

1. Proposed Project Overview

The following subsections of the Application for an Environmental Assessment Certificate (the Application) provide an overview of the proposed Tilbury Phase 2 LNG Expansion Project (proposed Project) that includes details on the proponent description, proposed Project locations, proposed Project components, proposed Project activities, workforce requirements, and the need and purpose of the proposed Project.

1.1 Proposed Project Introduction

FortisBC Holdings Inc. (FHI) with its regulated natural gas subsidiary FortisBC Energy Inc. (FEI) (collectively referred to as FortisBC) is proposing to expand the existing liquefied natural gas (LNG) facility at 7651 Hopcott Road, on Tilbury Island in Delta, British Columbia (proposed Project Site) (Figure 1.1-1). The proposed Project is located within the core territory of Musqueam Indian Band. The proposed Project Area is also in overlapping asserted territories or areas of interest of an additional 40 Indigenous nations. The proposed Project Site is on a long-standing developed, brownfield, industrial site owned by FortisBC. The proposed Project Site is zoned as I7 Special Industrial for uses including natural gas and petroleum products.

The proposed Project includes construction and operation of a new LNG Storage Tank with a working volume of 142,400 cubic metres (m³) (approximately 3.5 petajoules [PJ]), new liquefaction facilities with capacity of up to 7,700 tonnes per day (t/d) of LNG production, natural gas receiving facilities, and supporting infrastructure. All permanent components of the proposed Project are planned within the proposed Project Site boundaries.

1.1.1 History of Liquefied Natural Gas Development on Tilbury Island

LNG has been produced on Tilbury Island for more than 50 years. The site is now home to two LNG facilities, the Tilbury Base Plant, and the Phase 1A production and storage expansion in operation since 2018 (Phase 1A). The Tilbury Base Plant began operation in 1971 as a peak-shaving facility designed to meet Lower Mainland energy needs during the coldest days of the year. The facility continues to serve this purpose; it provided backup energy supply for six consecutive days in December 2021 during unusually cold temperatures, as well as recently in January 2023 due to unplanned disruptions in Westcoast Energy's pipeline (which supplies the Lower Mainland).

Phase 1A included the installation of additional production capacity and a larger storage tank to support the liquid fuel market. It began operation in 2018, supplying the growing demand for LNG from the local transportation sector, including trucks and ferries. This expansion included ancillary infrastructure, such as power supply, gas supply, and a facility to load LNG onto trucks. An expansion to the truck loading facility was initiated in 2021, and construction crews mobilized to the Tilbury LNG site in the second quarter (Q2) of 2022 to commence onsite works.

Other facilities in the design and development stage at the Tilbury LNG facility location include a Phase 1B LNG liquefaction expansion, which was approved by the Government of British Columbia (B.C.) under Direction 5 to the British Columbia Utilities Commission (BCUC), and the associated 230-kilovolt (kV) power supply expansion. These facilities are expected to be in service by 2027 at the earliest. In addition, the Tilbury Base Plant is scheduled to be demolished as a component of the Tilbury LNG Storage Expansion (TLSE) project, which is the subject of a Certificate of Public Convenience and Necessity (CPCN) Application that was filed with the BCUC in December 2020. More details on proposed Project components and liquefaction volumes are outlined in subsection 1.4.

1 Working with local customers, FortisBC has demonstrated the viability of a local LNG marine fuel market
2 and now has proven expertise and safe, innovative solutions for local marine customers who are
3 converting their fleets to utilize LNG fuel to meet increasingly strict marine sector emissions regulations.
4 FortisBC currently fuels 10 marine vessels with LNG, including six for BC Ferries and four for Seaspac
5 Ferries Corporation (Seaspac). From 2016 to present, FortisBC has safely delivered over
6 6,000 truck-to-ship bunkering loads to its marine customers, which has allowed them to reduce their
7 greenhouse gas (GHG) emissions by over 160,000 tonnes using low-carbon intensity (CI) LNG from
8 Tilbury instead of diesel. This equates to removing nearly 50,000¹ passenger vehicles off the road each
9 year. FortisBC provides this LNG marine fuelling service through a customized onboard truck-to-ship
10 process.

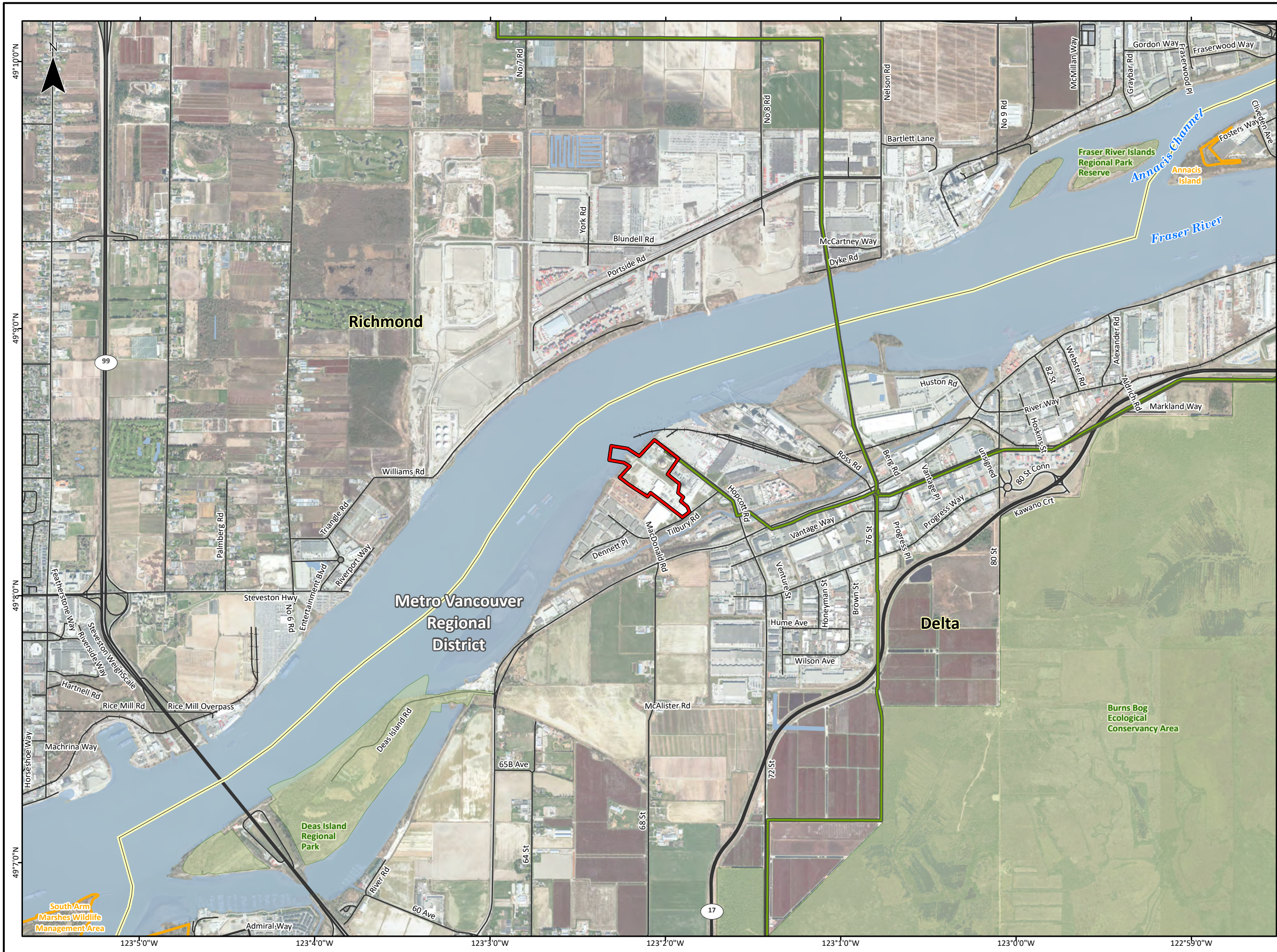
11 In addition, FortisBC provides low-CI LNG for on-road medium- and heavy-duty transportation solutions.
12 Since the beginning of the LNG program, FortisBC has provided support for more than 1,000 medium and
13 heavy-duty vehicles so they can operate on compressed natural gas (CNG) or LNG. Natural gas vehicles
14 emit up to 30 percent less GHG emissions and dramatically lower oxides of nitrogen (NO_x) emissions than
15 the cleanest diesel and gasoline engines, all while emitting almost no asthma-inducing oxides of sulphur
16 (SO_x) or particulate matter (PM) (Northwest Gas Association n.d.).

17 1.1.2 Recent Developments and Assessments

18 The Tilbury Marine Jetty (TMJ) project is proposed by Tilbury Jetty Limited Partnership (affiliates of
19 FortisBC and Seaspac). The environmental assessment (EA) for the TMJ project initiated in May 2015, was
20 issued an Environmental Assessment Certificate by the B.C. Environmental Assessment Office (EAO) on
21 March 27, 2024, and is the closest in proximity and most recent EA to the proposed Project Site. Available
22 information from the TMJ project EA has been reviewed, and relevant information incorporated into this
23 Application includes the following:

- 24 ▪ Application Information Requirements: WesPac Tilbury Marine Jetty Project (B.C. EAO 2016)
- 25 ▪ Reasons for Ministers Decision: Tilbury Marine Jetty (B.C. EAO 2024)
- 26 ▪ Musqueam Indian Band Traditional Knowledge and Use Study for WesPac Midstream's Proposed LNG
27 Marine Jetty Project (Tam et al. 2018)
- 28 ▪ WesPac Tilbury Marine Jetty Project Tilbury Island, Delta, B.C.: Project Description CEAA Summary
29 (WesPac 2015)
- 30 ▪ Environmental Assessment Certificate Application – WesPac Tilbury Marine Jetty Project
31 (WesPac 2019)
- 32 ▪ Subsection 4.2: Current Use of Land and Resources for Traditional Purposes and Aboriginal and Treaty
33 Rights Assessments (WesPac Tilbury Marine Jetty Project Marine Shipping Assessment [WesPac n.d.])
- 34 ▪ Archaeological Impact Assessment FortisBC Energy Inc.'s Tilbury 2 Project (Stantec 2014);
35 Archaeological Overview Assessment for the FortisBC Tilbury LNG Production and Storage Facility
36 Expansion, Delta, BC. (Golder 2020); and Archaeological Impact Assessment of the FortisBC Tilbury
37 LNG Production and Storage Facility, Delta, B.C. (Golder 2022)

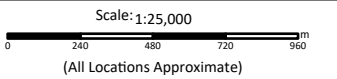
¹ [Natural Resources Canada GHG Equivalency Calculator](#) based on a 160,000 tonnes CO_{2e} removed (NRCan n.d.).



**FIGURE 1.1-1
REGIONAL LOCATION
TILBURY PHASE 2
LNG EXPANSION PROJECT**

- Proposed Project Footprint
- Existing FortisBC Pipeline
- Highway
- Road
- Railway
- Municipality
- Provincial Wildlife Management Area and Conservation Land
- Park/Protected Area
- Waterbody

49° 8' 27.4" N 123° 2' 4.8" W
NTS Grid: 092G03



Jacobs

Project Number CE778100

NAD1983 UTM Zone 10 North.
Proposed Project: Jacobs 2022; Existing FortisBC Pipeline: FortisBC 2012; Roads: NRCan 2015; Hydrography: BC Forests, Lands and Natural Resources Operations 2011; NR Can 2007; Municipal Boundaries, Regional District: BC MF/LNRO 2016; Railway: BC Forests, Lands, Natural Resource Operations and Rural Department 2015; Parks: NRCan 2017; MetroVancouver 2020; BC MF/LNRO 2008; Conservation Land: BC MF/LNRO 2015; Service Layer Credits: World Imagery: VFP, Earthstar Geographics.

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1 1.1.3 Engagement

2 The following subsections provide information on FortisBC's engagement with Indigenous nations, the
3 public, and governments. Subsections 1.1.3.2 and 1.1.3.3 summarize public and government engagement,
4 with more detailed information provided in Sections 3 and 4.

5 1.1.3.1 Indigenous Nations

6 Through decades of collaborating and partnering with Indigenous nations, FortisBC has learned the
7 importance and value of feedback and from Indigenous nations. This collaboration includes a range of
8 partnerships, from electric vehicle charging stations to Indigenous equity partners in assets like the
9 Mt. Hayes LNG facility. FortisBC recognizes that information shared by Indigenous nations contributes to a
10 more successful project. FortisBC's engagement with Indigenous nations varies based on the individual
11 Indigenous nation's interests in the proposed Project and engagement preferences. The objective of
12 FortisBC's engagement is to build effective relationships and ensure that Indigenous nations have
13 continual access to information and multiple means and opportunities to provide input while guided by its
14 Statement of Indigenous Principles (FortisBC n.d.b).

15 Indigenous nations were initially identified as potentially affected by the proposed Project through a
16 review of the Consultative Areas Database, which indicated the Indigenous nations whose Treaty Lands,
17 traditional territories, or other areas of use or management overlap with the general area within and
18 adjacent to the proposed Project Footprint (proposed Project Area). Potentially affected Indigenous
19 nations were also identified through FortisBC's engagement activities. Further identification of potentially
20 affected Indigenous nations then occurred via the Joint Summary of Issues and Engagement (IAAC and
21 B.C. EAO 2020). Fifteen Indigenous nations or organizations submitted notices to engage as a
22 participating Indigenous nation under the B.C. *Environmental Assessment Act (EAA)*. The full list of
23 Indigenous nations or organizations potentially affected by the proposed Project, whether they have or
24 have not submitted a notice to engage as participating Indigenous nations, is outlined in Table 11.1-1
25 (subsection 11.1).

26 FortisBC initiated preliminary engagement for the proposed Project in July 2019. Preliminary engagement
27 focused on establishing communication with Indigenous nations, information sharing, the regulatory
28 review process, the introduction of the Initial Project Description (IPD), responses to comments on the
29 draft IPD and incorporation of comments into the final draft, preferred means of engagement, and
30 capacity funding.

31 During the Early Engagement Phase of the EA process, FortisBC offered numerous virtual and in-person
32 site tours and opportunities for participation in biophysical field studies via summary calls or in-person
33 attendance. Proposed Project updates were provided, and Indigenous nations' views and input were
34 sought through written correspondence (emails or letters), phone conversations, and meetings based on
35 the preference indicated by each Indigenous nation. This was also the phase in which the draft Detailed
36 Project Description (DPD) was provided to Indigenous nations for review and input, with multiple
37 opportunities to provide comments through two DPD workshops, meetings, presentations, and written
38 correspondence. FortisBC also continued to engage with Indigenous nations regarding capacity funding,
39 including support for Indigenous-led assessments as expressed by some participating Indigenous nations.
40 FortisBC sought input from Indigenous nations on selecting Valued Components (VCs), the assessment
41 methodology, potential alternatives to the proposed Project, the proposed Project design (including
42 potential alternative means), study requirements, and the issues resolution process. In addition, FortisBC
43 worked with Indigenous nations and signed capacity funding agreements with participating Indigenous
44 nations regarding the collection and use of Indigenous Knowledge to inform this Application. Refer to
45 subsection 11.1.5.2 for further information on the use of Indigenous Knowledge in the Application.

