallasii*) are also known to use Kitimat Arm for spawning and rockfish *(Sebastes spp.*) may be found at depth along the rocky fjord wall and soft sediment. Other fish species (Pacific halibut, *Hippoglossus stenolepis;* Pacific sandlance,

Ammodytes hexapterus; ronquil, *Ronquilus spp.* eelpout, *Lycodes spp.;* sculpin, family Cottidae; ratfish, *Hydrolagus colliei*; and flatfish, Family Pleuronectidae) are likely to be found within the Cedar LNG Project Area. Invertebrate species such as Dungeness crab *(Metacarcinus magister*), Pacific blue mussel *(Mytilus trossulus*), barnacles *(e.g., Semibalanus spp*.), sea urchins *(Strongylocentrotus spp.*) *s*ea cucumber (e.g., *Apostichopus californicus*), snails *(Littorina spp*.), and limpets (*Lottia spp.*) use the intertidal and subtidal environments within the project area either seasonally or year-round. Other species of interest like northern abalone (*Haliotis kamtschatkana*) or glass sponge reefs (Class *Hexactinellida*) could be found within the project area. Marine mammals (resident and Bigg's killer whales, *Orcinus orca;* humpback whales, *Megaptera novaeangliae;* Steller sea lion, *Eumetopias jubatus;* Dall's porpoise, *Phocoenoides dalli;* harbour porpoise, *Phocoena phocoena;* harbour seal, *Phoca vitulina*) are also found in Douglas Channel.

6.2.3 Vegetation and Wetlands Resources

The western shore of Kitimat Arm is in the sub-montane variant of the Coastal Western Hemlock (CWH) Very Wet Maritime Subzone (vm1). The CWHvm1 has a wet, humid, mild, oceanic climate and occupies an extensive area at elevations below 400 m. Zonal forests are dominated by western hemlock (*Tsuga heterophylla*), amabilis fir (*Abies amabilis*), and western redcedar (*Thuja plicata*) with a thick shrub understory of conifer regeneration and blueberries (*Vaccinium*), with a sparse herb layer of bunchberry (*Cornus canadensis*), deer fern (*Struthiopteris spicant*), and spiny wood fern (*Dryopteris expansa*), with a carpet of feather and leafy mosses (Banner et al. 2003).

Wetter forested site units dominate the landscape in the CWHvm1, even on sloping terrain. Wetter forests are dominated by amabilis fir, western redcedar, western hemlock, Sitka spruce (*Picea sitchensis*), and yellow cedar (*Cupressus nootkatensis*). Understory vegetation includes devil's club (*Oplopanax horridus*), foamflower (*Tiarella*), salmonberry (*Rubus spectabilis*), and oak fern (*Gymnocarpium dryopteris*). Lanky (*Rhytidiadelphus loreus*) and leafy mosses and green sphagnum are common (Banner et al. 2003).

The British Columbia Conservation Data Centre (2019) reports 12 listed plant communities that potentially to occur in the Kitimat Valley lowlands. Three red-listed communities occur in the CWHvm1 and Kalum Forest District:

1. Dune wildrye—beach pea community, Ecological Unit uncorrelated
2. Sitka spruce/Salmonberry, Ecological Unit CWHvm1/09
3. Sitka sedge/peat moss wetland fen, Wetland community Wf51

Nine blue-listed communities occur in the CWHvm1 and Kalum Forest District:

1. Western hemlock—western redcedar/Salal very wet maritime, Ecological unit CWHvm1/03
2. Western redcedar—western hemlock/sword fern, Ecological unit CWHvm1/04
3. Western hemlock—amabilis fir/Deer fern, Ecological Unit CWHvm1/06
4. Amabilis fir—western redcedar/salmonberry, Ecological Unit CWHvm1/07
5. Amabilis fir—Sitka spruce/Devil's club, Ecological Unit CWHvm1/08
6. Black cottonwood—red alder/Salmonberry, Ecological Unit CWHvm1/10

7. Western redcedar—Sitka spruce/skunk cabbage, Ecological unit CWHvm1/14
8. Labrador tea/western bog-laurel bog/peat mosses, Wetland community Wb50
9. Sitka willow/Sitka sedge swamp, Wetland community Ws06

6.2.4 Wildlife and Wildlife Habitat

The Cedar LNG Project Area is characterized by coastal coniferous forests, riparian areas, rocky shorelines, and deep marine water. Terrestrial ecosystems in the Kitimat area support a wide variety of wildlife species, including mammals (e.g., grizzly bear [*Ursus arctos*], black bear [*Ursus americanus*], Pacific marten [*Martes caurina*]), raptors (e.g., bald eagle [*Haliaeetus leucocephalus*], osprey [Pandion haliaetus]), forest birds (e.g., marbled murrelet [*Brachyramphus marmoratus*], olive-sided flycatcher [*Contopus cooperi*], western screech owl [*Megascops kennicottii kennicottii*]), and amphibians (e.g., western toad [*Anaxyrus boreas*], coastal tailed frog [*Ascaphus truei*]). Nearshore marine ecosystems support many species of shorebirds, wading birds, waterfowl, and marine birds (e.g., great blue heron [*Ardea herodias fannini*], surf scoter [*Melanitta perspicillata*]).

Several wildlife species that are known to occur in the Kitimat area are species of conservation concern and are listed federally on Schedule 1 of the *Species at Risk Act* or on the provincial Red or Blue list. Species of conservation concern that have previously been documented in the area include grizzly bear, little brown myotis (*Myotis lucifugus*), marbled murrelet, northern goshawk (*Accipiter gentilis laingi*), western screech owl, and coastal tailed frog. Habitat in the Cedar LNG Project Area may support one of more of these species of conservation concern.

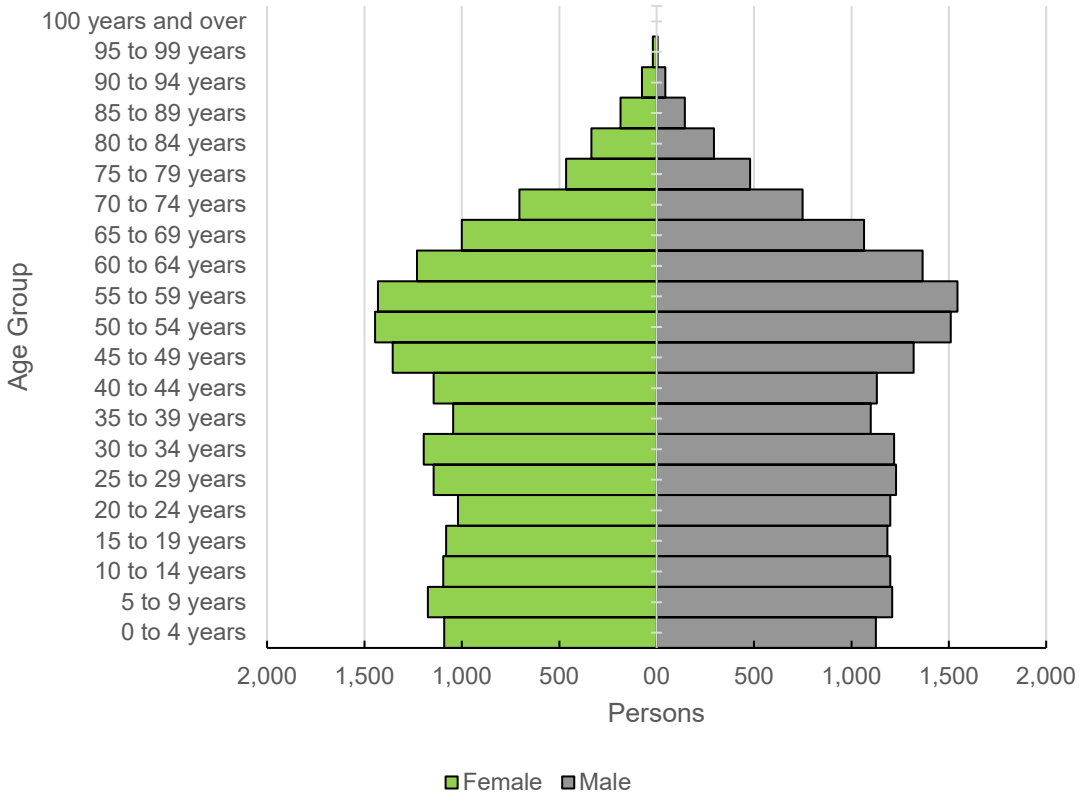
6.3 Human Environment Setting

6.3.1 Social and Economic Setting

6.3.1.1 REGIONAL SETTING

The proposed Project is located in the Regional District of Kitimat-Stikine (RDKS). The RDKS provides local government services to an area of 100,000 km^2 in northwestern British Columbia. In 2016, the population of RDKS was estimated at 37,367 persons (less than a 1% increase from 2011), of whom roughly 36% identified themselves as Indigenous (Statistics Canada 2017). RDKS includes the City of Terrace, Village of Hazelton, Nisga'a (Nisga'a land), District Municipalities of Kitimat, New Hazelton, and Stewart, RDKS Electoral Areas A, B, C (Part 1 and 2), D, E, and F, and the Indian Reserves of Babine 17, Bulkley River 19, Coryatsaqua (Moricetown) 2, Dease Lake 9, Gitanmaax 1, Gitanyow 1, Gitsegukla 1, Gitwangak 1, Guhthe Tah 12, Hagwilget 1, Iskut 6, Kispiox 1, Kitamaat 2, Kitasoo 1, Kitselas 1, Kitsumkaylum 1, Kshish 4, Kulspai 6, Moricetown 1, Sik-e-dakh 2, Tahltan 1, Telegraph Creek.

In 2016, approximately 18% of the population of the RDKS were between 0 to 14 years of age, 67% between 15 to 64 years of age, and 15% were 65 years of age or older (Statistics Canada 2017). Population counts by age group are presented in Figure 8. The average (mean) age of the population was 39.9 years (median of 40.8 years).



SOURCE: Statistics Canada 2017

FIGURE 8 POPULATION PYRAMID—RDKS, 2016

In 2016, the housing stock of the RDKS was primarily comprised of single-detached houses (72%; Statistics Canada 2017). Other attached dwellings (i.e., semi-detached houses, town houses, apartments in duplexes and low-rise[6] buildings, and other single-attached houses) accounted for 22% of the housing stock while movable dwellings accounting for 6% (Statistics Canada 2017). The average household size was 2.5 persons (Statistics Canada 2017). Approximately 96% of households occupied housing considered by the Canadian Mortgage and Housing Corporation (CMHC) as 'suitable' (dwelling has enough bedrooms for the size and composition of the household). The number of owner-occupied housing outnumbered tenant-occupied housing by a ratio of 3:1 (Statistics Canada 2017). Roughly 91% of owner households and 85% of tenant households occupied dwellings considered to be 'affordable'[7] by the CMHC. Median monthly shelter costs for owned dwellings ($794/month) were lower than tenant occupied dwellings ($883/month) in 2016 (Statistics Canada 2017).

[6] Apartment with fewer than five storeys

[7] The CMHC considered housing to be affordable if shelter costs represent less than 30% of a households before-tax income (2018)

The economic base of the RDKS in 2016 was weighted toward non-basic industries[8], employing 51% of the labour force (Statistics Canada 2017). Of non-basic industries, employment was greatest in retail trade (accounting for 11.2% of the employed labour force), followed by accommodation and food services (10.9%; Statistics Canada 2017). Employment in basic industries[9] accounted for 45.7% of the labour force with employment greatest in health care and social assistance (11.3%), followed by construction (10.9%; Statistics Canada 2017). Employment in non-classified North American Industry Classification System (NAICS) industries accounted for 3.3% of the employed labour force (Statistics Canada 2017).

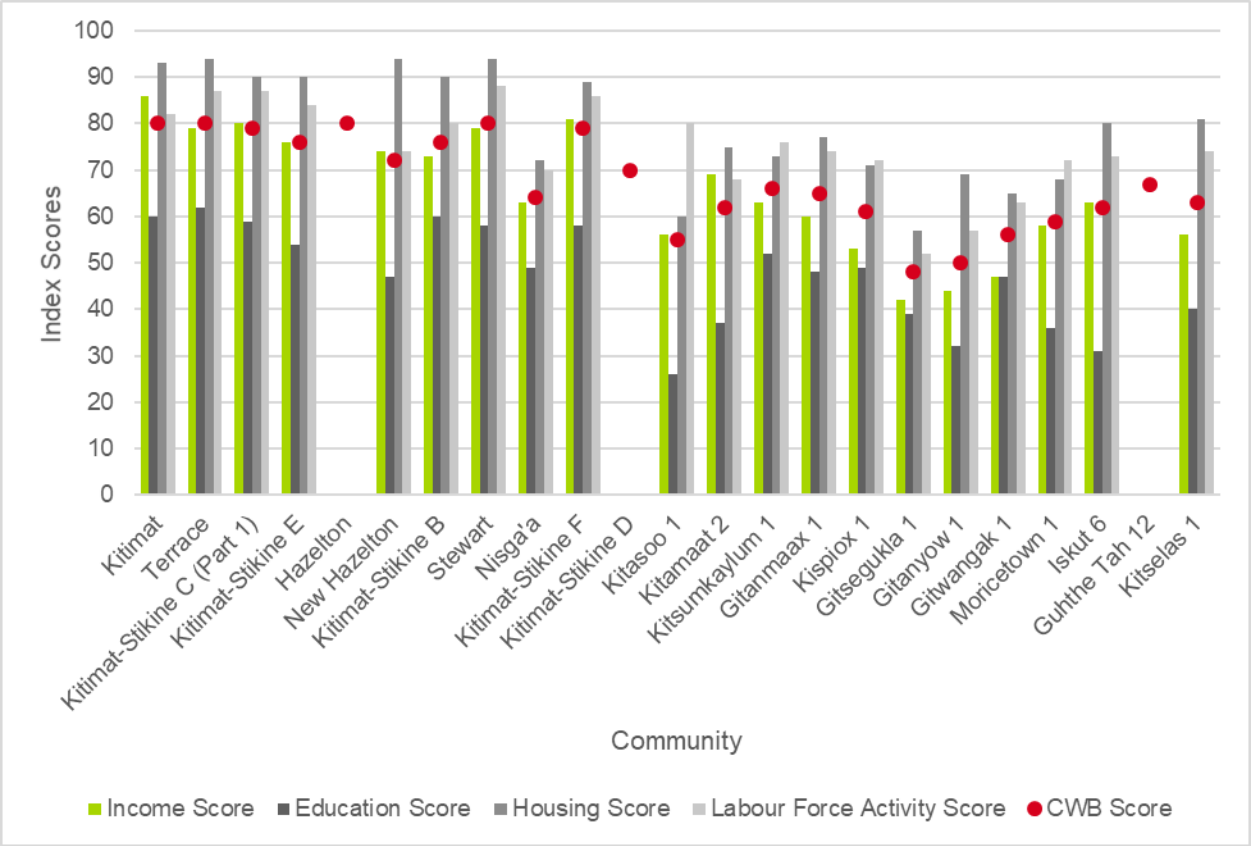
For the year ended December 31, 2018, the RDKS posted an annual net surplus of nearly $3.6 million with revenues of $36.2 million and expenditures of $32.6 million (RDKS 2019). Roughly 72% of 2018 revenue was generated through taxation (25% of revenue), grants (23%) and revenue from own sources (24%; RDKS 2019). Of the 47 expenditure lines included in the RDKS five-year (2019-2023) Financial Plan, roughly 66% of expenditures were associated with five line items (Skeena Ice Area [36%], Hazeltons & Steward area solid waste [10%], general government expenditures [8%], and Queensway sewer utility [3%]; RDKS 2019).

Numerous measures of community-wellbeing can be used to describe current conditions within BC communities. One measure that is universally comparable across all Canadian communities is the Community Well-Being (CWB) Index published by Crown-Indigenous and Northern Affairs Canada (CIRNAC). The CWB index measures socio-economic well-being for individual communities across Canada using four component criteria (education, labour force activity, income and housing) as informed by the results of Statistics Canada's Census of the Population. The CWB index has a maximum score of 100 (CIRNAC 2019). According to the index, CWB scores within the RDKS range from 48 to 80 (mode of 80, n=4). Well-being scores for communities that have published data[10] are shown in Figure 9. Component scores for RDKS Electoral Area D, Hazelton, and Guhthe Tah 12 are suppressed; however, total CWB scores are available and are therefore included in the figure. For comparison, the highest CWB score is BC is a 90, scored by only three communities (two in the Lower Mainland [the City of West Vancouver and the Village of Belcarra] and one on Vancouver Island [the District Municipality of Oak Bay]). The City of Vancouver and the City of Victoria each have a CWB score of 85 (CIRNAC 2019).

[8] Non-basic industries are broadly characterized as the "service" sector as they generally sell services within a region. Non-basic industries are therefore not considered primary economic generators.

[9] Basic industries generate much of their revenue from sales to customers located outside of the region and are therefore the primary economic generators (because they bring in income from outside of the region). Components of the public sector funded from provincial and federal sources also have some characteristics of basic sectors because they involve currency inflow from outside the region.

[10] Information is not available for RDKS Electoral Area A, C (Part 2), Kshish 4, Kulspai 6, Coryatsaqua (Moricetown) 2, Hagwilget 1, Sik-e-dakh 2, Babine 17, Bulkley River 19, Dease Lake 9, Tahltan 1, and Telegraph Creek.



SOURCE: ISC 2019

FIGURE 9 COMMUNITY WELL-BEING SCORES—RDKS COMMUNITIES 2016

6.3.1.2 LOCAL SETTING

Haisla Nation

Through its 19 reserve/settlement areas[11] Haisla Nation encompasses an area covering 726 ha (Indigenous and Northern Affairs Canada [INAC] 2019a), with a traditional territory spanning approximately 1,295 km^2 that encompasses the Kitimat River, portions of Douglas Channel north of Princess Royal Channel, the Kemano River, and surrounding lands (see Figure 10). As of June 2019, the total registered population of Haisla Nation was 1,944 persons (INAC 2019b). Of the total registered population, roughly 32% live on Haisla Nation reserve lands while 65% live off reserve lands (2.3% live on other First Nation reserve lands and 0.1% on Crown lands; INAC 2019b).

[11] Bees 6, Crab River (Crab Harbour) 18, Gander Island 14, Giltoyees 13, Henerson's Ranch 11, Ja We Yah's 99, Jugwees (Minette Bay) 5, Kemano 17, Kildala River (Thala) 10, Kitamaat 1, Kitamaat 2, Kitasa 7, Kitlope 16, Kuaste (Mud Bay) (Kildala Arm) 8, Misgatlee 14, Tahla (Kildala) 4, Toeshka (Eagle Bay) 12, Walth 3, Wekellals 15

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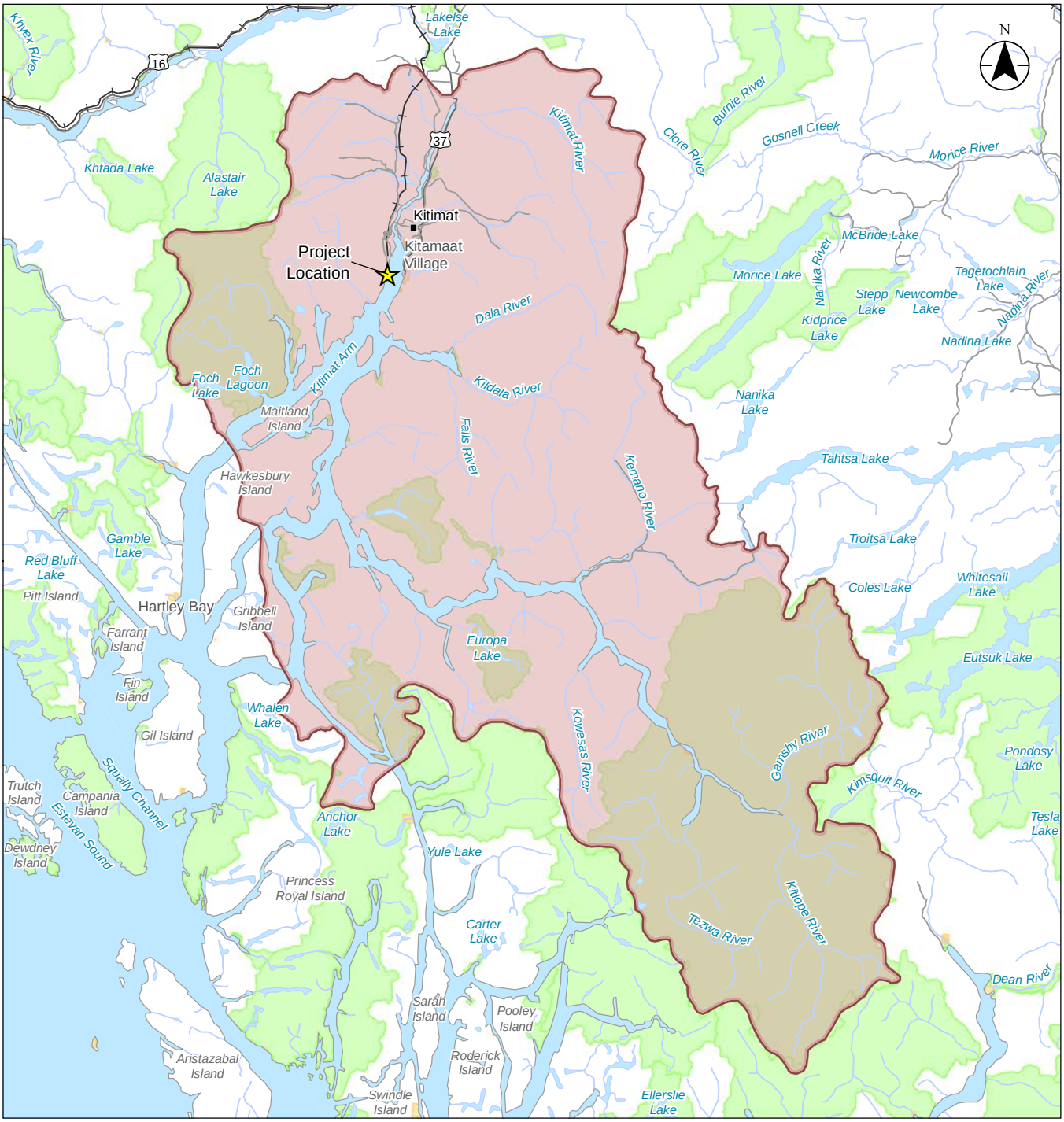
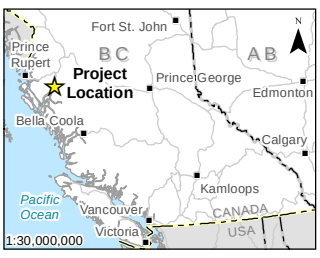




Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

- Highway
- Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, Protected Area, or Conservancy Area
- Project Location
- Haisla Traditional Territory

0 10 20 30 40 50 km

1:1,100,000 (at original document size of 8.5x11)

Stantec

CEDAR LNG

Project Location
Kitimat,
British Columbia

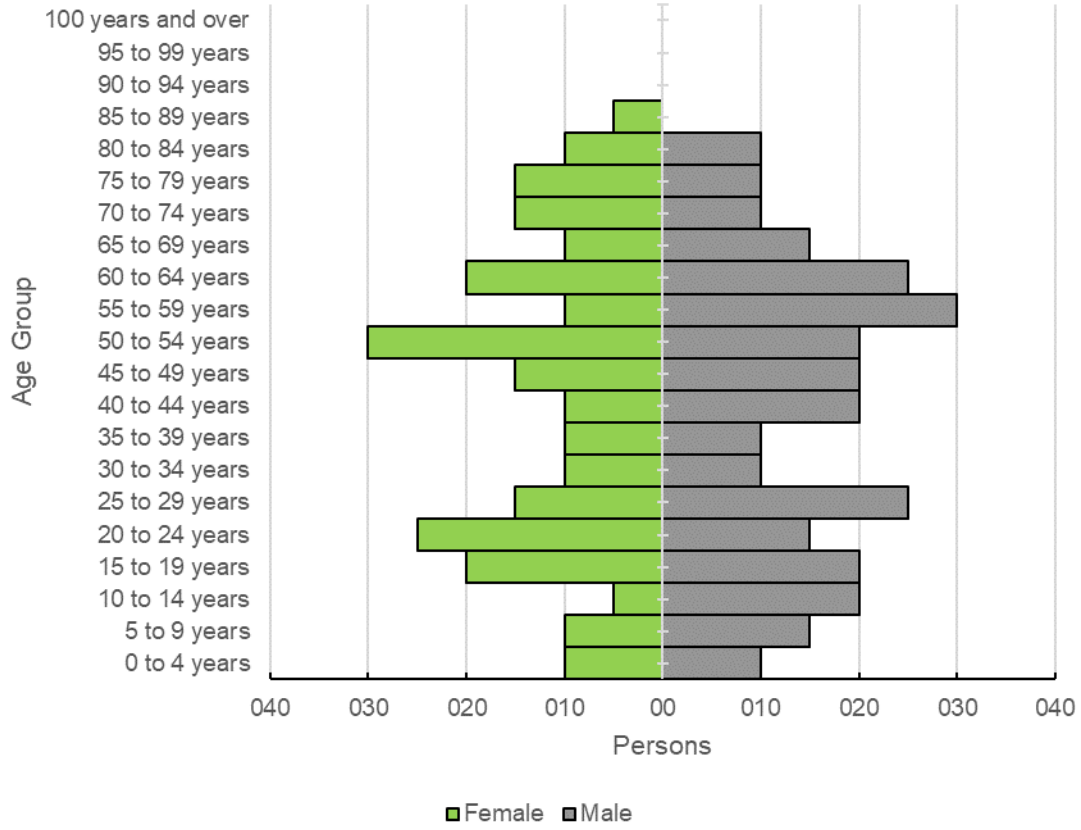
Project Number 123221301
Prepared by TCARDINAL on 20190716
Discipline Review by JMUNDY on 20190816

Client/Project/Report
Cedar LNG Export Development Ltd
Cedar LNG Project
Detailed Project Description

Figure No.
10

Title
Haisla Traditional Territory

Within Haisla Nation, Kitamaat Village (Statistics Canada Census Subdivision Kitamaat 2) is the most populated area. In 2016, Kitamaat Village had an estimated population of 525 persons, up 2.1% from 2011 (Statistics Canada 2017). Approximately 98% of the population self-identified as Indigenous in 2016 (Statistics Canada 2017). In 2016, approximately 13% of the population of Kitamaat Village were between 0 to 14 years of age, 69% between 15 to 64 years of age, and 18% were 65 years of age or older (Statistics Canada 2017). Population counts by age group are presented in Figure 11. The average (mean) age of the population was 43.1 years (median of 45.9 years).



SOURCE: Statistics Canada 2017

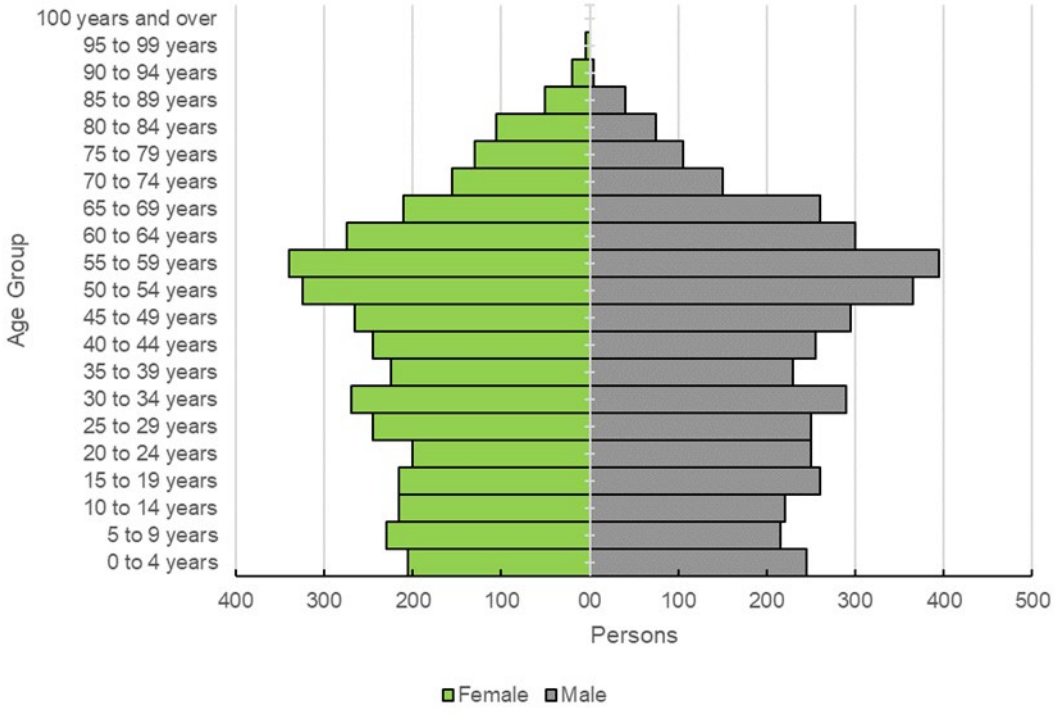
FIGURE 11 POPULATION PYRAMID—KITAMAAT VILLAGE, 2016

In 2016, the housing stock of the Kitamaat Village was primarily comprised of single-detached houses (92%; Statistics Canada 2017). Other attached dwellings accounted for the remaining 8% of the housing stock (Statistics Canada 2017). The average household size was 2.8 persons (Statistics Canada 2017). Approximately 96% of households occupied housing considered by the CMHC as ‘suitable’. Information on housing affordability and median monthly shelter costs have been supressed by Statistics Canada.

The economic base of Kitamaat Village is primarily non-basic, employing 57.5% of the labour force (Statistics Canada 2017). Of non-basic industries, employment is greatest in public administration (accounting 12.5% of the employed labour force), followed by retail trade, administrative and support services, and accommodation and food services (each accounting for 10.0% of the employed labour force [30% total]; Statistics Canada 2017). Employment in basic industries accounted for 37.5% of the labour force with employment greatest in construction (12.5%), followed by manufacturing (10.0%; Statistics Canada 2017). Employment in non-classified NAICS industries accounted for 5.0% of the employed labour force (Statistics Canada 2017).

District of Kitimat

The proposed Project is located within the boundaries of the District of Kitimat, approximately 10 km southwest of the town centre. The District of Kitimat covers an area of approximately 240 km^2. In 2016, the population of the District of Kitimat was 8,131 persons, down 2.5% from 2011 (Statistics Canada 2017). In 2016, roughly 12% of the population self-identified as Indigenous (Statistics Canada 2017). The District of Kitimat is the second most populated municipality in the RDKS (second to the City of Terrace). In 2016, approximately 16% of the population of the District of Kitimat were between 0 to 14 years of age, 68% between 15 to 64 years of age, and 16% were 65 years of age or older (Statistics Canada 2017). Population counts by age group are presented in Figure 12 The average (mean) age of the population was 41.4 years (median of 43.0 years).



SOURCE: Statistics Canada 2017

FIGURE 12 POPULATION PYRAMID—DISTRICT OF KITIMAT, 2016

In 2016, the housing stock of the District of Kitimat was primarily comprised of single-detached houses (66%; Statistics Canada 2017). Other attached dwellings (i.e., semi-detached houses, town houses, apartments in duplexes and low-rise[12] buildings, and other single-attached houses) accounted for 32% of the housing stock while movable dwellings accounting for 2% (Statistics Canada 2017). The average household size was 2.3 persons (Statistics Canada 2017). Approximately 97% of households occupied housing considered by the CMHC as 'suitable'. The number of owner-occupied housing outnumbered tenant-occupied housing by a ratio of almost 2:1 (Statistics Canada 2017). Roughly 99% of owner households and 83% of tenant households occupied dwellings considered to be 'affordable' by the CMHC. Median monthly shelter costs for owned dwellings ($1,012/month) were higher than tenant occupied dwellings ($900/month) in 2016 (Statistics Canada 2017).

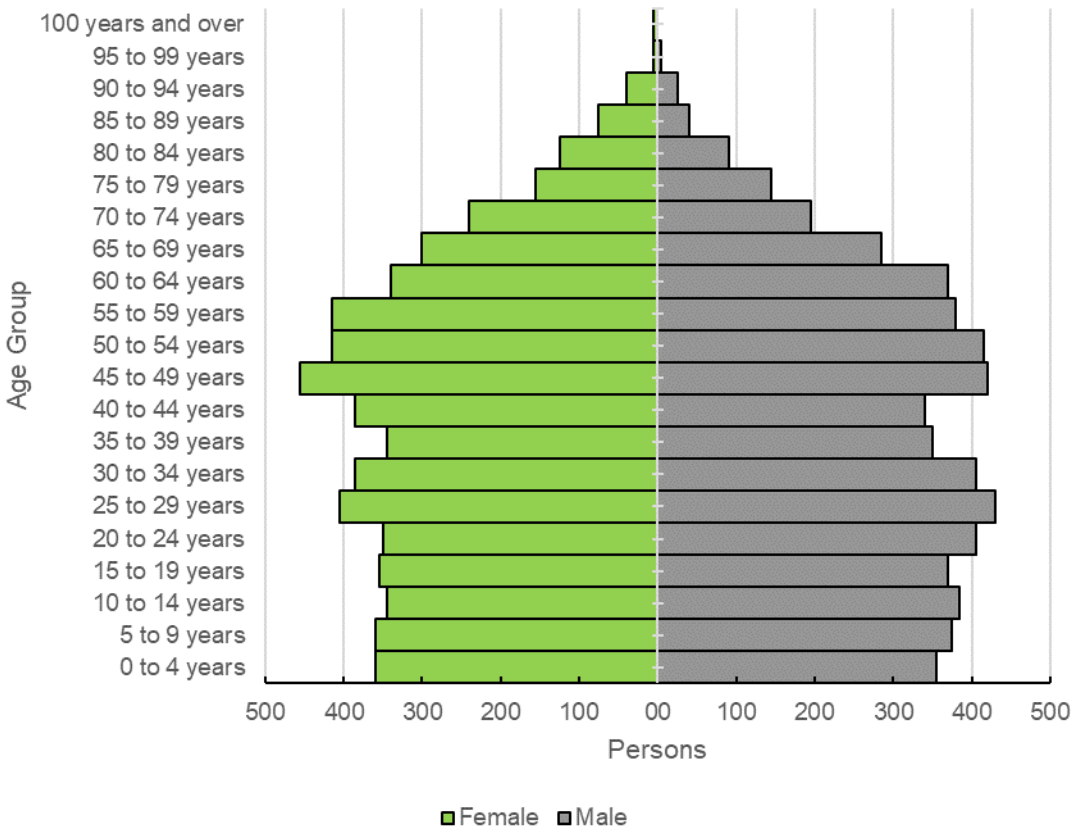
The economic base of the District of Kitimat is primarily basic, employing 54.0% of the labour force (Statistics Canada 2017). Of basic industries, employment is greatest in manufacturing (accounting 19.9% of the employed labour force), followed by construction (16.5%; Statistics Canada 2017). Employment in non-basic industries accounted for 44.0% of the labour force with employment greatest in retail trade (8.7%), followed by accommodation and food services (7.2%; Statistics Canada 2017). Employment in non-classified NAICS industries accounted for 2.0% of the employed labour force (Statistics Canada 2017).

At the time of writing, 2018 financial information was still under public review. For the year ended December 31, 2017, the District of Kitimat posted an annual net surplus of roughly $3.2 million with revenues of $31.9 million and expenses of $28.7 million (District of Kitimat 2018). In 2017, 82% of revenues were generated through taxation and grants in lieu. Of the 10 expense lines reported in the District of Kitimat's 2017 Annual Report, 76% of expenses were attributed to recreation and cultural services (23%), protective services (22%), transportation services (18%), and general government expenses (13%; District of Kitimat 2018).

City of Terrace

The proposed Project is approximately 70 km southwest of the City of Terrace. The City of Terrace covers an area of approximately 57 km^2. In 2016, the population of Terrace was 11,643 persons, up 1.4% from 2011 (Statistics Canada 2017). In 2016, roughly 24% of the population self-identified as Indigenous (Statistics Canada 2017). Terrace is the most populated municipality in the RDKS. In 2016, approximately 19% of the population of Terrace were between 0 to 14 years of age, 66% between 15 to 64 years of age, and 15% were 65 years of age or older (Statistics Canada 2017). Population counts by age group are presented in Figure 13. The average (mean) age of the population was 39.2 years (median of 38.8 years).

[12] Apartment with fewer than five storeys



SOURCE: Statistics Canada 2017

FIGURE 13 POPULATION PYRAMID—CITY OF TERRACE, 2016

In 2016, the housing stock of the City of Terrace was primarily comprised of single-detached houses (62%; Statistics Canada 2017). Other attached dwellings (i.e., semi-detached houses, town houses, apartments in duplexes and low-rise[13] buildings, and other single-attached houses) accounted for 34% of the housing stock while movable dwellings accounting for 4% (Statistics Canada 2017). The average household size was 2.5 persons (Statistics Canada 2017). Approximately 97% of households occupied housing considered by the CMHC as ‘suitable’. The number of owner-occupied housing outnumbered tenant-occupied housing by a ratio of almost 4:1 (Statistics Canada 2017). Roughly 91% of owner households and 83% of tenant households occupied dwellings considered to be ‘affordable’ by the CMHC. Median monthly shelter costs for owned dwellings ($743/month) were lower than tenant occupied dwellings ($1,001/month) in 2016 (Statistics Canada 2017).

[13] Apartment with fewer than five storeys

The economic base of Terrace is primarily non-basic, employing 58.1% of the labour force (Statistics Canada 2017). Of non-basic industries, employment is greatest in retail trade (accounting 14.8% of the employed labour force), followed by accommodation and food services (11.8%; Statistics Canada 2017). Employment in basic industries accounted for 40.4% of the labour force with employment greatest in health care and social assistance (13.4%), followed by accommodation education services (9.7%; Statistics Canada 2017). Employment in non-classified NAICS industries accounted for 1.4% of the employed labour force (Statistics Canada 2017).

For the year ended December 31, 2018, Terrace posted an annual net surplus of $2.6 million with revenues of $27.7 million and expenditures of $25.1 million (City of Terrace and Carlyle Shepherd & Co. 2019). Roughly 72% of 2018 revenue was generated through taxes (56%) and user fees and sales of goods and services (16%). Of 12 expenditure lines included in Terrace's 2018 Audited Consolidated Financial Statements - Statement of Operations, roughly 72% of expenditures were associated with for line items (protective services [23%], leisure services [17%], transportation and transit [16%], and amortization of tangible capital assets [16%]; City of Terrace and Carlyle Shepherd & Co. 2019)

6.3.2 Indigenous Groups Setting

The Cedar LNG Project Area is located within the Haisla Nation's traditional territory. The traditional territories of the following First Nations are intersected by or in proximity to the marine shipping route:

- Haisla Nation
- Gitga'at Nation
- Gitxaala First Nation
- Lax Kw'alaams Band
- Metlakatla First Nation
- Kitselas First Nation
- Kitsumkalum First Nation
- Council of the Haida Nation

Métis are another Indigenous Group that could potentially be affected or have an interest in the Project. A summary of Haisla Nation is provided in Section 7.3. Summaries of the remaining Indigenous Groups are provided in the following sections.

6.3.2.1 GITGA'AT NATION

Gitga'at Nation is based in Hartley Bay (IR 4 and 4A) approximately 50 km southwest of Kitimat and 125 km south of Prince Rupert and has a registered population of 777. There are 15 Gitga'at Nation reserves totaling approximately 641 ha. Hartley Bay is recognized as the home community with approximately 180 residents, and most of the remaining population live in Prince Rupert, Vancouver and on Vancouver Island. Gitga'at Nation's asserted territory encompasses roughly 7,500 km^2 and includes the lower Douglas Channel, Whale Channel, Wright Sound, and Lewis Pass to Caamano Sound on British Columbia's North and Central Coast (Figure 14).

6.3.2.2 GITXAALA NATION

Gitxaala Nation is based in the Village of Kitkatla on Dolphin Island in Kitkatla Channel, located approximately 120 km west of Kitimat and 55 km south of Prince Rupert. The Gitxaala Nation has approximately 2,000 members, of which 25% live on reserve. Gitxaala Nation has 21 reserves covering 1,885 ha; the majority of the area is the Dolphin Island 1 reserve where the Village of Kitkatla is located. The Gitxaala Nation's asserted traditional territory covers just over 3,000 ha encompassing the northern extent of its fishing territory on the Nass River, stretching south to the coastal islands just north of Kitasu Bay (Figure 15). The western edge of its territory extends seaward abutting against the marine territories of the Haida Nation. To the east, the territory extends to the mainland shore of Grenville Channel, where it meets Haisla and Gitga'at territories.

6.3.2.3 LAX KW'ALAAMS BAND

Lax Kw'alaams Band is based in Lax Kw'alaams (formally Port Simpson) near the north end of the Tsimpsean Peninsula. Lax Kw'alaams Band has approximately 3,500 members, of which 20% live on reserve land. There are 78 Lax Kw'alaams reserves throughout the asserted traditional territory, covering approximately 11,900 ha. Its asserted traditional territory encompasses the lands and waters between tributaries of the Skeena River, the height of land east of the Zymoetz River, and the Kitsumkalum River (Figure 11). It includes Nass Bay and Nass River to the west, and Wales and Pearse Islands, the Dundas and Stephens Islands groups as well as lands and waters at the mouth of the Skeena River, stretching south along Grenville Channel to the north.

6.3.2.4 METLAKATLA FIRST NATION

Metlakatla First Nation is based in Metlakatla, on the south half of Tsimpsean 2 reserve near Prince Rupert. The Nation has approximately 900 members, of which 10% live on reserve land in Metlakatla. The Metlakatla has 16 reserves, totaling 3,460 ha. Its asserted traditional territory extends from the coastal islands in eastern Hecate Strait to Lakelse Lake near Terrace (Figure 12). Portland Canal and Observatory Inlet mark the northern extent of the boundary and the headwaters of the Ecstall River mark the southern borders. Its territory includes the lower portions and the mouth of the Skeena River and its tributaries.

