

Ksi Lisims LNG
Natural Gas Liquefaction & Marine Terminal Project



KSI LISIMS LNG



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Acronyms and Abbreviations

AIR	Application Information Requirement
Agency	Impact Assessment Agency of Canada
Application	Environmental Assessment Certificate Application
BC	British Columbia
BC EAA	British Columbia <i>Environmental Assessment Act</i>
BC EAO	British Columbia Environmental Assessment Office
DFO	Fisheries and Oceans Canada
FLNG	floating liquefied natural gas production, storage and offloading facility
FNCI	First Nation Climate Initiative
IACC	<i>Impact Assessment Act</i>
km	kilometre
LAA	local assessment area
m	metre
m ³	cubic metre
MSR	marine shipping route
MSSR	materials and supply shipping route
NGL	natural gas liquid
Nisga'a Treaty	Nisga'a Final Agreement
NLG	Nisga'a Lisims Government
nm	nautical mile
OWAA	open water assessment area
Project	Ksi Lisims LNG – Natural Gas Liquefaction and Marine Terminal Project
Proponents	Nisga'a Nation, Rockies LNG Limited Partnership and Western LNG
RAA	regional assessment area
Site	Project Site

VC	valued component
WCGT	Westcoast Gas Transmission Project

1 APPLICATION SUMMARY

2 S1. INTRODUCTION

3 1.1 Overview

4 The Nisga'a Nation, Rockies LNG Limited Partnership (**Rockies LNG**) and Western LNG LLC (via its
5 subsidiary, **Western LNG**) (each a **Proponent** and collectively referred to herein as the **Proponents**), are
6 proposing to jointly develop an energy project, the Ksi Lisims LNG - Natural Gas Liquefaction and
7 Marine Terminal Project (the **Project**). The Project consists of:

- 8 • Two floating liquefaction, storage and off-loading barges (**FLNGs**) with the capacity to produce up
9 to 12 million tonnes per annum of liquefied natural gas (**LNG**) for export to international markets
- 10 • Marine components including two jetties that provide permanent mooring for the FLNGs, a
11 marine offloading facility that includes optional moorage for tugs, and shipping of LNG and natural
12 gas liquids (**NGLs**) between the Project Site (the **Site**) and the 12 nautical mile (**nm**) limit of the
13 Canadian territorial sea
- 14 • Supporting infrastructure including a third party owned transmission line between the Site and
15 Nisga'a Lands (as defined under the Nisga'a Final Agreement [**Nisga'a Treaty**]), water and
16 wastewater treatment, administrative buildings and workforce personnel accommodation.

17 The Project is subject to review under the BC *Environmental Assessment Act* (**BC EAA**), the federal *Impact*
18 *Assessment Act* (**IAA**), and the Nisga'a Treaty. The federal Minister of Environment and Climate Change
19 approved the Government of B.C.'s request to substitute the provincial review process for the federal
20 impact assessment process on April 6, 2023.

21 This document has been prepared to provide a summary of the Application for an Environmental
22 Assessment Certificate (the **Application**) as required by the Application Information Requirements (**AIR**).

23 1.1.1 Evolution of the Project

24 At the turn of the millennium, the Nisga'a Nation came together to sign the Nisga'a Treaty with the BC and
25 Canadian governments. The Nisga'a Treaty, BC's first modern treaty, was celebrated as a landmark step
26 toward reconciliation and equality. The Treaty establishes a constitutional right for the Nisga'a people to
27 self-govern, recognizes Nisga'a lands, and opens the door for economic initiatives, including the
28 development of the Nisga'a Nation's natural resources. Over twenty years later, the Nation has made
29 significant progress but has yet to realize the full benefits enabled through the development of their land
30 and resources.

31 Following community consultation, the Nisga'a Nation produced an economic prosperity plan which
32 identified the Project as the major project to support other opportunities. The Project would have a
33 transformative impact, not just for the Nisga'a people, but for Indigenous people across BC's northwest.

1 The Nisga'a Nation is a founding member of the First Nations Climate Initiative (**FNCI**), an Indigenous-led
2 collaborative forum dedicated to fighting climate change while also alleviating First Nations poverty,
3 restoring ecosystems in traditional territories, and enabling Indigenous people to become leading players
4 in a decarbonized economy. The Project represents a cornerstone project for the FNCI because it will
5 stimulate infrastructure investment such as electrical transmission, encourage innovation, mark a new
6 standard for cleaner energy development and plant seeds of prosperity for the entire region.

7 The Nisga'a Nation has attracted highly credible and experienced co-developers, Rockies LNG and Western
8 LNG, each of which bring a unique skill set to the Project. The Nisga'a Nation will host the facility on their
9 fee-simple, Category A land, and provide governance and environmental oversight. Rockies LNG is a
10 consortium of upstream natural gas producers that together produce one third of the natural gas
11 extracted from the Western Canadian Sedimentary Basin. Western LNG is a Houston-based company with
12 deep experience in the development and operation of LNG facilities.

13 The Proponents are committed to developing a Project that balances the need to build a strong local
14 economy in northwestern BC with protecting the environment. Together, the Proponents have identified
15 four goals for the Project:

- 16 1. Create economic self-determination for the Nisga'a Nation and improve the quality of life for
17 Nisga'a citizens through the provision of new revenue and royalty streams, training, education,
18 employment and contracting opportunities for Nisga'a citizens, while also providing indirect
19 benefits such as improved community infrastructure and marine emergency response in the
20 vicinity of the Site;
- 21 2. Create direct and indirect economic benefits for other Indigenous nations in the region, as well as
22 other communities in northwest BC, Alberta, and Canada, including skills training, local
23 employment, contracting and procurement;
- 24 3. Provide tax revenue that will support Indigenous, provincial and federal objectives to improve
25 health, education, transportation infrastructure and other social benefits; and
- 26 4. Provide social, economic, and environmental benefits by exporting Canadian natural gas with
27 lower life-cycle emissions through LNG, that provides a safe, secure and reliable source of energy.
28 Low carbon LNG supports the global transition away from more carbon intensive forms of energy
29 while providing improving energy security and reliability in global markets.

30 The Project will not only directly provide employment and contracting opportunities, and indirect
31 economic activity across British Columbia, it is also expected to result in tangential benefits such as
32 improved marine emergency response in the vicinity of the Site as well as training and capacity building
33 opportunities for northwest BC citizens and entrepreneurs.

34 The Nisga'a Nation has carefully planned this Project for nearly a decade. It is the lynchpin of their
35 economic prosperity plan, and the FNCI vision of a northwest BC clean energy hub. The Ksi Lisims LNG
36 Project is a catalyst for Indigenous economic independence and its success will be a clear signal that
37 modern treaties are meaningful and powerful vehicles for reconciliation.

1 **S2. PROJECT DESCRIPTION**

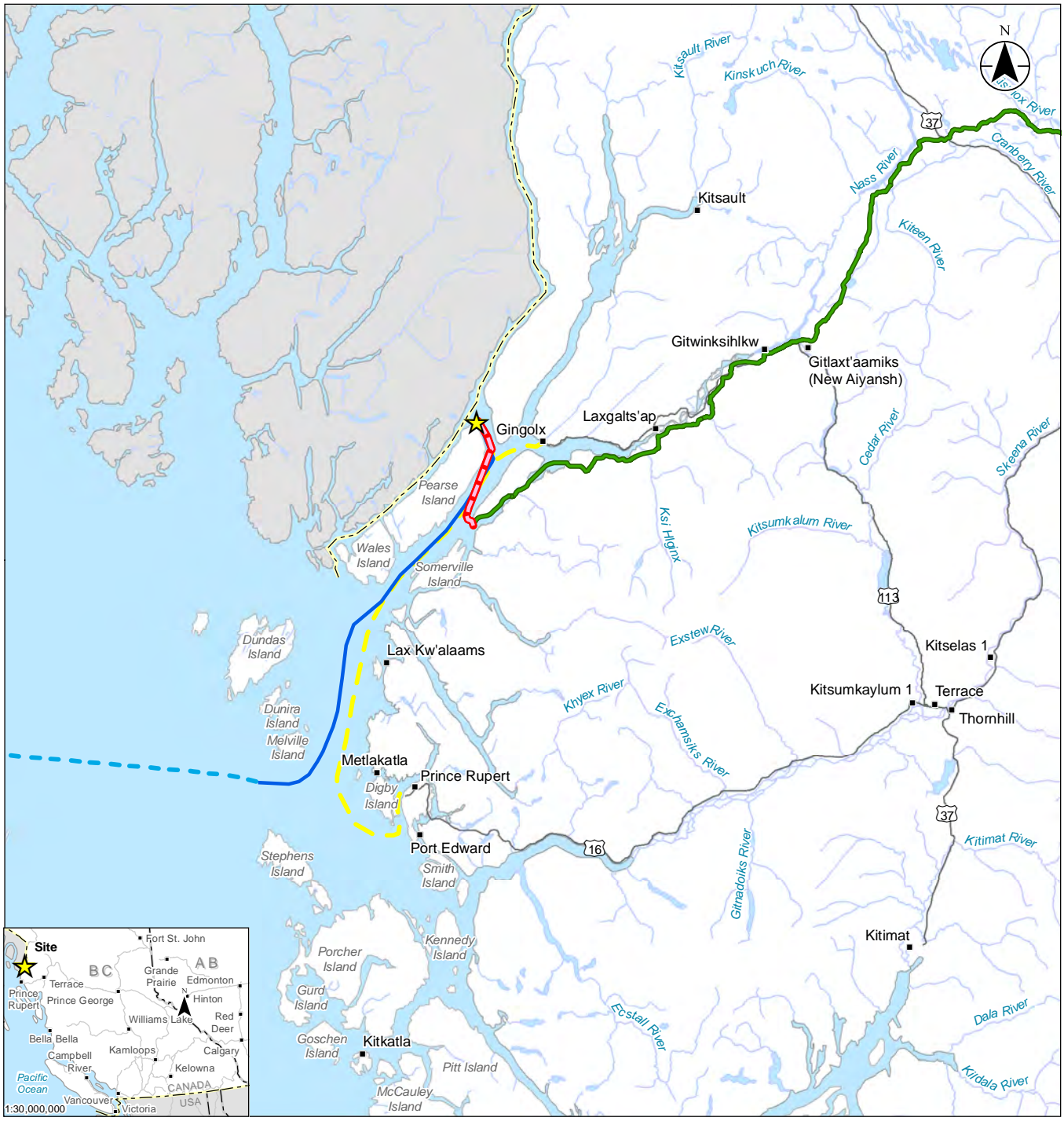
2 The proposed Project is a FLNG and marine terminal, including related infrastructure, on Category A Lands
3 (District Lots 5431 and 7235), as defined in the Nisga'a Treaty, owned in fee simple by the Nisga'a Nation,
4 and an adjacent proposed Water Lot on the northwest coast of BC at the northern end of Pearse Island
5 approximately 15 kilometres (**km**) west of the Nisga'a community of Gingolx, which is also the closest
6 community (Figure S2–1). The Project will convert Canadian natural gas to LNG. Natural gas will be
7 transported to the Site via a pipeline originating in northeastern BC. The pipeline will be owned and
8 operated by a third-party and will be subject to the regulatory requirements of the Nisga'a Lisims
9 Government (**NLG**), BC, and Canada.