1 In the Process Planning Phase, FortisBC continued the engagement activities outlined during Early
2 Engagement, including planned methods for incorporating Indigenous Knowledge into the Application
3 (refer to subsection 11.1.5.2). FortisBC hosted two Indigenous Knowledge workshops and presented the
4 information separately to those participating Indigenous nations who requested their own sessions.
5 FortisBC also began engaging on Indigenous interest (Section 11) information requirements and methods
6 during this phase and provided participating Indigenous nations with the opportunity to review the results
7 of Technical Data Reports (TDRs) and provide input prior to their use in this Application as the basis for
8 the biophysical VC sections. FortisBC also continued to engage with those participating Indigenous nations
9 who chose to conduct Indigenous-led assessments under subsection 19(4) of the *EAA* during this phase to
10 determine how FortisBC could support those assessments.

11 During the Application Development and Review Phase, FortisBC has carried out the applicable
12 engagement activities from the earlier phases and has worked with Indigenous nations to develop their
13 Section 11 (Indigenous interests) subsections. FortisBC provided Indigenous nations with at least three
14 drafts (a "50 percent complete [Rev A]," a "Rev B draft," and a "Rev D draft") of their individual subsections
15 to better identify and understand Indigenous interests and issues, identify, and seek input on how
16 Indigenous Knowledge has been captured and characterized, request feedback on the proposed
17 assessment methods, and provide opportunities for issues resolution. Comments provided by Indigenous
18 nations on the draft documents were taken into consideration and incorporated, as appropriate, into
19 subsequent drafts before submission of the Application to the B.C. EAO and Impact Assessment Agency of
20 Canada (IAAC). FortisBC will continue to incorporate comments received during the remainder of the
21 Application Development and Review Phase. FortisBC also continued the activities outlined previously, as
22 applicable, throughout the Application Development and Review Phase, which included another round of
23 site tours, community presentations, and identification of longer-term Indigenous nation interest in
24 participation in economic, employment, training, and other capacity-building opportunities.

25 In August 2022, FortisBC and Musqueam Indian Band announced the signing of an equity option
26 agreement that will result in the parties sharing benefits associated with the Tilbury LNG projects, which
27 includes the proposed Project. The agreement will involve Musqueam Indian Band and FortisBC working in
28 close collaboration as the proposed Project is developed. A shared goal of this agreement is to develop a
29 world-leading LNG facility that will result in beneficial outcomes for Musqueam Indian Band and the
30 region while improving the overall quality of the Tilbury LNG projects. The agreement includes options,
31 subject to regulatory approvals and certain conditions precedent, for Musqueam Indian Band to acquire
32 equity ownership in the proposed Project.

33 In January 2023, FortisBC and Snuneymuxw First Nation announced the signing of an agreement to work
34 in close collaboration on Tilbury LNG projects, which includes the proposed Project. The agreement
35 respects Snuneymuxw's assertion of rights in relation to the potential proposed Project effects and
36 represents a commitment to share benefits related to the Tilbury projects. Snuneymuxw has committed to
37 supporting Tilbury projects and participating in regulatory processes associated with proposed
38 developments at the Tilbury LNG site.

39 FortisBC looks forward to continued engagement with Indigenous nations throughout the remaining
40 phases of the proposed Project.

41 Refer to subsections 11.2 to 11.18 for a summary of engagement activities with each Indigenous nation.
42 Refer to the Indigenous Engagement and Collaboration Plan for additional details on past and planned
43 engagement activities with Indigenous nations.

1 1.1.3.2 Public

2 FortisBC approached public engagement with the intent of understanding the interests of the community
3 and incorporating the feedback into proposed Project design. In February 2020, FortisBC began public
4 engagement with initial stakeholder meetings and a public notification posted to FortisBC's [Talking Energy](#)
5 website (FortisBC n.d.c). The foundation of FortisBC's public engagement is based on the Early
6 Engagement Plan filed with the IPD and posted publicly to the B.C. EAO's Project Information Centre
7 (EPIC) website in February 2020 (FortisBC 2020a). This plan outlined varied opportunities for the public to
8 learn about the proposed Project and facilitate a two-way exchange of information. Further information on
9 public engagement is provided in Section 3.

10 1.1.3.3 Local, Provincial, and Federal Governments

11 Since 2019, FortisBC has maintained regular engagement with government representatives and agencies
12 to keep them informed of the proposed Project, provide proposed Project updates, answer questions, and
13 seek feedback.

14 FortisBC is committed to regular and transparent engagement with local, Federal, and Provincial
15 governments and regulatory agencies in accordance with the Process Order and Assessment Plan.
16 FortisBC meets regularly with the City of Delta (Delta) to inform them of updates related to the Tilbury
17 LNG facility and provides advance notice to government officials of FortisBC-related activities taking place
18 in their communities. FortisBC also engages local government staff, local first responders, and other
19 stakeholders for full-scale emergency exercises at the Tilbury LNG facility.

20 FortisBC's engagement approach is to meet the requirements of the Process Order by regularly engaging
21 with and informing government about the proposed Project. It also intends to communicate the potential
22 effects, opportunities, and solutions associated with the proposed Project and provide timely and relevant
23 updates to enable government to provide input and feedback during the EA and other regulatory
24 processes. Further information on government engagement is provided in Section 4.

25 1.1.4 Regulatory Context

26 The proposed Project is reviewable under the B.C. *EAA, Reviewable Projects Regulation* and under Canada's
27 *Impact Assessment Act (IAA), Physical Activities Regulations*. Further details regarding the Provincial and
28 Federal processes are provided in Section 2. FortisBC provided a concordance table for the Application in
29 accordance with guidance from the B.C. EAO Early Engagement Policy (B.C. EAO 2019) under a separate
30 cover. The summary of statutory requirements under the *IAA* is provided in Section 16.

31 FortisBC filed the IPD for the proposed Project to the B.C. EAO and IAAC in February 2020. The B.C. EAO's
32 acceptance of the IPD initiated the Early Engagement Phase, and IAAC's acceptance initiated the Planning
33 Phase. FortisBC prepared a DPD, which provides updated and additional information about the proposed
34 Project in accordance with the B.C. EAO (2020) and IAAC (n.d.) DPD requirements. The DPD also addresses
35 feedback raised during Early Engagement. The DPD, appended with draft versions of the VC Selection and
36 draft Application Information Requirements (AIR), was submitted, and subsequently accepted by the
37 B.C. EAO and IAAC in January 2022. The Process Planning Phase was initiated on January 12, 2022, when
38 the B.C. EAO issued a Readiness Decision Order. The Process Planning Phase concluded on June 13, 2022,
39 when the B.C. EAO issued the Process Order and Assessment Plan (B.C. EAO 2022). This Application has
40 been prepared in accordance with the requirements described in the Process Order and the Assessment
41 Plan. The timeline of the proposed Project's Application process is outlined in Table 1.1-1.

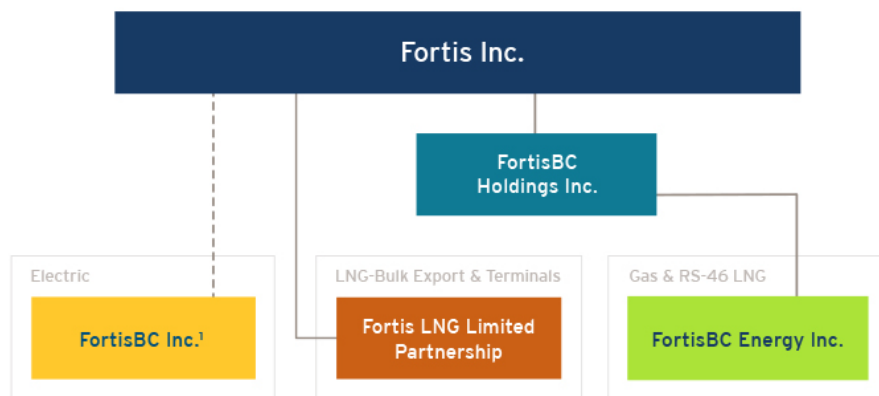
Table 1.1-1. Timeline of the Proposed Project's Application Process

Application Process Phase	Document	Responsibility	Date of Submittal/Issuance
Early Engagement	IPD	FortisBC	February 2020
	DPD	FortisBC	January 2022
Process Planning	Readiness Decision Order	B.C. EAO	January 2022
	Process Order: <ul style="list-style-type: none"> ▪ Schedule A Scope ▪ Schedule B Assessment Plan ▪ Schedule C AIR 	B.C. EAO	June 2022
Application Development and Review	Application	FortisBC	November 2024

1 **1.2 Proponent Description**

2 The proponents for the proposed Project are FHI and FEI, who are collectively referred to as FortisBC in the
3 Application. FHI is a B.C.-based company with subsidiary companies involved in natural gas, LNG, and
4 alternative energy in B.C. FEI is a natural gas utility, owner and operator of the Tilbury LNG facility, and
5 subsidiary of FHI. FEI owns and operates approximately 50,500 kilometres (km) of natural gas
6 transmission and distribution pipelines and two LNG production and storage facilities. Both FHI and FEI are
7 subsidiaries of Fortis Inc. Fortis Inc.'s B.C.-based companies (which include FHI, FEI, and FortisBC Inc.
8 [FBC]) employ more than 2,600 people working to deliver natural gas, electricity, and renewable energy to
9 more than 1.2 million customers across 135 communities in B.C. and 58 Indigenous nation communities
10 across 150 traditional territories.

11 Fortis Inc. is a publicly traded Canadian company on both the Toronto and New York stock exchanges, the
12 parent company of the proponent, and headquartered in St. John's, Newfoundland. Fortis Inc. is also the
13 parent company of FBC, an electrical utility operating in B.C. FBC owns and operates approximately
14 7,300 km of electric transmission and distribution power lines, as well as four hydroelectric generating
15 plants. Figure 1.2-1 shows the Fortis Inc. corporate structure.



¹ FortisBC Inc. is a wholly owned subsidiary of FortisBC Pacific Holdings Inc., which is a wholly owned subsidiary of Fortis West Inc. FortisWest Inc. is a wholly owned subsidiary of Fortis Inc.

Figure 1.2-1. Fortis Inc. Corporate Structure

Table 1.2-1 details the proponent contact information. Jacobs is the main consultant responsible for preparing the Application, with support from Two Worlds Consulting Ltd. and RWDI as major contributors to various sections. Subsection 19.4 identifies the key personnel responsible for preparing the Application, including their qualifications.

Table 1.2-1. Proposed Project Information and Key Contacts

Project or Proponent Information	Description
Project Name	Tilbury Phase 2 LNG Expansion Project
Proponent	FHI and FEI, who are collectively referred to as FortisBC
Proponent Corporate Address	16705 Fraser Highway Surrey, B.C. V4N 0E8
Proponent Website	http://www.fortisbc.com
Project Website	https://talkingenergy.ca/tilburyphase2
Proponent President and Chief Executive Officer	Roger Dall'Antonia
FortisBC Principal Contacts for the Application	James Humble Environment Manager Telephone: 604-328-4226 Email: james.humble@fortisbc.com

Fortis Inc.'s B.C.-based companies provide more than 95 percent of the natural gas energy delivered to customers in B.C. The company owns and operates a number of natural gas transmission, distribution, and storage assets and has the demonstrated capability to develop and operate the proposed Project while meeting accepted industry practices and legislation for safety and environmental protection. In addition to the Tilbury LNG facility, these assets include the Mt. Hayes LNG facility and a growing network of 19 (soon to be 20) CNG and LNG fuelling stations. FortisBC does not engage in natural gas exploration or

1 development of production, and it purchases natural gas from primary producers and acquires natural gas
2 on behalf of its customers from third-party producers.

3 The Tilbury LNG facility has been safely producing LNG since 1971, and the Mt. Hayes LNG facility has
4 been operating since 2011. These facilities have a demonstrated record of safely storing, producing, and
5 dispensing LNG over a combined 6 decades of operation. This record is attributed to the high safety
6 performance of FortisBC employees, as well as facility features designed for the safe production and
7 handling of LNG, including active monitoring, control, and alarm systems.

8 The Mt. Hayes facility is a 70,000-m³ (1.7 PJ) LNG storage facility located 6 km northwest of Ladysmith on
9 Vancouver Island. The facility provides important security of supply to the Vancouver Island Transmission
10 System. The Mt. Hayes facility is operated by FortisBC and is owned by Mt. Hayes General Partnership with
11 FortisBC and local Indigenous nations, Cowichan Tribes, and Stz'uminus First Nation. This partnership has
12 been in place since 2012 and demonstrates the FortisBC's commitment to, and mutual benefits of,
13 working together with Indigenous nations.

14 The proposed Project is an important investment within the FortisBC portfolio. FortisBC has assigned a
15 dedicated team of senior and experienced staff and management to guide the development of the
16 proposed Project to ensure that FortisBC's policies are followed and adhere to statutory obligations to the
17 BCUC and the ratepayers. FortisBC also has recent experience constructing and commissioning two LNG
18 facilities, Mt. Hayes and the Tilbury Phase 1A Expansion. This experience has provided FortisBC with a
19 broad understanding of the issues that may occur when building and operating LNG facilities at the
20 proposed Project Site. FortisBC policies developed and used for the operation of the existing facilities will
21 be reviewed and updated, if necessary, for implementation at the proposed Project Site.

22 **1.2.1 Commitment to the Lower-Carbon Energy Transition**

23 B.C. has unique aspects to its regional energy demands, and a "made-in-B.C." approach is necessary to
24 achieve long-term emissions reductions. As a result, FortisBC is a critical implementation partner for the
25 Federal and Provincial governments' GHG reduction objectives. To demonstrate our commitment to B.C.'s
26 climate goals, FortisBC developed the Clean Growth Pathway to 2050 (FortisBC n.d.a).

27 The Clean Growth Pathway to 2050 is based on a diversified approach to GHG emissions reduction.
28 In 2019, FortisBC commissioned Guidehouse, a consulting company with extensive expertise in both
29 energy and environmental issues, to conduct a study that explored decarbonization pathways in B.C. using
30 both the gas and electric systems to achieve the provincial carbon emissions reduction goal
31 (FortisBC n.d.a). The resulting work highlighted four action areas that FortisBC can take to help the
32 Government of B.C. achieve its GHG reduction objectives and reduce GHG emissions globally
33 (FortisBC n.d.a):

- 34 ▪ Energy efficiency
- 35 ▪ Renewable gas
- 36 ▪ Low-carbon transport
- 37 ▪ LNG to displace higher-carbon fuels for marine and global markets

38 Each of these actions has great potential to reduce GHG emissions and increase investment and growth in
39 the province. Beyond 2030, FortisBC's vision is to continue realizing low-carbon solutions and transition to
40 a utility that delivers low-carbon energy to domestic and global customers.

41 Expanding the supply of renewable gases is another key pathway for a decarbonized energy future.
42 FortisBC will set its goal in 2024 for the percentage of its gas supply to be renewable by 2030
43 (FortisBC n.d.a) in alignment with the Government of B.C.'s CleanBC Plan (Government of B.C. n.d.).
44 FortisBC is committed to providing low-carbon fuel alternatives for its customers and has been working

1 with renewable natural gas (RNG) suppliers since 2010. RNG, or biomethane, is a low to zero-carbon
2 energy that is key to a lower-carbon future for B.C. RNG is derived from organic sources, uses existing
3 carbon already within the ecosystem, and does not contribute any net carbon dioxide (CO₂) into the
4 atmosphere. As RNG mixes seamlessly into existing natural gas infrastructure, it displaces equivalent
5 volumes of conventional natural gas and decarbonizes the natural gas supply. FortisBC is on track to meet
6 or exceed its target of 15 percent renewable and low-carbon gas in its system by 2030 and envisions a
7 future where its system transitions fully to delivering low-carbon and renewable gases in order to achieve
8 net-zero emissions.