6.3.2.5 KITSELAS FIRST NATION

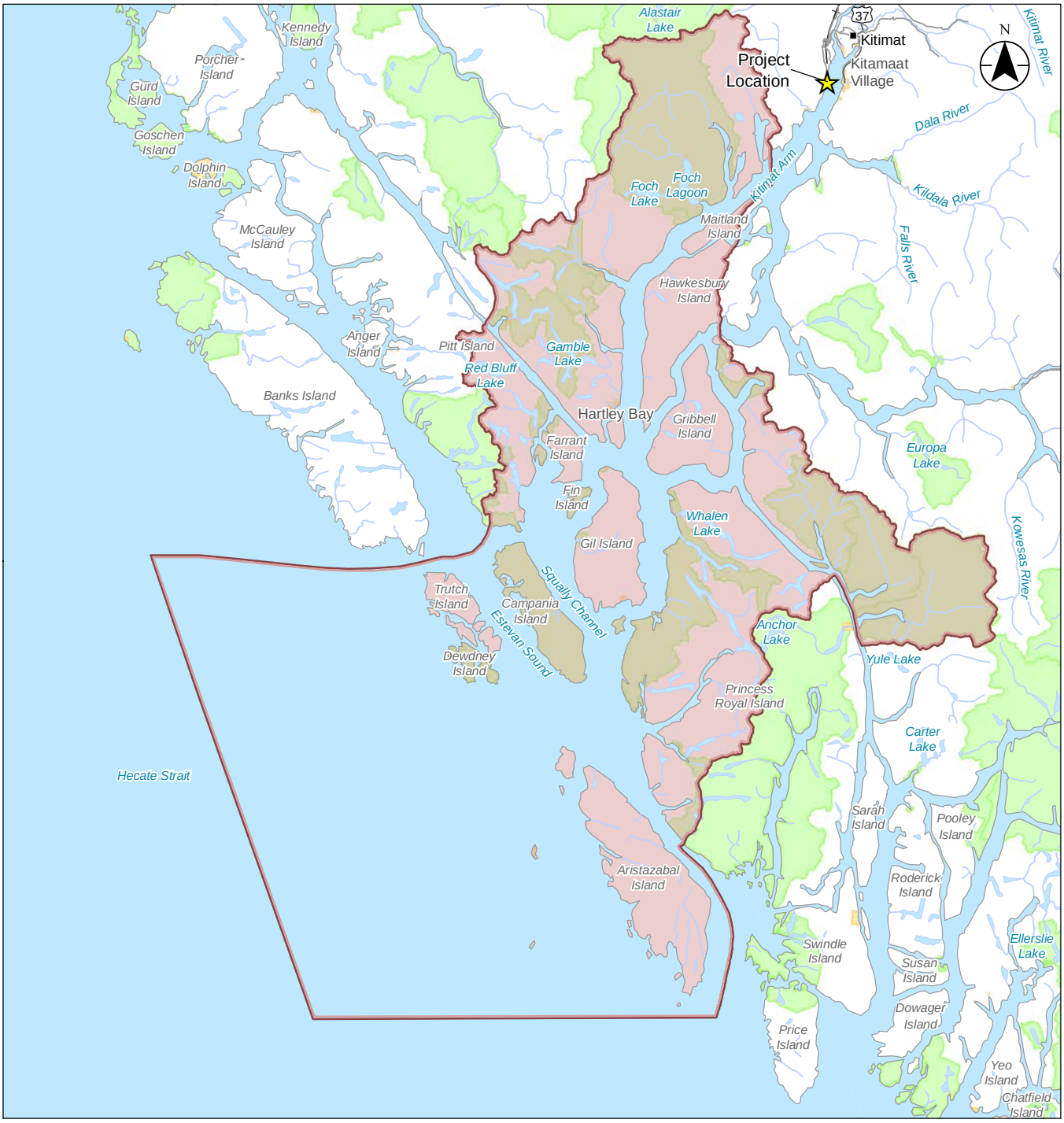
Kitselas First Nation has a registered population of 686 members, of which approximately 45% live on two reserves: Kitselas IR 1 and Kulspai IR 6. These reserves are located along the Skeena River; IR 1 is just outside of Terrace, and IR 6 is in the Kitselas Canyon to the east of Terrace. Kitselas First Nation has 10 reserves covering approximately 1070 ha; one reserve (Port Essington) is jointly administered with Kitsumkalum First Nation. The Kitselas First Nation's asserted territory includes the watersheds of the Skeena and Kitimat rivers from Lorne Creek in the east to the Skeena and Kitimat estuaries (Figure 13). In addition to this, the Kitselas First Nation has previously stated that it has traditional harvesting areas in coastal areas of the Prince Rupert Port area, the lower Skeena River and its estuary, and in the Nass River.

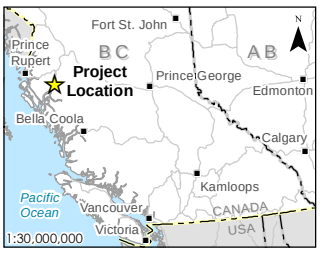
6.3.2.6 KITSUMKALUM

Kitsumkalum is based near Terrace and has a registered population of 769 members. About 35% of its population lives on reserve land, primarily in the main community at Kitsumkaylum IR 1. Kitsumkalum has four reserves totaling approximately 600 ha of land, including a co-managed reserve at Port Essington. Kitsumkalum has identified its traditional territory as the areas surrounding the Kitsumkalum and Zymacord watersheds, as well as the Cedar River watershed (Figure 14). The Kitsumkalum has also asserted the use of areas outside these territories, including Lakelse River, Cheweanlaw, Skeena River, Ecstall River and locations along Grenville Channel, Edy Pass, Stephens Island and Work Channel. Kitsumkalum also asserts shared territory extending to Low Inlet in Grenville Channel and Cape George in the Hecate Strait, stretching north to the Alaska and Nisga'a Nation borders.

6.3.2.7 HAIDA NATION

Haida Nation is based on the islands of Haida Gwaii, an archipelago off the north coast of British Columbia. There are two main Haida Nation communities, Old Massett and Skidegate, both located on Graham Island. Haida Nation has approximately 4,800 members and 40 reserves totalling approximately 1,800 ha of land. The traditional territory of the Haida Nation includes the archipelago of Haida Gwaii as well as its surrounding waters, and parts of southern Alaska (Figure 20).





- Highway
- Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, Protected Area, or Conservancy Area
- Project Location
- Gitga'at Traditional Territory

0 10 20 30 40 50 km

1:1,100,000 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

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CEDAR LNG

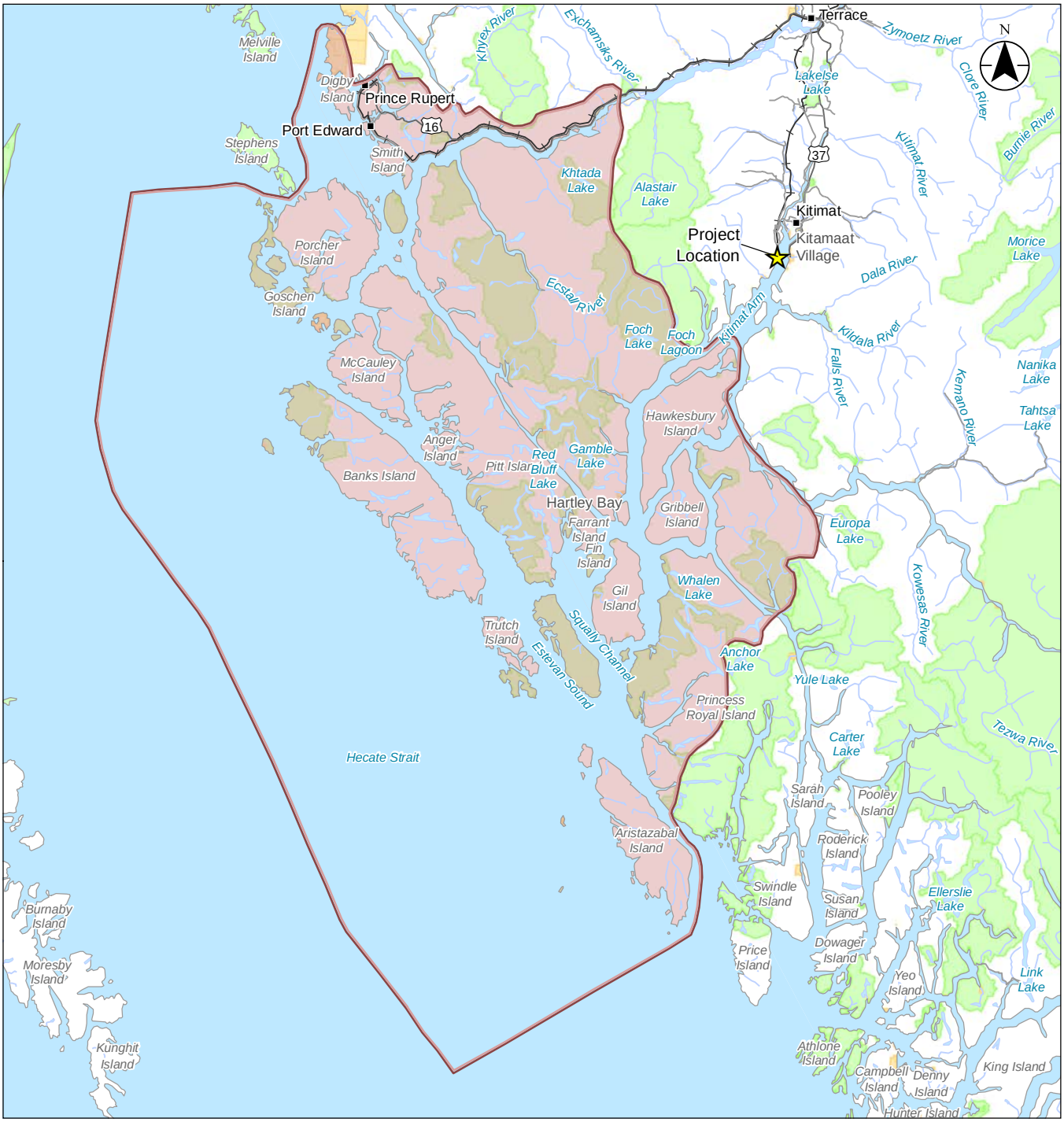
Project Location
Kitimat,
British Columbia

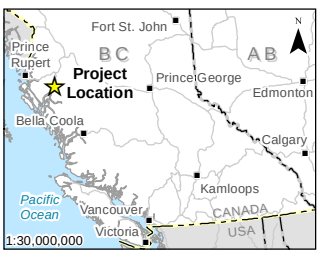
Project Number 123221301
Prepared by TCARDINAL on 20190716
Discipline Review by JMUNDY on 20190816

Client/Project/Report
Cedar LNG Export Development Ltd
Cedar LNG Project
Detailed Project Description

Figure No.
14

Title
Gitga'at Traditional Territory





Highway
Road
Railway
Watercourse
Waterbody
First Nations Reserve
Park, Ecological Reserve, Protected Area, or Conservancy Area

Project Location
Gitxaala Traditional Territory

0 10 20 30 40 50 km
1:1,500,000 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

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Cedar LNG Project
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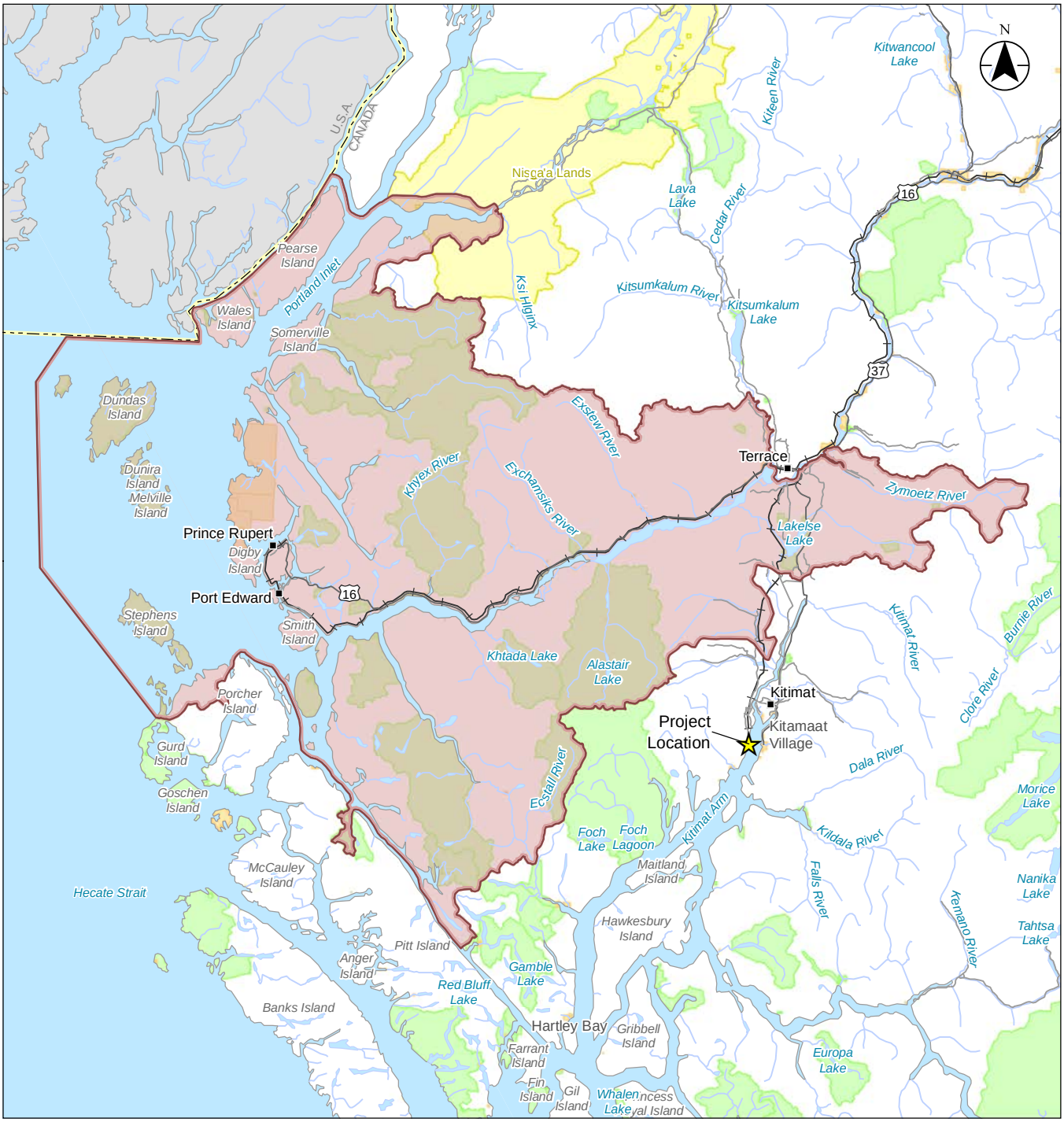
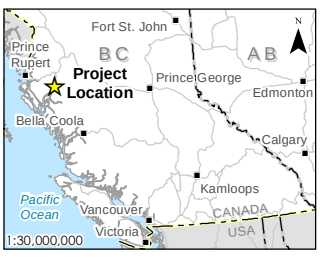
Figure No.
15

Title
Gitxaala Traditional Territory





Highway
Road
Railway
Watercourse
Waterbody
First Nations Reserve
Park, Ecological Reserve, Protected Area, or Conservancy Area
Treaty Lands

Project Location
Lax Kw'alaams Traditional Territory

0 10 20 30 40 50 km
1:1,300,000 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

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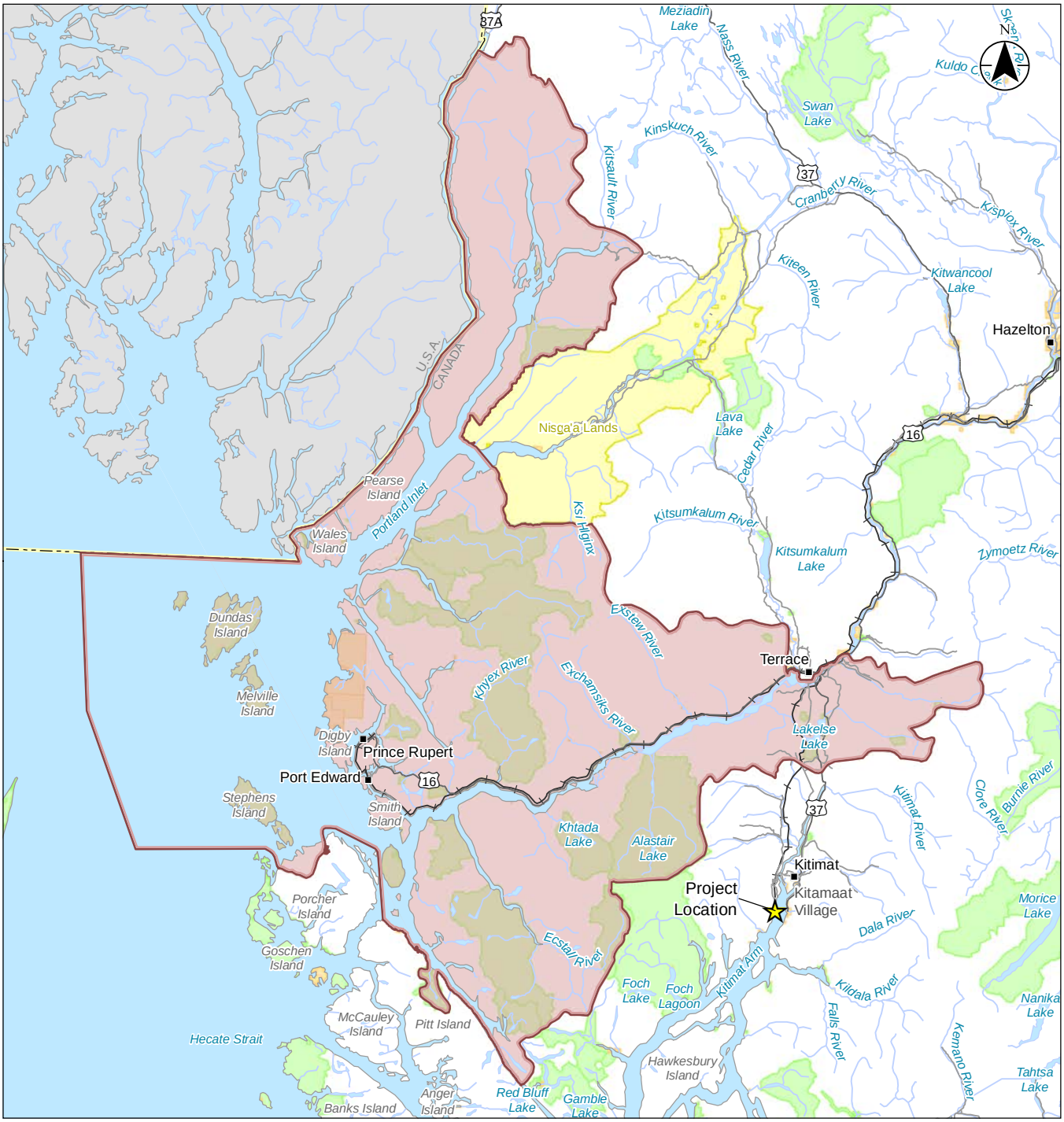
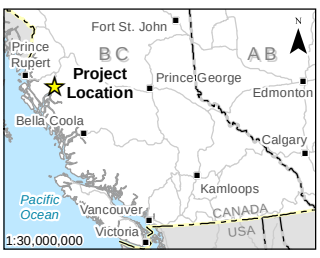
Figure No.
16

Title
Lax Kw'alaams Traditional Territory





Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

- Highway
- Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, Protected Area, or Conservancy Area
- Treaty Lands
- Project Location
- Metlakatla Traditional Territory

0 20 40 60 km

1:1,500,000 (at original document size of 8.5x11)

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Kitimat, British Columbia

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Figure No.
17

Title
Metlakatla Traditional Territory

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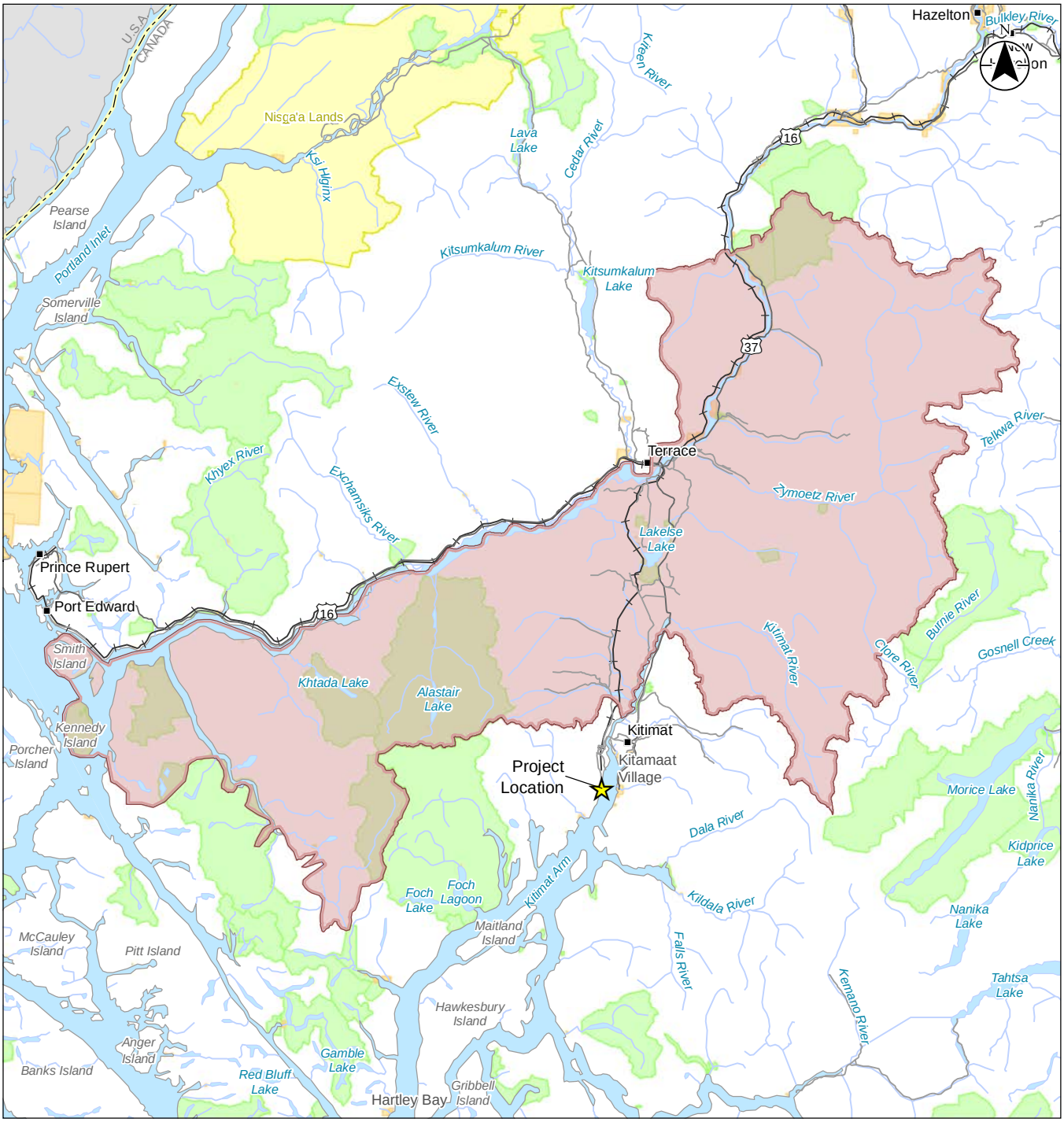

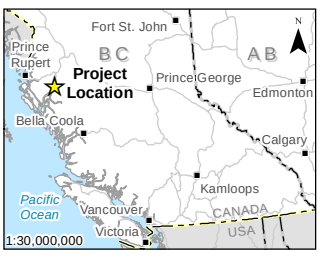

Notes
1. Coordinate System: NAD 1983 BC Environment Albers
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- Highway
- Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, Protected Area, or Conservancy Area
- Treaty Lands
- Project Location
- Kitselas Traditional Territory