10 At full build-out, the Project will receive between 1.7 and 2 billion cubic feet per day (i.e., 48.1 and
11 56.6 million cubic metres [**m³**] per day) of pipeline grade natural gas and produce up to 12 million tonnes
12 per annum of LNG. The Project includes shipping of LNG along the marine shipping route (**MSR**) between
13 the Site and the BC Coast Pilots boarding location at or near Triple Island and Canada's 12 nm territorial
14 sea limit (**marine shipping route**) (see Figure S2–1).

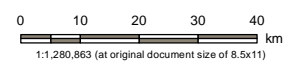
15 Construction of the Project is anticipated to span three to four years. The operational lifespan of the
16 Project is anticipated to be a minimum of 30 years, starting in 2028 (i.e., operational until at least 2058).

17 The Project will consist of two FLNGs, each with liquefaction processing units, and a combined total
18 nominal capacity of 12 million tonnes per annum of LNG. The main refrigerant compressor drives are
19 electric motors. Total storage capacity will be 490,000 m³ of LNG divided between the two FLNGs.
20 On-shore buildings include a control building, administrative building with a medical clinic, maintenance
21 workshop and warehouse, emergency response area, permanent workforce personnel accommodations,
22 and a security office. Figure S2–2 provides a conceptual Project layout.

23



- ★ Site
- Marine Transit Route
- - - Open Water Marine Shipping Route
- Materials and Supply Shipping Route
- - - Potential Location of Connecting Pipeline
- Prince Rupert Gas Transmission
- Populated Place
- Highway
- - - International Boundary
- - - Provincial Boundary
- Watercourse
- Country
- Canada
- United States
- Waterbody



Project Location:
Pearse Island, BC

Project Number: 123221820
Prepared by TQUILICHINI on 20230921
Requested by MRANSOM on 20230920
Checked by EFLORY on 20230925

Client/Project/Report
Ksi Lisims LNG
Natural Gas Liquefaction and Marine Terminal
Application Summary

Figure No.
S2-1

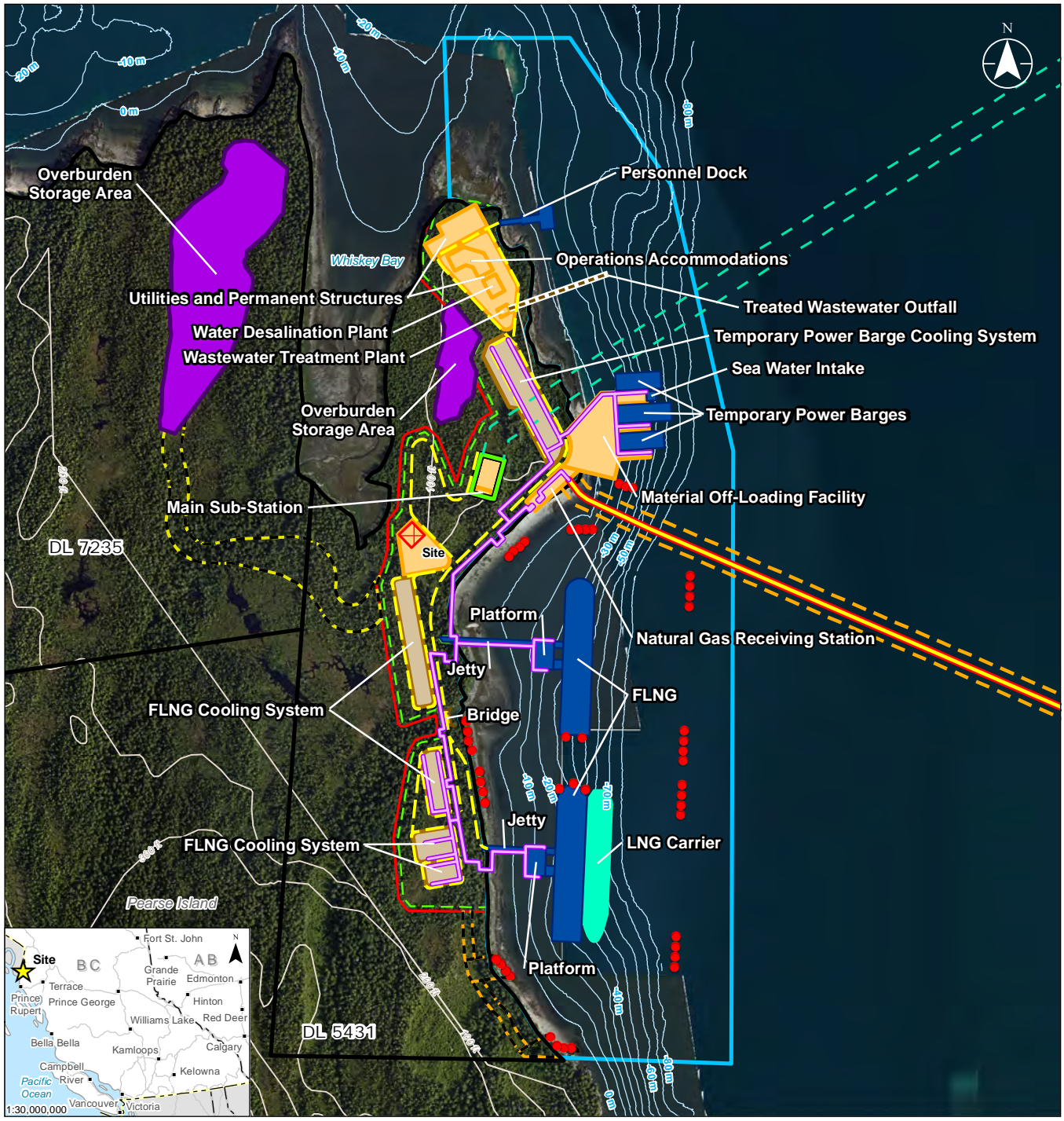
Title
Project Location

Notes

1. Coordinate System: NAD 1983 BC Environment Albers
2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada, Stantec, NISG a'a Nation, Rockies LNG

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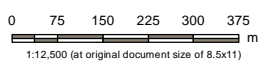


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Notes
 1. Coordinate System: NAD 1983 UTM Zone 9N
 2. Data Sources: DataBC, Government of British Columbia; Natural Resources Canada
 3. Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- Mooring Anchor
- ★ Site
- Proposed Access Road
- Feed Gas Pipeline
- Feed Gas Pipeline Right-of-Way
- Powerline Right-of-Way from Mainland
- Utility Line
- Wastewater Treated Effluent Pipeline
- Boundaries of District Lots 7235 and 5431
- Anchor Access Corridor
- Overburden Area Access Corridor
- Site Fence Line
- Terrestrial Footprint
- Footprint Component**
- Bridge
- Buildings and Utilities
- Cooling Structures
- Helicopter Pad
- Marine Component (Fixed)
- Marine Component (Not Fixed)
- Marine Footprint
- Overburden Storage Area
- Switchyard
- Bathymetric Contour



Project Location: Pearse Island, BC
 Project Number: 123221820
 Prepared by AYIU on 20240530
 Requested by JFRIES on 20240530
 Checked by EFLORY on 20240530

Client/Project/Report
 Ksi Lisims LNG
 Natural Gas Liquefaction and Marine Terminal
 Section 1.0

Figure No.
S2-2

Title
Conceptual Project Layout

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1 **S3. ENGAGEMENT ACTIVITIES AND SUMMARY OF KEY ISSUES IDENTIFIED**

2 The Proponents developed plans to engage Indigenous nations, the public and interested parties to gather
3 meaningful input for the design, construction and operation of the Project. This section provides an
4 overview of the engagement activities completed to date.

5 **3.1 Indigenous Nation Engagement**

6 The Proponents recognize the importance of early and meaningful engagement with Indigenous nations
7 and strive to establish and maintain mutually respectful relationships with Indigenous nations engaged
8 with the Project. To date, the Proponents have endeavoured to engage regional Indigenous nations
9 through: (1) Nation-to-Nation engagement led by Nisga'a leadership and (2) technical engagements led
10 by the Project team. The focus has been on early engagement at the technical level with designates of
11 each of the Indigenous nations.