9 **1.3 Proposed Project Location**

10 The proposed Project Site is located on private property owned by FortisBC for the existing Tilbury LNG
11 facility on Tilbury Island, within the Tilbury Industrial Park in Delta, B.C. Northeast of the proposed Project
12 Site is the south arm of the Fraser River; to the southwest of the proposed Project Site is Tilbury Slough,
13 which is a side channel of the Fraser River (Figure 1.3-1). The legal description of the proposed Project
14 Site is Lot 1 District Lot 135 Group 2 New Westminster District Plan EPP28232 except Plan EPP 36476,
15 Parcel Identification 029-263-301. The proposed Project Site will be connected to the Metro Vancouver
16 mains drinking water supply which will provide the potable drinking water to the proposed Project Site.

17 The proposed Project Site can be accessed by road via Hopcott Road, Tilbury Road or by water via the
18 Fraser River. Main transportation corridors to the proposed Project Site include Highways 99, 91, and 17,
19 located to the west, east, and south, respectively. The Fraser River is an important transportation route and
20 is used by numerous industrial facilities and cargo terminals that handle logs, steel, machinery, and
21 general industrial cargo. The Fraser River is also used for Indigenous, commercial, and recreational
22 purposes, including boating, fishing, tourism, and marine transportation. Tilbury Island is connected by rail
23 to the BNSF Railway Company (BNSF) network one of North America's largest freight networks. The
24 property adjacent to and northeast of the proposed Project Site is a marine ferry terminal that loads and
25 unloads highway trucks (tractor trailers) from ferries; typically, more than 10 daily ferry arrivals and
26 departures are scheduled from this location.

27 FortisBC currently operates an LNG facility adjacent to and contiguous with the proposed Project Site,
28 which occupies the northern portion of the 7651 Hopcott Road property (closest to the Fraser River).
29 Coordinates of the approximate centre of the proposed Project Site are latitude 49°08'28"N and longitude
30 123°01'57"W, and elevation is approximately 1 metre above sea level (masl).

31 Neighbouring properties are mainly used for industrial purposes, with the nearest resident being
32 approximately 450 metres (m) to the southwest of the proposed Project Site, although the closest
33 residential area is approximately 3 km away. Other nearby businesses include the Riverside Funeral Home
34 and Crematorium and the Delta Community Animal Shelter. Public access to the proposed Project Site is
35 limited, although there is public use of the dike to the north of the proposed Project Site along the Fraser
36 River. There is no land-based recreational access to the proposed Project Site.

FIGURE 1.3-1

PROPOSED PROJECT LOCATION

TILBURY PHASE 2 LNG EXPANSION PROJECT

- Proposed Project Footprint
- Existing FortisBC Pipeline
- Highway
- Road
- Railway
- Municipality
- Waterbody

49° 8' 27.4" N 123° 2' 4.8" W
NTS Grid: 092G03

Scale: 1:10,000



(All Locations Approximate)

Jacobs

Project Number CE778100

NAD1983 UTM Zone 10 North.
Proposed Project: Jacobs 2022; Existing FortisBC Pipeline: FortisBC 2012; Roads: NRCan 2015; Hydrography: BC Forests, Lands and Natural Resource Operations 2011; NR Can 2007; Municipal Boundaries, Regional District: BC MFNR 2016; Railway: BC Forests, Lands, Natural Resource Operations and Rural Development 2015; Parks: NRCan 2017; MetroVancouver 2020; BC MFNR 2008; Conservation Land: BC MFNR 2013; Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community.

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49° 9' 0" N

49° 8' 0" N

123° 3' 0" W

123° 2' 0" W

123° 1' 0" W

1 **1.3.1 Proximity of the Proposed Project to Parks and Protected Areas**

2 There are no parks and protected areas at the proposed Project Site. However, there are a number of
 3 regional and federally designated parks and protected areas in proximity to the proposed Project, and
 4 these are summarized in Table 1.3-1.

Table 1.3-1. Parks and Protected Areas in Proximity to the Proposed Project Footprint

Name	Designation	Approximate Distance Relative to Proposed Project Footprint
Deas Island Regional Park	Regional park	1.7 km to the southwest on Fraser River
Fraser River Islands Regional Park	Regional park	2.9 km to the northeast on Fraser River
Boundary Bay Regional Park	Regional park	8.4 km south
Delta Nature Reserve	Regional park	7.2 km to the east, east of Nordel Way
Burns Bog Ecological Conservation Area	Ecological Conservancy Area	1.9 km to the southeast
George C. Reifel MBS	MBS	11.0 km to the southwest
Alaksen NWA	NWA	12.0 km to the southwest

Notes:

MBS = Migratory Bird Sanctuary

NWA = National Wildlife Area

proposed Project Footprint = the area directly disturbed by proposed Project activities

5 There are no federal lands or reserves that will be used for the purpose of carrying out the proposed
 6 Project. The proposed Project will not require federal financial support and is located in an area that has
 7 not been the subject of federal or regional environmental studies. The portion of the Fraser River next to
 8 the proposed Project Site is within Provincial jurisdiction. The largest Regional Assessment Area (RAA)
 9 encompasses 1,892 federal parcels. The closest federal lands to the proposed Project Site are on the
 10 southern tip of Tilbury Island, where federal parcels are narrow strips of land in the riparian area of the
 11 Fraser River and a side channel. The closest parcel to the proposed Project Site is 150 m to the southwest
 12 and encompasses a portion of the Tilbury Island dike, which is used as a public walking trail. Directly across
 13 the Fraser River from the proposed Project Site (approximately 900 m north) is a complex of federally
 14 owned industrial parcels on Lulu Island. The businesses directly adjacent to the river include Lulu Island
 15 Terminal, Coast 2000 Terminals, and Westran Portside Terminal.

16 **1.3.2 Proximity of the Proposed Project to Sensitive Areas**

17 The proposed Project Site does not overlap with any B.C. Conservation Data Centre (CDC) element
 18 occurrence records of wildlife species at risk wildlife habitat areas, ungulate winter ranges, or old growth
 19 management areas (refer to subsections 7.7 and 7.8).

20 Two wetlands occur within the proposed Project Footprint (0.5 percent of the proposed Project Footprint),
 21 both of which are ecological communities of conservation concern. The area of Tilbury Slough is a wetland
 22 complex with an area of non-listed shallow open water bordered by common cattail (*Typha latifolia*)
 23 marshes, which are Blue-listed ecological communities in B.C. The wetland complex has been reduced in
 24 size through the construction of neighbouring developments and is located between industrial facilities to
 25 the north and south. High-use paved roads with existing culverts cross the wetland, with additional

1 high-use paved roads adjacent to the wetland riparian area to the north and south (refer to
 2 subsection 7.7) (Figure 1.3-2).



3
 4 **Figure 1.3-2. View of Tilbury Site with Phase 1A in Foreground and Tilbury Base Plant in Background**

5 **1.3.3 Traditional Territories and Historical Use**

6 The proposed Project is located within the core territory of Musqueam Indian Band. The proposed Project
 7 Area is also in overlapping asserted territories or areas of interest of an additional 40 Indigenous nations
 8 (Figures 11.2-1 to 11.18e-1). Refer to subsection 11.1 for a complete list of Indigenous nations that
 9 FortisBC is engaging with regarding their interests in the proposed Project.

10 Several Indigenous nations with kinship ties to the local Nations traditionally used the south arm of the
 11 Fraser River for travel, trade, fishing and harvesting purposes with their kin; spirituality; habitation; and
 12 other traditional purposes (Tam et al. 2018, Turner 2020; LFFA 2015; Stz'uminus First Nation 2014;
 13 PMV 2015; Tsawout First Nation 2015). FortisBC is aware that the historic Indigenous village (located
 14 approximately 515 m north of the proposed Project Site on the opposite side of the Fraser River), known
 15 variously as λəqtinas, Tl'uqtinus, Tl'ektines, or Tl'eqtines, among other phonetizations, is a cultural site of
 16 high significance to a number of Indigenous nations). FortisBC is aware of sources referencing the site or
 17 has received information from Musqueam Indian Band, Quw'utsun Nation, Ts'uubaa-asatx, Tsawwassen
 18 First Nation, Tsleil-Waututh Nation, Kwantlen First Nation, Semiahmoo First Nation, and Stó:lō
 19 communities that highlights the importance of the village.

20 Local Indigenous Knowledge gathered describe salmon, white sturgeon, and eulachon as important fish
 21 species. Indigenous nations continue to experience ways of life strongly tied to the Fraser River for food,
 22 social, and ceremonial (FSC) purposes (refer to subsections 11.2 to 11.18). The Fraser River remains an

1 important cultural and archaeological area to many Indigenous Peoples who continue to regularly fish and
2 use the Fraser River.

3 During engagement with Indigenous nations, the Tilbury Slough was identified as an area of interest.
4 The Tilbury Slough supports small patches of riparian forest, which provides habitat for breeding, nesting,
5 and foraging for a variety of migratory birds, waterfowl, and raptors. The tidal flats along the Fraser River
6 also provide habitat for migratory birds. Burns Bog, a critical Ecological Conservancy Area, was also
7 identified as an area of interest by some Indigenous nations.

8 Along the Fraser River, forests prior to settlement by non-Indigenous people were dominated by
9 Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), and western hemlock (*Tsuga*
10 *heterophylla*) (Boyle et al. 1997). A study on culturally significant vegetation of Tilbury Island describes the
11 island as having originally been composed of three distinct vegetation communities (Turner 2020):
12 (1) mixed woodland of cottonwood, alder, willow, and crab apple; (2) prairie grass and shrubland
13 composed of grass, willow, hardhack, and crab apple; and (3) mixed wet vegetation community composed
14 of cedar, hemlock, spruce, alder, cottonwood, willow, yew, crab apple, and ferns.

15 In the early 1800s, settlers arrived in the Lower Mainland and began to change the landscape through
16 their activities, including clearing for agriculture and timber harvest (Boyle et al. 1997). Nonnative plant
17 species, some of which are invasive, arrived with the settlers. The original vegetation of the entire area of
18 the lower Fraser River soon changed with agricultural development and logging, followed by industrial
19 development. Vegetation was removed, shorelines were diked, areas were ditched and drained, and large
20 portions of the land were paved over for roads, parking areas, and buildings (Turner 2020).

21 Dikes began to be constructed along the Fraser River in the 1860s to convert land for agricultural use
22 (Boyle et al. 1997). The construction of dikes and industrial development led to a 70-percent loss of
23 wetland ecosystems within the Fraser River Estuary (Government of Canada and Government of
24 B.C. 1978). A 1949 photo in the Delta Archives Collection shows a large portion of Tilbury Island being
25 used for agriculture, having been diked and cleared of native vegetation (Delta Heritage Society n.d.).
26 Since 1949, farmland on Tilbury Island has been replaced with industrial developments.

27 The entire proposed Project Footprint is located within the existing Tilbury LNG facility, which was
28 previously used for agricultural purposes in the early part of the 20th century. In the 1970s, the
29 agricultural fields were converted to a sawmill on the western half of the Tilbury LNG facility, and the
30 eastern half was converted for use as natural gas processing and storage. Currently, the existing Tilbury
31 LNG facility and proposed Project Footprint are covered by concrete surfaces, gravelled and paved areas,
32 existing infrastructure, and equipment laydown areas, with very little to no habitat value for wildlife. More
33 details on the historical environmental characteristics of the area can be found in Section 13, Summary of
34 Biophysical Factors that Support Ecosystem Function. Additional changes to landscape features are
35 described in subsection 7.11.

36 **1.4 Proposed Project Components**

37 As an expansion of an existing LNG facility in an industrial park, the proposed Project leverages existing
38 infrastructure and previously developed lands and incorporates best in class electric-drive technology to
39 reduce the environmental footprint of the development. The development philosophy, components of the
40 proposed Project, and associated ancillary works, including both onsite and offsite facilities and associated
41 activities, are described in the DPD. Any updates or changes to the proposed Project components since
42 submission of the DPD are described in detail in subsection 1.5.5.

1 The option for shipping equipment modules and bulk materials along the Fraser River was considered in
 2 the DPD and AIR. As outlined in the B.C. EAO AIR, the Application assesses construction of the material
 3 offloading facility (MOF) and waterborne delivery of construction materials to the MOF during
 4 construction of the proposed Project. The proposed location of the MOF is along the navigable waterway
 5 of the Fraser River adjacent to the FortisBC property (Water Licence No. 2005596, Diversion Identification
 6 PD191626, WELL DRILL/TRANSPRT MGMT).

7 As a result of concerns received during the B.C EAO Application Development phase engagement activities
 8 that occurred after the development of the AIR, the proposed Project will no longer utilize any waterborne
 9 delivery of modular components and bulk construction materials to the proposed Project Site during
 10 construction. As a result, no MOF is required to be constructed for the proposed Project to accommodate
 11 waterborne deliveries. Avoidance of waterborne deliveries are included in the assessment as an avoidance
 12 mitigation measure. Implementation of this avoidance mitigation measure has been incorporated into this
 13 Application in the determination of potential residual effects. More detail is provided in subsection 1.5.5,
 14 Summary of Changes from the Detailed Project Description.

15 Table 1.4-1 provides a description of the components for the construction and operation phases of the
 16 proposed Project. Laydown and storage areas will be located either within the proposed Project Site or on
 17 previously disturbed areas, such as adjacent industrial sites. Figure 1.4-1 is an artistic rendering of the
 18 proposed Project facilities and supporting infrastructure.

Table 1.4-1. Proposed Project Components

Proposed Project Component	Description of Component
<i>Temporary Construction Components and Activities</i>	
Construction Infrastructure and Services	<ul style="list-style-type: none"> ▪ Temporary offices, first aid, and security will be required for construction activities. ▪ Existing proposed Project Site services will be used (such as power and water). Where remote power and lighting is required, portable generator systems or temporary construction power will be used.
Construction Laydown and Staging	In addition to FortisBC’s property, additional offsite laydown and storage space will be required, especially during later or overlapping construction phases. Local and preferred options will be identified, assessed, and determined during detailed design or execution planning based on the specific requirements.
Construction Materials Delivery	Existing roadways and proposed Project Site access points will be used. As described in subsection 1.5.5, delivery of modular components and some bulk materials by river is no longer contemplated but are assessed in the Application to be consistent with the AIR. As an avoidance mitigation measure, no waterborne deliveries are proposed in subsequent assessment subsections in the determination of potential residual effects to VCs and Indigenous interests.
Ground Preparation	Components of the LNG Storage Tank include ground improvements and foundations.