0 10 20 30 40 50 km

1:1,100,000 (at original document size of 8.5x11)

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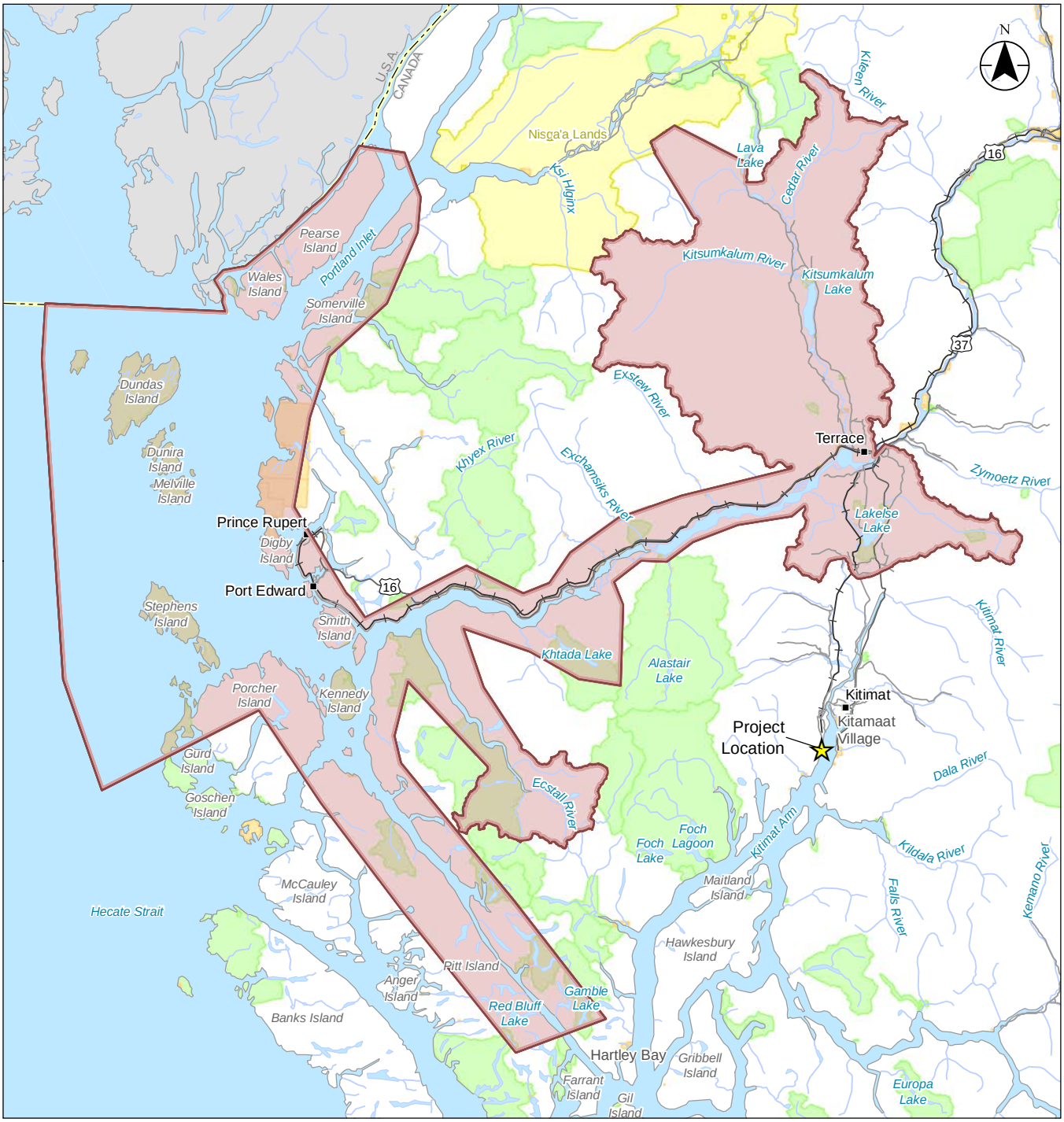
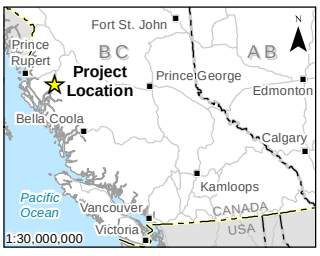
Cedar LNG Project
Detailed Project Description

Figure No.
18

Title
Kitselas Traditional Territory





Highway
Road
Railway
Watercourse
Waterbody
First Nations Reserve
Park, Ecological Reserve, or Protected Area
Treaty Lands

Project Location
Kitsumkalum Traditional Territory

0 10 20 30 40 50 km
1:1,200,000 (at original document size of 8.5x11)

Notes
1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada

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CEDAR LNG

Project Location
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Cedar LNG Project
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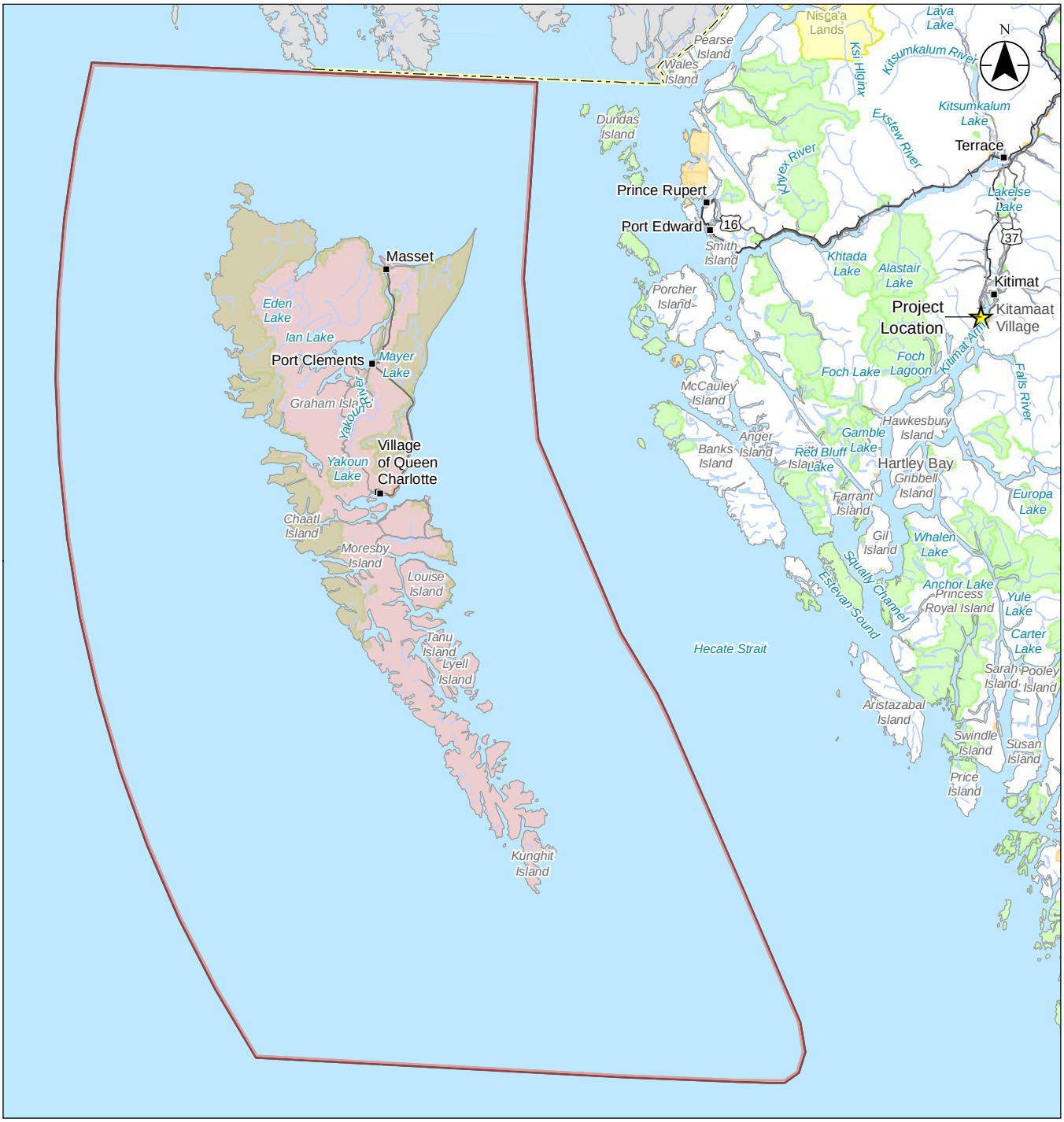
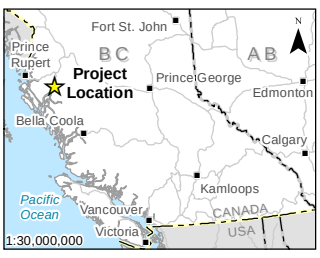
Figure No.
19

Title
Kitsumkalum Traditional Territory





Notes
1. Coordinate System: NAD 1983 BC Environment Albers
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- Highway
- Road
- Railway
- Watercourse
- Waterbody
- First Nations Reserve
- Park, Ecological Reserve, Protected Area, or Conservancy Area
- Treaty Lands
- Project Location
- Haida Nation Traditional Territory

0 20 40 60 80 100 km

1:2,250,000 (at original document size of 8.5x11)

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CEDAR LNG

Project Location
Kitimat, British Columbia

Project Number 123221301
Prepared by TCARDINAL on 20190716
Discipline Review by JMUNDY on 20190816

Client/Project/Report
Cedar LNG Export Development Ltd
Cedar LNG Project
Detailed Project Description

Figure No.
20

Title
Haida Nation Traditional Territory

6.3.2.8 MÉTIS

Métis in British Columbia are represented by Métis Nation British Columbia which represents thirty-eight Métis Chartered Communities. Three of these communities are within the northwest region including the Northwest BC Métis Association based in Terrace. Métis Nation British Columbia is recognized as the official governing organization for Métis in British Columbia, and its aim is to support and develop opportunities for its communities.

6.3.3 Archaeological and Heritage Setting

Archaeological and heritage sites recorded in the vicinity of the Project encompass a range of sites defined under the *Heritage Conservation Act* (HCA) as having "heritage value to British Columbia, a community or an Aboriginal people". The HCA automatically extends legal protection to archaeological sites with evidence of human habitation or use before AD 1846, burial places with historical or archaeological value, Aboriginal rock art, and heritage ship and aircraft wrecks. This protection applies to sites on provincial Crown and private land. Sites that are not protected under the HCA, such as historic places posting 1846 AD, may still have heritage value to communities or Indigenous groups.

BCEAA and IAA require assessment of physical cultural heritage, such as historic heritage sites and paleontological sites. The IAA defines heritage as "physical and cultural heritage" and "any structure, site or thing that is of historical, archaeological, paleontological, or architectural significance".

According to the Provincial Heritage Register, there are numerous archaeological sites recorded along Kitimat Arm in the general vicinity of the Project. Most of these sites are culturally modified tree sites, with lithic scatters, shell middens, and human burials also represented in the archaeological record of the area. While there are no archaeological or heritage sites recorded in Provincial Heritage Register within the Cedar LNG Project Area, the entire footprint has not been subject to archaeological impact assessment. Any outstanding areas will be subject to an archaeological impact assessment as part of the regulatory process.

6.3.4 Human Health Setting

The health status of people in the Kitimat area is typical of suburban regions in British Columbia. The overall health status in the Kitimat area is lower than the average for British Columbians, which is influenced by lower levels of access to health care services typically experienced in suburban regions of the province (e.g., shortage of doctors and related professions).

The air quality in the Kitimat region is characterized as very good, with industrial facilities located away from major population centers. The Kitimat River serves as the potable water source for the District of Kitimat. There is limited development upstream from the water intake, and the water is generally considered to be very good quality and low in chemical contaminants. However, the water system is characterized as high-risk due to the regular presence of waterborne pathogens. Raw water is disinfected with chlorine prior to being pumped into the water distribution system.

The seafood harvested from Kitimat Arm is an important local food source for residents and the local Haisla Nation, particularly for people living on reserve in Kitamaat Village, located on the eastern shoreline. Salmon, Dungeness crab, halibut and eulachon (oolichan) are all important traditional marine country foods that help to maintain food security among those who live off the land.

7.0 Potential Environmental, Economic, Social Heritage and Health Effects

The following subsections provide a preliminary overview of Project activities that have the potential to result in environmental, social, economic, heritage and health effects. No feasibility studies have been conducted pertaining to the potential effects of the Project; however, the environmental assessments for the Kitimat LNG and LNG Canada projects provide an indication of the types of effects that may result from development of an LNG facility in Kitimat Arm. Potential cumulative effects and measures to mitigate and manage residual and cumulative effects are also described.

The Project is located more than 140 km from the United States border and, based on past environmental assessments in the Kitimat area, trans-boundary effects on lands outside of British Columbia or Canada are not predicted to occur. The two areas with greatest potential for trans-boundary effects are employment and economy and GHGs. It is possible that the project will utilize international workers for positions requiring LNG experience (particularly during the start-up phase), although the priority will be to first source workers from elsewhere in British Columbia, then Canada. GHGs are considered in the context of provincial, national and international emission inventories.

7.1 Potential Environmental Effects

Construction, operation and decommissioning of the Project have potential to result in environmental effects through land clearing for temporary workspace and installation of permanent infrastructure, emissions from construction activities and operation of the LNG facility, and shipping activities. Table 9 provides a summary of anticipated potential effects of the Project on the environment based on the types of activities required for construction, operation and decommissioning of the Project and the current environmental setting of the area.

Although the Project is not located on federal lands, it is possible that some of the environmental effects identified in Table 9 may extend to federal lands. For example, air emissions may disperse to nearby federal lands; see Table 7 for a summary of federal lands in proximity to the proposed Project. The EAC application will evaluate potential for environmental effects to occur on federal lands and characterize such effects.

Best practices and mitigation measures to avoid and reduce potential effects of the Project will be incorporated and considered in Project design. Examples include:

- Cedar has selected the floating nearshore LNG production unit for the Project. Locating the majority of Project infrastructure on this vessel will reduce the Project footprint and associated clearing.
- Cedar has selected air cooling as the cooling technology for the Project rather than seawater cooling. This avoids the potential for entrainment or impingement of marine fish and larvae, as well as the discharge of warm water into Douglas Channel.

- Cedar is making the Project “electric ready” in preparation for the outcome of discussions with BC Hydro regarding feasibility of full electrification of the Project.
- The third-party pipeline providing feed gas to the LNG facility will be co-located in a shared corridor with other pipelines, following routing established through a MOTI-led corridor study.

As the Project progresses through the environmental assessment process, additional or revised mitigation measures will be incorporated into the Project design. Mitigation measures will be developed in accordance with applicable provincial and federal regulations and permit requirements, best management practices, and specific measures identified through the environmental assessment process.

Prior to construction, a Construction Environmental Management Plan will be developed that will specify the mitigations and controls to be implemented through construction as well as describe environmental monitoring requirements. Additional management plans may also be developed (e.g., emergency response plan, access management plan, marine fish management plan) as determined to be required through the environmental assessment. Cedar will retain environmental monitor(s) to verify compliance with the management plans as well as the effectiveness of the mitigation measures.

The Project has the potential to contribute cumulatively to potential effects on the environment associated with past, present and reasonably foreseeable future projects and activities in the region. These may include forestry, power, and oil and gas projects and activities. Additional information on previous environmental studies completed in Kitimat are found in Section 6.1.

TABLE 12 POTENTIAL ENVIRONMENTAL EFFECTS OF THE PROJECT

Component of the Biophysical Environment	Potential Project Effects	Project Activities and Anticipated Pathway of Effects
Air Quality	• Increase in ambient concentrations of criteria air contaminants, including SO_2, NO_X, carbon monoxide and particulate matter (PM_{10} and $PM_{2.5}$)	Construction: land clearing, power generation, fuel combustion and vehicle traffic Operation: power generation (if required), fuel combustion, flaring, incineration, fugitive emissions, marine support vessels and vehicle traffic. Operational emissions will be lower in the preferred (electrified) option and higher in the alternative (power generation) option. Decommissioning: fuel combustion, demolition, backfilling and removal of infrastructure
Noise	• Increased noise levels causing nuisance, annoyance and sleep disturbance to people, as well as displacement and sensory disturbance to wildlife.	Construction: operation of equipment and vehicles during earthworks and construction, installation of piles (if required), blasting (if required) Operation: operation of the LNG facility, flaring, loading of carriers Decommissioning: operation of equipment
Greenhouse Gas	• Increase the emission of GHGs including CO_2, methane, nitrous oxide expressed as CO_2e	Construction: land clearing, site preparation, fuel combustion and vehicle traffic Operation: stationary combustion of fossil fuel, flaring, venting and fugitive emissions, power generation (if required) and shipping of products. Operational emissions will be lower in the preferred (electrified) option and higher in the alternative (power generation) option. Decommissioning: dismantling of infrastructure and reclamation activities
Freshwater Fish	• Fish mortality • Harmful alteration, disruption of destruction of fish habitat.	Construction of watercourse crossings could disturb stream beds and banks, alter riparian vegetation and release deleterious substances (e.g., sediment, hydrocarbons). Decommissioning will have similar impacts as those during construction. Extraction of water from streams (if selected as the water source) will reduce flows in the affected watercourses and potentially reduce the availability of downstream fish habitat. Extraction of groundwater may affect stream flows in nearby watercourses and potentially reduce the availability of downstream fish habitat.

TABLE 12 POTENTIAL ENVIRONMENTAL EFFECTS OF THE PROJECT

Component of the Biophysical Environment	Potential Project Effects	Project Activities and Anticipated Pathway of Effects
Marine Resources	• Fish mortality • Harmful alteration, disruption of destruction of fish habitat. • Behavioural change caused by sensory disturbances.	Construction and operation of the nearshore LNG production unit, mooring dolphins and bollards, marine jetty or jetties, marine offloading facility, and workboat moorage in the marine environment has potential to alter habitat quality for marine vegetation, displace or alter marine fish habitat types within the Project footprint, shade marine plants, and cause sensory disturbances that could kill, displace or alter habitat use by marine fish and mammals. Marine shipping has potential to affect marine mammals and fish through underwater noise; however, the Northern Gateway and LNG Canada environmental assessments found the project-specific and cumulative effects on marine mammals from shipping were not significant. Decommissioning will have similar impacts as those during construction.
Vegetation and Wetlands	• Change in the abundance of plant species of interest • Change in the abundance of ecological communities of interest • Change in wetland functions	Construction of terrestrial Project components will result in the direct loss or alteration of vegetation, which may potentially include plant species at risk, traditionally used plant species, and native plant communities including provincially listed ecological communities, old forest, and wetland communities. Invasive plant species may be introduced or spread as a result of Project activities that disturb the ground.
Wildlife	• Change in the availability and/or suitability of wildlife habitat, increased mortality risk, and changes to movement patterns	Project activities have potential to affect migratory and non-migratory birds and terrestrial wildlife. Construction of Project components will remove habitat and alter habitat suitability for some wildlife species. Mortality risk for wildlife may increase during construction due to increased human presence, use of heavy equipment, vegetation clearing, and collision with vehicles or infrastructure. Movement of wildlife may change during construction in response to perceived barriers or increased sensory disturbance. Construction and operation of the nearshore LNG production unit and jetty/jetties are likely to alter shoreline and nearshore habitat and may change habitat availability and suitability for marine birds. Mortality risk and movement patterns of marine birds may also change due to use of artificial lighting and increased vessel traffic. Decommissioning activities are expected to result in similar effects pathways to wildlife.

7.2 Potential Social and Economic Effects

Construction, operation and decommissioning of the project have potential to result in social and economic effects through the changes in land and marine use and the creation of employment opportunities and local population increase from construction and operation of the Project. Table 10 provides a summary of anticipated potential social and economic effects of the Project based on an understanding of the types of activities and workforce required for construction, operation and decommissioning of the Project, and the current human environment setting of the area.

TABLE 13 POTENTIAL SOCIAL AND ECONOMIC EFFECTS OF THE PROJECT

Social and Economic Pillar	Potential Project Effects	Project Activities and Anticipated Pathway of Effects
Land and Resource Use	• Change in private property and tenured land use • Change in non-tenured land use	Project use of lands may be incompatible with overlapping occurrences and uses of private property and Crown land (tenured and non-tenured use). The presence of construction and operational workforces and mobile equipment (including associated noise and emissions) may result in short-term changes in the quality of experience of engaging in existing land uses near the Project.
Marine Use	• Change in marine navigation • Change in marine fisheries and other uses	Construction of the new marine terminal and related infrastructure will result in new permanent marine structures. These structures and the associated control zones could result in changes in navigation in the vicinity of these marine works. Additional large shipping traffic (LNG carrier traffic) in or along the shipping route could also affect navigation. Shipping traffic could reduce the quality of experience of fishing and marine recreation. Project workers employed during the construction phase may also engage in recreational fishing in the vicinity of other fishers. Construction and operation of marine infrastructure, including the safety zones, will also preclude fishing, recreation, and tourism within the immediate vicinity.
Socio-Community	• Change in community infrastructure and services • Change in accommodation availability • Change in transportation infrastructure • Change in community health and wellness	Construction, operation, closure and remediation of the Project could increase demand for accommodations, community infrastructure and services, and demand on transportation infrastructure. The Project may adversely affect the social and cultural wellbeing of local residents as a result of the presence of a temporary workforce, which could disrupt community life. Workers who secure employment with the Project may benefit from increased disposable income and skillsets.
Employment and Economy	• Change in regional labour force • Change in regional business • Change in provincial economy	Project expenditures and employment during construction, operation, and closure and reclamation of the Project could result in changes to the regional labour force and business activity as well as the provincial economy.

Mitigation measures may be recommended to enhance benefits and reduce or mitigate adverse effects of the Project. These mitigation measures may include:

- Development and implementation of a project benefits plan, social management plan, traffic and access management plan, emergency response plan, and marine activities plan
- Development and use of a community, public, and stakeholder engagement plan with particular consideration given to marine users, including recreationalists, commercial tourism operators, fishers, Transport Canada, DFO, and relevant stakeholders.
- Provision of an appropriately scaled onsite medical clinic
- Implementation of an alcohol and drug policy
- Installation of appropriate marine navigation aids

Management plans will be developed as determined to be required through the environmental assessment. Cedar with retain environmental monitor(s) or other qualified professionals to verify compliance with the management plans as well as the effectiveness of the mitigation measures.