12 Engagement activities with the Indigenous nations have included:

- 13 • Introducing the Project and the Proponents
- 14 • Providing notification of Project steps and processes
- 15 • Signing Environmental Assessment and Regulatory Process Funding Agreements. The Agreements
16 provide funding for the Indigenous nation to undertake studies to understand Project-related
17 effects to their interests and to participate in the environmental assessment process
- 18 • Providing a copy of the draft AIR, the Detailed Project Description, the valued component (VC)
19 selection document, and other Project materials for review and comment
- 20 • Providing a copy of the preliminary list of potential effects on each nation and preliminary list of
21 information sources for review and comment
- 22 • Providing preliminary drafts of mitigation measures, environmental assessment documents and
23 technical data reports for review in advance of submission to the British Columbia Environmental
24 Assessment Office (BC EAO)
- 25 • Providing updates regarding Project design and evolving timelines

26 Key concerns raised by Indigenous nations during engagement includes:

- 27 • Potential disruption to cultural transference, and ability of families to engage in harvesting and
28 other activities on or around Pearse Island, and identification of alternative areas for harvesting
29 within a Nations traditional territory.
- 30 • Potential interruptions to country food fishing and harvesting activities within Portland Canal and
31 on north Pearse Island.
- 32 • Potential interactions between long lines (set for halibut) within Portland Canal and transiting
33 LNGCs as well as the potential underwater pipeline that will transect Portland Canal.
- 34 • Potential impacts on harvested species

- 1 • Potential impacts to marine resources from increased shipping, with a particular focus on
2 marine mammals and marine fisheries
- 3 • Potential impacts on water, wildlife, fish, and birds within and beyond the Project’s assessment
4 areas
- 5 • Potential impacts to air quality, with a focus on air emissions and GHG
- 6 • Potential accidents and malfunctions with the potential to affect environmental health,
7 resource quality and abundance, and health and well-being.
- 8 • Potential adverse interactions between the non-local workforce and local community members,
9 including but not limited to increase in drugs and alcohol prevalence in the community and
10 violence.
- 11 • Potential increases in the cost of living, including increases in housing and rental costs
- 12 • Potential impacts of the proposed shipping routes, including potential impacts to safety of Nations
13 travelling on the water due to the potential for marine accidents and the generation of
14 unpredictable wakes
- 15 • Potential cumulative effects from increased marine vessel traffic

16 **3.2 Public Engagement**

17 The public and stakeholders were provided opportunities to participate in engagement activities in
18 accordance with the BC EAO Process Order and the Proponents’ Public Engagement Plan. Through all
19 phases of the Application process (Early Engagement, Process Planning, and Application development),
20 the Project has engaged with the public as required by the BC EAO and the Impact Assessment Agency of
21 Canada (the **Agency**) as follows:

- 22 • The Project website is maintained and updated.
- 23 • Virtual (or in-person, depending on the COVID-19 protocols) open houses, town halls, or
24 community meetings have taken place during BC EAO and Agency-designated public comment
25 periods.
- 26 • Digital and print advertisements, as well as social media, have been developed to promote open
27 houses, town halls, or community meetings and direct the interested public to an online
28 registration page on the Project’s website.
- 29 • Educational materials were shared on the Project website to help the public learn more about the
30 Project.
- 31 • Input and feedback from virtual town halls, open houses, or community meetings, or other input
32 received outside of these sessions, was recorded in an issues tracking table.

1 Supportive feedback from the community included optimism that the Project would generate new
2 economic and job opportunities. In a public survey conducted by the Nisga'a Nation in 2022, over
3 74 per cent of respondents agreed the Project would have a positive impact on job opportunities, and
4 60 per cent agreed it would result in an overall economic benefit.

5 Key concerns raised by the public included:

- 6 • The Project will emit greenhouse gas emissions
- 7 • Potential impacts to fish and wildlife habitat
- 8 • Local investment should be directed toward tourism, training workers, and intermittent
9 renewable energy sources
- 10 • Potential for accident and malfunction risks and human health impacts
- 11 • Economic benefit uncertainty based on previous mega project development in region
- 12 • Increased marine traffic on the coast
- 13 • The Nisga'a Nation does not represent all Indigenous communities that may be impacted
- 14 • Potential risks to women and other marginalized communities typically associated with
15 construction camps
- 16 • Potential impacts on local cost of housing and demand on daycare

17 At multiple points during the Project's development, the Project team conducted outreach to over
18 70 identified community stakeholders. 85 percent of those contacted have not, to date, provided a
19 response or indicated interest in dialogue.

20 As Project Application development and review progresses, the Proponents will continue to provide
21 information and engage with the public as well as provide opportunities to offer feedback on the Project.
22 Additional detail regarding public engagement can be found in Section 3.0 of the Application.

23 **3.3 Government Engagement**

24 The Proponents have conducted various engagement activities with federal, provincial, municipal, and
25 regional governments beginning in Q4 of 2020 and continuing through to present. Through each phase of
26 the Application process (Early Engagement, Process Planning, and Application development), the
27 Proponents have implemented best practices which have included early and transparent engagement.
28 The Proponents sought to tailor the engagement approach to reflect the needs and interests of municipal
29 and regional governments through the following:

- 30 • Emailed notifications to targeted municipal and regional government representatives identified
31 during early Project engagement informing them of how they can get involved, how best to
32 provide feedback, and an offer to have virtual meetings and/or provide more information about
33 the Project, at various stages during the early engagement process.

- 1 • Pursued recommendations from these entities on how best to engage their communities on the
2 Project. For example, the municipal and regional governments may suggest community events to
3 participate in.
- 4 • Pursued feedback from municipal and regional governments on how to best reach out to diverse
5 populations within the community to carry out engagement activities that are inclusive and
6 representative of the community at large.
- 7 • Requested meetings with various provincial and federal government representatives to
8 understand key issues and collect regional information to support the development of baseline
9 conditions
- 10 • Provided timely information on the Project and engagement sessions planned for their
11 communities, to allow for meaningful public and stakeholder engagement within local
12 communities.
- 13 • Tracked concerns raised by members of the participating communities during engagement
14 sessions.

15 The Proponents have met with the BC EAO and the Agency in an ongoing manner, including weekly
16 meetings that began August 18, 2021, to facilitate Project discussions. In addition, various Project and
17 topic specific meetings have been held between the Proponents, the BC EAO, the Agency as well as other
18 municipal provincial and federal agencies. Where appropriate, results of engagement have been carried
19 through the Application. As Project planning activities progress, the Proponents will continue to provide
20 information and engage with local governments as well as provide opportunities to offer feedback on the
21 Project. Additional detail regarding government engagement can be found in Section 4.0 of the
22 Application.

23 **3.4 Summary of Gender Based Analysis Plus**

24 The Application incorporates Gender Based Analysis Plus (GBA Plus) to inform the assessment of social,
25 economic and health VCs for distinct human populations. The analysis emphasizes the importance of
26 disaggregating both qualitative and quantitative data, as available, to understand the unique impacts on
27 diverse subgroups, considering numerous factors, including the intersection of sex, gender, ethnicity/race,
28 culture, religion, income, age, sexual orientation, disability, education, geography and language. As
29 applicable, each VC assessment is disaggregated to support the analysis of disproportionate effects on
30 distinct human populations, including for the identification of follow-up programs. The Application relied
31 on the following guidance documents for the GBA Plus:

- 32 • Guidance: Gender-Based Analysis Plus in Impact Assessment (Agency 2021)
- 33 • Tool - Assessing the Quality of a GBA Plus in the Impact Statement (Agency no date)
- 34 • Human and Community Well-Being (BC EAO 2020)

35

1 **S4. SUMMARY OF KEY EFFECTS, MITIGATIONS AND FOLLOW-UP PROGRAMS**

2 The following section provides a summary of key Project effects, mitigation measures, predicted residual
3 and cumulative effects and any required follow up programs for the VCs, climate change, malfunctions
4 and accidents and effects of the environment on the Project. Table 4.1 provides a summary of key effects,
5 mitigation as well as cumulative effects. More detailed description of residual effects is provided in
6 Sections 4.1 through 4.17.

Table 4–1 – Summary of Key Effects, Mitigation and Design Considerations and Key Cumulative Effects for VCs, Climate Change, Malfunctions and Accidents and Effects of the Environment

Value Components	Key Effects and Considerations	Mitigation and Design Considerations	Key Cumulative Effects
Air Quality	<ul style="list-style-type: none"> Increase in concentrations of ambient air pollutants 	<ul style="list-style-type: none"> Gas turbines and heat medium heaters selected based on ability to meet legislated emissions requirements Re-liquefaction of boil-off gas from the LNG tanks and from LNG carriers during loading operations Implement industry standard practices for construction including dust control and regular maintenance of machinery and equipment Implement industry standard practices for inspection and maintenance including regular maintenance of machinery and equipment, and completing annual emissions testing 	<ul style="list-style-type: none"> Potential for cumulative effects with reasonably foreseeable Nasoga Compressor Station associated with Westcoast Gas Transmission Project (WCGT) Comparison of maximum predicted ambient air pollutant concentrations between cumulative and Project (Application) cases shows negligible change (<1%) Overall risk for cumulative effects is low
Acoustic	<ul style="list-style-type: none"> Increased noise levels causing nuisance, annoyance, and sleep disturbance to people (i.e., personnel sleeping at Site) 	<ul style="list-style-type: none"> Schedule construction activities predominantly during the day shift Consider noise ratings when selecting equipment Implement noise rating targets for equipment Reduce construction and operation marine traffic to and from the Site Incorporate noise attenuation measures into the design of worker's accommodation building (walls and roof) Blasting will meet established thresholds for ground vibration and overpressure 	<ul style="list-style-type: none"> Potential for cumulative effects with existing and future forestry activities, marine shipping activities and reasonably foreseeable third-party powerline and pipeline construction. Noise sensitive receptors closest to the MSR activities will have more cumulative noise effects from the Project than noise sensitive receptors further away. Expect increased noise throughout the life of the Project; however, the risk of residual cumulative effects is moderate because the predicted noise levels are below the BC OGC noise guideline at all residential receptors and/or Health Canada guidance except at Whiskey Bay.
Surface Water	<ul style="list-style-type: none"> Change in the chemical and physical composition of surface water Change in surface water quantity 	<ul style="list-style-type: none"> Implement erosion prevention, sediment control measures as well as water and stormwater management. Develop and implement a Trigger Action Response Plan for water and sediment control management Avoid watercourses, wetlands, and riparian areas, to the extent possible 	<ul style="list-style-type: none"> Potential surface water residual effects related to quantity are not expected to interact with other existing, planned or reasonably foreseeable projects and/or activities Potential for increase in sulphur and nitrogen deposition due to Project and Nasoga Compressor Station (WCGT); however, overall risk to surface water quality is low
Groundwater	<ul style="list-style-type: none"> Change in local groundwater levels due to change in recharge/discharge characteristics 	<ul style="list-style-type: none"> Develop and implement measures for water and stormwater management 	<ul style="list-style-type: none"> Potential groundwater residual effects are not expected to interact with other existing, planned or reasonably foreseeable projects and/or activities
Vegetation and Wetlands	<ul style="list-style-type: none"> Change in abundance of plant species of conservation concern, botanical and cultural forest product plant species and/or invasive plant species Change in abundance or condition of ecological communities of conservation concern Change in wetlands areal extent and/or function 	<ul style="list-style-type: none"> Mark clearing boundaries prior to Site preparation to keep clearing activities within the designated footprint Implement practices to reduce the introduction or spread of invasive plants and noxious weeds Incorporate botanical and cultural forest products into reclamation planning Complete a pre-construction survey of environmentally sensitive features, specifically ecological communities of conservation concern and wetlands within the Project footprint Wetland monitoring, management, and compensation plan 	<ul style="list-style-type: none"> Potential for cumulative effects with emissions from the reasonably foreseeable Nasoga Compressor Station as well as existing and future forestry activities Potential cumulative effects result primarily from direct loss of vegetation due to clearing/construction and eutrophication as a result of nitrogen deposition, which together are predicted to result in potential changes to the abundance of plant species of interest, abundance or condition of ecological communities of conservation concern, as well as changes to wetlands Largest magnitude is predicted increase in eutrophication effects to lichen.