Table 1.4-1. Proposed Project Components

Proposed Project Component	Description of Component
MOF	<p>As described in more detail in subsection 1.5.5, the MOF is no longer being constructed as a result of engagement activities during the Early Application phase; however, to be consistent with the AIR, the MOF is described as follows:</p> <ul style="list-style-type: none"> ▪ Material offloading of prefabricated equipment modules will be required with access from the Fraser River. An existing dock (Figure 1.3-1) will require upgrades to accommodate barge unloading of proposed Project equipment modules and bulk materials during construction. ▪ The upgrades could include the topside of the jetty and upland areas and may include grading, load-bearing, and dike upgrades, as well as new in-water structures (such as piles or shoreline protection) as part of the design. The design will include mitigation measures to reduce effects to the surrounding aquatic systems. ▪ The upgrades may be maintained after completion of the proposed Project for use by the non-project components of the Tilbury LNG facility.
Water Management and Hydrotesting	<ul style="list-style-type: none"> ▪ The hydrotesting of the LNG Storage Tank is a specific construction and commissioning activity that is described in Appendix Q. A large volume of water is required for the hydrotest (approximately 95,000 m³). Hydrotesting requires that the LNG Storage Tank be filled, tested, and emptied in a 21-day period. Currently, both the source of the hydrotest water and the post-hydrotest management of the water are undetermined, but alternatives have been considered. Appendix Q includes assessment of utilizing the municipal water and sewer systems to support hydrotesting. ▪ Rainwater and surface water runoff management systems will be required for the proposed Project Site during construction and operation. These systems will include runoff collection ditches with sediment control features, which will connect with the Delta stormwater sewer system. ▪ In addition, groundwater management may be required during construction excavations at the proposed Project Site given the shallow water table in the area.
<i>Operation Components and Activities</i>	
LNG Storage	<p>One new full-containment storage tank with up to 142,400 m³ (3.5 PJ) of working storage. Components of the LNG Storage Tank include double-wall (full-containment) construction; LNG pumps; a closed loop BOG management system, including gas compressors; insulated piping; access stairways; lighting; instrumentation; controls; a rooftop crane system; and safety systems.</p>
Natural Gas Processing and Liquefaction	<ul style="list-style-type: none"> ▪ Expected to be built in one or more trains or phases depending on market demand for a total additional installed capacity of up to 7,700 t/d. ▪ From the metering or distribution and control equipment, natural gas will enter gas pretreatment to remove components in the natural gas not compatible with the cryogenic liquefaction process. Pretreatment includes filtration, separators, compression, and adsorption processes. ▪ Combustion of waste streams to provide thermal regeneration of certain pretreatment processes, including continuous thermal oxidation and periodic (that is, emergency circumstances or planned maintenance) combustion (flare) of vent or relief gases. FortisBC has committed to the incorporation of air emissions-control technologies into the design as a mitigation measure; this is discussed further in subsection 1.7 and Appendix B.

Table 1.4-1. Proposed Project Components

Proposed Project Component	Description of Component
Natural Gas Processing and Liquefaction (continued)	<ul style="list-style-type: none"> ▪ Electric-drive refrigerant compressors and air cooling used in the liquefaction process. ▪ Refrigerant unloading, storage, and make-up system. ▪ Instrument air and nitrogen generator systems, firewater system, control and safety system electronics, storm and wastewater handling systems, and potable and de-mineralized water systems. ▪ LNG transfer and BOG management systems. ▪ Fire detection and suppression, safety, security, emergency response, and protection systems designed to meet or exceed applicable standards.
Natural Gas Receiving	<p>Natural gas will be received at the proposed Project Site from existing FortisBC gas lines. Additional metering or distribution and control equipment will be needed at the proposed Project Site to distribute gas to specific liquefaction operating units.</p>
Supporting Infrastructure	<ul style="list-style-type: none"> ▪ The following facilities will be permanently installed for the lifecycle of the proposed LNG Storage Tank and liquefaction facilities and will support the safe operation of the facility: <ul style="list-style-type: none"> – Site administration, control rooms, site grading, roadways, lighting, security, and safety facilities – Liquid hydrocarbon or chemical storage and handling facilities – Connection to BC Hydro or FortisBC power systems – Additions to potable water, firewater, wastewater, and stormwater systems from existing proposed Project Site systems

Note:

BOG = boil-off gas



1

2 **Figure 1.4-1. Proposed Project Phase 2 Facilities Artistic Rendering**

3 Table 1.4-2 summarizes the assets, status, and working capacity of the LNG Storage Tank, and Table 1.4-3
 4 summarizes the liquefaction capacity onsite.

Table 1.4-2. Summary of Liquefied Natural Gas Storage

Asset	Status	Working Capacity (m ³)
Tilbury Base Plant Tank	Existing	28,000
Phase 1A Storage Tank	Existing	46,000
Phase 2 Storage Tank	Proposed, in EA process	142,400
Total		216,400

5

Table 1.4-3. Summary of Liquefaction Capacity Onsite

Asset	Status	Capacity (t/d)
Tilbury Base Plant	Existing	60
Phase 1A Facility	Existing	700
Phase 1B Facility	Planned	Up to 2,000
Phase 2 Facility	Proposed, in EA Process	7,700
Total		10,460

1 **1.5 Proposed Project Activities**

2 The proposed Project will consist of site preparation, construction, operation, and decommissioning, as
3 described in the following subsections.

4 **1.5.1 Schedule**

5 The preliminary proposed Project Schedule is designed to provide FortisBC with reasonable time to meet
6 key proposed Project milestones, meet resiliency objectives and market opportunities, and allow suitable
7 time for engagement with Indigenous nations, the public, and stakeholders. FortisBC will continue to seek
8 feedback on the proposed Project Schedule throughout the assessment process.

9 Primary activities and major milestones are listed in Table 1.5-1 for the proposed Project. Construction
10 start dates are subject to receipt of the Environmental Assessment Certificate (EAC) and required permits
11 and approvals, and these dates are presented as estimates based on current schedule assumptions.

Table 1.5-1. Preliminary Proposed Project Schedule

Task	Timing
EAC issued	Q1 2026
Permitting (synchronous permitting for some permit applications with EA Review)	2026 to 2027
Construction of LNG Storage Tank	2027+
Phased construction of LNG liquefaction facilities	2029+
LNG Storage Tank in service	2030
LNG liquefaction facilities in service	2031+
Decommissioning	After 40+ years during end of proposed Project in-operational life

Note:

Q1 = first quarter

1 **1.5.2 Site Preparation and Construction**

2 Table 1.5-2 outlines the proposed Project activities and timing for site preparation and construction.
3 Most proposed Project-related activities will be conducted within the property boundaries of the proposed
4 Project Site. Laydown and storage areas will be located either within the proposed Project Site or on
5 previously disturbed areas, such as adjacent industrial sites or remote storage facilities.

6 The proposed Project Site is a previously developed and subsequently decommissioned brownfield
7 industrial site; the proposed Project Site has little vegetation and requires no clearing or grubbing to
8 prepare it for construction.

9 As the current plans are to construct the LNG Storage Tank prior to the liquefaction, initial staging for the
10 LNG Storage Tank construction is anticipated to be on the proposed Project Site. This will include staging
11 the materials and equipment necessary for ground improvements under the LNG Storage Tank, as well as
12 the equipment and materials necessary to construct the LNG Storage Tank. Staging for the construction of
13 the LNG liquefaction will be dependent on the final development concept (that is, both the final
14 liquefaction capacity and the number of liquefaction trains).

15 Site preparation will include regrading the proposed Project Site, raising the elevation of the proposed
16 Project Site in some cases (for flood control and proofing purposes), constructing heavy haul roads
17 (for transporting the modules), and installing stone columns and other ground improvements. To ensure
18 ground conditions are suitable for construction, some spoil material may be removed from the proposed
19 Project Site and replaced with fill that meets prescribed engineering specifications. Similarly, aggregate
20 will be imported to the proposed Project Site for use in stone columns and other ground improvements or
21 haul road surfacing. There are multiple local sources of engineered fill and aggregate; the final source will
22 be determined during contracting following the issuance of an EAC. Similarly, there are multiple options
23 for the offsite disposal or reuse of the spoil material; however, the availability of many of these options are
24 dependent on demand and current activity levels in the Lower Mainland. The handling, stockpiling, and
25 moving of both spoil material and engineered fill or aggregate will be described in detail in the
26 Construction Environmental Management Plans (CEMPs) developed post-EAC. No materials will be
27 borrowed from the proposed Project Site.

28 Onsite and offsite equipment and materials storage areas will be identified post-EAC during detailed
29 construction planning and contracting. The proposed Project will rely on existing storage, warehousing,
30 and laydown facilities. Factors that will be considered for the selected storage areas will include
31 accessibility to the proposed Project Site, the source of the materials being stored, and the available
32 transportation options.

33 It was originally proposed that modular construction techniques would be utilized for the LNG liquefaction.
34 However, as described in further detail in subsection 1.5.5, FortisBC's commitment to not utilize any
35 waterborne deliveries during construction will reduce FortisBC's ability to utilize large modular
36 construction components and require use of smaller modular components that can be moved by road
37 transport. FortisBC anticipates that transportation of bulk materials such as gravel, piping, structural steel,
38 and cable to site will be by truck via the provincial and local road systems. Material transport
39 arrangements will be required to adhere to FortisBC's proposed Project CEMPs, and input from Indigenous
40 nations and stakeholders and will be gained through engagement activities to ensure proactive
41 engagement with road users.

42 Onsite, mobile equipment required to support construction includes earth-moving equipment (for site
43 grading and construction of haul roads), ground-improvement equipment (for installing stone columns
44 and similar features), manlifts, forklifts and cranes, and highway vehicles for the purposes of personnel

1 and materials transport and delivery. The number of any given type of mobile equipment is undetermined
 2 at this time and will not be known with certainty until detailed design is completed post-EAC.

3 Although refuelling protocols will be finalized during contracting, it is feasible that refuelling will be
 4 completed through the temporary installation of a fuel depot or the use of portable refuelling equipment.
 5 Hazardous materials, fuels, and residues will be stored and handled in accordance with the requirements
 6 of the *Hazardous Waste Regulation* and transported in accordance with the *Transportation of Dangerous*
 7 *Goods Act* and the applicable B.C. Fire Code. When practical, volumes of hazardous materials stored on the
 8 proposed Project Site will be limited to the minimum necessary for the task.

9 Surface water runoff will be managed through improvements and additions to the existing surface water
 10 management system, which is composed of ditches that connect to the Delta stormwater sewer system.
 11 Sediment control features will be incorporated into the stormwater management system, both temporary
 12 (during construction) and permanent (for operation). Should dewatering of any open excavations be
 13 required, it is proposed that the water pumped out of the excavation will be released on the proposed
 14 Project Site, utilizing the surface water management infrastructure to store, divert, and release the
 15 excavation water.

16 In-water works will not be required, as the MOF will not be utilized for the proposed Project. As described
 17 in more detail in subsection 1.5.5 and as a result of Early Engagement, the MOF is no longer required and
 18 will not be constructed as part of the proposed Project. The MOF and potential effects arising associated
 19 with it are included in the Application to be consistent with the AIR.

20 The hydrotesting of the LNG Storage Tank is a specific construction and commissioning activity that is
 21 described in Appendix Q. A large volume of water is required for the hydrotest (an estimated 95,000 m³).
 22 Hydrotesting requires that the LNG Storage Tank be filled, tested, and emptied during a 21-day period.
 23 At this time, both the source of the hydrotest water and the post-hydrotest management of the water are
 24 undetermined. The Application considers utilization of the municipal water and storm sewer system for
 25 supply and management of the hydrotest water.

Table 1.5-2. Description of proposed Project Activities – Site Preparation and Construction

Proposed Project Activities	Timing
Site Preparation Activities	
<ul style="list-style-type: none"> ▪ Site planning by phase ▪ Mobilizing construction equipment, temporary offices, and materials to the proposed Project Site ▪ Clearing, filling, and grading the previously developed brownfield site ▪ Providing construction utilities, including power, water, phone, offices, and internet services ▪ Relocating or improving stormwater and erosion- and sediment-control measures ▪ Conducting ground preparation, geotechnical work, and work permitted for the site to improve soil load bearing (could include preloading and geotechnical ground stabilization) 	2027 to 2029

Table 1.5-2. Description of proposed Project Activities – Site Preparation and Construction

Proposed Project Activities	Timing
Construction Activities	
<ul style="list-style-type: none"> ▪ Conducting ground improvements, heavy haul roads, and civil works, including foundations and structures. ▪ Constructing electrical step-down transformers from the Phase 1B 230-kV substation, including associated onsite proposed Project power lines. ▪ Constructing the LNG Storage Tank and installing related piping and instrumentation and controls or electrical equipment, in-tank pumps, boil-off compressors, and piping connections to the existing plant and to the TMJ project. ▪ Constructing the gas supply interface and pretreatment systems. ▪ Transporting, setting, and conducting final assembly construction of liquefaction train modules. ▪ Constructing TO and/or TEGF for combustion of waste and emergency vent streams; before the flares are built at site, the relief streams from pressure safety valves or blowdown valves will be vented to atmosphere (that is, to a safe location) during upset and emergency scenarios. ▪ Connecting liquefaction trains to LNG tank, power, utilities, safety, and control systems. ▪ Constructing administration or control, maintenance, utility, and safety facilities. ▪ Commissioning phased equipment installation, including initial purging, cool down, and fill of LNG lines and tank. ▪ Decommissioning temporary infrastructure, such as construction offices, warehousing, temporary power, fuel depots, and batch plants. ▪ Conducting site clean-up and security installation. 	2027

Notes:

TEGF = totally enclosed ground flare

TO = thermal oxidizer

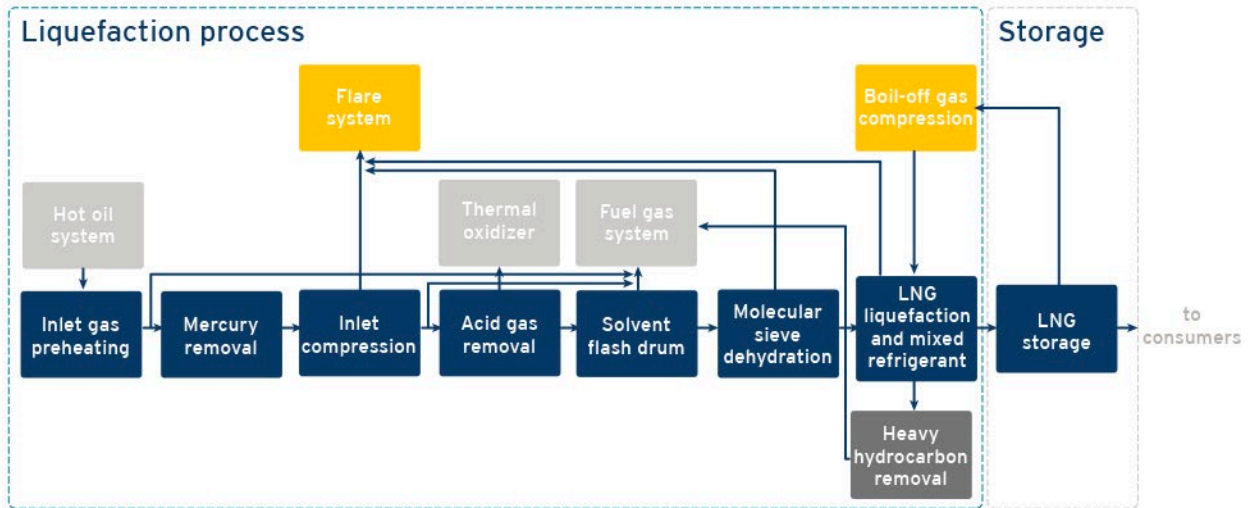
1 1.5.3 Operation

2 Table 1.5-3 outlines the proposed Project activities and timing for operation.

Table 1.5-3. Description of Proposed Project Activities – Operation

Operation Activities	Timing
<ul style="list-style-type: none"> ▪ Receiving natural gas via piping from the existing FortisBC Tilbury LNG natural gas metering station and inlet manifolds ▪ Pretreating natural gas to remove components of gas line natural gas not compatible with the liquefaction process ▪ Storing refrigerants ▪ Liquefaction of the natural gas (using electric compression drives and air cooling) ▪ Transferring and storing LNG ▪ Managing LNG BOG ▪ Transferring stored LNG to distribution (existing regasification or send-out, TMJ project) ▪ Controlling, inspecting, and maintaining proposed Project components 	2030

1 The existing Tilbury LNG facility receives gas from the Coastal Transmission System; this existing
 2 infrastructure will deliver gas for the Phase 2 Expansion. A simplified process schematic is shown on
 3 Figure 1.5-1.