The Project will contribute cumulatively to potential effects on social and economic conditions through expenditures and changes in land and marine use and demand for labour, accommodations, community infrastructure and services, and transportation infrastructure. These changes in addition to the presence of the Project's temporary workforce could contribute to cumulative effects on community health and wellbeing.

7.3 Potential Heritage Effects

The provincial HCA automatically extends legal protection to archaeological sites with evidence of human habitation or use before AD 1846, burial places with historical or archaeological value, Aboriginal rock art, and heritage ship and aircraft wrecks. This protection applies to sites on Provincial Crown and private land. Sites that are not protected under the *Act* may still have heritage value. BCEAA and IAA require assessment of any change to the environment on physical and cultural heritage and any structure, site or thing that is of historical or archaeological significance.

Project activities have the potential to result in direct and indirect effects on archaeological and heritage sites during ground-disturbing activities including vegetation and tree clearing, as summarized in Table 11. An archaeological impact assessment will be conducted for portions of the project footprint that have not been previously assessed to identify any unrecorded sites that may be present is, assess their significance, evaluate potential project-related impacts, and provide management recommendations, as necessary.

TABLE 14 POTENTIAL HERITAGE EFFECTS OF THE PROJECT

Heritage Pillar	Potential Project Effects	Project Activities and Anticipated Pathway of Effects
Cultural and Heritage Resources	Loss of information about or alteration to site contents or context	Construction will involve tree clearing and ground disturbing activities that could adversely affect archaeological and heritage resources

Site avoidance is typically the preferred mitigation measure; however, if avoidance is not feasible other mitigation options (e.g., systematic data recovery) will be considered. Recommended mitigation measures will be reviewed with the appropriate regulatory authorities and discussed with Haisla Nation. Alterations to any archeological sites protected by the HCA would at a minimum require prior issuance of a Section 12 alteration permit issued from the Archaeology Branch of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

Management plans will be developed as determined to be required through the environmental assessment. Cedar with retain environmental monitor(s) or other qualified professionals to verify compliance with the management plans as well as the effectiveness of the mitigation measures.

The HCA requires that all projects, including the proposed Project, mitigate for destruction or disturbance of legally protected culturally modified trees and archaeological sites. As such, there is limited potential for the Project to interact cumulatively with archaeological and heritage resources.

7.4 Potential Human Health Effects

Human health in the context of an environmental assessment is defined as the health effect from exposure to chemicals in the environment; socio-community considerations such as community health and wellbeing are addressed in the Social pillar under BCEAA.

Human health is influenced by people's interaction with the environment. The quality of air that people breathe and the quality of food and water that people consume influence their overall health status. If there are reductions in the quality of air, soil, water, or food attributed to the Project, the resulting change in human health relative to existing conditions will be characterized. Factors that contribute to human health include changes to the availability and consumption patterns for traditionally harvested foods from the land, including wild plants, wild game, fish, and other seafoods.

The potential health risk pathway associated with the Project will be characterized. A human health risk assessment will be conducted to quantify the risk to human health and characterize the incremental change in health risk that the Project may have on local people and temporary land users (e.g., recreational land users).

TABLE 15 POTENTIAL HEALTH EFFECTS OF THE PROJECT

Valued Component	Potential Project Effects	Project Activities and Anticipated Pathway of Effects
Human Health	Change to human health	Construction, operation, and decommissioning activities may release chemicals of concern into the environment. People who are exposed to chemicals of concern through air inhalation, food and water ingestion, and dermal contact may experience a change in their health risk.

Mitigation measures may be recommended to reduce or mitigate the release of chemicals of concern to the environment, which will indirectly reduce the effect on human health. These mitigation measures may include:

- Managing emissions and discharges to the air, soil and water
- Managing access disruptions to areas used for the harvest of traditional country foods or traditional medicines.

Management plans will be developed as determined to be required through the environmental assessment. Cedar with retain environmental monitor(s) or other qualified professionals to verify compliance with the management plans as well as the effectiveness of the mitigation measures.

The Project will contribute cumulatively to potential effects on health conditions, through emissions to the local airshed. This contribution will be smaller for the preferred option (full electrification) and larger for the alternative option (power generation). Cumulative effects to the local airshed and associated health concerns have been previously characterized through the Kitimat Airshed Study, which considered the existing Rio Tinto aluminum smelter as well as four potential LNG terminals, a proposed oil refinery, gas turbine powered electrical generation facilities; and through the LNG Canada environmental effects assessment which considered cumulative effects from the existing Rio Tinto aluminum smelter as well as three proposed LNG terminals, an oil export terminal, and a proposed oil refinery.

7.5 Potential Impacts of Project-Related Changes on Indigenous Peoples

Potential impact on Indigenous peoples as a result of Project-related changes to the environment include effects on:

- Physical and cultural heritage, through Project tree clearing and ground disturbing activities that could adversely affect archaeological and heritage resources.
- Current use of lands and resources for traditional purposes, including the use of land and water for cultural activities, through effects on preferred harvested species, or changes in access to or use of preferred sites.

- Structure, site or thing that is of historical, archaeological, paleontological or architectural significance, through Project related clearing and ground disturbance activities

Potential changes to the health, social or economic conditions of Indigenous peoples as a result of carrying out of the Project include changes to:

- Human health, from exposure to chemicals of concern that the Project may release into the environment.
- Social and economic conditions, through potential interference with marine fisheries and shoreline harvesting, interference with marine recreation and tourism, or change in diet and nutrition.

Haisla Nation, as the owner of Cedar, aims to provide benefits to health and socio-economic conditions of Indigenous peoples through pursuit of this economic opportunity, and to appropriately manage potential impacts to physical and cultural heritage and current use of lands and resources for traditional purposes. Cedar will engage with Haisla Nation's technical department (consisting of Lands, Environment and Fisheries) and other potentially affected Indigenous groups throughout the assessment process to understand potential for impacts and develop suitable mitigation and management approaches.

The results of the assessment of environmental, economic, social, heritage and health effects of the Project (per the potential effects described in Sections 7.1 through 7.4) in combination with input received from Indigenous groups via consultation activities will be used to inform the assessment of potential effects of the Project on Indigenous interests (i.e., asserted or determined Aboriginal rights, including title and treaty rights), including potential effects identified in the Summary of Issues prepared by IAAC based on feedback provided by Indigenous groups during their review of the Initial Project Description. The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22 factors, including Project-related effects to Indigenous groups, have been taken into account in the Project's impact assessment.

As the Project progresses through the environmental assessment process, Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities.

7.6 Potential Effects in Relation to *Impact Assessment Act* Requirements

As required by the Information and Management of Time Limits Regulations, the following sub-sections describe the potential for changes caused as a result of carrying out the Project to fish and fish habitat and marine plants as defined in the *Fisheries Act*, and migratory birds, as well as the potential for environmental changes on federal lands, in a province other than the province in which the Project is proposed to be carried out, or outside of Canada. Potential effects of environmental changes on Indigenous peoples are discussed in Section 7.5.

Fish and Fish Habitat—The Project has the potential to cause adverse effects to fish and fish habitat, as defined in the *Fisheries Act*, including:

- Harmful alteration, disruption of destruction of fish habitat due to the Project infrastructure and changes in water quality and quantity
- Changes to fish food and nutrient content
- Fish mortality
- Changes in behaviour of fish

Aquatic species—Potential Project-related effects to aquatic species, as defined in the *Species at Risk Act*, include:

- Changes in habitat quality
- Loss of habitat from shading of marine vegetation and construction and decommissioning of infrastructure
- Mortality associated with Project construction

Migratory Birds—Potential Project-related effects to migratory birds, as defined in the *Migratory Birds Convention Act*, include:

- Direct loss of habitat and potential habitat due to Project footprint
- Indirect loss of habitat and potential habitat due to sensory disturbance
- Behavioural response due to sensory disturbance
- Mortality (direct and indirect)

8.0 Engagement and Consultation with Indigenous Groups

“Aboriginal Interests” are defined by the EAO as potential or established Aboriginal rights, including title, and treaty rights. Cedar understands that identifying and recommending measures to address potential adverse effects to Aboriginal Interests from the Project, or from its cumulative interaction with other past, present or reasonably foreseeable projects, will be an important element of the environmental assessment and the fulfillment of the Crown’s common law duty to consult and accommodate.

Subject to any different direction from regulators, Cedar anticipates that the following Indigenous groups will be engaged in consultations related to the Project:

- Haisla Nation
- Gitxaala Nation
- Gitga’at Nation
- Lax Kw’alaams Band

- Metlakatla First Nation
- Kitselas First Nation
- Kitsumkalum First Nation
- Council of the Haida Nation
- Metis Nation of BC

The Haisla Nation Chief Councillor, on behalf of Cedar LNG, has had preliminary meetings with the above groups, with the exception of the Council of the Haida Nation and the Métis Nation of BC, in August 2019 and October 2019 to begin the consultation process for the Project's assessment process. Initial feedback has been positive, and Cedar is committed to ongoing dialogue as the Project progresses.

The main elements for active engagement and consultation with Indigenous groups will include:

- Regularly scheduled project updates, conference calls and meetings with First Nation administrative staff, consultants, elders and other members of Indigenous groups (through the Working Group and otherwise)
- Conducting community meetings, open houses and workshops where requested
- Facilitating opportunities to participate in collecting baseline information, as well as review and input into the information

Working-level Project effects consultation undertaken by Cedar will be complemented by higher level engagements between Haisla Nation and other Indigenous groups. Haisla Nation has previous experience and established relationships engaging some of these groups on other major projects being undertaken within the Haisla territory by companies that have entered into agreements with the Haisla Nation.

Engagement with Indigenous groups will include consideration of "current use of lands and resources for traditional purposes", as required by the *Act*. If the Project is subject to substitution under the IAA, engagement with Indigenous groups will include consideration of potential Project effects to:

- Physical and cultural heritage
- Any structure, site or thing that is of historical, archeological, paleontological or architectural significance
- Any change occurring in Canada to the health, social or economic conditions of the Indigenous peoples of Canada,

Cedar is committed to providing local benefits associated with its Project and working proactively with interested First Nations and the local community to identity and provide training, employment and contracting opportunities during the phases of the Project.

Based on a review of the effects determinations from other projects with similar types of Project activities, potential impacts on established or asserted Aboriginal rights, title, and other interests as a result of the Project are expected to focus on shipping activities and may include:

- Impacts to harvesting activities as a result of potential impacts of Project shipping on marine birds and marine resources

- Impacts to culturally important sites, trails and travelways as a result of Project shipping

Cedar intends to engage with the above Indigenous groups regarding established or asserted Aboriginal rights, title and other interests (including current use for traditional purposes) that may be affected by the Project.

9.0 Engagement and Consultation with Governments, the Public and Other Parties

The Haisla Nation has had preliminary discussions with government representatives regarding the Project since 2012. This includes recent meetings with the Deputy Minister of Energy, Mines and Petroleum Resources, the EAO and former Canadian Environmental Assessment Agency to provide an informal early introduction to the Project. Cedar has been conducting pre-Application activities associated with the federal and provincial assessment processes since submission of the Project Description and Initial Project Description in August 2019. In meetings with the EAO and IAAC, the opportunities for substitution were also discussed with a key focus on timelines for upcoming regulatory changes and milestones associated with provincial and federal environmental assessment processes.

IAAC conducted a comment period on the Initial Project Description and substitution request for the Cedar LNG Project from September 19 to October 20, 2019. Based on feedback received from Indigenous groups, federal authorities and the public during this comment period, the IAAC prepared a Summary of Issues relevant to the Project. Cedar's proposed approach to addressing each of these issues is provided in Appendix D.

Key issues raised in IAAC's Summary of Issues include:

- Potential effects of accidents or malfunctions, including effects to health and safety
- Potential effects of the Project on the acoustic environment, atmospheric environment, climate change and greenhouse gas emissions
- Potential effects of the Project on quality and quantity of country foods
- Consideration of cumulative effects
- Potential effects of the Project on economic conditions, human health and wellbeing, social conditions, and vulnerable population groups
- Potential effects of the Project on fish and fish habitat marine mammals, migratory birds, species at risk, terrestrial wildlife and wetlands
- Potential effects of the Project on Indigenous peoples' social and economic conditions, use of lands and resources, and rights
- Considerations around marine shipping

Cedar anticipates conducting a substituted environmental assessment, pending IAAC's decision on the need for an impact assessment and on Cedar and EAO's request to grant substitution to the provincial process. If substitution is granted, Cedar anticipates completing the following steps in scoping the impact assessment:

- Cedar will prepare a draft Valued Components (VC) selection document outlining the VCs to include in the assessment of potential positive and negative impacts of the Project. This will be developed in consideration of the issues identified through IAAC's Summary of Issues and provided to the Working Group and Indigenous groups for review and comment. It will be revised as requested by the EAO to incorporate feedback received during consultation.
- Cedar will prepare a draft Application Information Requirements (dAIR) document outlining the scope of assessment of potential positive and negative impacts of the Project. The dAIR will be provided to the working group, Indigenous groups, and the public for review and comment. The EAO will finalize the Application Information Requirements (AIR) based on feedback received during consultation on the dAIR, to establish the required scope of the assessment.

Cedar will then prepare an environmental assessment certificate (EAC) application that meets the requirements of the approved AIR. Under a substituted assessment, the EAO will review the EAC application and prepare an Assessment Report that will be used by the provincial and federal Ministers to support their respective decisions.

Cedar has prepared the responses in Appendix D based on our proposed approach to the assessment, which will be confirmed through development and finalization of the VC selection document and AIR. The issues raised will be considered in developing these documents, and when finalized will establish and confirm the required scope of the Projects' impact assessment.

Cedar has initiated commercial discussions with Rio Tinto and Coastal GasLink regarding easement agreements for the pipeline and transmission line, and natural gas supply. The Cedar LNG Project Area is owned in fee simple by an affiliate of Haisla Nation except for some submerged Crown land for which a lease will be obtained.

10.0 References

Banner, A., MacKenzie, W., Haeussler, S., Thomson, S., Pojar, J., & Trowbridge, R. 1993. A field guide to site identification and interpretation for the Prince Rupert Forest Region. Ministry of Forests, Research Program. Available at: https://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh26.htm

BC Conservation Data Centre (BC CDC) 2019. BC Species and Ecosystems Explorer. BC Ministry of Environment, Victoria, BC. Available at: http://a100.gov.bc.ca/pub/eswp/. Accessed: July 12, 2019.

BC Ministry of Energy and Mines and Petroleum Resources (BC MEMPR) n.d. British Columbia's Natural Gas Strategy – Fueling B.C.'s Economy for the Next Decade and Beyond. Available at: http://lnginnorthernbc.ca/images/uploads/documents/BC-natural_gas_strategy-Feb2012.pdf. Accessed July 15, 2019

BC Ministry of Environment and Climate Change Strategy, 2014. News release: Study shows Kitimat airshet can handle new industrial development. Available at: https://news.gov.bc.ca/releases/2014ENV0050-001007. Accessed July 15, 2019.

City of Terrace and Carlyle Shepherd & Co. 2019. 2018 Annual Report – City of Terrace Consolidated Financial Statements – December 31, 2018 [Carlyle Shepherd & Co. Independent Auditors Report]. Available from: https://www.terrace.ca/sites/default/files/docs/2018_annual_report_final_version_w_financial_statement.pdf. Accessed: July 14, 2019.

Canadian Mortgage and Housing Corporation [CMHC]. 2018. About Affordable Housing in Canada. What is Affordable Housing? Available at: https://www.cmhc-schl.gc.ca/en/developing-and-renovating/develop-new-affordable-housing/programs-and-information/about-affordable-housing-in-canada. Accessed: December 2019.

Crown-Indigenous Relations and Northern Affairs Canada [CIRNAC] 2019. Community Well-being Index. CSV File – 2016 (in English). Available from: https://open.canada.ca/data/en/dataset/56578f58-a775-44ea-9cc5-9bf7c78410e6. Accessed: December 2019.

DFO. 2017. Oceans. Areas of Interest, MPAs, Other Measures, Integrated Oceans Management. Pacific North Coast Integrated Management Areas (PNCIMA). Available from: https://www.dfo-mpo.gc.ca/oceans/management-gestion/pncima-zgicnp-eng.html. Accessed: July 14, 2019.

District of Kitimat. 2018. 2017 Annual Report. Available from: https://www.kitimat.ca/en/municipal-hall/resources/Documents/2017-Annual-Report-FINAL-VERSION.pdf. Accessed: July 14, 2019.

EAO. 2016. Preparing a Project Description. Available from: https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/environmental-assessments/guidance-documents/eao-guidance-preparing-project-description.pdf. Accessed: August 13, 2019.

ESSA Technologies, J. Laurence, Risk Sciences International, Trent University, and Trinity Consultants. 2014. Kitimat Airshed Emissions Effects Assessment. Report prepared for BC Ministry of Environment, Smithers, BC. 205 pp. + appendices.

Government of British Columbia 2019. 2017 Provincial Inventory. Available online at: https://www2.gov.bc.ca/gov/content/environment/climate-change/data/provincial-inventory (Accessed: November 2019).

Government of Canada 2019. Draft Strategic Assessment of Climate Change. Available at: https://www.strategicassessmentclimatechange.ca/ Accessed: December 2019.

Government of Canada 2019. Greenhouse Gas Reporting Program. Latest Update in the Canada Gazette, Part 1, Volume 153. Number 3. Available at: http://gazette.gc.ca/rp-pr/p1/2019/2019-01-19/html/notice-avis-eng.html. Accessed: February 2019.

Haisla Nation and BDO. 2018. Haisla Nation Council. Consolidated Financial Statements for the year ended March 31, 2018. Available from: http://fnp-ppn.aandc-aadnc.gc.ca/fnp/Main/Search/DisplayBinaryData.aspx?BAND_NUMBER_FF=676&FY=2017-2018&DOC=Audited consolidated financial statements&lang=eng. Accessed: July 14, 2019.

INAC 2019a. Aboriginal Peoples and Communities. First Nation Profiles. Haisla Nation. Reserves/Settlements/Villages. Available from: http://fnp-ppn.aandc-aadnc.gc.ca/fnp/Main/Search/FNReserves.aspx?BAND_NUMBER=676&lang=eng. Accessed: July 14, 2019.

INAC. 2019b. Aboriginal Peoples and Communities. First Nation Profiles. Haisla Nation. Registered Population. Available from: http://fnp-ppn.aandc-aadnc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=676&lang=eng. Accessed: July 14, 2019.

Kitimat Municipal Code. 2019a. Available from: https://www.kitimat.ca/en/municipal-hall/bylaws.aspx. Accessed: July 14, 2019.

Kitimat Municipal Code. 2019b. Part 9 – Planning, Division 6 – Industrial Zoning. Available from: https://www.kitimat.ca/en/municipal-hall/resources/Documents/Part-9-Div-6.pdf. Accessed: July 14, 2019.

Kitimat Municipal Code. 2019c. Part 9 – Planning, Division 7 – Greenbelt Zoning. Available from: https://www.kitimat.ca/en/municipal-hall/resources/Documents/Part-9-Div-7.pdf. Accessed: July 14, 2019.

MaPP. 2017. North Coast-Skeena First Nations Stewardship Society & Province of British Columbia – North Coast Marine Plan 2015. Available from: http://mappocean.org/wp-content/uploads/2016/07/MarinePlan_NorthCoast_WebVer_20151207_corrected.pdf. Accessed: July 14, 2019.

MaPP. 2019. Marine Plan Partnership for the North Pacific Coast (MaPP). Available from: http://mappocean.org/. Accessed: July 14, 2019.

MSRM. 2002. Kalum Land and Resource Management Plan. Available from: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/skeena-region/kalum-lrmp/kalum_lrmp.pdf. Accessed: July 14, 2019.

PBC. 2019a. Kalum Land & Resource Management Plan. Available from: https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/skeena/kalum-lrmp. Accessed: July 14, 2019.

PBC. 2019b. Kalum Sustainable Resource Management Plan. Available from: https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/skeena/kalum-lrmp/https-www-for-gov-bc-ca-tasb-slrp-legal-direction-kalum-srmp. Accessed: July 14, 2019.

PNCIMA. 2017. Pacific North Coast Integrated Management Area Plan. Available from: http://www.pncima.org/media/documents/2016-plan/2316-dfo-pncima-report-v17-optimized.pdf. Accessed: July 14, 2019.

RDKS. 2019. 2019-2023 Financial Plan. Available from: https://kitimatstikine.civicweb.net/filepro/document/29822/2019-2023%20Financial%20Plan.pdf. Accessed: July 14, 2019.

Statistics Canada. 2017. Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. Available from: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E. Accessed: July 14, 2019.