Table 4–1 – Summary of Key Effects, Mitigation and Design Considerations and Key Cumulative Effects for VCs, Climate Change, Malfunctions and Accidents and Effects of the Environment

Value Components	Key Effects and Considerations	Mitigation and Design Considerations	Key Cumulative Effects
Wildlife and Wildlife Habitat	<ul style="list-style-type: none"> ▪ Changes in wildlife habitat ▪ Potential for increased mortality risk to wildlife ▪ Changes in movement related to changes in habitat 	<ul style="list-style-type: none"> ▪ Avoid Site preparation disturbance during primary nesting period ▪ Develop and implement additional wildlife management measures such as to protect identified wildlife habitat features ▪ Establish lighting that limits environmental disturbance ▪ Complete a pre-construction survey for wildlife habitat features ▪ Mark buffers around identified active wildlife habitat features prior to Site preparation activities ▪ Install fences around the terrestrial border of the Project footprint ▪ Develop and implement waste management measures 	<ul style="list-style-type: none"> ▪ Potential for cumulative effects with existing and future industrial projects and resource use (i.e., forestry, fishing, aquaculture) activities along and associated with the shipping route as well as reasonably foreseeable industrial projects and activities including the third-party transmission line and pipeline ▪ Residual cumulative effects on wildlife are predicted as a result of changes in vegetative cover (e.g., removal) and type (e.g., conversion of old forest to second-growth forest) and increasing levels of indirect effects (e.g., noise, lighting, human presence, vessel traffic) and direct effects (e.g., vessel and vehicle traffic), which are expected to result in changes to habitat, movement, and mortality risk ▪ Overall, residual cumulative effects on wildlife are not anticipated to result in a measurable adverse residual effect for wildlife because cumulative effects are not predicted to threaten the long-term persistence or viability of species of management concern, or species of cultural or traditional importance
Freshwater Fish and Fish Habitat	<ul style="list-style-type: none"> ▪ Change in phytoplankton/trophic status due to deposition of nitrogen ▪ Changes to fish habitat due to harmful alteration, disruption or destruction of fish habitat ▪ Change in fish health, growth, survival, or reproduction 	<ul style="list-style-type: none"> ▪ Limit water withdrawals to maintain fish habitat ▪ Use clear span bridges or arch culverts to cross streams with confirmed fish presence ▪ Use only clean equipment at Site 	<ul style="list-style-type: none"> ▪ Potential for cumulative effects with emissions reasonably foreseeable from Nasoga Compressor Station (WCGT) as well as existing and future forestry activities ▪ Residual cumulative effects to fish habitat due to riparian vegetation clearing combine with residual effects from past, present, or future forestry activities; however, cumulative risk to freshwater fish and fish habitat is expected to be low ▪ Potential cumulative effects due to clearing/construction and eutrophication as a result of nitrogen deposition may cause residual cumulative effects in phytoplankton density; however, no changes in trophic status are predicted in any of the assessed lakes and streams. As such the overall risk is low
Marine Resources	<ul style="list-style-type: none"> ▪ Change in water and sediment quality resulting in potential effects on marine flora and fauna ▪ Change in habitat due to harmful alteration, disruption or destruction of fish habitat ▪ Change in fish, marine mammal and sea turtle behavior caused by sensory disturbances ▪ Risk of fish, marine mammal or sea turtle injury or mortality risk 	<ul style="list-style-type: none"> ▪ Develop and implement erosion prevention and sediment control measures ▪ Avoid impacts to sensitive marine areas ▪ Where possible, schedule Project activities during NLG and Fisheries and Oceans Canada (DFO) windows of least risk ▪ Implement sound attenuation prior to and during pile driving ▪ Conduct underwater noise monitoring during construction ▪ Conduct fish salvage, as required 	<ul style="list-style-type: none"> ▪ Potential for cumulative effects with existing and future industrial projects and resource use (i.e., forestry, fishing, aquaculture) activities with associated shipping as well as reasonably foreseeable industrial projects and activities including the third-party transmission line and pipeline ▪ Potential for cumulative effects associated with increased total suspended solids during construction, due to underwater noise associated with marine shipping (both from Project vessels as well as the operation of the facility), due to avoidance related to artificial lighting as well as potential increase in injury or mortality associated with marine transport and shipping exists ▪ Overall, the potential risk of cumulative effects on marine resources is moderate (water quality, loss of habitat, injury or mortality) to high (sensory disturbance)

Table 4–1 – Summary of Key Effects, Mitigation and Design Considerations and Key Cumulative Effects for VCs, Climate Change, Malfunctions and Accidents and Effects of the Environment

Value Components	Key Effects and Considerations	Mitigation and Design Considerations	Key Cumulative Effects
Employment and Economy	<ul style="list-style-type: none"> Change in regional employment, business, and economy (i.e., tax and gross domestic product) Potential for disproportionate effects on diverse subgroups 	<ul style="list-style-type: none"> Develop and implement workforce strategies that support the hiring of a BC or Canadian resident construction workforce in the building of those components of the Project constructed/assembled in Canada Develop and maintain a database of Nisga'a businesses and contractors as well as other Indigenous, local and regional businesses and contractors Work with government agencies, educational institutions and contractors to implement on-the-job training and apprenticeship programs Identify potential shortages of workers with specific skill requirements and training and work with local and regional training and education facilities and communities to increase opportunities for Indigenous and local community members to obtain training Develop and implement gender equity and diversity policies that focuses on hiring Nisga'a Nation members, local and Indigenous persons, and women to increase Project employment opportunities among underrepresented populations 	<ul style="list-style-type: none"> Potential for cumulative effects with existing and future industrial projects and activities as well as reasonably foreseeable industrial projects and activities including the third-party transmission line and pipeline Potential cumulative effects may result from demand on regional businesses and economy for materials, goods and services (including labour scarcity and cost); however, overall risk is low Note that positive residual effects are predicted for regional employment and therefore no cumulative effect is assessed
Marine Use	<ul style="list-style-type: none"> Change in marine navigation, Potential effects on marine fisheries and other uses due to shipping traffic Changes in visual quality, shipping-related noise and ambient light Potential for disproportionate effects on diverse subgroups 	<ul style="list-style-type: none"> Identify and install aids to navigation Establish an operational safety zone around the Project marine infrastructure 	<ul style="list-style-type: none"> Potential for cumulative effects with existing and future industrial projects and resource use (i.e., forestry, fishing, aquaculture) activities along and associated with the shipping route as well as reasonably foreseeable industrial projects and activities including the third-party transmission line and pipeline If all present and foreseeable projects and activities proceed, approximately 2,920 vessels could intersect or transit the Project MSR annually. Based on expected Project LNG carrier and NGL product vessel movements, the Project will contribute an additional 6% large marine vessel traffic movements in the region This increase will result in a moderate risk of cumulative effects related to marine use, visual quality and marine navigation effects
Infrastructure and Services	<ul style="list-style-type: none"> Change in infrastructure and services especially capacity, demand and supply of infrastructure and services Potential for road and air traffic effects as well as traffic incidents Potential for change in accommodation availability and costs Potential for disproportionate effects on diverse subgroups 	<ul style="list-style-type: none"> Develop and implement a worker code of conduct including ethics and respectful workplace training Provide cultural awareness training to all personnel and contractors Security personnel and access control will be provided at Site Develop and implement emergency management and response including fire prevention and protection measures Develop and implement a community feedback tool or process to receive and address community questions, suggestions, concerns, and complaints Develop and implement traffic safety measures for Project-related travel Personnel will be housed in a workforce accommodation center located on Site. 	<ul style="list-style-type: none"> Potential for cumulative effects with existing and future industrial projects as well as reasonably foreseeable industrial projects and activities including the third-party transmission line and pipeline Expected moderate risk for residual cumulative effects related to infrastructure and services, accommodation availability and transportation infrastructure Adverse residual cumulative effects on housing availability may result in an exceedance of housing capacity, or a decrease in the quality of a service provided, on an ongoing basis, which cannot be mitigated with current or anticipated programs, policies, or mitigation measures

Table 4–1 – Summary of Key Effects, Mitigation and Design Considerations and Key Cumulative Effects for VCs, Climate Change, Malfunctions and Accidents and Effects of the Environment