4
 5 **Figure 1.5-1. Tilbury Phase 2 Liquefied Natural Gas Facility Liquefaction Process Diagram**

6 Upon receipt, the gas will be purified (for example, removing the mercaptans added to the domestic gas
 7 supply as a public safety measure) prior to liquefaction. The current development concept assumes either
 8 coil-wound heat exchangers or cold boxes will be applied as the main liquefaction heat exchangers.
 9 The plant will consist of a pipeline interface system, an inlet compression system, natural gas
 10 pretreatment systems, a heavy hydrocarbon removal system, a liquefaction unit, and a BOG compression
 11 system. In detail, the plant consists of the main process and utility units provided in Table 1.5-4.

Table 1.5-4. Description of Main Operation Components

Unit Name	Short Description
Pipeline interface system	Inlet gas preheating
Mercury removal system (optional—not currently required based on existing feed gas composition)	Mercury removal based on an adsorbents bed
Inlet gas compression system	Compression of inlet gas to liquefaction pressure
Acid gas removal system	CO ₂ , sulphur compounds, and aromatics removal from the feed gas using an amine system
Molecular sieve dehydration system	Deep dehydration by regenerable molecular sieve beds
Heavy hydrocarbon removal system	Ethane and propane will be separated from the feed gas to create a pure methane stream for liquefaction
LNG liquefaction and mixed refrigerant system	Natural gas liquefaction using refrigerant cycles (single or dual, as required) for liquefaction
Refrigerant unloading/storage and make-up system	Make-up supply facilities
BOG compression system	Capture and compression of BOG to return BOG to the system

Table 1.5-4. Description of Main Operation Components

Unit Name	Short Description
Fuel gas system	Use of separated gases as a fuel source for combustion fired process equipment
Associated utility systems	Includes all required utility systems—instrument air system, inert gas system, hot oil system, flare, TO, potable water, fire water, and demineralized water

- 1 As previously described, the primary purpose of the LNG Storage Tank is to improve the resilience of the
 2 gas distribution and supply system. The 3-billion cubic feet (BCF) LNG Storage Tank provides sufficient
 3 LNG supply to serve FortisBC’s Lower Mainland winter design load for at least 3 days without depleting the
 4 entire inventory of LNG, allowing response to a 3-day “no-flow” event. Any BOG from the tank will be
 5 captured and reliquefied, used as fuel onsite, or sent out into the gas distribution and supply system.
- 6 The liquefaction process requires chemicals (for example, solvent and adsorbents) and filters for gas
 7 treatment. The adsorbents and filters in the system are replaced when the performance gets reduced over
 8 time. Refrigerants are in a closed loop and do not come in contact with the gas stream. There are no solid
 9 or liquid wastes generated from the refrigerant system. Table 1.5-5 describes the material inventory at the
 10 Tilbury LNG site.

Table 1.5-5. Material Inventory on Tilbury Liquefied Natural Gas Site

Consumable	Details and Purpose	Volume/Weight/Consumption
Refrigerants	Typical refrigerants utilized in an LNG liquefaction facility may include the following: <ul style="list-style-type: none"> ▪ High-purity nitrogen ▪ Methane ▪ Ethylene ▪ Propane 	Estimated volume onsite as follows: <ul style="list-style-type: none"> ▪ 15 tonnes ▪ 30 tonnes ▪ 80 tonnes ▪ 125 tonnes
	Chemicals	Hybrid solvent or equivalent— used as part of the acid gas removal system (removal of sulphides and acid gases such as CO ₂ , hydrogen sulphide, and COS)
	Anti-foam agent (for use as part of acid gas removal system) comprised of blends of silicon derivatives	500 L
	Potassium carbonate used as pretreatment degreaser prior to initial commissioning	20 tonnes (one time use during commissioning and startup)
Adsorbents	Activated carbon—used as part of the acid gas removal system	18.5 m ³ first charge expected to last 6-12 months
	Mercury adsorbent—used as part of the mercury removal system (optional)	60 tonnes first charge expected to last more than 3 years
	Water adsorbent—used as part of the molecular sieve dehydration system	210 tonnes first charge expected to last more than 3 years

Table 1.5-5. Material Inventory on Tilbury Liquefied Natural Gas Site

Consumable	Details and Purpose	Volume/Weight/Consumption
Adsorbents (continued)	Water/methanol adsorbent Type 1—used as part of the refrigerant make-up system	530 kg first charge expected to last more than 1 year
	Water/methanol adsorbent Type 2—used as part of refrigerant make-up system	1,150 kg first charge expected to last more than 1 year
Heat medium	Industrial hot oil or equivalent	<ul style="list-style-type: none"> ▪ Inventory = 800 tonnes ▪ Closed loop system may require make-up periodically (for example, following filter change or during pump maintenance)
Fuel gas	From process gas, including heavy hydrocarbons, with feed gas as backup	Estimated 9,000–9,500 kg per hour
Demineralized water	Required as make-up water for the acid gas removal system	1.1–2.0 m ³ per hour
Lubricants	Machinery lubricating oil, as required	30–50 m ³ (change out frequency per manufacturer standards)

Notes:

Volumes are estimated for the purposes of this assessment and are subject to change during detailed design of the proposed Project.

COS = carbonyl sulphide

kg = kilogram(s)

L = litre(s)

- 1 Waste streams generated during operation are included in Table 1.5-6.

Table 1.5-6. Waste Streams Generated During Operation of the Existing Tilbury Liquefied Natural Gas Plant

Waste Stream	Description	Volume/Weight/Consumption
Adsorbents	<ul style="list-style-type: none"> ▪ Activated carbon—used as part of the acid gas removal system ▪ Mercury adsorbent—used as part of the mercury removal system (optional) ▪ Water adsorbent —used as part of the molecular sieve dehydration system ▪ Water/methanol adsorbent Type 1—used as part of the refrigerant make-up system ▪ Water/methanol adsorbent Type 2—used as part of refrigerant make-up system 	<ul style="list-style-type: none"> ▪ 18.5 m³ first charge expected to last 6-12 months ▪ 60 tonnes first charge expected to last more than 3 years ▪ 210 tonnes first charge expected to last more than 3 years ▪ 530 kg first charge expected to last more than 1 year ▪ 1150 kg first charge expected to last more than 1 year

1 The existing Tilbury LNG facility sorts its waste into the following streams depending on the material:

- 2 ▪ Recyclable metals
- 3 ▪ Wood and cardboard
- 4 ▪ Landfill waste that cannot be recycled
- 5 ▪ Compost
- 6 ▪ Hazardous waste such as used oil, aerosols, and batteries

7 The waste is sorted according to the applicable regulatory requirements. The waste streams are
8 periodically collected by a licensed Contractor for offsite disposal at an appropriately regulated facility.
9 During operation of the proposed Project, FortisBC will continue to utilize the existing protocols and
10 procedures to manage waste onsite and will ensure compliance with applicable regulatory requirements.

11 Storage and handling of reagents, petroleum products, chemical products, hazardous materials, and
12 residual materials will comply with the requirements of the *Transportation of Dangerous Goods*
13 regulations, *Hazardous Waste Regulation*, and Fire Code.

14 Stormwater will be managed on the proposed Project Site using the stormwater management
15 infrastructure installed during construction. This infrastructure will consist of open drainage ditches inside
16 the site as well as perimeter ditches that will control and direct surface runoff to the Delta stormwater
17 sewer system. Prior to discharge into the stormwater drainage ditches, stormwater is collected and tested
18 for compliance with the B.C. Working Water Quality Guidelines (WQGs) for Aquatic Life (B.C. MOE 2013;
19 B.C. ENV 2021).

20 As the proposed LNG storage and liquefaction facilities will be built and operated in a developed industrial
21 area in the Lower Mainland, water will be provided from a connection to the Metro Vancouver water main.
22 There are no industrial effluent streams associated with the proposed Project.

23 At the time of this Application submission, the preferred water source for the one time hydrotest is the
24 municipal water system, and the preferred discharge option is the use of the existing stormwater sewer
25 connections; however, this is subject to change during the detailed design phase of the proposed Project.
26 Alternatives considered for hydrotesting water supply and disposal are described in the Hydrotest TDR
27 (Appendix Q of the Application).

28 **1.5.4 Decommissioning and Reclamation**

29 The proposed Project Site is zoned for industrial use; therefore, at the end of the proposed Project's
30 operational life of 40 or more years, the proposed Project facilities will be decommissioned in accordance
31 with regulations applicable at that time, including British Columbia Energy Regulator (BCER) permitting
32 requirements, and in consideration of future business requirements and the preferred land uses at that
33 time.

34 Decommissioning activities may include the following:

- 35 ▪ De-energizing, decommissioning purging, and dismantling LNG facilities
- 36 ▪ Repurposing and recycling materials and equipment
- 37 ▪ Preparing the proposed Project Site for subsequent use

38 The proposed Project is located on fee simple property zoned for industrial use within an industrial park.
39 The proposed Project Site has previously been utilized as Industrial Land (IL), and FortisBC anticipates that
40 at the end of the proposed Project's economic life, the facility will be de-energized, the aboveground
41 facilities will be removed, and the ground will be regraded in preparation for future industrial
42 development. No impediments to current or future brownfield redevelopment have been identified, and

1 based on the information available to FortisBC, FortisBC anticipates this land and adjacent properties will
2 continue to be used for industrial purposes in the future.

3 Given the estimated operational life of the proposed Project, there is uncertainty as to the future land uses
4 and zoning. The most likely scenario is that the land use will remain industrial and/or commercial
5 industrial. In this case, as the property is fee simple land, the land may be reutilized by FortisBC or sold to
6 a future developer. Closer to decommissioning, FortisBC will consult with Nations on the potential future
7 land use of the site.

8 **1.5.5 Summary of Changes from the Detailed Project Description**

9 The core proposed Project components listed in the DPD have not changed since the submission of the
10 DPD in January 2022. The following are updates to proposed Project components described in the DPD.

- 11 ▪ When the DPD was submitted, the conceptual design features and construction activities for the
12 proposed MOF had not been developed. In Table 1.4-1 the MOF concept description has been further
13 developed and described.
- 14 ▪ The Preliminary Project Schedule has been refined since the submission of the DPD. The date of “EAC
15 issued” has moved to Q1 2026 from Q1/Q2 2023 as written in the DPD. The date change reflects the
16 current status of the proposed Project.
- 17 ▪ Since the submission of the DPD, FortisBC has conducted a screening assessment on the Best
18 Available Technologies (BAT) to reduce proposed Project GHG emissions as described in the BAT
19 Report (Appendix P of the Application). The BAT assessed select technology mixes including
20 electrically driven compression and gas-fired technologies that optimize reliability, resulting in initial
21 low GHG and criteria air contaminant (CAC) emissions with the potential for further reductions in the
22 future. FortisBC has also committed to installing air emissions control technologies (such as
23 scrubbers) with the selection-process of technology being determined post-EAC and during the
24 Detailed Project Design phase.

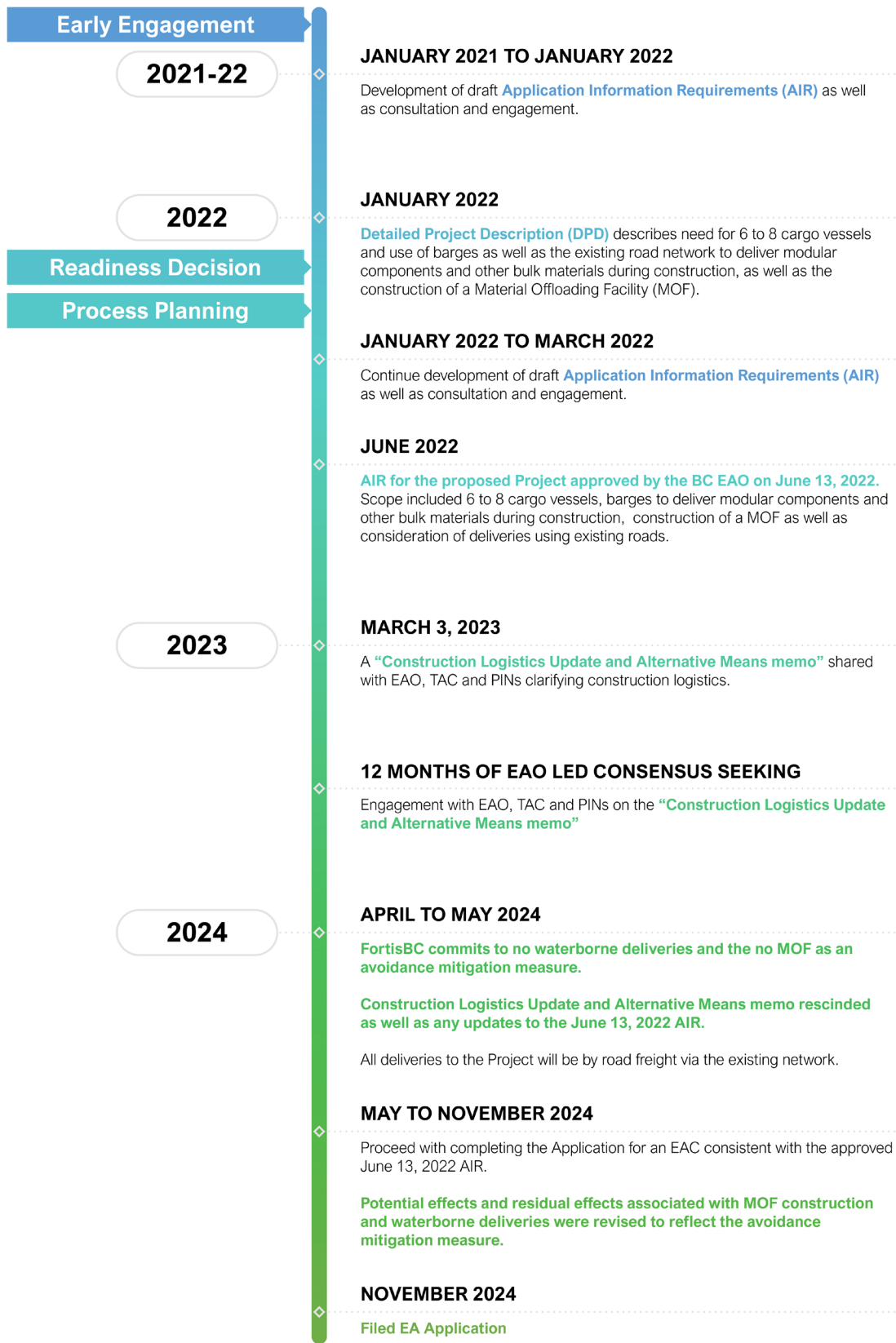
25 The following subsection describes changes to proposed construction logistics since submission of the
26 DPD in January 2022.