Appendix A

Table of Concordance

TABLE A-1 IAA CONCORDANCE TABLE FOR DETAILED PROJECT DESCRIPTION REQUIREMENTS

Information Requirement	Document Section	Tables & Figures
PART A—UPDATED GENERAL INFORMATION		
1 The project's name, type or sector and proposed location.	1.0	
2 The proponent's name and contact information and the name and contact information of their primary representative for the purpose of the description of the project.	1.4	Table 1
PART B—PLANNING PHASE RESULTS		
3 A summary of the results of any engagement undertaken with any jurisdiction or other party, including a description of how the proponent intends to address the issues raised in the summary referred to in subsection 14(1) of the Act.	1.5, 8.0, 9.0	
4 A summary of the results of any engagement undertaken with the Indigenous peoples of Canada, including		
(a) list of the Indigenous groups that may be affected by the project, including those groups that identified themselves during the planning phase as potentially being affected; and	8.0	
(b) description of how the proponent intends to address the issues raised in the summary referred to in subsection 14(1) of the *Act*, including any potential adverse impact that the project may have on the rights of the Indigenous peoples of Canada recognized and affirmed by section 35 of the *Constitution Act*, 1982.	9.0, Appendix D	Table D-1
5 Any study or plan, relevant to the project, that is being or has been conducted in respect of the region where the project is to be carried out, including a regional assessment that is being or has been carried out under section 92 or 93 of the *Act* or by any jurisdiction, including by or on behalf of an Indigenous governing body, if the study or plan is available to the public.	5.1, Appendix C	Table C-1
6 Any strategic assessment, relevant to the project, that is being or has been carried out under section 95 of the *Act*.	1.5	
PART C—PROJECT INFORMATION		
7 A statement of the purpose of and need for the project, including any potential benefits.	1.3	
8 The provisions in the schedule to the Physical Activities Regulations describing the project, in whole or in part.	1.5	Table 2
9 A description of all activities, infrastructure, permanent or temporary structures and physical works to be included in and associated with the construction, operation and decommissioning of the project, including their purpose, size and capacity.	2.1, 2.2	Table 4

TABLE A-1 IAA CONCORDANCE TABLE FOR DETAILED PROJECT DESCRIPTION REQUIREMENTS

Information Requirement	Document Section	Tables & Figures
10 An estimate of the maximum production capacity of the project and a description of the production processes to be used.	1.0, 2.1.6	Table 4
11 The anticipated schedule for the project's construction, operation, decommissioning and abandonment, including any expansions of the project.	2.3	Table 5
12 A description of		
(a) potential alternative means of carrying out the project that the proponent is considering and that are technically and economically feasible, including through the use of best available technologies; and	2.1	
(b) potential alternatives to the project that the proponent is considering and that are technically and economically feasible and directly related to the project.	1.3	
PART D—LOCATION INFORMATION		
13 A description of the project's proposed location, including	4.0	
(a) its proposed geographic coordinates, including, for linear development projects, the proposed locations of major ancillary facilities that are integral to the project and a description of the spatial boundaries of the proposed study corridor;	4.0	
(b) site maps produced at an appropriate scale in order to determine the project's proposed general location and the spatial relationship of the project components;		Figure 1, Figure 2, Figure 3, Figure 4, Figure 5
(c) the legal description of land to be used for the project, including, if the land has already been acquired, the title, deed or document and any authorization relating to a water lot;	4.2	Table 8 Figure 6
(d) the project's proximity to any permanent, seasonal or temporary residences and to the nearest affected communities;	4.0	
(e) the project's proximity to land used for traditional purposes by Indigenous peoples of Canada, land in a reserve as defined in subsection 2(1) of the *Indian Act*, First Nation land as defined in subsection 2(1) of the *First Nations Land Management Act*, land that is subject to a comprehensive land claim agreement or a self-government agreement and any other land set aside for the use and benefit of Indigenous peoples of Canada; and	4.3.1	Table 10
(f) the project's proximity to any federal lands.	4.3.1	Table 10

TABLE A-1 IAA CONCORDANCE TABLE FOR DETAILED PROJECT DESCRIPTION REQUIREMENTS

Information Requirement	Document Section	Tables & Figures
14 A description of the physical and biological environment of the project's location, based on information that is available to the public.	6.0, 6.1, 6.2	
15 A description of the health, social and economic context in the region where the project is located, based on information that is available to the public or derived from any engagement undertaken.	6.3	
PART E—FEDERAL, PROVINCIAL, TERRITORIAL, INDIGENOUS AND MUNICIPAL INVOLVEMENT		
16 A description of any financial support that federal authorities are, or may be, providing to the project.	5.2	
17 A description of any federal lands that may be used for the purpose of carrying out the project.	4.2	
18 A list of the permits, licenses or other authorizations that may be required by jurisdictions that have powers, duties or functions in relation to an assessment of the project's environmental effects.	1.5	
PART F—POTENTIAL EFFECTS OF THE PROJECT		
19 A description of any changes that, as a result of the carrying out of the project, may be caused to the following components of the environment that are within the legislative authority of Parliament:		
(a) fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act*;	7.6	
(b) aquatic species, as defined in subsection 2(1) of the *Species at Risk Act*; and	7.6	
(c) migratory birds, as defined in subsection 2(1) of the *Migratory Birds Convention Act*, 1994.	7.6	
20 A description of any changes to the environment that, as a result of the carrying out of the project, may occur on federal lands, in a province other than the province in which the project is proposed to be carried out or outside Canada.	7.1	
21 With respect to the Indigenous peoples of Canada, a description of any impact—that, as a result of the carrying out of the project, may occur in Canada and result from any change to the environment—on physical and cultural heritage, the current use of lands and resources for traditional purposes and any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, based on information that is available to the public or derived from any engagement undertaken with Indigenous peoples of Canada.	7.5	

TABLE A-1 IAA CONCORDANCE TABLE FOR DETAILED PROJECT DESCRIPTION REQUIREMENTS

Information Requirement	Document Section	Tables & Figures
22 A description of any change that, as a result of the carrying out of the project, may occur in Canada to the health, social or economic conditions of Indigenous peoples of Canada, based on information that is available to the public or derived from any engagement undertaken with Indigenous peoples of Canada.	7.5	
23 An estimate of any greenhouse gas emissions associated with the project.	3.1	
24 A description of the types of waste and emissions that are likely to be generated—in the air, in or on water and in or on land—during any phase of the project and a description of the plan to manage them.	3.1, 3.2	Table 6 Table 7
PART G—SUMMARY		
25 A plain-language summary of the information that is required under items 1 to 24 in English and in French.		

Appendix B

Responsible Authors of the Project Description

TABLE B-1 RESPONSIBLE AUTHORS OF THE PROJECT DESCRIPTION

Name and Qualification	Project Role	Relevant Experience
Tony Brady [1]	President	
Nathan Gloag, B.Eng. (civil); Grad. Dip. Legal Studies [1]	Engineering and Construction aspects	More than 18 years of experience in the development and execution of major capital projects throughout the energy, renewable power, infrastructure, oil and gas sectors
Amanda Zinter [1]	Initial draft	17 years of experience in energy projects and 9 years of environmental and regulatory consulting experience focusing on the oil and gas sector in British Columbia, including work on six LNG import terminals
Ward Prystay, M.Sc., R.P.Bio. [2]	BCEAA and IAA requirements, senior review	26 years of environmental consulting experience focusing on environmental assessment in the oil and gas sector, including work on eight LNG import and export terminals in Canada
Jennifer Mundy, B.Sc., R.P.Bio.[2]	BCEAA and IAA requirements	13 years of environmental consulting experience focusing on environmental assessment in the oil and gas sector, including four LNG import and export terminals
April Hauk, B.Sc., EP [2]	Air Quality	14 years of experience related to assessment and permitting for oil and gas pipelines and facilities
Sandra Banholzer, M.Sc. [2]	Acoustic Environment	6 years of experience including acoustic baseline studies and environmental assessments for oil and gas facilities.
Tim Edgell, Ph.D., R.P.Bio. [2]	Marine Environment	16 years of experience in marine ecosystem baseline studies and assessments
Stephen Roberts, B.Com., MREM [2]	Social and Economic Resources	11 years of experience conducting social and economic analyses, community engagement, and traditional use studies in support of land use planning and environmental assessments, including three LNG projects
Rebecca Wilson, M.Sc., R.P.Bio. [2]	Wildlife Resources	7 years of experience including baseline studies and environmental assessments for pipelines and facilities
Libby McMillan, M.Sc. 2	Marine Water Quality and Environment	5 years of experience in marine ecosystem research and assessments including water quality analysis and reporting
Laura Trudell, B.C.D., Adv. Dip. GIS [2]	GIS Specialist	7 years of experience providing GIS solutions in the environmental planning and natural resources sectors from map production to custom spatial analyses.

TABLE B-1 RESPONSIBLE AUTHORS OF THE PROJECT DESCRIPTION

Name and Qualification	Project Role	Relevant Experience
Courtney Tiechko, B.Sc. [2]	Freshwater Fisheries	5 years of experience in environmental consulting focused on freshwater fisheries
Rachel Keeler, M,Sc., R.P.Bio. [2]	Freshwater Fisheries	15 years of environmental consulting experience focusing on baseline and environmental assessments of freshwater fish and aquatic resources for developments such as pipelines, transmission lines, and roads.
Gillian Mathews B.Sc., M.Sc. [2]	Greenhouse Gas	6 years of experience including greenhouse gas baseline studies, verifications and environmental assessments for oil and gas facilities
Meghan O'Neill, B.Sc., R.P.Bio. [2]	Vegetation and Wetland Resources	10 years of environmental consulting experience conducting vegetation and wetland baseline studies and assessments for pipelines and facilities, including wetland functions field work on LNGC in 2016
Sean McKnight, RPCA [2]	Archaeological and Heritage Resources	15 years of experience including archaeological assessments and permitting for pipelines and facilities
Ryan Spady, RPCA [2]	Archaeological and Heritage Resources	17 years of experience including archaeological assessments and permitting for pipelines and facilities
Rick Lee, M.Sc., MBA, R.P.Bio. [2]	Human Health	15 years of human health risk assessment experience including environmental assessments for three LNG projects

NOTES:

[1] Cedar

[2] Stantec Consulting Ltd.

Appendix C

Summary of Environmental Studies Applicable to the West Douglas Channel Pipeline Corridor

Table C-1 Previous Work Applicable to the West Douglas Channel Pipeline Corridor

Project	Applicable Studies (including dates)	VCs included in the Assessment	Relevant Mitigation Measures	Relevant Conclusions
Kitimat LNG Environmental Assessment	Baseline studies were conducted in 2004 and 2005 to support the Kitimat LNG EAC Application, including: • Coastal tailed frog surveys • Breeding bird surveys • Winter tracking and aerial ungulate inventory surveys • Terrestrial Ecosystem Mapping (TEM) TEM surveys • Waterfowl and seabird surveys • Fish and fish habitat assessments for streams and riparian habitats Link to Kitimat LNG Assessment Report and Comprehensive Study Report (2006): https://www.projects.eao.gov.bc.ca/api/document/5886b83ea4acd4014b820250/fetch/Kitimat%20LNG%20-%20Project%20Assessment%20Report%20and%20Comprehensive%20Study%20Report.pdf Link to the Kitimat LNG EAC Application and associated Technical Data Reports: https://www.projects.eao.gov.bc.ca/p/588510cdaaecd9001b815f84/documents;currentPage=3;pageSize=10;keywords=%22Application%20for%20an%20Environmental%20Assessment%20Certificate%22;sortBy=-datePosted;ms=1573666569043	• Atmospheric environment • Vegetation resources • Wildlife and wildlife habitat • Freshwater fish and fish habitat • Marine environment • Avifauna • Employment and business • Community and regional infrastructure and services • First Nations communities and land use • Land and resource use • Marine navigation • Archaeological and heritage resources • Public health and safety	Section 7.16 of the EAC Application includes a summary of 220 commitments for the Kitimat LNG Project. Selected mitigation measures that are relevant to the pipeline include: • An Environmental Protection Plan (EPP) will be developed for the construction phase of the project. It will outline all environmental protection measures to be employed during construction and operation phases of the project. • To avoid loss of riparian habitat, removal of vegetation and soils with Riparian Management Areas will be minimized. Vegetation retention within those areas will be maximized. Stream banks will be revegetated with native plants, grasses, shrubs and trees • Use of aerial pipeline crossings. Use pipeline lateral horizontal directional drilling for all fish bearing stream crossings with riparian classification greater than large S3 type watercourses • Conduct all stream crossings during the period of least risk to fish and fish habitat • All pipeline crossings with flowing water will be constructed using either trenchless methods or an isolated crossing technique • Minimize right-of-way (ROW) width and clearing to the greatest extent possible • A field survey will confirm the presence of nesting attributes (mossy branches) for Marbled Murrelets. Site clearing will be conducted outside of the breeding season.	According to the Kitimat LNG Terminal Project Assessment Report and Comprehensive Study Report, the proposed Project was not likely to result in significant adverse effects.
Kitimat LNG EAC Amendment	According to the Project's dAAIR, in 2017 and 2019 the following surveys were conducted to support the Kitimat LNG EAC Amendment: • Vegetation and bioterrain field surveys to support TEM • Soil acidification and eutrophication field surveys • Amphibian surveys • Bat summer acoustic surveys • Breeding bird surveys • Marbled murrelet habitat surveys • Northern goshawk surveys • Raptor and heron nest surveys • Western screech-owl surveys • Heritage resources inventory Link to the Kitimat LNG EAC Amendment dAIR: https://www.projects.eao.gov.bc.ca/api/document/5d9b69a5862e090021f64814/fetch/DRAFT_AAIR_KLNG_Expansion_07Oct2019_Rev1.0_full.pdf	• Greenhouse gas management • Air quality • Vegetation • Wildlife and wildlife habitat • Surface water resources • Groundwater resources • Freshwater fish and fish habitat • Marine mammals • Marine resources • Economy • Socio-community • Current use of lands and resources for traditional purposes • Marine and land resource use • Visual quality • Heritage resources • Human health	TBD	TBD

Table C-1 Previous Work Applicable to the West Douglas Channel Pipeline Corridor

Project	Applicable Studies (including dates)	VCs included in the Assessment	Relevant Mitigation Measures	Relevant Conclusions
Kitimat West Douglas Channel Corridor Analysis (Ministry of Transportation and Infrastructure)	The following activities were undertaken to assess existing infrastructure and identify potential future development needs, and to identify routings for infrastructure improvements: • Review and assessment of existing information • An existing condition assessment in 2014/15 that included: – Analyzing existing traffic volumes, carrying out traffic counts, developing potential future traffic generation numbers – Assessing the design and condition of existing Bish Forest Service Road – Reviewing and assessing previous road designs – Collecting and reviewing information on specific exclusion zones – Reviewing and compiling existing information on proposed pipeline alignments – Reviewing and assessing: o Existing power infrastructure and future needs in the area o Existing communication infrastructure and future needs o Geotechnical conditions and hazards o Environmental habitat and resources o Archaeological resources • Consultation with potential developers • Work with potential industrial developers to develop corridors to avoid infrastructure conflicts • Assessment of terrain, stream crossing, infrastructure crossings, and geotechnical issues • Consideration of environmental impacts in corridor selection, including the following: – Minimizing the use of environmentally sensitive areas – Selecting corridors with the flattest terrain possible to minimize the overall construction footprint – Using trenchless installations or aerial crossings to cross major streams and minimize in-stream activity and impact to fish habitat – Minimizing the overall construction footprint to reduce impacts to vegetation and habitat • Consideration of archaeological issues in corridor selection, such as selecting corridors to avoid known archaeological areas The study notes that a considerable amount of work had already been carried out by proponents of industrial development in the area and that work was incorporated in the analysis. Link not available; this report is not publicly available.	n/a	n/a This study does not prescribe mitigation measures, but coordination of a common corridor is itself a mitigation measure to reduce potential for environmental effects.	The study concluded: • The proposed infrastructure corridors, with the exception of the corridor along the project development area in Scenario 2A, are considered feasible. • A common pipeline corridor will have some challenges but provides opportunities for common access, streamlining of stakeholder consultation, potential reduction of grading costs, and possible optimization of road and stream crossings. • 23 registered archaeological sites exist within the study area, including eight sites that would be directly impacted by various infrastructure corridors. • This study considered the Upper Route from the Kitimat Technical Corridor Assessment Report for the portion of the LNG pipeline corridor extending to the Cedar LNG site.
Kitimat Technical Corridor Assessment Report (Prepared for Pacific Northern Gas Ltd.)	Pacific Northern Gas Ltd. led a consortium (including Cedar LNG and Chevron) in advancing LNG projects in the West Douglas Channel region of British Columbia. The following activities were undertaken in 2015 to inform decisions regarding the construction of Pacific Northern Gas Ltd. and Chevron Canada Ltd.'s independent natural gas transmission systems planned for the Kitimat Valley: • An assessment of route options • An assessment of the feasibility of the right of way configuration alternatives along the selected routing • Preliminary rock volume calculations and construction execution plans Link not available; this report is not publicly available.	n/a	n/a This study does not prescribe mitigation measures, but coordination of a common corridor is itself a mitigation measure to reduce potential for environmental effects.	The Upper Route was recommended as it maximizes the commonality of the two pipeline routes while also providing maximum routing outside the Rio Tinto facility's requested exclusion zone, allows for the sharing of the right of way at key crossings (Moore and Anderson Creeks), and minimizes the inconvenience to public and industry during construction. The Upper Route from this study was used in MOTI's West Douglas Channel Corridor Analysis.

Table C-1 Previous Work Applicable to the West Douglas Channel Pipeline Corridor

Project	Applicable Studies (including dates)	VCs included in the Assessment	Relevant Mitigation Measures	Relevant Conclusions
Northern Gateway Environmental Assessment	Baseline wildlife studies were conducted from 2005 to 2009, and included: • Trumpeter swan aerial surveys • Waterbird aerial surveys • Coastal-tailed frog dip-net, hand-sweep and scan surveys • TEM surveys • Northern goshawk aerial nest surveys and ground-based call-playback surveys • Sharp-tailed grouse lek surveys • Songbird point-count surveys • Marbled murrelet land-based surveys • Mountain goat aerial surveys • Pond-dwelling amphibian visual and dip-net surveys • Winter track surveys • Pellet surveys Other baseline studies conducted from 2005 to 2009 included: • Background acoustic surveys along the pipeline route, including a survey near the Kitimat terminal. • Vegetation field surveys to confirm ecosystem unit designation and boundaries and develop detailed descriptions for ecosystem units. • Surface water quality and sediment data collection, specifically water sampling at locations with existing potential effects from upstream industry or downstream from domestic water intakes. • Freshwater fish and fish habitat field surveys to describe fish and fish habitat presence, and habitat quality within the pipeline right of way, powerline easement, access road, and terminal site watercourse crossings. • Heritage resources field studies to identify and evaluate archaeological, historical, and recent traditional use sites. Link to the Northern Gateway Environmental Impact Statement on the IAAC Registry: https://www.acee-ceaa.gc.ca/050/evaluations/document/43426	• Atmospheric environment • Acoustic environment • Soils • Terrain • Vegetation • Wildlife • Surface water resources • Freshwater fish and fish habitat • Hydrogeology • Paleontology • Heritage resources • Marine sediment and water quality • Marine vegetation • Marine benthic invertebrates • Marine fish and fish habitat • Marine mammals • Marine birds • Marine fisheries • National and provincial economics • Human health • Non-traditional land use	The NEB recommended 209 conditions for the project. Key pipeline mitigations included: • Develop a Construction Environmental Protection and Management Plan (EPMP), a comprehensive compilation of all environmental protection procedures, mitigation measures, and monitoring commitments. • Develop and implement a Linear Feature Management and Removal Plan • Develop and implement an Access Management Plan • Develop and implement a Pipeline Environmental Effects Monitoring Program • Develop provisional least risk periods for watercourse crossings • File alignment sheets with the NEB	Project residual effects were determined to be not significant. It was determined that the Project in combination with other past, present and reasonably foreseeable future activities was likely to contribute to significant adverse cumulative effects for certain populations of grizzly bear. The North Coast GBPU, with which the Cedar project overlaps, had net linear feature density thresholds that were already exceeded in the base case. The intention of the shared Douglas Channel Corridor in the MOTI study is to limit increases to linear feature density.
Douglas Channel Environmental Assessment	In 2010 and 2011, baseline studies were conducted to support the CEAA screening for the Douglas Channel project. These included: • Wildlife presence/absence surveys and habitat mapping • Rare plant and TEM surveys • Fish and fish habitat surveys • Archaeological impact assessment Link not available; Douglas Channel Project related baseline studies are not publicly available.	• Atmospheric environment • Noise, vibration and visual aesthetics • Vegetation and rare vascular plants • Wetlands • Wildlife and wildlife habitat (including threatened/endangered species) • Avifauna • Fresh water environment (including fish and fish habitat) • Marine water environment (including fish and fish habitat) • Navigable waters issues • Human health and safety • First Nations current use for traditional purposes • Archaeological and heritage resources	n/a	n/a

Table C-1 Previous Work Applicable to the West Douglas Channel Pipeline Corridor

Project	Applicable Studies (including dates)	VCs included in the Assessment	Relevant Mitigation Measures	Relevant Conclusions
PTE Permitting	Studies were conducted from 2017 to 2019 to support permit applications, including: • Fish and fish habitat field assessments • Archaeological overview assessment and archaeological impact assessment • Terrestrial wildlife surveys including marbled murrelet, western screech-owl, stick nest, and coastal tailed frog surveys Link not available; PTE Permitting related studies are not publicly available.	n/a	TBD	n/a
Pipeline Permitting for Feed Gas Supply to Cedar LNG	Cedar is committed to the following field programs along the pipeline to confirm existing data and fill data gaps, to support permitting requirements: • Fish and fish habitat field assessments • Terrestrial wildlife surveys • Archaeological impact assessment • TEM and rare plant surveys	n/a	TBD	n/a

Appendix D

Responses to Summary of Issues

The IAAC conducted a comment period on the Initial Project Description and substitution request for the Cedar LNG Project from September 19 to October 20, 2019. Based on feedback received from Indigenous groups, federal authorities and the public during this comment period, the IAAC prepared a Summary of Issues relevant to the Project. Table D-1 presents Cedar's proposed approach to addressing each of these issues.

If IAAC determines that an impact assessment is required and the minister grants substitution, Cedar anticipates completing the following steps in scoping the impact assessment:

- Cedar will prepare a draft Valued Components (VC) selection document outlining the VCs to include in the assessment of potential positive and negative impacts of the Project. This will be developed in consideration of the issues identified through the IAAC's Summary of Issues and provided to the Working Group and Indigenous groups for review and comment. It will be revised as requested by the EAO to incorporate feedback received during consultation.
- Cedar will prepare a draft Application Information Requirements (dAIR) document outlining the scope of assessment of potential positive and negative impacts of the Project in accordance with the *Impact Assessment Act* and EAO guidance. The dAIR will be provided to the working group, Indigenous groups, and the public for review and comment. The EAO will finalize the Application Information Requirements (AIR) based on feedback received during consultation on the dAIR, to establish the required scope of the assessment.

Cedar will then prepare an environmental assessment certificate (EAC) application that meets the requirements of the approved AIR. Under a substituted assessment, the EAO will review the EAC application and prepare an Assessment Report that will be used by the provincial and federal Ministers to support their respective decisions.