Value Components	Key Effects and Considerations	Mitigation and Design Considerations	Key Cumulative Effects
Community Health and Wellness	<ul style="list-style-type: none"> ▪ Change in community health such as health behaviours, risk conditions and health outcomes ▪ Potential effects on community wellness including social and Indigenous determinants of health ▪ Changes to health and medical infrastructure and services including demand for services as well as capacity and supply ▪ Potential for changes in food security including costing as well as availability and accessibility of market and country foods ▪ Potential for disproportionate effects on diverse subgroups 	<ul style="list-style-type: none"> ▪ Develop and implement an employee drug and alcohol policy ▪ Develop and implement a health and medical services plan ▪ Develop and implement a discrimination, bullying and harassment in the workplace policy ▪ Develop and implement a social and economic effects management plan ▪ Inclusion of on-Site medical facilities with at least one nurse practitioner and/or paramedic. 	<ul style="list-style-type: none"> ▪ Potential for cumulative effects with existing and future industrial projects and resource use (i.e., forestry, fishing, aquaculture) activities as well as reasonably foreseeable industrial projects and activities including the third-party transmission line and pipeline ▪ Cumulative effects on community health and wellness may occur through changes in population, employment and economic opportunities, working conditions, and income ▪ The magnitude of cumulative effects ranges from low to high; however, the Project’s contribution to these effects is primarily low to moderate
Human Health	<ul style="list-style-type: none"> ▪ Potential changes to human health due to exposure to emissions, noise and nighttime sleep disturbance. 	<ul style="list-style-type: none"> ▪ No Human Health specific mitigation; mitigation in the Air Quality and Acoustic VCs reduce emissions to levels that limit human health risk 	<ul style="list-style-type: none"> ▪ Potential for cumulative effects with emissions from reasonably foreseeable Nasoga Compressor Station (WCGT) ▪ There is limited spatial overlap of the air emissions from the Project and the Nasoga Compressor Station. Cumulative concentrations of air emission are predicted to remain below air quality guidelines, indicating no or minimal risk of adverse health effects to vulnerable and healthy populations ▪ There is no predicted overlap of noise and other projects or activities at receptor locations ▪ The risk of cumulative residual effects on human health is low
Archaeological and Heritage Resources	<ul style="list-style-type: none"> ▪ Loss of information about or alteration to archaeological or heritage site contents or context. 	<ul style="list-style-type: none"> ▪ Avoid identified archaeological and heritage sites to the extent possible ▪ In cases where avoidance is not feasible or practical, mitigation will involve systematic data recovery 	<ul style="list-style-type: none"> ▪ No adverse residual Project effects on Archaeological and Heritage Resources are anticipated. Therefore, there is no potential for cumulative effects
Climate Change	<ul style="list-style-type: none"> ▪ Emissions of greenhouse gas ▪ Assessment of best available technology and mitigation ▪ Potential for Project contribution to BC and Canadian GHG emissions ▪ Assessment of upstream emissions ▪ Development of a net-zero emission plan for the Project ▪ Assessment of climate resilience 	<ul style="list-style-type: none"> ▪ The Proponents will be working closely with government agencies to ensure alignment with provincial and federal GHG emission requirements, including those set out in CleanBC, the Roadmap to 2030 and the New Energy Action Framework. ▪ The Proponents will purchase carbon offsets sufficient to offset direct and acquired energy emissions equal to what is expected at full grid power 	<ul style="list-style-type: none"> ▪ Climate change is a global phenomenon and has the potential to interact with other local, regional, BC, Canada and global sources of GHG emissions; however, a cumulative effects assessment is not completed. See Section 4.15 for details regarding the assessment of Climate Change
Malfunctions and Accidents	<ul style="list-style-type: none"> ▪ Assessment of 7 possible scenarios: <ul style="list-style-type: none"> • On-shore and off-shore spills of hazardous materials • On-shore and off-shore fires or explosions • Loss of containment of LNG or hazardous materials from the FLNGs • Emergency LNG production unit shutdown • Vessel grounding, collision, near miss incidents, or allisions • LNG carriers or NGL product vessel spills • Project-related transportation incidents (roadway and marine) 	<ul style="list-style-type: none"> ▪ Develop and implement an emergency response program ▪ Planning and design will avoid the potential for Project activities to cause a forest fire ▪ If large numbers of workers are anticipated to be traveling to Site via Highway 113/ Nisga'a Highway and then by marine ferry, the Proponents will provide buses to transport workers to Site and reduce the number of individual vehicle trips ▪ Project vehicles traveling on Highway 113/Nisga'a Highway will carry fire suppression tools (e.g., fire pump can) 	<ul style="list-style-type: none"> ▪ Cumulative effects are not assessed for Malfunctions and Accidents

Table 4–1 – Summary of Key Effects, Mitigation and Design Considerations and Key Cumulative Effects for VCs, Climate Change, Malfunctions and Accidents and Effects of the Environment

Value Components	Key Effects and Considerations	Mitigation and Design Considerations	Key Cumulative Effects
Effects of the Environment	<ul style="list-style-type: none"> ▪ Potential for Project risk related to four potential environmental conditions: <ul style="list-style-type: none"> • Climate change • Extreme weather • Tsunamis and seismic events • Forest fires 	<ul style="list-style-type: none"> ▪ FLNGs will be built in a manner that allows adjustment to changing water levels, whether due to sea level rise or storms ▪ Develop and implement inclement weather response measures ▪ A marine operation vessel will be available at the facility during operation to provide security and emergency response, if necessary ▪ Establish muster points on high ground to ensure the safety of personnel during a storm surge, seismic event and/or tsunami 	<ul style="list-style-type: none"> ▪ Cumulative effects are not assessed for potential environmental effects on the Project

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1 **4.1 Air Quality**

2 Residual effects associated with air quality are expected based on dispersion modelling predicting an
3 increase in concentrations of ambient air pollutants due to Project air emissions. However, the magnitude
4 of residual effects during construction is expected to be low and limited to the area close to the Site.
5 During operation, residual effects are expected to be moderate and occur within 2.5 km of the Site.
6 The residual effects are reversible; ambient concentrations will reduce once operations cease. The Project
7 residual effects may cumulatively interact with the residual effects (emissions) from the approved but not
8 yet constructed Westcoast Connector Gas Transmission K5 Nasoga compressor station (see Table 4–1).

9 As required by the *Environmental Management Act*, the Project will obtain a waste discharge permit
10 administered by the BC Energy Regulator. Further assessment of Project effects on air quality will be
11 completed as part of the waste discharge permit application.

12 **4.2 Acoustic**

13 Residual effects associated with the acoustic environment will result from noise emissions during
14 construction and operation. Two receptors are modelled to exceed federal guidance for noise from
15 Health Canada. These receptor locations are identified as harvest activity locations where activities are
16 generally considered intermittent (not extended occupancy). The Project-related marine traffic residual
17 effect along the shipping route is below the baseline sound level. Existing projects and physical activities
18 likely to interact cumulatively with Project noise are limited to MSR activities (see Table 4–1).

19 With the implementation of mitigation and management measures, the residual effects are not
20 anticipated to result in an exceedance of applicable provincial and federal noise guideline limits at most
21 receptors; therefore, no follow-up strategy is proposed.

22 **4.3 Surface Water**

23 Potential residual effects associated with surface water quality include an increase in total suspended
24 solids and turbidity during construction and an increase of sulphur and nitrogen deposition to
25 surface waters during operation; however, these effects are expected to be low magnitude and reversible
26 following construction and operation, respectively. Water withdrawals during construction may reduce
27 the quantity of water; however, water withdrawal will be based on maintaining adequate in-stream flow
28 (i.e., corresponding with BC Environmental Flow Needs guidelines). Residual effects to surface water
29 quantity will not interact cumulatively with the residual effects of other projects.

30 The construction environmental management plan will outline environmental monitoring requirements,
31 including monitoring of surface water quality and quantity. It is also anticipated that a follow-up
32 acidification and eutrophication monitoring program will be developed in consultation with
33 British Columbia Ministry of Environment and Climate Change Strategy to monitor lakes and streams in
34 the vicinity of the Project for acidification and eutrophication during operation. The Project residual
35 effects may cumulatively interact with the residual effects (emissions) from the approved but not yet

1 constructed Westcoast Connector Gas Transmission K5 Nasoga compressor station related to sulphur and
2 nitrogen deposition in surface waters; however, overall risk of cumulative effects is low (see Table 4–1).
3 The Proponents are collecting hydrometric data to define appropriate withdrawal levels and expect that
4 monitoring for turbidity will be required during construction. In addition, it is anticipated that acidification
5 and eutrophication monitoring will be required.

6 **4.4 Groundwater**

7 The Project may result in a change in groundwater quantity due to changes in ground surface material,
8 permeability and decreased infiltration (recharge) rates; however, these changes are expected to be low
9 in magnitude and reversible. No cumulative effects are anticipated because there are no past, present or
10 reasonably foreseeable future projects or activities that may interact temporally or spatially with the
11 potential residual effect on groundwater.

12 With the implementation of water and stormwater management measures, no follow-up strategy is
13 proposed for Groundwater.

14 **4.5 Vegetation and Wetlands**

15 Residual effects associated with vegetation and wetlands includes the loss of species and ecological
16 communities of conservation concern, the loss of areas that support botanical and cultural forest product
17 plant species, the potential eutrophication of species and ecological communities of conservation concern
18 and in particular lichen as well as the loss and change to wetlands. However, regional population densities
19 and the extent of ecological communities are sufficient to sustain current populations, communities, and
20 associated wetland functions without active management. As such, residual effects are low to moderate
21 in magnitude. There is potential for cumulative effects associated with existing and future forestry
22 activities and residual effects (emissions) from the approved but not yet constructed
23 Westcoast Connector Gas Transmission K5 Nasoga compressor station related to emissions that may
24 cause eutrophication (see Table 4–1).

25 It is expected that a follow-up program for Vegetation and Wetland Resources will be implemented to
26 verify Project effects and confirm that mitigation measures are effective. Included in this will be wetland
27 monitoring identified as part of the anticipated wetland compensation for wetlands subject to no net loss
28 of functions goal of the Federal Policy on Wetland Conservation.