27 **1.5.5.1 Changes to Construction Logistics**

28 In January 2022, FortisBC submitted the DPD for the proposed Project to the EAO. The DPD described the
29 need for six to eight proposed Project cargo vessels and the use of barges to deliver modular components
30 and other construction materials to a MOF during the construction phase. The DPD included the
31 construction of a MOF for delivery of these construction materials and prefabricated modules. The DPD
32 also outlined that existing roadways would be used to deliver bulk construction materials to the proposed
33 Project. As required by the EAA, the AIR for the proposed Project was approved by the B.C. EAO on
34 February 24, 2022, after conducting Process Planning and consensus seeking. During Application
35 Development guided by the AIR, FortisBC conducted an analysis of the transportation methods available
36 to bring materials to the proposed Project Site during construction. Findings were reported by FortisBC in
37 the Construction Logistics Update and Alternative Means Memorandum (memo) submitted to the
38 B.C. EAO in March 2023. In this memo, FortisBC clarified the number of barges with prefabricated modules
39 and construction materials that would be brought to the proposed Project Site.

40 During FortisBC’s engagement and an additional round of B.C. EAO-led consensus seeking with Indigenous
41 nations during the Application Development phase to discuss the Construction Logistics Update and
42 Alternative Means Memo, concerns were raised about potential negative effects to Aboriginal Rights to
43 fish, as well as negative cumulative effects on the Fraser River resulting from the proposed barge traffic.

1 FortisBC considered feedback from all participants and decided not to utilize the alternative construction
2 means of waterborne delivery of modules or bulk construction materials described in the DPD. To address
3 concerns about potential effects to the Fraser River, FortisBC has committed to remove construction of the
4 MOF and barge deliveries to the proposed Project Site during construction as an avoidance mitigation
5 measure. Construction materials, equipment, and any other deliveries to the proposed Project Site during
6 construction will be by road freight using existing roads and highways. The proposed Project will utilize
7 smaller modules that are compatible with standard highway transportation. As a result of the avoidance of
8 waterborne activities during construction, the MOF and associated barge deliveries will no longer be
9 required for the proposed Project. FortisBC has therefore rescinded the Construction Logistics Update and
10 Alternative Means Memo. FortisBC will proceed with completing the Application for an EAC consistent with
11 the AIR, which B.C. EAO sought consensus on and published on February 24, 2022. In accordance with the
12 AIR, potential effects from construction of the MOF and barge delivery vessels to the MOF are assessed in
13 each VC assessment subsection. In the assessment, avoidance mitigation measures (that is, no waterborne
14 deliveries or MOF construction) are presented and considered in the determination of potential residual
15 effects. For a timeline of activities, refer to Figure 1.5-2.



1

2 **Figure 1.5-2. Waterborne Activities Avoidance Mitigation Measure Timeline**

1 **1.6 Workforce Requirements**

2 Proposed Project construction is expected to create approximately 6,200 direct, full-time equivalent (FTE)
 3 jobs² in B.C. It is estimated that between 5 – 10 percent of positions during construction will be filled using
 4 contract workers. When including all direct, indirect, and induced effects, proposed Project-related
 5 employment in B.C. during construction is expected to be approximately 13,300 FTE jobs.

6 It is estimated that the operation phase workforce for the proposed Project-related LNG production and
 7 storage will create approximately 600 jobs, including 100 jobs at the Tilbury facility, 400 indirect jobs for
 8 suppliers and other services, and 100 jobs through induced effects on the economy. Workers employed
 9 during operation are expected to be employed by FortisBC, with little to no positions filled by contract
 10 workers. Three quarters of the estimated 100 direct employment positions for the proposed Project
 11 operation will be skilled trades, including licensed Red Seal mechanics, machinists, welders, and other
 12 skilled trades, and the remainder will be engineers, professional positions, and management positions
 13 (Table 1.6-1).

14 **1.6.1 Opportunities for Employment**

15 FortisBC anticipates the following employment opportunities for the construction phase of the
 16 proposed Project.

Table 1.6-1. Estimated British Columbia Direct, Indirect, and Induced Proposed Project-related Employment During Construction³

Proposed Project-related Employment During Construction	Construction Employment (FTE, Person-years, Cumulative Over a 6-year Period)	Annual Employment (FTE, Person-years)
Direct	6,200	1,000
Indirect	4,800	800
Induced	2,300	400
Total	13,300	2,200

17 For details on employment during construction of the proposed Project, including employment numbers
 18 by sector, refer to subsection 7.10, Employment and Economy.

19 FortisBC anticipates the employment opportunities listed in Table 1.6-2 for the operational phase of the
 20 proposed Project.

Table 1.6-2. Estimated British Columbia Employment During Operation for Liquefied Natural Gas Production

Proposed Project-related Employment During Operation	LNG Facility (FTE, Person-years, Annual)
Direct	100

² "Jobs" refers to full-time employees, expressed in person-years. One person year of employment is equivalent to the number of hours that an individual would work on a full-time basis for one year.

³ Numbers rounded to nearest 100 from the output of the economic model output presented in Section 7 – Employment and Economy because of variability in actual employment at the time of construction.

Table 1.6-2. Estimated British Columbia Employment During Operation for Liquefied Natural Gas Production

Proposed Project-related Employment During Operation	LNG Facility (FTE, Person-years, Annual)
Indirect	400
Induced	100
Total	600

1 Direct, indirect, and induced jobs that will be created due to the proposed Project-related LNG production
 2 at the Tilbury facility and upstream production of natural gas include support services during operation in
 3 industrial sectors including transportation and warehousing; utilities; and finance, insurance, real estate,
 4 rental and leasing, and holding companies. For details on employment during operation of the proposed
 5 Project, including employment numbers by sector, refer to subsection 7.10, Employment and Economy.

6 **1.6.2 Anticipated Workforce Region of Origin**

7 The workforce development plan will encourage resourcing local, Indigenous, and underrepresented
 8 workers to the proposed Project. It is the preference of the proposed Project to source labour locally and
 9 regionally; however, the labour market will dictate where appropriately qualified resources are available.

10 **1.6.3 Investment in Training**

11 To execute a project of this size and scope, the proposed Project requires a high-quality workforce.
 12 FortisBC anticipates the proposed Project will invest in and create training and education opportunities for
 13 both Contractor staff and FortisBC employees.

14 Currently, the proposed Project team is building relationships with education institutions, local
 15 communities, Indigenous nations, underrepresented groups, and unions to understand how it can
 16 collaboratively provide education, training, apprenticeships, and opportunities for the proposed Project
 17 that benefit all parties.

18 FortisBC is working to identify investment levels in trades training to attract and develop workforce
 19 capacity as part of the workforce development plan, as well as to set requirements for the selected
 20 Contractor to encourage training programs and apprenticeships for the proposed Project.

21 **1.6.4 Expected Workforce Requirements Based on the National Occupational Classification System**

22 Expected workforce requirements based on the National Occupational Classification (NOC) are shown in
 23 estimated working hours in Table 1.6-3.

Table 1.6-3. Expected Workforce Requirements Based on the National Occupational Classification

NOC Number	Employment Category	Estimated Working Hours Required
Construction		
011	Administrative services managers	115,000
021	Engineering, architecture, science, and information systems managers	313,000
112	Human resources and business service professionals	150,000
121	Administrative services supervisors	188,000
141	General office workers	356,000
152	Supply chain logistics, tracking, and scheduling coordination occupations	241,000
213	Civil, mechanical, electrical, and chemical engineers	738,000
214	Other engineers	77,000
215	Architects, urban planners, and land surveyors	600
225	Technical occupations in architecture, drafting, surveying, geomatics, and meteorology	55,000
226	Other technical inspectors and regulatory officers	181,000
411	Judges, lawyers, and Quebec notaries	7,000
720	Contractors and supervisors in industrial, electrical, and construction trades, and related workers	914,000
723	Machining, metal forming, shaping, and erecting trades	4,446,000
724	Electrical trades and electrical power line and telecommunications workers	399,000
728	Masonry and plastering trades	130,000
729	Other construction trades	764,000
751	Motor vehicle and transit drivers	108,000
923	Central control and process operators in processing and manufacturing	217,000
Operation^a		
001	Legislators and senior management	4,000
008	Middle management occupations in trades, transportation, production, and utilities	6,000
011	Administrative services managers	2,000
021	Engineering, architecture, science, and information systems managers	29,000
112	Human resources and business service professionals	23,000
121	Administrative services supervisors	2,000
141	General office workers	2,000

Table 1.6-3. Expected Workforce Requirements Based on the National Occupational Classification

NOC Number	Employment Category	Estimated Working Hours Required
152	Supply chain logistics, tracking, and scheduling coordination occupations	19,000
213	Civil, mechanical, electrical, and chemical engineers	8,000
214	Other engineers	8,000
225	Technical occupations in architecture, drafting, surveying, geomatics, and meteorology	4,000
226	Other technical inspectors and regulatory officers	6,000
654	Security guards and related service occupations	17,000
720	Contractors and supervisors in industrial, electrical, and construction trades and related workers	46,000
724	Electrical trades and electrical power line and telecommunications workers	42,000
729	Other construction trades	33,000
731	Machinery and transportation equipment mechanics (except motor vehicles)	17,000
923	Central control and process operators in processing and manufacturing	127,000

^a Estimated workforce hours obtained from estimated full-time employment numbers projected in the FortisBC LNG: Opex estimation, Phase I + II Close-Out Report by Partners in Performance (2019).

1 1.6.5 Working Conditions, Schedule, and Transportation

2 The proposed Project anticipates rates of pay to align with current market rates at the time of contracting,
3 which may include overtime. Working conditions for the Contractors will be determined by their
4 employment contracts or collective agreements.

5 The majority of construction work performed will be physical work performed outdoors with exposure to
6 weather conditions. Work performed on the proposed Project Site could involve working around or with
7 machinery, heavy equipment, vehicles, and other workers.

8 Office work may be performed on the proposed Project Site or offsite in a project office.

9 FortisBC anticipates that the Contractor will determine the working hours based on the construction
10 schedule. It is feasible that working hours will include a variable shift schedule including day, evening,
11 weekend, and rotating shifts. Offsite parking options are being explored as part of the workforce plan, with
12 a shuttle service to move workers back and forth to the proposed Project Site, as required.

13 1.6.6 Hiring, Workplace Policies, and Programs for Indigenous Nation Employment and 14 Employment of Underrepresented Groups

15 FortisBC has an existing Human Resource and Guidelines policy that will be used as a standard for the
16 proposed Project. Conformance with this policy will be a requirement of proposed Project contracts to
17 ensure Contractors have consistent practices and will be achieved via the requirement of the procurement
18 process. Decisions regarding hiring, promotion, transfers, and any other job assignments will be made on
19 the basis of qualification, ability, and performance. FortisBC is committed to identifying and removing

Environmental Assessment Certificate Application

1 discriminatory barriers that could limit qualified people from participation in our workplace. This ensures
2 fair and equitable treatment and opportunity for all employees and job applicants regardless of religious
3 beliefs, gender, gender identity or expression, sexual orientation, marital status, family status, religion,
4 race, age, colour, national origin, ancestry, mental or physical disability, criminal conviction unrelated to
5 work, or any other status protected by Federal and Provincial laws.

6 The proposed Project will have a minimum hiring standard to ensure that candidates have the basic skills
7 that improve their opportunities for advancement. The minimum hiring standard is a high school diploma
8 (or certificate of equivalency) or a recognized technical degree or diploma. Many positions within the
9 proposed Project will require advanced education and specific work experience.

10 The existing FortisBC Code of Conduct and Ethics Policy sets out a high standard of conduct that is
11 expected of everyone at FortisBC. FortisBC requires all employees, consultants, contractors, and
12 representatives of FortisBC to read the code and to acknowledge that they understand and agree to follow
13 the outlined:

- 14 ▪ Being your best
- 15 ▪ Protecting health, safety, and the environment
- 16 ▪ Acting responsibly
- 17 ▪ Protecting FortisBC assets
- 18 ▪ Where to go for help

19 FortisBC recognizes that its people are the energy behind its success, which is why FortisBC's commitment
20 to its Culture of Belonging statement of principles will lead to a more inclusive, diverse, and equitable
21 workplace for the entire FortisBC family, which will help FortisBC power business results, now and in the
22 future. In addition, the current proposed Project team has collaboratively created a set of guiding
23 principles to help to define how decisions are made and how interactions with internal and external parties
24 are conducted. They serve as the compass for the team, to shape decisions and interactions, while safely
25 and efficiently executing all activities.

26 FortisBC is committed to building effective Indigenous relationships and to ensuring it has the structure,
27 resources, and skills necessary to maintain these relationships. To meet this commitment, the actions of
28 FortisBC and its employees will be guided by FortisBC's Statement of Indigenous Principles
29 (FortisBC n.d.b), which includes the following tenets:

- 30 ▪ FortisBC companies acknowledge, respect, and understand that Indigenous Peoples have unique
31 histories, cultures, protocols, values, beliefs, and governments.
- 32 ▪ FortisBC supports fair and equal access to employment and business opportunities within FortisBC
33 companies for Indigenous Peoples.
- 34 ▪ FortisBC will develop fair, accessible employment practices and plans that ensure Indigenous Peoples
35 are considered fairly for employment opportunities within FortisBC.
- 36 ▪ FortisBC will strive to attract Indigenous employees, consultants and Contractors, and business
37 partnerships.
- 38 ▪ FortisBC is committed to dialogue through clear and open communication with Indigenous
39 communities on an ongoing and timely basis for the mutual interest and benefit of both parties.
- 40 ▪ FortisBC encourages awareness and understanding of Indigenous issues within its work force, industry,
41 and communities where it operates.
- 42 ▪ To achieve better understanding and appreciation of Indigenous culture, values, and beliefs, FortisBC
43 is committed to educating its employees regarding Indigenous issues, interests, and goals.

- 1 ▪ FortisBC will ensure that when interacting with Indigenous Peoples, its employees, consultants, and
2 Contractors demonstrate respect and understanding of Indigenous Peoples' culture, values, and
3 beliefs.
- 4 ▪ To give effect to these principles, each of FortisBC's business units will develop, in dialogue with
5 Indigenous communities, plans specific to their circumstances.
- 6 ▪ Honour existing hiring commitments made in applicable agreements.

7 **1.6.7 Employee Assistance Programs and Benefits**

8 FortisBC offers its employees a wide range of benefits that vary depending on affiliation and/or collective
9 agreement. Those benefits include extended health and dental, employee assistance and family support,
10 and a pension plan and may include career and transition planning. Employees employed directly by
11 FortisBC on the proposed Project will be eligible for FortisBC benefits. Employees employed by
12 Contractors will have any accessible benefits provided by their direct employer and outlined in their
13 employment contract or collective agreement.