If IAAC determines that an impact assessment is required but the minister does not grant substitution, then Cedar will proceed into the next steps of the planning phase under the *Impact Assessment Act*, including working with the IAAC on the development of the Public Participation Plan, the Indigenous Engagement and Partnership Plan, the Cooperation Plan, the Permitting Plan, and the Tailored Impact Statement Guidelines. Drafts of these documents will be made available publicly before they are finalized. Cedar will then prepare an impact statement addressing the requirements of the Tailored Impact Statement Guidelines. IAAC will conduct their impact assessment based on the information in the impact statement, once they have accepted it as complete. The Impact Assessment Report prepared by IAAC would then be used to support federal decision making.

Cedar has prepared the responses in Table D-1 based on our proposed approach to the assessment, which will be confirmed through development and finalization of the VC selection document and AIR. The issues raised will be considered in developing these documents, and when finalized will establish and confirm the required scope of the Project's impact assessment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Accidents and Malfunctions	
1	Effects of accidents or malfunctions, including spills of hazardous substances, and the consideration of spill prevention and response plans in the assessment.	The EAC application will include an Accidents or Malfunctions section (as per the requirements of paragraph 22(1)(a)(i) of the *Impact Assessment Act*) that will consider the potential effects of accidents or malfunctions, such as spills of hazardous materials, on VCs most likely to be affected. The assessment will describe measures to reduce the likelihood of specified accident or malfunction scenarios occurring as well as response plans. The proposed scope of the assessment of accidents and malfunctions will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
2	Effects of marine shipping-related accidents or malfunctions including effects to the health and safety of Indigenous peoples and on title, rights and interests, including distinct customs and cultural practices.	The EAC application will include an Accidents or Malfunctions section that will consider the potential effects of accidents or malfunctions, such as marine-related accidents, on VCs most likely to be affected. The assessment will describe measures to reduce the likelihood of specified accident or malfunction scenarios occurring as well as response plans. The proposed scope of the assessment of accidents and malfunctions will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment. The results of the Accidents or Malfunctions assessment, in combination with the input received from Indigenous groups via consultation activities, will be used to inform the assessment of potential effects of the Project on Indigenous interests (i.e., asserted or determined Aboriginal rights, including title and treaty rights), such as distinct customs and cultural practices, as a result of shipping-related accidents or malfunctions. The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Acoustic Environment	
3	Effects of underwater noise from Project activities including construction and marine shipping.	The EAC application will include a Marine Resources VC that will consider the potential effects of underwater noise (from Project construction and LNG carriers) on marine resources, including marine mammals and fish. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment. The assessment of potential impacts related to LNG carriers using the Douglas Channel shipping route will build on previous assessments of marine shipping along this route, including the LNG Canada and Northern Gateway projects. Both projects included cumulative effects assessments and resulted in federal and provincial conclusions of no significant adverse effects related to effects of marine shipping on marine resources. As the Northern Gateway and Douglas Channel LNG projects have been cancelled since the LNG Canada cumulative effects assessment was completed, the maximum level of shipping activity, inclusive of Cedar LNG shipping, will be smaller than previously considered in these assessments.
4	Effects of noise on health of human receptors, including those with a heightened sensitivity to noise exposure (e.g., Indigenous peoples, schools, childcare centres, places of worship).	The EAC application will include a Noise VC assessment that compares noise emissions from construction and operation at noise-sensitive locations to relevant provincial and federal guidelines. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
5	Effects of noise on wildlife, including from construction activity, machinery use and increased vehicle traffic.	The EAC application will include a Wildlife VC that will consider the potential effects of in-air noise from Project activities as required and if applicable (e.g., blasting, operation of machinery, pile installation) during construction and operation of the Project on wildlife habitat suitability and wildlife movement. The assessment of potential effects of noise on wildlife will be encompassed in the assessment of indirect effects from sensory disturbances (e.g., noise, lighting). The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Alternative Means of Carrying Out the Project	
6	Effects from all design options, including in relation to power generation, on Aboriginal rights, direct air emissions, and greenhouse gas (GHG) emissions.	The EAC application will consider the potential environmental, health, social and economic effects of alternative means of carrying out the Project that are technically and economically feasible. This will include consideration of effects on impacts to Indigenous interests, air emissions, and greenhouse gas emissions for technically and economically feasible alternative.
7	Clarity on rationale for using floating versus land-based facilities.	Using a floating nearshore LNG production unit has lower development costs, reduces the Project's environmental footprint by requiring less land and reduces the overall potential for local impacts associated with transient workers during construction. Haisla Nation has indicated their preference for this approach as a means of advancing Haisla Nation economic development and reducing potential effects. A floating nearshore LNG production unit solution also provides advantages during the decommission stage of the project, making it much easier to reclaim and rehabilitate the project site.
	Atmospheric Environment	
8	Effects on air quality through land clearing activities, power generation, fuel combustion, incineration, flaring, and vehicle and vessel traffic.	The EAC application will include an Air Quality VC that will consider the potential effects of air emissions generated during the construction, operation, and decommissioning of the Project. As summarized in Table 12 of the Detailed Project Description, emissions from the following Project activities (described in Section 2.2 of the Detailed Project Description) will be considered in the assessment: • Construction: land clearing, power generation, fuel combustion, and vehicle traffic. • Operation: power generation (if required; electrification is the preferred), fuel combustion, flaring, incineration, fugitive emissions, marine support vessels and vehicle traffic. • Decommissioning: fuel combustion, demolition, backfilling and removal of infrastructure. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
9	Effects on air quality through improper management or disposal of materials, including contaminated soil and excavated materials, organic waste and wastes from construction, liquid wastes (storm water, sanitary wastewater, effluent run off, industrial wastewater from gas dehydration process, and ballast water discharge) and other hazardous wastes.	The environmental issues referred to in this comment assume that construction and operation of the LNG facility will not comply with regulatory requirements or industry best practices. Cedar is not planning to assess effects from illegal or non-conforming practices. Cedar will design and operate the Project in accordance with the *Oil and Gas Activities Act* and associated regulations. To promote the implementation of industry best practices, a Waste Management Plan will be developed as part of the Construction Environmental Management Plan to ensure proper management and disposal of materials. Waste will be managed and treated in compliance with applicable federal and provincial regulatory requirements, and permits will be obtained in accordance with the *Environmental Management Act* as applicable. It is expected that an environmental management system will be developed for the operation phase of the Project.
10	Effects from the emissions of pollutants on sensitive receivers (e.g., migratory birds, species at risk, health of Indigenous communities) and their habitat, including from soil and surface water acidification.	Based on reviews of typical emissions from LNG facilities during construction and operation, potential environmental effects pathways (e.g., air and effluent emissions), and the results of environmental assessments from other projects with similar activities (as summarized in Section 5.1 of the Detailed Project Description), ecological health effects are not anticipated. Project-environment interactions and the proposed scope of assessment will be provided to Indigenous groups, government agencies, and the public for review and comment via the draft Application Information Requirements. This is expected to include consideration of Project effects on wildlife, water quality, Indigenous communities, and health.
11	Consideration of emissions that may result in exceedances of established regional air quality thresholds for management action.	The Air Quality VC will include an assessment of air emissions and will compare these results to the BC Air Quality Objectives (BC AQO) and Canadian Ambient Air Quality Standards (CAAQS). The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Climate Change and Greenhouse Gas Emissions	
12	Impact on Canada's ability to meet its obligations and commitments in respect of climate change.	Section 3.1 of the Detailed Project Description provides an estimate of the Project's net annual greenhouse gas emissions following the approach outlined in the Environment and Climate Change Canada (ECCC) draft Strategic Assessment on Climate Change. This will be updated in the EAC application as applicable. The EAC application will provide an estimate of the greenhouse gas emissions generated by the Project during construction, operation, and decommissioning, and compare this to provincial and national emission levels. The assessment will align with the requirements of ECCC's Strategic Assessment of Climate Change. Cedar is looking to utilise electrification to the maximum extent possible in order to reduce greenhouse gas emissions and reduce potential impacts on climate change. Cedar has commenced discussions with BC Hydro and recently initiated their System Impact Study process. Availability of electricity to power the facility is dependent on this process.
13	Effects of GHG emissions, including those generated by marine shipping, and the Project's contribution to climate change.	Please refer to the response above. Emissions from shipping will be included in the greenhouse gas emissions estimates presented in the EAC application. The EAC application will address the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change as per paragraph 22(1)(i) of the *Impact Assessment Act*.
	Country Foods	
14	Effects on quality and quantity of county foods, including seafood (salmon, crab, halibut and eulachon), wildlife and plants, including medicines.	The assessment will include a Human Health VC that will consider potential effects of the Project on quality and accessibility of country foods, including marine and terrestrial country foods. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
15	Effects on country foods from the release of contaminants of potential concern into the environment (air, water, soil) which could be absorbed by foods sourced through hunting, trapping, fishing, harvesting, grown for subsistence or medicinal purposes, or having Indigenous cultural importance.	If there are reductions in the quality of air, soil, water, or food attributable to the Project and of sufficient magnitude to affect the quality of country foods or resources used for Indigenous cultural purposes, the resulting change in human health relative to existing conditions will be characterized as part of the Human Health VC. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
16	Effects on the status of food security within the Indigenous groups and local communities.	Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include both positive and negative considerations around food security in the assessment of potential effects on Indigenous interests, as applicable. The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment.
	Cumulative Effects	
17	Cumulative effects on airsheds (e.g., Kitimat Airshed, Douglas Channel Airshed) and of GHG emissions from all phases of the Project in combination with other past, present and future industrial development and marine shipping.	The Air Quality VC will consider the potential cumulative effects of emissions within a regional study area and will include emissions from shipping during operation. The EAC application will quantify the greenhouse gas emissions from each phase of the Project as per the ECCC draft Strategic Assessment on Climate Change, and address the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change as per paragraph 22(1)(i) of the *Impact Assessment Act*. The proposed scope of these assessments will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
18	Cumulative effects on nearby watercourses and waterbodies along the corridor for the feed gas distribution system.	The EAC application will include a Freshwater Fish VC that will consider potential effects of the Project on fish and fish habitat, as well as potential for cumulative impacts from other past, present and reasonably foreseeable projects and activities in the region. The scope of the assessment will be contingent on the scope of the Project established by the EAO and the IAAC.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
19	Cumulative effects to species at risk from upstream gas development, including Caribou, Grizzly Bear, fish and amphibians.	Upstream gas developments, such as natural gas extraction sites and associated pipelines, are regulated by the BC Oil and Gas Commission, and are currently outside of the scope of this assessment. An upstream GHG assessment will be completed in accordance with ECCC draft Strategic Assessment on Climate Change, if the Project is determined to exceed 500kt CO_2e of upstream GHG emissions per year.
20	Consideration of research on the efficacy of past mitigation measures and restoration projects in the surrounding area.	The assessment of potential effects of the Project will include mitigation measures to avoid or reduce potential effects on valued components. Cedar will consider publicly available information on the efficacy of mitigation measures for other similar projects in the surrounding area, for example information presented as a result of commitments to follow-up programs to verify the efficacy of mitigation measures presented in their environmental assessments.
21	Cumulative effects of marine shipping on human health of the general population and Indigenous peoples, on fish and other marine species, and on marine navigation including by Indigenous peoples.	Marine shipping will be a recognized Project activity during operations and considered in each effects assessment of the EAC application where shipping-environment interactions are identified. The analysis of Project-environment interactions will consider each VC (e.g., Human Health and Marine Resources) and Indigenous interests.
22	Cumulative effects of marine shipping to the rights, title and interests of Indigenous peoples within territories that overlap with the shipping route.	Cedar will assess potential effects on Indigenous interests and this will include consideration of marine shipping.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Economic Conditions	
23	Effects on economic conditions resulting from increased population, economic activities and opportunities, changes to cost of living, social and cultural settings, and in- and out-migration.	The assessment of the Employment and Economy VC will consider potential positive and negative effects of the Project on employment and economic conditions. It is anticipated this will encompass the Terrace to Kitimat region. The assessment of the Socio-Community VC will consider positive and negative potential effects of the Project on local and regional infrastructure and services including population changes that may increase the demand for housing, and how Project-related business growth and increased incomes for residents may affect social determinants of health. It will also consider potential effects on the social wellbeing of local residents as a result of the presence of a temporary workforce. The scope of the proposed effects assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment. Pursuing a floating nearshore LNG production unit solution will help reduce socio economic impacts associated with a transient workforce.
24	Effects on local businesses that may provide supplies and services required for the Project, including tourism as it relates to effects to fish and fish habitat.	The assessment of the Employment and Economy VC will consider potential changes in the regional labour force and regional business while the assessment of the Marine Use VC will consider potential changes to marine navigation, marine fisheries, and other uses (such as recreation and tourism). The proposed scope of these assessments will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
25	Effects on the labour force, including the availability of skilled and unskilled workers, existing working conditions, wages and/or average salary, full-time/part-time and temporary/permanent employment and training and recruiting plan.	The assessment of the Employment and Economy VC will consider potential changes in the regional labour force, regional business, and provincial economy. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
26	Effects on domestic gas supply, including pricing, and global gas market analysis.	Effects on domestic gas supply, such as pricing and global market analysis are outside the scope of this assessment. The National Energy Board (NEB) issued Licence GL-327 to Cedar 1 LNG Export Ltd. (a wholly owned subsidiary of Cedar) on May 27, 2016. The NEB export licence application and decision process considers supply and demand forecasts and implications for the Canadian and North American gas market. Additional information can be found in the application and decision statement available on the Canadian Energy Regulator's website.
	Effects of the Environment on the Project	
27	Effects of the environment on the Project through extreme weather events, increased precipitation due to climate change, tsunamis, landslides, slope erosion, rock/ground instability, marine geology, geohazards and potential of submarine landslides.	The EAC application will include an assessment of any change to the designated project that may be caused by the environment (as per the requirements of paragraph 22(1)(j) of the *Impact Assessment Act*). The assessment will describe the environmental conditions considered as well as the measures to reduce the likelihood of adverse effects on the Project. These events will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
28	Inclusion of a seismic hazard assessment and terrain hazards assessment.	As noted above, the EAC application will include an assessment of any change to the designated project that may be caused by the environment (as per the requirements of paragraph 22(1)(j) of the *Impact Assessment Act*). Cedar anticipates this will include consideration of earthquakes, landslides, and other potential terrain hazard impacts. The proposed scope of the effects of the environment on the project will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
	Fish and Fish Habitat	
29	Effects on fish (including salmon and herring) mortality, lifecycle and productivity, and fish habitat, through alteration, disruption and destruction of fish habitat, during all Project phases.	The EAC application will consider potential effects to fish, including salmon and herring, and fish habitat through assessment of the Freshwater Fish and Marine Resources VCs. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	General	
30	Ability for the public to actively participate in the assessment.	Cedar will develop a Public Consultation Plan for comment by the EAO and IAAC, and approval by the EAO. Once approved, Cedar will execute and report on this plan as part of the environmental assessment process. Cedar will also conduct public engagement as per the section 10 Order under BCEAA.
31	Provision of government support to facilitate research related to public concerns.	It is Cedar's view that this issue is outside of its care and control. Provincial and/or federal agencies would be in a position to address this issue.
32	Inclusion of nearby communities, including Terrace and Indigenous communities, in the study areas for relevant valued components including air quality, economic conditions, human health and well-being, and social conditions.	Local and regional assessment areas for each VC will be proposed in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment. Local assessment areas will be developed to encompass the area in which Project related effects can be predicted or measured with a level of confidence that allows for assessment and there is a reasonable expectation that those effects could be of concern to a VC. Regional assessment areas will establish the context for the determination of significance of Project residual effects and encompass the extent of past, present and reasonably future activities included in the cumulative effects assessment.
	General—Assessment Type	
33	Value of federal assessment, particularly in relation to marine areas, marine life and habitats, impacts to Indigenous rights, and effects to human health, and referral to a joint review panel.	Cedar is confident that a substituted assessment can provide a robust evaluation of potential effects to marine areas, marine life and habitats, impacts to Indigenous rights, and effects to human health via assessment of the Marine Resources, Marine Use, Human Health VCs and the assessment of potential effects to Indigenous interests. The Impact Assessment Cooperation Agreement Between Canada and British Columbia requires the EAC application to meet all requirements of both the *Impact Assessment Act* and BCEAA, and outlines the requirements for cooperation to ensure a robust assessment process.
	General—Project Description	
34	Clarity on the proponent's involvement in any Technical Review Process of Marine Terminal Systems and Transshipment Sites (TERMPOL).	Cedar is not planning to undertake a formal TERMPOL process as the proposed shipping route has been extensively studied by other proponents, including multiple formal TERMPOL studies. Cedar will develop a project specific Marine Transportation Plan, including a review of existing TERMPOL studies and implementation of applicable measures including but not limited to pilot station pick up location,