29 **4.6 Wildlife and Wildlife Habitat**

30 Residual effects associated with wildlife and wildlife habitat are predicted associated with direct habitat
31 loss or alteration of wildlife habitat; indirect loss or alteration of wildlife habitat due to sensory
32 disturbance (i.e., reduced habitat effectiveness); and an increase in mortality risk associated with Project
33 marine vessel and vehicle traffic. However, the residual effects are expected to be low to moderate in
34 magnitude, with the exception of high magnitude residual effects associated with the change in habitat
35 for young forest bird community, winter shelter for moose and Pacific marten. The sustainability of
36 regional populations is not expected to be adversely affected. Cumulative effects may result from any

1 project or activity (existing and foreseeable) with associated shipping (limited to marine birds and
2 shorebirds), forestry activities and the third-party transmission line and pipeline (see Table 4–1).

3 The Proponents anticipate the need for a follow-up program to confirm the presence/absence of marbled
4 murrelet critical habitat within the Project Site.

5 **4.7 Freshwater Fish and Fish Habitat**

6 Adverse residual effects associated with fish and fish habitat are predicted related to an increase in
7 nitrogen and sulphur concentrations resulting in reduced fish habitat quality, a loss of riparian area that
8 may reduce fish habitat quality, potential for change in water quantity during construction, potential
9 alteration of fish habitat associated with culvert installation (and removal) and potential for fish habitat
10 quality reduction associated with increased sedimentation in streams affected by construction. Residual
11 effects are expected to be low to moderate in magnitude. There is potential for cumulative effects
12 associated with existing and future forestry activities and residual effects (emissions) from the approved
13 but not yet constructed Westcoast Connector Gas Transmission K5 Nasoga compressor station related to
14 emissions that may cause eutrophication (see Table 4–1).

15 A surface water quality monitoring program will be implemented to monitor the effects of air emissions
16 on the trophic state, pH, and acid neutralizing capacity of lakes and streams.

17 **4.8 Marine Resources**

18 Residual effects associated with marine resources include an increase in total suspended solids that may
19 affect water quality; direct loss and alteration of fish habitat; a change in behavior for marine fish and
20 mammals associated with underwater noise and artificial light; and an increase in injury and mortality risk
21 for marine fish, marine mammals and sea turtles associated with increased shipping. There is no
22 measurable change expected in the productivity of fish, invertebrate, marine mammal, or sea turtle
23 populations. There is overlap with all other present and foreseeable future projects and activities
24 requiring marine transportation. Cumulative effects to change in injury or mortality risk may be
25 irreversible. Additional detail related to cumulative effects is presented in Table 4–1.

26 If the Project activities are deemed to constitute a harmful alteration, disruption, or destruction a
27 Section 35(2)(b) Authorization under the *Fisheries Act* and associated habitat offsetting will be required.
28 Any offset features (e.g., rocky reefs, eelgrass planting, habitat restoration) will require long-term
29 monitoring to verify the effectiveness of the feature and to confirm that the success criteria are met.

30 **4.9 Employment and Economy**

31 Positive residual effects are expected on regional employment, regional businesses and regional economy
32 in the form of direct, indirect, and induced employment and labour income in the local assessment area
33 and other parts of BC and Canada and contributions to local, regional, provincial, and federal gross
34 domestic product and government revenues stem from Project demand and expenditures on labour,
35 goods, and services. In addition to government revenue earned through Project-related expenditures, the

1 Project will also pay property tax to Nisga'a Nation; these funds will support the Project objective of
2 economic reconciliation.

3 Adverse residual effects associated with employment and economy are expected to affect regional
4 businesses related to increased competition for labour and upward pressure on wages and regional
5 economy associated with potential for increased prices for consumables and cost of living. These potential
6 adverse residual effects are expected to be moderate in magnitude. The residual effects of other industrial
7 and marine projects and activities have the potential to interact cumulatively with the residual effects
8 from the Project (see Table 4–1).

9 The Proponents will develop and implement a social and economic effects management plan to adaptively
10 manage potential direct social and economic effects on services and infrastructure delivered by provincial
11 agencies and local governments.

12 **4.10 Marine Use**

13 The addition of Aids to Navigation near the Site will have a positive effect on marine navigation.

14 The Project is expected to have adverse residual effects on marine navigation and marine fisheries and
15 other uses related to the increase in marine vessels as well as change in access near the Project Site and
16 change in aesthetics. However, the Project is not expected to create a change or disruption that widely
17 reduces or restricts present marine use activities to a point where they cannot continue at current activity
18 levels and the magnitude of residual effects is expected to be low to moderate (limited to effects on
19 marine fisheries and other use). There is the potential for cumulative effects due to overlap of Project
20 residual effects with all other present and foreseeable future projects and activities requiring
21 marine transportation (see Table 4–1).

22 During Application review, the Proponents heard from Indigenous Nations that there is a desire for a
23 culturally-appropriate follow-up monitoring program for marine use. The Proponents are committed to
24 including this as part of the bi-lateral impact benefit negotiations and to the development of a
25 Terminal Operations Manual as part of the Navigation Safety Assessment.

26 **4.11 Infrastructure and Services**

27 The Project may result in positive residual effects associate with improved access to local infrastructure
28 and services through development of new regional infrastructure (i.e., new third-party natural gas
29 pipeline and electrical transmission line). In addition, the Project is expected to bring economic
30 opportunities and revenue to both Indigenous and non-Indigenous communities and businesses.

31 Adverse residual effects include additional demands on infrastructure and services such as childcare and
32 ambulance services, increased demand on accommodation availability and increased Project-related
33 traffic and use of transportation infrastructure. With the implementation of mitigation such as Project
34 personnel accommodation at Site, the magnitude of residual effects is expected to be low to moderate.
35 Residual effects of other industrial projects have the potential to result in cumulative effects with the
36 Project (see Table 4–1).

1 The Proponents have and will continue to engage with local and municipal government departments,
2 public agencies and private-sector companies that deliver infrastructure and services to assist with
3 planning for Project effects; as such, no specific follow-up and monitoring programs have been identified.

4 **4.12 Community Health and Wellness**

5 The Project will result in business and employment opportunities that generate meaningful improvements
6 in economic conditions in communities as well as significant revenue, taxes, and funding that will allow
7 the NLG to direct funds and resources to priorities and interests. Overall, the economic opportunities
8 associated with the Project for the Nisga'a Nation have the potential to result in improved community
9 well-being. Similarly, the Project is expected to result in economic development opportunities for other
10 Indigenous communities in the region. Through positive social effects related to employment and income,
11 the Project could result in positive residual effects for health behaviours (e.g., there is a clear correlation
12 between increased income and employment status and decreased smoking rates and other risk
13 behaviours) and could result in positive residual effects for households and individuals experiencing food
14 insecurity. Positive residual effects may also include enhanced ability to purchase equipment required for
15 traditional and cultural resource harvesting activities as well as market foods.

16 The Project has the potential to result in adverse residual effects on community health such as adverse
17 changes in mental health conditions as a result of employment and increased income related conditions
18 (e.g., increased substance abuse and communicable disease transmission); community wellness including
19 adverse affects on family dynamics due to rotational work; cost of living increases; as well as potential
20 increase in crime and adverse changes to sense of place and Indigenous environmental dispossession;
21 increased food security risks associated with potential increases in cost of living and reduced availability
22 of country foods; and health and medical infrastructure and services pressure associated with increased
23 pressure on health, emergency and social services due to out-of-region workers or emergency response.
24 Adverse residual effects are low to moderate in magnitude except related to community health where
25 magnitude has the potential to range from low to high. All existing and reasonably foreseeable projects
26 and activities have the potential to interact cumulatively with the residual effects of the Project (see
27 Table 4–1).

28 A social and economic effects management plan will include monitoring and reporting mechanisms for
29 skills training, employment, and procurement and effects on community-level infrastructure and services.

30 **4.13 Human Health**

31 Residual effects associated with human health include the potential increase in air emissions resulting in
32 potential human health risk and/or increase in noise levels resulting in increased annoyance rates and/or
33 sleep disturbance. However, air emissions are expected to be below air quality guidelines and noise
34 residual effects, following mitigation such as personnel accommodation design, and are negligible in
35 magnitude (i.e., predicted operation noise at the on-Site accommodation is expected to be within the
36 sleep disturbance limit). There is limited overlap of air emissions and no overlap of noise with other past,
37 present or reasonably foreseeable future projects or activities (see Table 4–1).

1 Based on the negligible magnitude of exposure and the limited number of people that would be exposed,
2 there is a low probability of adverse health effects. Therefore, no follow-up strategy is proposed for
3 Human Health.

4 **4.14 Archaeological and Heritage Resources**

5 Based on the implementation of mitigation, such as avoiding identified archaeological and heritage sites
6 and completing systematic data recovery should avoidance not be feasible (or practical), no Project
7 residual adverse effects have been identified on archaeological or heritage resources. As such there is no
8 potential for cumulative effects.

9 Any addition of lands that were not assessed as part of the Project-specific archaeology impact
10 assessments or paleontology study will need to be reviewed by a professional archaeologist and/or
11 paleontologist. The Proponents will develop and implement a Project-specific construction environmental
12 management plan that includes a chance find procedure.

13 **4.15 Climate Change**

14 Following implementation of mitigation measures, direct and indirect Project contributions to
15 GHG emissions arising from the construction and operation phases (once BC Hydro connection is
16 established) were estimated to be:

- 17 • 0.002% (construction) and 0.04% (operation) of the Canada GHG emissions total
- 18 • 0.02% (construction) and 0.4% (operation) of the BC GHG emission total
- 19 • 0.01% (construction) and 0.1% (operation) of the Canadian Oil and Gas sector emission total

20 A full upstream assessment of emission sources was completed. Upstream emissions are potentially
21 incremental to existing natural gas production, processing, and transmission GHG emissions in Canada,
22 but are not considered incremental on a North American and Global scale. The Project, supplied with
23 natural gas from the WCSB has a significantly lower well-to-port emissions intensity than comparable
24 projects on the US Gulf Coast with between 0.76–1.19 tonnes of CO₂e/tonne of LNG lower. At full scale,
25 that results in an emissions reduction of 9–14 million tonnes of CO₂e per year to a comparable US Gulf
26 Coast LNG facility.