14 **1.6.8 Workplace Policies and Programs**

15 FortisBC has an existing Code of Conduct that employees are expected to adhere to. FortisBC recognizes
16 that every proposed Project worker has the right to a safe and healthy workplace with sound safety and
17 environmental practices. Proposed Project workers will be required to comply with all applicable safety
18 and environmental legislation; FortisBC requirements, including the FortisBC Safety and Environmental
19 Policy; and accepted industry practices and standards.

20 This includes the FortisBC Fit for Duty policy which all staff must comply with, and which Contractors are
21 required to conform with. All proposed Project workers will be required to come to work fit for duty and
22 follow the requirements outlined in the policy.

23 Similarly, all proposed Project workers, staff, and Contractors will be required to comply with FortisBC's
24 Respect in the Workplace Policy, which describes FortisBC's expectations for a workplace that is
25 professional, respectful, and free of harassment, bullying, and intimidation. FortisBC shall require the
26 Contractor to have and implement policies and program equal to or more stringent than the Company's
27 Fit for Duty and Respect in The Workplace Policies.

28 **1.7 The Need for and Purpose of the Proposed Project and Alternatives** 29 **Considered**

30 This subsection provides information on the proposed Project purpose and alternatives.

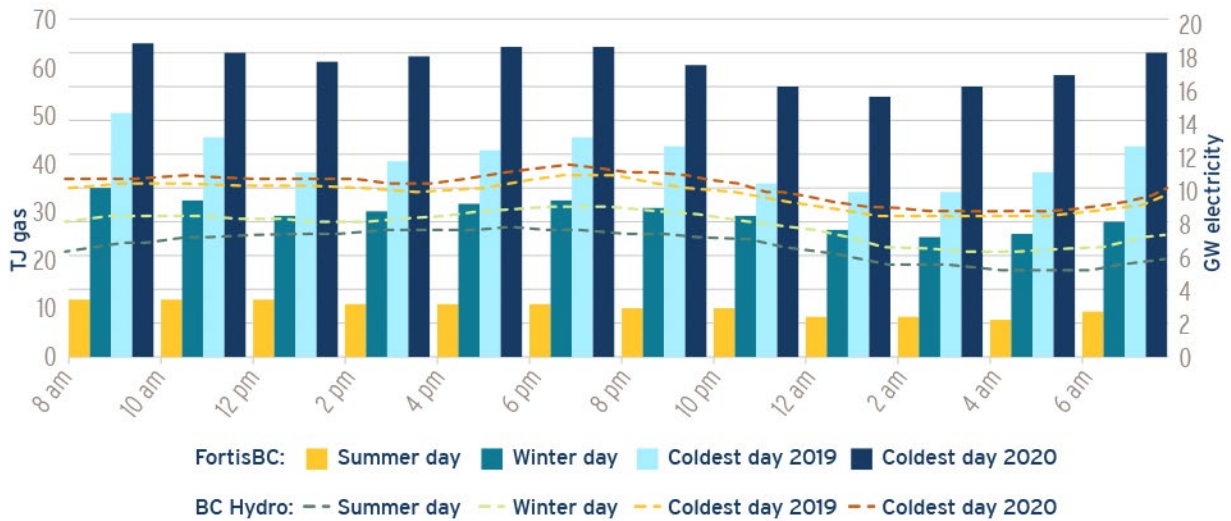
31 **1.7.1 Need for the Proposed Project**

32 The purpose of the proposed Project is to increase storage of LNG for energy resilience in the Lower
33 Mainland and increase LNG production to meet the need for LNG as a transportable and storable low-CI
34 fuel. The proposed Project will provide low-carbon fuel to support local and global energy transition goals.

35 **1.7.1.1 Resilience of Energy Supply**

36 The existing Tilbury LNG facilities serve a key role in FortisBC's Lower Mainland gas system by producing
37 and storing LNG for use during peak demand periods (such as cold days during the winter; refer to
38 Figure 1.7-1). FortisBC's gas system provides up to double the energy compared to BC Hydro's electric

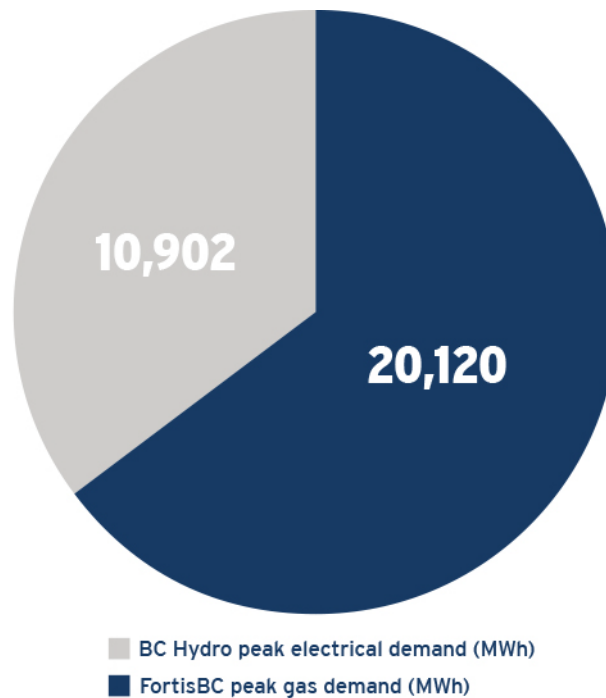
1 system in B.C. on the coldest days of the year (Figure 1.7-2). Recent gas supply disruptions, coupled with
 2 the increase in peak energy demand (resulting from growth of the population and corresponding growth
 3 in energy demand since 1971, when Tilbury first began operation) have demonstrated the need to expand
 4 LNG storage to protect the region from the effects of both gas supply outages and periods of peak
 5 demand.



6

7 **Figure 1.7-1. December 2021 Cold Snap Shows the Value of British Columbia's Gas System**

8 *Source: FortisBC, 2022a.*



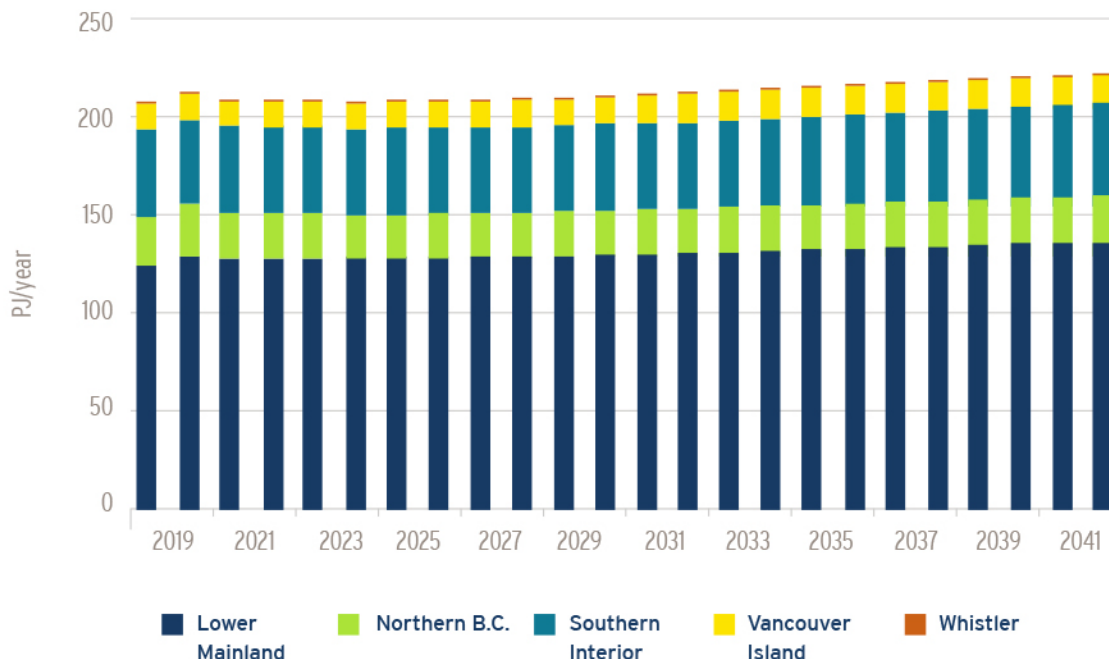
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10 **Figure 1.7-2. FortisBC and BC Hydro Peak Hour Energy Demand – December 27, 2021**

11 *Source: FortisBC, 2022b.*

1 At 8:00 am on December 27, 2021, FortisBC delivered the energy-equivalent of 20,120 megawatts (MW)
 2 through the gas system, whereas BC Hydro delivered 10,902 MW.

3 Currently, the natural gas delivery system, excluding the Tilbury facility, has insufficient capacity to
 4 support the peak daily Lower Mainland load, with the greatest shortfall occurring during winter months.
 5 The region's energy needs have grown and are expected to continue growing into 2041 (refer to
 6 Figure 1.7-3). The current facilities do not have the storage capacity to meet the increasing demand while
 7 also accounting for contingency amounts needed in the event of emergency upstream gas supply
 8 disruption.



9
 10 **Figure 1.7-3. Reference Case Annual Natural Gas Demand Forecast for Residential, Commercial, and**
 11 **Industrial Customers by Region**
 12 *Source: FortisBC, 2022b.*

13 Following a gas supply disruption in 2018 that cut off gas supply to the Lower Mainland for 2 days
 14 (October 9 to early October 11, 2018), FortisBC began developing an LNG storage expansion to help
 15 FortisBC withstand unforeseen events and maintain reliable service to customers. The proposed Project
 16 includes a storage tank that is designed to store enough energy to supply the Lower Mainland for at least
 17 three peak demand days, which is based on the length of time required to restore gas supply.

18 The regional demand for gaseous energy as well as peak demand is forecast to grow over the next
 19 2 decades, increasing the importance of energy system resilience and ensuring that the Tilbury facility has
 20 sufficient capacity to meet current and projected demand in the event of supply disruptions.

21 The proposed Project's increased LNG storage capacity creates benefit through adding resilience to
 22 FortisBC's gas system (that is, to increase its ability to withstand, manage through, and recover from
 23 supply emergencies), which will improve the security of supply to FortisBC's approximately 1.1 million
 24 natural gas customers in B.C.

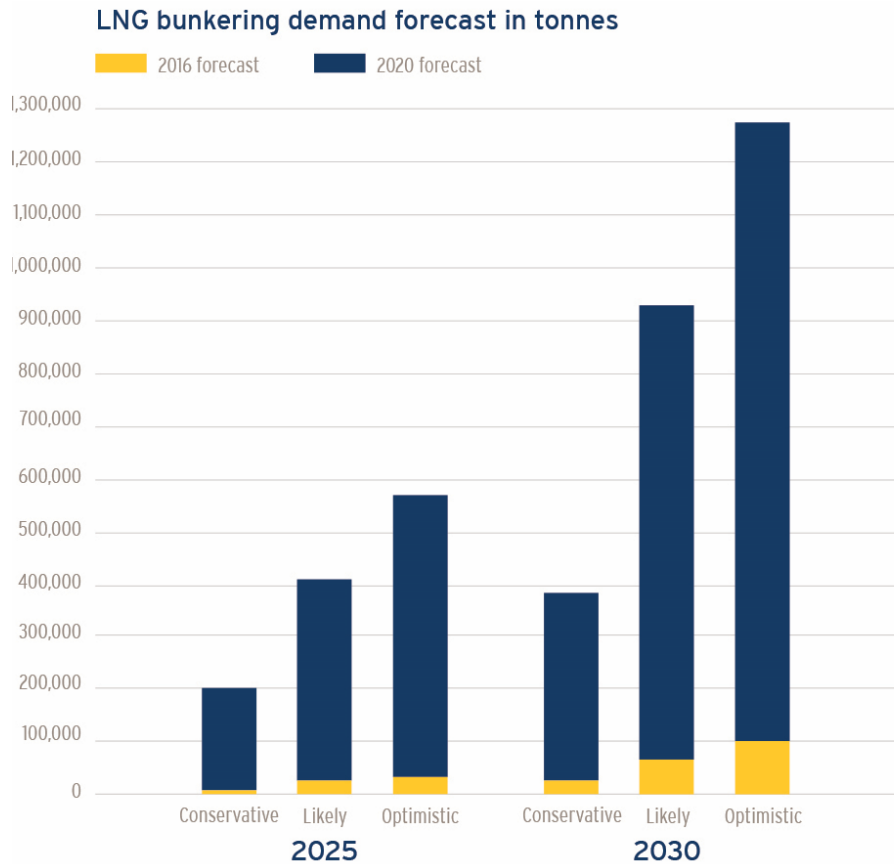
1 The LNG Storage Tank component of the proposed Project, projected to be completed and in service by
2 2028, will provide a regional, immediately accessible backup gas supply to FortisBC customers, primarily
3 in the Lower Mainland, in the event of a supply emergency to minimize the risk of widespread outages or a
4 lengthy and costly system-wide collapse.

5 Without additional system resilience from the proposed Project, these gas supply disruptions or
6 constraints have the potential to cause widespread and long-lasting natural gas outages for customers
7 and the region.

8 **1.7.1.2 Liquefied Natural Gas as a Low-carbon Fuel**

9 Efforts to reduce carbon emissions requires replacing conventional fuels such as diesel and coal with
10 low-carbon alternatives. Industries and consumers alike are actively striving to minimize their carbon
11 footprint, thus boosting the surge in demand for low-carbon fuels. This growing demand has spurred a
12 substantial increase in both local and global markets for LNG. The Port of Vancouver is forecasting
13 significant increases in LNG usage by 2030 (Port of Vancouver n.d.), a situation reflective of the growing
14 global demand for LNG as a marine fuel. Global shipping registrar DNV forecasts that by 2030, up to
15 37 percent of the marine sector's energy could come from LNG, suggesting that there is an opportunity to
16 provide marine fuel beyond 1 million tonnes per annum (MTPA) in the Port of Vancouver (Mandra 2022).
17 The global LNG bunkering market is predicted to grow to between \$8.3 to \$10.2 billion dollars of annual
18 revenue within the next 5 years (2023) as the marine shipping sector moves to lower emissions (Mordor
19 Intelligence 2023). The proposed Project proposes to meet this need with the installation of additional
20 LNG liquefaction at the Tilbury LNG facility.

21 The 2020 Vancouver Fraser Port Authority (VFPA) LNG demand study (VFPA 2017), depicted on
22 Figure 1.7-4, reveals that the projected LNG bunkering demand could surpass 1.2 MTPA by 2030. As the
23 industry increasingly adheres to regulations promoting the use of cleaner-burning, low-carbon fuels, the
24 demand for LNG in the local and global marine sector will rise.



1

2 **Figure 1.7-4. Liquefied Natural Gas Demand Forecast in the Port of Vancouver for 2025 and 2030**
 3 **(shown in tonnes of liquefied natural gas per annum)**

4 The transportation sector accounted for 28 percent of Canada’s GHG emissions in 2021 (ECCC 2023).
 5 Approximately 2.3 percent of transportation emissions were from domestic marine transportation, which
 6 typically burns diesel fuel, and 62 percent was from road transportation (ECCC 2023). LNG is becoming an
 7 increasingly important fuel for local transportation, such as passenger and cargo ferries between the
 8 Lower Mainland and Vancouver Island, to reduce emissions. LNG from the proposed Project is a proven,
 9 viable, lower-carbon alternative fuel that can result in substantial emissions reductions in the
 10 transportation sector. Additionally, LNG is a cleaner-burning fuel than commonly used marine and
 11 transportation fuels like diesel or marine fuel oil, reducing the CACs emitted by vehicles and vessels.