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
		travel speed, arrangement and number of escort tugs. Cedar will also perform static and dynamic mooring analysis for berthing of LNG carriers at the Project site.
35	Clarity on whether a disposal at sea permit would be required. If required, effects of disposal at sea.	Dredging for the safe arrival, berthing and departure of LNG carriers is not expected to be required at this time, and removal of marine sediments to accommodate the jetty/jetties or nearshore LNG production unit is not expected. As such, disposal at sea is not being proposed. If at any point during Project development dredging and/or disposal at sea become necessary, Cedar will advise the appropriate authorities. Until that point, effects of disposal at sea are not proposed for inclusion in the EAC application.
36	Clarity on the cooling method to be used for the liquefaction process.	As noted in Section 7.1 of the Detailed Project Description, Cedar has selected air cooling as the primary liquefaction cooling technology for the project.
37	Clarity on marine safety associated with the storage of liquefied natural gas in close proximity to other LNG terminals.	The proposed Cedar LNG project is over 2 km away from the marine terminal and over 4 km away from the LNG processing and storage site associated with the LNG Canada Export Terminal. Marine safety considerations associated with the storage of LNG will be addressed by designing and building the storage facilities in accordance with relevant regulations and standards. A detailed Quantitative Risk Analysis and associated safety studies (including potential escalation) will be undertaken as part of the Pre-FEED / FEED process. Additionally, Cedar intends to collaborate with other marine users in the Kitimat Harbour to form a marine coordination committee to assist in communications and assure the safety of all marine users in the private port.
38	Clarity on the regional, provincial and national benefits of the Project.	The EAC application will consider both adverse and positive effects of the Project on the environment, health, social, or economic conditions, as required under section 22(1)(a) of the *Impact Assessment Act*. In general, VC assessments will be conducted at the local and regional scale through consideration of local and regional assessment areas. The assessment of the Employment and Economy VC will also consider impacts of the Project to gross domestic product at provincial and federal levels. Positive effects (benefits) associated with other VCs will also be described.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
39	Clarity on the location of bunkering of the offloading LNG tanker vessels and tugs.	Bunkering of the LNG carriers is not anticipated to be an activity associated with the Project. It is anticipated that LNG carriers calling at the Project site will be dual fuel and have the ability to operate on both LNG and low sulphur marine diesel.
40	Clarity on the source of expertise with designing, constructing and operating a floating LNG facility in B.C.	Cedar has secured a Joint Venture Partner (JVP) for the purposes of developing, constructing and operating the Cedar LNG project. Cedar's JVP has significant technical expertise and experience in the construction, commissioning and operation of floating LNG projects. Cedar will disclose their JVP, preferred engineering, procurement and construction (EPC) contractor and potential reference projects during the assessment process.
41	Methodology and the assumptions used to calculate GHG emissions estimates as described in the draft Strategic Assessment of Climate Change, including consideration of upstream effects due to extraction and transportation of natural gas.	Section 3.1 of the Detailed Project Description provides an estimate of the Project's net annual greenhouse gas emissions following the approach outlined in the ECCC draft Strategic Assessment on Climate Change. This will be updated in the EAC application as applicable. The EAC application will provide an estimate of the greenhouse gas emissions generated by the Project during construction, operation, and decommissioning, and compare this to provincial and national emission levels. The EAC application will address the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its environmental obligations and its commitments in respect of climate change as per paragraph 22(1)(i) of the *Impact Assessment Act*. An upstream GHG assessment will be completed in accordance with ECCC draft Strategic Assessment on Climate Change if the Project is determined to exceed 500kt CO_2e of upstream GHG emissions per year.
42	Details on the pipeline and transmission corridor, including engineering and design information.	The EAC application will provide an overview of the Project as set out in the section 11 Order under BCEAA. This will include the appropriate level of engineering and design information needed to undertake a rigorous effects assessment. Cedar is of the perspective that the pipeline should be excluded from the scope of the assessment and Project as defined in the section 11 Order, because potential effects of the connector pipeline have already been substantially assessed through previous environmental assessments, environmental risks associated with the pipeline are very low, and the pipeline will be adequately managed via a robust permitting process. Additional information regarding anticipated permitting requirements for the pipeline is provided in Section 5.3 of the Detailed Project Description. Additional information related to previous environmental studies in the pipeline corridor is provided in Appendix C to the Detailed Project Description. Cedar has been in related discussions with EAO concerning this issue.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
43	Clarity on condensate removal from project site.	The EAC application will provide an overview of the Project (including activities associated with condensate management). The level of condensate removal and management is tied to the finalisation of the heat material balance during Pre-FEED / FEED and the level of electrification available to the project.
	Human Health and Well-Being	
44	Effects of electric and magnetic fields at traditional, ceremonial or recreational use sites situated in the Project area, including along the proposed transmission line corridor.	Cedar considers this issue to be outside of the scope of the assessment, as the transmission line included in the electrification option will meet applicable safety and health guidelines set out for electric and magnetic fields.
45	Effects of air emissions on the health of Kitimat area residents.	A human health risk assessment will be conducted to quantify human health risk from air emissions and characterize the incremental change in health risk that the Project may have on local people, including Kitimat area residents and temporary land users (e.g., recreational land users), and presented in the Human Health VC assessment. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
46	Effects on potential human receptor sites, including residences, cabins, and traditional use sites (including temporary or seasonal sites for hunting, fishing, trapping, berry picking, recreation, ceremonial uses). Consideration of distance of key Project components to sensitive human receptor locations (including schools, hospitals, retirement complexes, assisted care homes).	The human health risk assessment conducted to support the Human Health VC assessment will consider special receptor locations such as schools, hospitals, retirement complexes, assisted care home, and recreational areas. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
47	Clarity on approach for consultation with local population regarding the detailed Health Impact Assessment (HIA) incorporating GBA+.	The human health risk assessment conducted to support the Human Health VC assessment and the Socio-Community VC assessment, which includes consideration of social determinants of health, will consider GBA+ factors such as sex, gender, age, or physical ability. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
48	Effects on the community health profile including birth rates, death rates, injuries and chronic disease rates, mental health status and other community-relevant health issues.	The EAC application will evaluate potential effects on the Socio-Community VC, including consideration of social determinants of health. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
49	Effects to human receptors from changes to air quality, visual conditions, noise, water and country food quality.	The Human Health VC will consider the potential for changes to human health from Project-related emissions (e.g., air, water, noise), while the Socio-Community VC will consider potential for the Project to affect social determinants of health. If there are reductions in the quality of air, soil, water, or food attributed to the Project, the resulting change in human health relative to existing conditions will be characterized. Factors that contribute to human health include changes to the accessibility of traditionally harvested foods from the land, including wild plants, wild game, fish, and other seafoods. The Land and Resource Use VC will consider potential effects to non-tenured land uses associated with changes to visual conditions. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
50	Effects on the existing health services and programs due to the influx of workers.	The Socio-Community VC will consider the potential change in community services, including health services, due to the presence of a temporary workforce. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment. Pursuing a floating nearshore LNG production unit solution will assist in managing impacts associated with a transient workforce.
51	Effects on drinking water sources, both surface and/or groundwater (permanent, seasonal, periodic or temporary).	The Project area is not located near a municipal or private domestic water supply and is not anticipated to affect drinking water sources, therefore Cedar considers this concern to be outside the scope of the assessment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
52	Effects due to gender-based violence, spread of sexually transmitted infections and human trafficking, due to the influx of workers to the communities.	The Socio-Community VC will consider the potential changes in community health and wellness, including changes in health indicators (e.g., mental health issues, substance abuse, sexually transmitted infection (STI) rates), as a result of the presence of a temporary workforce. The assessment will include consideration of GBA+ factors such as sex, gender, or ethnicity. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment. Pursuing a floating nearshore LNG production unit solution will assist in managing impacts associated with a transient workforce.
53	Effects to human health through dermal contact with contaminated surface water or groundwater.	The human health risk assessment conducted to support the Human Health VC assessment will consider the potential for changes to human health from Project-related emissions, however based on initial review of potential effects pathways, the project is not anticipated to release contaminants to surface water or groundwater resulting in concerns related to dermal contact (e.g., recreational use water and domestic use water). The human health risk assessment will evaluate potential pathways of effects and provide further rationale related to this issue. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
54	Effects on Indigenous community health using disaggregated data that is specific to Indigenous peoples.	The EAC application will include consideration of potential effects on the Socio-Community VC, considering factors including access to infrastructure and services, housing and accommodations, and social determinants of health. Disaggregated data will be used to the extent it is publicly available. Since Census information obtained from Statistics Canada, the primary dataset used to inform the characterization of existing population and demographic conditions, is limited to sex (i.e., male and female) and indigeneity, and is also prone to suppression (to protect the identity of respondents), gaps in publicly available data are expected. Where identified, gaps will be reviewed to determine the need for additional baseline collection. The results of this assessment will inform the assessment of potential effects on Indigenous interests (i.e., asserted or determined Aboriginal rights, including title and treaty rights). The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include considerations around effects to Indigenous community health in the assessment of potential effects on Indigenous interests as applicable.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Indigenous Peoples' Social and Economic Conditions	
55	Effects to the social and economic conditions of Indigenous communities using disaggregated data that is specific to Indigenous peoples.	The EAC application will include consideration of potential effects on Socio-Community and the Employment and Economy VCs. Disaggregated data will be used in these assessments to the extent it is publicly available. Since Census information obtained from Statistics Canada, the primary dataset used to inform the characterization of existing population and demographic conditions, is limited to sex (i.e., male and female) and indigeneity, and is also prone to suppression (to protect the identity of respondents), gaps in publicly available data are expected. Where identified, gaps will be reviewed to determine the need for additional baseline collection. The results of these assessments will inform the assessment of potential effects on Indigenous interests (i.e., asserted or determined Aboriginal rights, including title and treaty rights). The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities, and will include considerations around effects to social and economic conditions of Indigenous communities in the assessment of potential effects on Indigenous interests as applicable.
56	Effects on the wellbeing and day-to-day lives of Indigenous peoples living in the region and their communities due to social and economic effects of the Project (e.g. increased service and housing pressures in the region).	The EAC application will evaluate potential adverse and positive effects of the Project on the Socio-Community and Employment and Economy VCs, and the results of these evaluations will inform the assessment of potential effects on Indigenous interests (i.e., asserted or determined Aboriginal rights, including title and treaty rights). The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities, and will include considerations around increased service and housing pressures in the region in the assessment of potential effects on Indigenous interests as applicable.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
57	Effects on Indigenous groups' access to economic benefits and opportunities and identification of mitigation measures to address long-term youth unemployment.	The EAC application will evaluate potential adverse and positive effects of the Project on the Employment and Economy VC, including consideration of GBA+ factors such as sex, and Indigeneity, and the results of this evaluation will inform the assessment of potential effects on Indigenous interests (i.e., asserted or determined Aboriginal rights, including title and treaty rights). The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities, and will include considerations around Indigenous youth employment in the assessment of potential effects on Indigenous interests as applicable.
58	Effects on contractors, companies and social conditions within local Indigenous communities due to changes in cost of living and access to the labour market.	The EAC application will evaluate potential positive and adverse effects of the Project on the Employment and Economy VC. This is expected to include consideration of potential pressures and benefits of the Project on employment and economic conditions, including contributing factors that may affect cost of living such as increased competition for labour and wage inflation. The results of this evaluation will inform the assessment of potential effects on Indigenous interests (i.e., asserted or determined Aboriginal rights, including title and treaty rights). The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities, and will include considerations around cost of living and employment opportunities within local Indigenous communities as applicable.
	Indigenous Peoples' Use of Lands and Resources	
59	Effects on the availability of resources, preferred use areas, socio-economic conditions and cultural wellbeing of Indigenous peoples through an increase in resource users (e.g. influx of workers that would fish or hunt).	The EAC application will evaluate potential effects of the Project on non-tenured Crown land-uses through the Land and Resource Use VC, the results of which will inform the assessment of potential effects of the Project on Indigenous interests (i.e., asserted or determined Aboriginal rights, including title and treaty rights). The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities, and will include considerations around availability of resources, preferred use areas, socio-economic conditions and cultural wellbeing of Indigenous peoples as applicable.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
60	Effects on the quality and quantity of resources used for traditional purposes, due to increased access to remote/culturally important areas, and restrictions of Indigenous peoples' access to preferred locations for harvesting or recreation, particularly in the marine environment.	The EAC application will evaluate potential effects of the Project on Indigenous interests, including current use of lands and resources for traditional purposes. The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include considerations around quality and quantity of resources as applicable.
61	Effects on Indigenous peoples' use of the area due to changes in sensory experience (including changes to noise, light, visual conditions) and safety or perceived safety concerns.	The EAC application will evaluate potential effects of the Project on Indigenous interests, including current use of lands and resources for traditional purposes. The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include considerations around sensory experience, safety, and perceived safety as applicable.
62	Effects on intergenerational knowledge transfer and the health and wellbeing of Indigenous peoples due to changes to the use of lands and resources.	The EAC application will evaluate potential effects of the Project on Indigenous interests, including current use of lands and resources for traditional purposes. The EAC application will provide a summary of statutory requirements under the federal *Impact Assessment Act* and describe how the section 22(1) factors have been taken into account in the Project's assessment. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include considerations around intergenerational knowledge transfer and health and wellbeing as applicable.
	Indigenous Peoples' Rights	
63	Effects to the rights of Indigenous peoples and their traditional land use through the construction and operation of the Project.	The EAC application will evaluate potential effects of the Project on Indigenous interests. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include considerations around rights, asserted rights, and traditional land use as applicable.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Marine Mammals	
64	Effects to marine mammals and their habitat from Project activities, including marine shipping that alter, disrupt or destroy habitat.	The EAC application will evaluate potential effects to the Marine Resources VC and will consider the potential for Project activities, including shipping, on marine habitats. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment. The assessment of potential impacts related to LNG carriers using the Douglas Channel shipping route will build on previous assessments of marine shipping along this route, including the LNG Canada and Northern Gateway projects. Both projects included cumulative effects assessments and resulted in federal and provincial conclusions of no significant adverse effects related to effects of marine shipping on marine resources. As the Northern Gateway and Douglas Channel LNG projects have been cancelled, the maximum level of shipping activity, inclusive of Cedar LNG shipping, will be smaller than previously considered in these cumulative effects assessments.
	Marine Shipping	
65	Effects to the environment and marine safety from marine shipping including support tugs and vessels, with consideration of mitigation measures.	The Maine Use VC will include an assessment of potential effects on marine use, including fishing, and navigable waters. The assessment will identify mitigation measures to promote marine safety and reduce the potential for adverse effects on marine use. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
66	Effects of marine shipping on human health of the general population and Indigenous peoples, fish and other marine species, air quality, GHG emissions, and marine navigation including by Indigenous peoples.	The EAC application will include consideration of potential interactions between Project activities and VCs. Marine shipping is considered a project activity and will be included in this evaluation of interactions. Human Health, Marine Resources, Air Quality, and Marine Use are proposed as VCs. Section 3.1 of the Detailed Project Description provides an estimate of the Project's net annual greenhouse gas emissions following the approach outlined in the ECCC draft Strategic Assessment on Climate Change. This will be updated in the EAC application as applicable. Emissions from shipping will be included in the greenhouse gas emissions estimates provided in the EAC application The assessment of the VCs in Part B of the Application will include consideration of potential effects on the general population, which includes Indigenous peoples. Part C of the Application will address specific issues regarding Indigenous rights and interests. The proposed scope of each VC assessment and of the assessment of potential effects to Indigenous interests will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
67	Effects of marine shipping to the rights, title and interests of Indigenous peoples within the territories that overlap with the shipping route, including beyond the Triple Island Pilotage Station.	The EAC application will evaluate potential effects of the Project, including marine shipping, on Indigenous interests. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities such as marine shipping. The spatial scale of the assessment will be determined by the EAO and IAAC.
68	Comprehensive consultation with each Indigenous group whose territory overlaps the shipping route.	Cedar will develop an Indigenous Consultation Plan to outline how Cedar will engage with Indigenous groups with territory territories overlapping the shipping route. Cedar will submit Indigenous Consultation Reports to the EAO during the environmental assessment process to report on consultation progress.
69	Effects of marine shipping on the harvesting of marine resources by Indigenous peoples along the shipping route including changes to access, noise, the ability to harvest in important locations at preferred times in preferred ways, perceptions of safety, loss of fishing gear, and subsequent community repercussions.	The EAC application will evaluate potential effects of the Project, including marine shipping, on Indigenous interests and include an assessment of potential effects on current use of lands and resources for traditional purposes. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include considerations of marine shipping, access to harvesting areas, and perceptions of safety as applicable.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
70	Effects of marine shipping and wake on traditional customs and practices of Indigenous peoples, including harvesting and associated travel, sustenance for communities, feasting and trading, and the transference of traditional knowledge.	The EAC application will evaluate potential effects of the Project, including marine shipping, on Indigenous interests. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include considerations of traditional customs and practices of Indigenous peoples as applicable. Based on the studies conducted by other proponents (e.g., LNG Canada, Woodfibre), with the implementation of mitigation measures such as speed limits vessel wake is not anticipated to result in significant adverse residual effects on marine fisheries or shoreline harvesting.
71	Consideration of Indigenous/community-developed valued components in the assessment of marine shipping effects.	Cedar will provide a VC selection document to the Working Group for review and feedback that proposed VCs to include in the assessment.
72	Details on the increase in shipping through the region, size and speed of vessels, plans for mitigating underwater noise and impacts to marine mammals, and increased vessel traffic effects on fishing lanes, access to resources, and changes to the social and ceremonial sense of place and self.	As outlined in Section 1.2 of the Detailed Project Description, LNG carriers are anticipated to call at the LNG facility approximately 40 to 50 times per year (an average of approximately one LNG shipment every 7 to 10 days). The average size of LNG carriers anticipated to arrive at the LNG facility will be approximately 180,000 m^3 with the terminal design allowing carriers of up to 216,000 m^3 to moor and load. When transiting to and from the facility, LNG carriers will follow established deep-sea shipping routes. It is expected that LNG carriers would enter Canadian waters through Dixon Entrance north of Haida Gwaii, proceed eastward and then southward through Hecate Strait where a Pilot will board at a designated location, into Browning Entrance at the northern extent of Principe Channel. Vessels will follow a route south through Principe Channel before navigating through Nipean Sound, Otter Channel, Lewis Passage, Wright Sound, and Douglas Channel. The EAC application will include evaluation of potential effects to the Marine Resources and Marine Use VCs, including potential effects of Project shipping on marine mammals, fisheries and access to resources. The Application will include mitigation measures to promote marine safety and reduce the potential for adverse effects. The results of the VC assessments will inform consideration of potential effects to Indigenous interests. Cedar is committed to engaging and consulting with potentially affected Indigenous groups to understand how they may be affected by Project activities and will include considerations of marine shipping and changes to social and ceremonial sense of place and self as applicable. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous Groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Migratory Birds And their Habitat	
73	Effects on migratory birds through clearing activities, collisions with vehicles or infrastructure, flaring events, increased presence of humans, use of heavy equipment and increased sensory disturbance during construction and operations.	The Wildlife VC will consider the potential effects of the Project on wildlife, including migratory birds. The assessment will consider the potential for change in availability and/or suitability of wildlife habitat, increased mortality risk, and changes to movement patterns. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous Groups, government agencies, and the public for review and comment.
74	Effects on the quality, availability and ecological function of migratory bird and wildlife habitat, including wetlands and provincially listed ecological communities.	The Wildlife VC will consider the potential effects of the Project on wildlife, including migratory birds. The assessment will consider the potential for change in availability and/or suitability of wildlife habitat, increased mortality risk, and changes to movement patterns. The Vegetation and Wetlands VC will consider the potential change in wetland functions, as well as change in abundance of plant species and ecological communities of interest. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
	Social Conditions	
75	Effects on population composition, density and growth, ethnic identity, family structure, and dependency ratio.	The Socio-Community VC will consider changes in population and demographics as a potential pathway affecting community health and wellness. The assessment will include consideration of GBA+ factors in understanding potential effects and developing mitigation strategies. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous Groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
76	Effects on access, ownership and use of local resources (e.g. land tenure).	The EAC application will evaluate potential effects to the Land and Resource Use VC, including potential change in non-tenured land uses. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous Groups, government agencies, and the public for review and comment.
77	Effects on the existing local and regional infrastructure in the Project area, including railways, highways, traffic, pipelines, water mains, sewage lines, power lines and any other potentially affected facility.	As required under section 22(1)(a) of the *Impact Assessment Act,* the assessment will consider both positive and adverse effects of the Project on social conditions. The EAC application will evaluate potential positive and adverse effects to the Socio-Community VC, including consideration of potential effects of the Project on local and regional infrastructure (e.g., roads and highways), and potential effects to the Land and Resource Use VC, including consideration of potential effects of the Project on tenured land uses (e.g., oil and gas [facilities and pipelines] and utilities [water and sewage lines and electric power lines]). The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
78	Effects on the existing local and regional services in the Project area such as: accommodation, recreation, waste disposal, police, fire fighting, ambulance and health care services, education, and day care.	As required under section 22(1)(a) of the *Impact Assessment Act,* the assessment will consider both positive and adverse effects of the Project on social conditions. The EAC application will evaluate potential positive and adverse effects to the Socio-Community VC, including consideration of potential effects of the Project on local and regional infrastructure. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
79	Effects on navigable waterways and waterbodies including access and users of the waterways.	The EAC application will evaluate potential effects to the Marine Use VC, including consideration of potential effects of the Project on navigation and marine use. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Species at Risk, Terrestrial Wildlife and their Habitat	
80	Effects to federally listed species at risk, including Northern Resident and Transient Killer Whales, as a result of death, harm, or harassment of an individual, the destruction of the residence of one or more individuals or the destruction of critical habitat of federally listed species that may occur through Project construction and operation.	The environmental effects referred to in this comment assume that construction and operation of the LNG facility will not comply with regulatory requirements or industry best practices. Cedar is not planning to assess effects from illegal or non-conforming practices. Cedar will design and operate the Project in accordance with the requirements of the *Fisheries Act* and *Species at Risk Act* (and associated regulations to both Acts). To promote the implementation of industry best practices, Construction Environmental Management Plan will be developed to document mitigation measures to be implemented. It is expected that an environmental management system will be developed for the operation phase of the Project.
81	Effects to federally listed species at risk due to increased human presence, use of heavy equipment, vegetation clearing, and collisions with vehicles and infrastructure.	The EAC application will consider potential effects to federally listed species via the Wildlife, Vegetation and Wetlands, Freshwater Fish and Marine Resources VCs. The assessment will present potential effects to these VCs, propose mitigation measures to manage the potential effects, and characterize residual effects that remain after application of mitigation measures.
82	Mitigation measures designed based on the most recent best management practices, guidelines, and scientific literature, and implemented to be consistent with all applicable recovery strategies and action plans.	The EAC application will consider potential effects to federally listed species and their habitat via the Wildlife, Vegetation and Wetlands, Freshwater Fish and Marine Resources VCs. The assessment will present potential effects to these VCs, propose mitigation measures to manage the potential effects, and characterize residual effects that remain after application of mitigation measures.
83	Mitigation measures, follow-up and monitoring programs to avoid, reduce or compensate for effects to federally listed species and their habitat (e.g., Marbled Murrelet nesting habitat).	The EAC application will consider potential effects to SARA-listed species (threatened and endangered) and their habitat via the Wildlife, Vegetation and Wetlands, Freshwater Fish and Marine Resources VCs. The assessment will present potential effects to these VCs, propose mitigation measures to manage the potential effects, and characterize residual effects that remain after application of mitigation measures.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
	Water—Groundwater and Surface Water	
84	Effects to surface water quality from wastewater, storm water and process water discharge, and accidental releases of solid, liquid or hazardous waste.	The EAC application will include consideration of potential effects to both freshwater and marine fish as a result of changes in water quality and water quantity associated with authorized/permitted discharges. It will also consider the potential effects associated with accidents and malfunctions, including accidental spills. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
85	Effects to groundwater quantity through the use of surface water and groundwater as a water supply source during construction and operation.	The BC Water Resources Atlas (http://maps.gov.bc.ca/ess/hm/wrbc/) does not show an aquifer or any water wells to be present in the vicinity of the LNG terminal (aquifer 1075 is approximately 2.4 km north of the Cedar site). As such, an assessment of potential effects to groundwater quantity is not proposed.
86	Effects to contaminant loads in streams through the use of nearby water sources.	The EAC application will include consideration of potential changes in water quality as part of the assessment of freshwater fish and fish habitat. This process will include completing a Project-environment interactions table to identify potential pathways for effects to occur. If an increase in contaminant loading in streams is identified as a potential effect, it will be included in the proposed scope of the assessment that will be presented in the draft Application Information Requirements document. These will be provided to Indigenous groups, government agencies, and the public for review and comment before they are finalized by the EAO.
87	Effects to water quality through improper management or disposal of materials, including contaminated or hazardous wastes.	The environmental effects referred to in this comment assume that construction and operation of the LNG facility will not comply with regulatory requirements or industry best practices. Cedar is not planning to assess effects from illegal or non-conforming practices. Cedar is committed to proper management of disposal and materials, including any contaminated or hazardous wastes. A Waste Management Plan will be developed as part of the Construction Environmental Management Plan to ensure proper management and disposal of materials. Waste will be managed and treated in compliance with applicable federal and provincial regulatory requirements, and permits will be obtained in accordance with the *Environmental Management Act* as applicable.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
88	Effects of water withdrawal/alteration on local watersheds including watercourse flows.	The EAC application will include consideration of potential effects to fish habitat as a result of any proposed surface water withdrawals. The proposed scope of the assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
	Wetlands	
89	Effects to wetlands, including wetland water quality through the construction of Project components (e.g., roads, power generation facility)	The Vegetation and Wetlands VC will consider potential for the Project to result in changes to wetland functions. The proposed scope of assessment will be presented in the draft Application Information Requirements document that will be provided to Indigenous groups, government agencies, and the public for review and comment.
	Visual Environment	
90	Effects of change in visual environment to human receptors and wildlife, including the amount of night-time lighting of the facility.	The EAC application will consider the potential for changes in the visual environment to affect human receptors via the Land and Resource VC. The Wildlife VC will consider potential sensory effects on wildlife.
	Vulnerable Population Groups (GBA+)	
91	Effects on vulnerable population groups (GBA+) such as women, disabled persons, elders and youth as a result of impacts from the influx of workers to the communities.	The EAC application will include consideration of GBA+ factors including sex, indigeneity, disability, and age in evaluating potential effects, in particular through the assessment of VCs in the social, economic and health pillars.
92	The differential impacts on diverse groups of people resulting from all phases of the Project, including disaggregated data, and mitigation strategies to address these impacts including the incorporation of a GBA+ approach.	The EAC application will include consideration of GBA+ factors in understanding potential effects and developing mitigation strategies, in particular through the assessment of VCs in the social, economic and health pillars. Disaggregated data will be used to the extent it is publicly available. Since Census information obtained from Statistics Canada, the primary dataset used to inform the characterization of existing population and demographic conditions, is limited to sex (i.e., male and female) and indigeneity, and is also prone to suppression (to protect the identity of respondents), gaps in publicly available data are expected. Where identified, gaps will be reviewed to determine the need for additional baseline collection.

TABLE D-1 RESPONSES TO SUMMARY OF ISSUES

ID	High-level Summary of Issues	Cedar LNG Response
93	Approach to consultation, including that consultation activities consider barriers to participation for local under-represented groups.	Cedar will develop three consultation plans to guide consultation activities for the Project: an Indigenous Groups Consultation Plan, an Agency Consultation Plan, and a Public Consultation Plan. Cedar will provide these plans to the EAO and IAAC for comment and to the EAO for approval. Cedar will also conduct public engagement as per the section 10 Order under BCEAA. The activities in the Public Consultation Plan and the EAO-directed public engagement is intended to facilitate participation of all members of the public, including under-represented groups.