27 The Proponents have developed a net-zero plan for the Project that takes an already best-in-class Project
28 and confirms the Proponents' commitment to climate change action. The Proponents are committed to
29 establishing, reviewing, and monitoring the GHG emissions targets and net-zero plan in consultation with
30 the Climate Action Secretariat, Indigenous nations, and the Ministry of Energy, Mines and Low Carbon
31 Innovation, once the facility has established a normal operation baseline.

32 The estimated GHG emissions from the Project are expected to be a small fraction of BC's and Canada's
33 total emissions, with the strong potential to have a net-positive global impact on climate emissions due
34 to the fuel switching benefit associated with the Project's low GHG content relative to all other fossil fuels.
35 The Project will have incremental emissions being a greenfield development, however, this impact will be

1 mitigated through the Project's net-zero plan and will result in net emissions equal to 0 kt CO₂e/yr, once
2 an interconnection with the electricity grid is provided by BC Hydro. The Project has the potential to
3 support the Nisga'a Nation and other Indigenous nation's goals of responding to climate change while
4 allowing for economic development.

5 A Climate Change Resilience Assessment was conducted to assess risks to the Project due to climate
6 change and to identify adaptation options to mitigate those risks. The climate variables that presented
7 the highest risks to the Project are heating degree days, cold days, freeze-thaw cycles, short duration high
8 intensity rainfall, heavy snowfall, and high wind events. High intensity rainfall can cause damage to the
9 Project infrastructure components (e.g., access roads and bridges) through erosion resulting in increased
10 risks of sedimentation into surface waters. Large waves associated with high wind events can cause
11 shoreline erosion and damage to the mooring systems resulting in increased risks of contamination from
12 the FLNG facility if a system failure occurs. The climate risks associated with wind gusts \geq 120 km/h can
13 increase the risk of generating airborne dust or other materials from or near ground level, and thus may
14 cause spreading of contaminated surface materials. Wildfire may cause structural damage of
15 infrastructure components and result in increased risks of contamination into air, land, and water systems.
16 Sea level rise may cause flooding and erosion at the Site resulting in increased risks of sedimentation into
17 surface water. The increased risks of contamination to the environment associated with extreme high
18 temperature, high intensity rainfall, high wind events, wildfire, and sea level rise under future climate
19 conditions could impact the marine life and wildlife habitats.

20 **4.16 Malfunctions and Accidents**

21 As stated in Table 4–1, seven malfunction and/or accident scenarios are assessed for the Application.
22 The assessment of effects from each malfunction or accident uses a risk-based approach, which takes into
23 consideration the likelihood and consequence of a malfunction or accident. These two ratings are
24 combined to determine the risk.

25 With respect to terrestrial and marine spills of hazardous materials, the overall risk to VCs is rated low or
26 moderate. The Project risk associated with terrestrial or marine spills of a hazardous material is expected
27 to be as low as reasonably practicable given identified mitigation measures and controls. The overall risk
28 to VCs from an NGL spill is considered low. With respect to onshore or offshore fires or explosions, the
29 overall risk to VCs from an terrestrial or marine fire or explosion is rated low. The overall worst-case risk
30 of loss of LNG containment from the FLNGs is considered low as is the overall risk to VCs from an
31 emergency LNG production unit shutdown requiring flaring. The overall risk of a vessel grounding,
32 collision, or allision on VCs is considered low.

33 The overall risk of a vehicular accident to VCs is considered moderate to high. Given the potential high risk
34 associated with transportation-related incidents, particularly vehicular accidents on
35 Highway 113/Nisga'a Highway, the Project will use identified mitigation measures as well as an adaptive
36 management approach to implement controls as soon as practical to respond to incidents and reduce
37 potential further incidents.

1 Any residual effects would be identified during incident response activities. It is expected that follow-up
2 and/or monitoring may be required should an incident occur.

3 **4.17 Effects of the Environment**

4 The potential for effects on the Project related to climate change, extreme weather, tsunamis or seismic
5 events and forest fires are assessed for potential risk as likelihood and consequence. Any adverse effects
6 on the Project from climate change are expected to be insignificant and any damage sustained can be
7 repaired without overall interruption to the Project operation; the overall risk to the Project from climate
8 change is low. The risk of extreme temperatures that are predicted for the Project footprint are within
9 normal operating limits for LNG facilities based on current design standards. The potential for extreme
10 weather-related events to have an adverse effect on the Project is unlikely. Any effects on the Project that
11 do occur are expected to be managed through maintenance during operation. The Project will be designed
12 to withstand seismic events in accordance with engineering design standards. The risk of a tsunami or
13 seismic event is based on the historical events and a geophysical assessment of landforms. There is
14 uncertainty in the risk since tsunamis and seismic events cannot be predicted. A forest fire on
15 Pearse Island or along the transmission line route could result in an emergency shutdown; however, the
16 assessment of the potential effects of wildfires to the Project indicates that there is a low risk of a
17 forest fire affecting the Project.

18

1 **S5. SUMMARY OF DIRECT AND INCIDENTAL EFFECTS WITHIN FEDERAL**
2 **JURISDICTION**

3 Under section 2 of the *Impact Assessment Act*, effects within federal jurisdiction includes “a change to the
4 environment that would occur... on federal lands”. Direct physical impacts to federal lands as a result of
5 the Project are not anticipated as activities such as vegetation clearing and grading are not occurring on
6 federal lands. The construction of marine in-water infrastructure will occur on inland waters, and
7 therefore do not cause direct impacts to federal lands. Project air and noise emissions (shipping and
8 facility operation) have the potential to interaction with federal land due to the transport of constituents
9 from the Site to elsewhere. These emissions have the potential to affect marine habitat, behaviour, and
10 injury or mortality of marine resources (including marine birds) from noise emissions (due to shipping and
11 facility operation). Based on the geographic extent of the predicted effects from the Project, the federal
12 lands potentially affected by the Project are First Nation Reserve lands (and therefore communities
13 within), conservancy areas and a DFO hatchery along the shipping route or the territorial sea of Canada
14 along the shipping routes.

15

1 **S6. COMMITMENTS OR RECOMMENDATIONS MADE TO OR WITH OTHER**
2 **PARTIES**

3 To date, no commitments or recommendations have been made by the Proponents to or with
4 other parties.

5

1 **S7. SUMMARY OF KEY EFFECTS ON INDIGENOUS INTERESTS AND RIGHTS,**
2 **MITIGATIONS, AND FOLLOW-UP PROGRAMS**

3 A summary of the key effects, mitigation and design measures and cumulative effects for each Indigenous
4 nation is provided in Table 7–1. Additional information regarding effects and context for the predicted
5 Project effects on the Indigenous interests is provided in Sections 7.1 as well as any identified follow up
6 programs.

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Table 7–1 – Summary of Key Effects, Mitigation and Design Considerations, and Cumulative Effects for Indigenous Interests

Indigenous Nation	Key Effects and Considerations	Mitigation and Design Considerations	Key Cumulative Effects
Nisga'a Nation	<ul style="list-style-type: none"> ▪ Changes to Nisga'a interests in fish and aquatics (freshwater and marine), wildlife, migratory birds, botanical forest products, and lands due to residual effects predicted on related VCs (e.g., ecological effects) and associated social considerations. ▪ Changes to the existing and future economic, social, and cultural well-being of Nisga'a citizens due to residual effects predicted on related VCs and associated social considerations (e.g., change in Nisga'a employment and income, change in Nisga'a community well-being, effect of changing work patterns and incomes on Nisga'a cultural activities and practices). 	<ul style="list-style-type: none"> ▪ Mitigations and design considerations listed in Table 4.1 reduce the predicted residual and cumulative effects of the Project on the Indigenous interests. A complete listing of mitigation measures can be found in Appendix A. ▪ The Proponents will continue to work with the Indigenous nations to develop a shared understanding of how the Project may affect their Indigenous interests, and to discuss the Project and its effects, understand concerns that may arise and respond to those concerns. ▪ Through ongoing engagement (i.e., throughout the life of the Project) and in development of the social and economic effects management plan, the Proponents aim to maintain a positive long-term relationship with the Indigenous nations. 	<ul style="list-style-type: none"> ▪ Cumulative effects are predicted to adversely affect Nisga'a paragraph 8(e) and (f) interests ▪ Cumulative effects are considered partially reversible as they are primarily tied to Project construction activities, marine shipping traffic, and associated effects. ▪ Cumulative effects may be irreversible for Nisga'a citizens who have already experienced alienation and dispossession from those portions of Nisga'a Lands and /or the Nass Area (and associated natural resource activity and related earnings) that overlap with the applicable VC regional assessment areas (RAAs), the open water assessment area (OWAA), the MSR, and in the vicinity of the Project footprint.
Lax Kw'alaams Band	<ul style="list-style-type: none"> ▪ Changes to Lax Kw'alaams Band harvest and consumption (shoreline and marine; terrestrial), stewardship and governance, livelihood and socio-economic conditions, sacred and heritage sites, health and well-being, culture, temporary and seasonal camps, and access and travel due to residual effects predicted on related VCs (e.g., change in habitat, abundance, and / or distribution of harvested resources) and associated social considerations (e.g., change in community cohesion, change in necessary conditions). 	<ul style="list-style-type: none"> ▪ The Proponents have identified their willingness to collaborate in programs or initiatives aimed at limiting cumulative effects in the region (e.g., the Transport Canada Cumulative Effects of Marine Shipping [CEMS] initiative, with respect to underwater noise on marine mammals; the Environmental Stewardship Initiative, with respect to cumulative effects on marine and terrestrial ecosystems). 	<ul style="list-style-type: none"> ▪ Cumulative effects are predicted to adversely affect Indigenous interests. ▪ Cumulative effects are considered partially reversible as they are primarily tied to Project marine shipping traffic and associated effects. ▪ Cumulative effects may be irreversible for members of the Indigenous nations who have already experienced alienation and dispossession from the lands and waters within those portions of their traditional territories and / or harvesting areas that overlap with the applicable VC RAAs, the OWAA, the MSR/materials and supply shipping route (MSSR), and in the vicinity of the Project footprint.
Metlakatla First Nation	<ul style="list-style-type: none"> ▪ Changes to Metlakatla First Nation harvest and consumption (marine and terrestrial), governance, decision making, and economic development, sacred places and heritage sites, health, well-being, and safety, cultural identity, access and travel, and sense of place due to residual effects predicted on related VCs (e.g., change in habitat, abundance, and / or distribution of harvested resources) and associated social considerations (e.g., change in community cohesion, change in necessary conditions). 		
Kitsumkalum First Nation	<ul style="list-style-type: none"> ▪ Changes to Kitsumkalum First Nation harvest and consumption (marine and terrestrial), governance, socio-economic conditions, sacred and heritage sites, well-being, access and travel, and transmission of knowledge due to residual effects predicted on related VCs (e.g., change in habitat, abundance, and / or distribution of harvested resources) and associated social considerations (e.g., change in community cohesion, change in necessary conditions). 		
Kitselas First Nation	<ul style="list-style-type: none"> ▪ Changes to Kitselas First Nation harvest and consumption (marine and terrestrial), governance, sovereignty and authority for decision making, socio-economic conditions, sacred places and heritage sites, health and well-being, and access and travel due to residual effects predicted on related VCs (e.g., change in habitat, abundance, and / or distribution of harvested resources) and associated social considerations (e.g., change in community cohesion, change in necessary conditions). 		

Table 7–1 – Summary of Key Effects, Mitigation and Design Considerations, and Cumulative Effects for Indigenous Interests

Indigenous Nation	Key Effects and Considerations	Mitigation and Design Considerations	Key Cumulative Effects
Gitxaala Nation	<ul style="list-style-type: none"> ▪ Changes to Gitxaala Nation Harvest and consumption (Marine and terrestrial), governance; socio-economic conditions, sacred places and heritage sites, health and well-being, access and travel, cultural identity due to residual effects predicted on related VCs (e.g., change in habitat, abundance, and / or distribution of harvested resources) and associated social considerations (e.g., change in community cohesion, change in necessary conditions). 		
Gitga’at First Nation	<ul style="list-style-type: none"> ▪ Changes to Gitga’at First Nation harvest and consumption of marine and terrestrial resources and associated cultural practices, governance, sacred places and heritage sites, socio-economic conditions, health and well-being, and access and travel due to residual effects predicted on related VCs (e.g., change in habitat, abundance, and / or distribution of harvested resources) and associated social considerations (e.g., change in community cohesion, change in necessary conditions). 		
Haida Nation	<ul style="list-style-type: none"> ▪ Changes to Haida Nation harvest and consumption (marine), governance and socio-economic conditions, sacred places and heritage sites, and access and travel due to residual effects predicted on related VCs (e.g., change in habitat, abundance, and / or distribution of harvested resources) and associated social considerations (e.g., change in community cohesion, change in necessary conditions). 		
Métis Nation British Columbia	<ul style="list-style-type: none"> ▪ Changes to Métis Nation British Columbia harvest and consumption (marine and terrestrial), governance and socio-economic conditions, sacred places, and access and travel due to residual effects predicted on related VCs (e.g., change in habitat, abundance, and / or distribution of harvested resources) and associated social considerations (e.g., change in community cohesion, change in necessary conditions). 		

1 7.1 Indigenous Interests

2 The Proponents have assessed the Project's residual and cumulative effects on the interests of the
3 Indigenous nations. Based on its scope, setting and scale, the Project has the potential to interact with
4 the rights of Indigenous nations as recognized and affirmed by section 35 of the *Constitution Act, 1982*
5 (i.e., Aboriginal rights). As described in Section S2, the physical components of the Project are located on
6 Category A Lands, as defined in the Nisga'a Treaty, owned in fee simple by the Nisga'a Nation, and an
7 adjacent proposed Water Lot on the northwest coast of BC at the northern end of Pearse Island.

8 The Project footprint and MSR are proposed to be located within the traditional territories of
9 Lax Kw'alaams Band, Metlakatla First Nation, Kitsumkalum First Nation, and Kitselas First Nation.
10 A component of the MSR (i.e., the marine supply vessel shipping route) intersects with the northern
11 extent of Gitxaala Nation and Gitga'at First Nation traditional territories and the OWAA intersects with
12 the northern extent of Haida Territories, as identified by Haida Nation. The Project footprint, and MSR
13 may overlap with Métis Nation British Columbia harvesting areas. Potential direct and indirect Project
14 effects on the Indigenous interests (Table 7–1) are predicted to occur in the vicinity of the Project
15 footprint, along MSR and OWAA, and within the Local Assessment Areas (LAA) and RAAs of related VCs.

16 As described in Section 3.1, the Proponents have undertaken early and meaningful engagement with
17 potentially affected Indigenous nations and strive to maintain mutually respectful relationships with
18 Indigenous nations engaged with the Project. In addition to the engagement activities described in Section
19 3.1., the Proponents established an Environmental Assessment and Regulatory Process Funding
20 Agreements with the following potentially affected Indigenous nations: Lax Kw'alaams Band,
21 Metlakatla First Nation, Kitselas First Nation, Kitsumkalum First Nation, Gitga'at First Nation, and
22 Gitxaala Nation. This funding supported Nation-led studies (e.g., Indigenous land and resource use
23 studies) to understand Project related effects to their interests and to participate in the environmental
24 assessment process. At the time of Application submission, however, three Project-specific Nation-led
25 studies have not been completed. The Proponents will continue to engage potentially affected
26 Indigenous nations regarding the completion of their Project-specific studies. Information provided by the
27 Indigenous nations following submission of the Application will be reviewed in the context of the
28 environmental assessment, to verify findings of the environmental assessment and to incorporate any
29 changes into Project planning, as appropriate.

30 The Proponents have committed to mitigation and enhancement measures, which are anticipated to
31 avoid or reduce residual adverse effects on the Indigenous interests as well as ongoing engagement
32 throughout construction and the operation life of the Project. The Proponents also considered the
33 benefits (i.e., positive effects) of the proposed Project to Indigenous nations whose traditional territories
34 and areas of interest overlap with the Project. There is a high likelihood that the Project will result in
35 measurable residual effects on the identified Indigenous interests. Based on the existing conditions within
36 the LAAs, the scope and scale of Project activities and physical works, and the effectiveness of
37 Project-specific mitigation and enhancement measures, including management plans developed through
38 The Proponents' ongoing engagement with the Indigenous nations (e.g., Indigenous Consultation and

1 Engagement Plan, the social and economic effects management plan), the Project is expected to result in
2 low to moderate¹ magnitude residual effects extending into the LAAs, the OWAA, the MSR/MSSR, and at
3 the Project footprint.

4 Existing environmental conditions within the Project assessment areas reflect cumulative effects on the
5 environment from past and present projects and physical activities. Private land conversion, forestry
6 activities, oil and gas production, and linear developments (e.g., roads, pipelines, transmission lines) have
7 altered the current regional landscape and have contributed to an existing cumulative effect on each
8 Indigenous nation's interests in the RAAs. The predicted Project residual effects combined with the
9 residual effects of past, present, and reasonably foreseeable future projects in the region are anticipated
10 to result in moderate magnitude residual cumulative effects on Indigenous interests. Residual cumulative
11 effects are considered partially reversible as they are primarily tied to the Project's marine shipping traffic
12 and associated effects. However, residual cumulative effects may be irreversible for members of the
13 Indigenous nations who have already experienced alienation and dispossession within their traditional
14 territory, as these experiences are likely to increase in the future rather than decrease and require
15 regional initiatives and programs to be addressed. While mitigation measures implemented for the Project
16 and other marine development projects that have the potential to result in cumulative effects with Project
17 effects will reduce the magnitude, extent, and duration of residual cumulative effects, there is a high
18 likelihood of Project contributions to adverse residual cumulative effects on Indigenous interests.

19

¹ The characterization of the magnitude of the predicted residual effects of the Project on the Indigenous interests (Table 7–1) vary per Indigenous nation in relation to the anticipated extent of the predicted interactions.

1 **S8. CONCLUSIONS**

2 The Application has assessed the effects of the Project on 14 VCs, the interests of nine Indigenous nations,
3 and factors specified by the IAA and BC EAA. The scope of the assessment considered concerns and issues
4 raised through the Proponent’s consultation and engagement with regulatory agencies,
5 Indigenous nations, stakeholders, and the public. The Proponents recognize the importance of early and
6 meaningful engagement with Indigenous nations and strives to establish and maintain mutually respectful
7 relationships with Indigenous nations engaged with the Project. First and foremost, the Project includes
8 collaboration with the Nisga’a Nation. The NLG has openly supported the Project and has taken a lead role
9 in informing Nisga’a citizens about the Project.

10 The Project is being undertaken by a unique and progressive collaboration of Proponents that are looking
11 to develop a Project that will create economic reconciliation and self-determination for the Nisga’a Nation
12 and improve the quality of life for Nisga’a citizens, while also creating direct and indirect economic
13 benefits for other Indigenous nations, BC, Alberta, and Canada. The Project is being designed in a manner
14 consistent with the environmental goals of BC, Canada, and the Nisga’a Nation, and will be one of the
15 lowest carbon-emitting LNG export facilities in the world. Once in operation, the Project will create
16 benefits in Canada and produce global benefits as the world transitions to a low carbon energy economy.

17 Each VC section of the Application provides a detailed evaluation of Project interactions, proposed
18 mitigation and enhancement measures, and the potential for residual and cumulative effects. Stand-alone
19 assessments of effects on Indigenous interests were completed for Nisga’a Nation, Lax Kw’alaams Band,
20 Metlakatla First Nation, Kitsumkalum First Nation, Kitselas First Nation, Gitxaała Nation,
21 Gitga’at First Nation, Haida Nation, and Métis Nation British Columbia. Mitigation measures to reduce or
22 avoid adverse residual effects on the biophysical and social and economic environment have been
23 developed for the Project and are described for each VC and within the stand-alone assessments for each
24 Indigenous nation. With the implementation of the proposed mitigation and enhancement measures,
25 adverse residual biophysical and social and economic effects of Project-related construction, operation,
26 and decommissioning are anticipated to be within acceptable levels for all VCs.

27

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