12 The liquefaction capacity component of the proposed Project will provide a reliable source of
 13 clean-burning, low-carbon fuel for local, regional, and international customers, allowing marine fuel oil or
 14 diesel to be displaced, lowering customers’ GHG and CAC emissions. Like the existing LNG liquefaction at
 15 the Tilbury LNG facility, the proposed Project will be powered by hydroelectricity to produce amongst the
 16 lowest CI LNG in the world (Canada and the Natural Gas Economy 2019). LNG from the proposed Project is
 17 calculated to have a CI of approximately 0.07 metric tonne of carbon dioxide equivalent per metric tonnes
 18 of liquefied natural gas (tCO₂e/tLNG), which is three-quarters lower than the global average of more than
 19 0.3 tCO₂e/tLNG (Delphi Group 2019). This can contribute to local, regional, and global reduction in GHG
 20 and air quality emissions for marine and overseas customers by replacing higher GHG emitting fuels
 21 (Affinity 2022). It also has lower emissions than the average global LNG producer, even before
 22 implementing net-zero mechanisms. LNG can offer important reductions in GHGs in both the combustion
 23 phase and across the lifecycle of the fuel, especially when liquefied and stored using low-carbon energy
 24 (Affinity 2022). On a lifecycle well-to-wake basis, GHG emissions could be reduced by over 2.4 million

1 tonnes of CO₂ annually if 2.5 million tonnes of LNG from proposed Project displaced marine diesel or fuel
2 oils.

3 Ports offering LNG bunkering service have increased from approximately 60 to 150 globally in the past
4 five years, including the Port of Long Beach and Port of Tacoma on North America's west coast, and may
5 reach approximately 250 by 2026 according to data from Clarksons Research (Mandra 2022). In the Port
6 of Vancouver, the combined Tilbury Phase 1 liquefaction capacity (up to an estimated 0.9 MTPA between
7 Phase 1A and Phase 1B) is insufficient to meet anticipated demand for LNG as a marine fuel. For example,
8 the Port of Vancouver's base case LNG forecast is for approximately 1 MTPA LNG marine fuel market by
9 2030. This represents about 7.0 percent of the annual fuel demand for vessels calling at the Port of
10 Vancouver and would exceed FortisBC's existing Phase 1 LNG vehicle-fuelling capacity at Tilbury (Affinity
11 2022).

12 As previously noted, the use of LNG as a fuel substantially reduces air pollutants, such as emissions from
13 ships, including SO_x to near zero, NO_x by up to 95 percent depending on the engine type, and PM by up to
14 99 percent, compared to diesel fuel (Sphera 2020). Marine shipping is one of the largest local air
15 pollution-emitting sectors, and there is a need for an alternative fuel to reduce emissions. In 2015, marine
16 shipping accounted for 65 percent of the transportation-related air emissions in the Port of Vancouver
17 (Port of Vancouver 2017). The Port of Vancouver has identified LNG as the only scalable and
18 commercially viable alternative to existing marine fuels. There is a need for the proposed Project to
19 provide this fuel and significantly reduce air pollution and GHG emissions locally. According to a FortisBC
20 commissioned report, a 1 MTPA LNG market would reduce NO_x by 500 tonnes annually in the Vancouver,
21 B.C., region alone (Affinity 2022).

22 Both the Provincial and Federal policy agendas are aligned with the development of LNG bunkering
23 infrastructure in the Port of Vancouver. The 2018 CleanBC plan highlights that "BC Ferries is joining the
24 move to cleaner fuels and cleaner vessels, with three new intermediate class 'dual fuel' ships, capable of
25 operating on LNG or marine diesel" (Government of B.C. 2018). The plan also states "B.C.'s transportation
26 trade corridors and ports connect local businesses to global markets, facilitate trade and underpin both
27 provincial and national economic growth" and commits to working with key transportation stakeholders to
28 "ensure B.C. has globally competitive, clean and efficient trade corridors." Both "reducing absolute
29 emissions while balancing economic growth along the corridors" and "promoting the use of clean fuel
30 sources in transportation trade corridors and ports" are highlighted in the document. The 2020 B.C.
31 Government throne speech stated that the Provincial government is "supporting development of LNG
32 bunkering in B.C. ports, reducing greenhouse gas emissions here and everywhere LNG-powered vessels
33 operate."

34 As part of the CleanBC 2030 Roadmap (Government of B.C. 2018) released in the fall of 2021, the
35 Government of B.C. indicated their intention to expand the plan to apply to marine fuels. The Low-carbon
36 Fuel Standard (LCFS) is one of the province's most successful approaches to reducing GHGs from
37 transportation. It requires fuel suppliers to progressively decrease the average CI of the fuels they supply
38 to users in B.C.

39 In 2019, the Federal Transport Minister Mandate Letter encouraged the development of programs that
40 support making Canada's major ports the most efficient and cleanest in the world and directs the Minister
41 to "support efforts that develop marine infrastructure and convert ships from burning heavy oil and diesel
42 toward more environmentally friendly fuels, like liquefied natural gas" (Trudeau 2019). Similarly, the
43 2021 Transport Minister Mandate Letter asks the Minister to "continue to support Canada's transition to
44 net zero by advancing measures to...support global efforts to reduce emissions in the air and marine
45 sectors" (Trudeau 2019).

1 1.7.2 Purpose for the Proposed Project

2 The purpose of the proposed Project is to strengthen resiliency by providing instantaneous backup gas
3 supply to FortisBC customers, primarily in the Lower Mainland, in the event of a supply emergency
4 (FortisBC 2020a). This need for increased resilience in the gas supply system is a local need, providing a
5 supply of gas in the Lower Mainland downstream of the transmission pipeline that delivers natural gas to
6 the region. The LNG Storage Tank will substantially improve FortisBC's ability to maintain continuity of
7 service to its customers in the event of a disruption in the upstream supply of natural gas to FortisBC's
8 Lower Mainland system. This risk manifested in 2018 when a pipeline ruptured on the Westcoast Energy
9 Inc. T-South System, leading to a supply disruption that threatened FortisBC's ability to maintain service to
10 its roughly 700,000 Lower Mainland gas customers. FortisBC has applied to the BCUC for a CPCN for the
11 LNG Storage Tank.

12 Insufficient system resilience can have wide-ranging socio-economic consequences, including substantial
13 public safety consequences, as well as financial implications for customers. The incident in 2018 resulted
14 in a complete supply disruption lasting for a 2-day "no-flow" period. Although supply was eventually
15 restored, the gas supply to FortisBC's distribution system from the T-South system remained constrained
16 for approximately 14 months following the incident. This firsthand experience underscored the critical
17 importance for FortisBC to expand its Tilbury facility, with the aim of ensuring uninterrupted service
18 continuity and preventing widespread and protracted service outages in the event of a natural gas supply
19 disruption.

20 Subsequent to the 2018 event, the gas reserves at the existing Tilbury LNG facility were utilized to respond
21 to periods of record peak demand (in December 2021) and a short-term supply disruption (in
22 December 2022), which demonstrated the need for resilience to grow with peak demand.

23 The second purpose of the proposed Project is to provide a clean-burning, low-carbon fuel alternative for
24 local and global markets to meet the growing demand. Locally, there is a growing demand for LNG as a
25 marine fuel; although some of this demand may be met with the Tilbury Phase 1 assets, there are
26 published LNG demand forecasts that exceed the planned Tilbury LNG Phase 1 capacity (Port of
27 Vancouver n.d.).

28 1.7.3 Alternatives to the Proposed Project

29 1.7.3.1 Alternatives to Providing Resiliency of Gas Supply

30 An analysis of multiple alternatives, described in detail in the FortisBC Application for a CPCN for the TLSE
31 project (FortisBC 2020b) submitted to the BCUC, determined that there are no viable alternatives to
32 tank-based LNG storage that can provide adequate gas volumes needed to provide energy resilience in
33 the Lower Mainland. Alternatives considered to ensure resiliency of gas supply to the Lower Mainland
34 included the following:

- 35 ▪ Load management by means of automated metering infrastructure (AMI)
- 36 ▪ Additional pipelines to diversify gas supply to the Lower Mainland
- 37 ▪ On-system underground storage
- 38 ▪ On-system LNG storage at a new site
- 39 ▪ At least 2-BCF LNG storage at the Tilbury facility

40 These were evaluated with the following listed in Table 1.7-1.

Table 1.7-1. Alternatives to the Proposed Project Considered

Resiliency Element	Alternative(s)	Discussion
Load management	AMI	AMI remote shutoff capability would add resiliency by reducing the potential for an uncontrolled shutdown but is best viewed as a complementing supply-side solution. Without additional supply in case of a “no-flow” event, large-scale load shedding would be required, leaving many customers without service.
Diversified pipeline supply	T-South pipeline expansion	Expansion in this corridor would still leave the Lower Mainland gas supply at risk of a single point of failure, such that new storage would still be required to provide resiliency.
	Expansion to Northwest Pipeline’s gorge capacity	Expansion would add little resiliency. Even if the gorge expansion was constructed, new storage would still be required to meet the resilience requirements.
	SCP expansion to Kingsvale, B.C. (that is, interconnecting with the T-South system 172 km north of FortisBC’s Lower Mainland system)	A new regional pipeline would add resiliency by reducing single point of failure risk north of Kingsvale on the T-South system. However, even with this alternative constructed, new storage would still be required to address single point of failure risk for the 172 km of pipeline south of Kingsvale to Huntingdon.
	SCP expansion to Huntingdon, B.C.	A new regional pipeline would add resiliency by diversifying supply into the Lower Mainland. Some gas would still be available if there was a failure on one pipeline system (T-South or expanded SCP). However, even if constructed, additional storage would still be required to supplement remaining pipeline flows and avoid significant load shedding.
Storage	Additional off-system storage contract	Contracting additional off-system storage would still leave the Lower Mainland subject to single point of failure risk because supply would remain dependent on the T-South system to access the storage resource.
	On-system underground storage	This alternative is not feasible within the Lower Mainland due to the regional geology.
	On-system storage at a new site	This alternative would provide resiliency but is more costly than expansion at an existing site, and it would require of pipeline construction, liquefaction, storage, and regasification.

Note:

SCP = Southern Crossing Pipeline

1 This evaluation concluded that on-system storage at Tilbury of up to 3 BCF would be the most appropriate
 2 solution, providing 3 days of supply to the Lower Mainland during cold weather periods.

3 **1.7.3.2 Alternative Energy Sources**

4 Although there are other LNG facilities proposed or under development in B.C., these facilities are focused
 5 on export markets, not providing LNG locally for use in ensuring utility energy resilience or as a marine
 6 and road transportation fuel.

1 A global movement toward cleaner-burning, low-carbon marine fuels has been underway for over a
2 decade. For example, the International Maritime Organization (IMO) has set a target to reduce all carbon
3 intensities by at least 40 percent compared to 2008 international shipping carbon intensities by 2030 and
4 70 percent by 2050 (DNV n.d.). Marine shipping providers have considered many alternative fuels and
5 have determined that LNG is an appropriate and proven alternative to marine diesel and bunkering fuel,
6 and that LNG is a pathway fuel that can help them meet IMO targets.

7 The use of LNG as a marine fuel is aligned with the Port of Vancouver's vision for the port. In its letter to
8 the EAO regarding the TMJ project on August 12, 2022, the Port of Vancouver notes the following:

9 *The achievement of this vision requires advancement of clean marine fuels that reduce air*
10 *pollutants and greenhouse gas emissions from shipping activities. The Tilbury Marine Jetty*
11 *is the critical link needed to enable a regional liquefied natural gas (LNG) supply chain*
12 *that can provide a cleaner fuel alternative to the marine sector. (VFPA 2022)*

13 The Port of Vancouver adds the following:

14 *Natural gas is the only commercially viable and scalable alternative to conventional*
15 *oil-based marine fuels for ocean-going vessels and is increasingly being adopted by*
16 *shipping lines globally. (VFPA 2022)*

17 In the near to medium term, there is stable and strong local and regional demand for both natural gas as
18 an energy source (refer to Figure 1.7-3) and for LNG as a marine fuel (Figure 1.7-4). The peak energy
19 delivery (Figure 1.7-2) demonstrates the importance of natural gas as energy source and provides some
20 insights into the magnitude of the efforts required to successfully transition the energy system. Gas will
21 continue to play an important role in the foreseeable future, and the introduction of RNG and other
22 low- and no-carbon gases into the system will be a critical aspect of the transition.

23 Furthermore, the global demand for LNG as an energy source remains strong and growing as other
24 economies transition away from carbon intensive energy sources. Despite the success of jurisdictions like
25 Canada reducing the use of carbon intensive fuels like coal, the global consumption has continued to rise
26 to record levels (IEA 2022), and this level of demand and consumption is forecast to remain relatively flat
27 for the next several years. This demonstrates the need for transportable and storable lower-carbon
28 alternatives, such as LNG, to be available as bridging fuels and will remain important for several decades
29 as the global energy infrastructure is transitioned away from crude oils (IEA 2023; Statista 2023).

30 Canada sustainably produces more natural gas than it uses as the fifth largest producer in the world. It is
31 expected to produce some of the lowest-emission LNG globally and is producing increasing volumes of
32 RNG (CER 2023). Canadian natural gas and LNG can play a vital role as a bridging fuel in helping the world
33 achieve energy affordability and security while supporting global net GHG reductions and will continue to
34 play a role in a low-carbon future with the use of RNG and similar low-carbon gases.

35 **1.7.4 Technologies Assessment**

36 A screening assessment on the BAT to reduce proposed Project GHG emissions is described in the
37 Best Available Technologies Report (Appendix P of the Application). The BAT assessment identified
38 technically and economically viable options for inclusion in an LNG liquefaction plant. That list of viable
39 technologies was subsequently screened against the site and regional characteristics, as well as the
40 existing utility and power supply, to determine which of those technologies was viable and appropriate for
41 inclusion in the proposed Project.

1 The design concept, which includes the use of electrically driven compression, a gas-fired hot oil heater
2 (HOH), and a TO, was informed by the BAT assessment. The Net Zero Plan (refer to Appendix O) examines
3 these design considerations in detail and discusses how, given the local context, the use of drop-in fuels
4 (that is, RNG and hydrogen) provides technology alternatives that allow emissions reductions to be
5 realized over time.

6 When assessing the local technical and economic feasibility of the technologies identified in the BAT
7 Report (Appendix P of the Application), the technologies were screened considering the following:

- 8 ▪ Energy availability and costs (that is, the availability and cost of electricity, hydrogen, RNG, and
9 natural gas)
- 10 ▪ The emissions footprint associated with each technology (for example, GHGs and CACs)
- 11 ▪ The physical footprint required to host the technology

12 The selected technology mix of electrically driven compression and gas-fired technologies optimizes
13 reliability, resulting in initial low GHG and CAC emissions with the potential for further reductions in the
14 future.

15 Given the level of uncertainty associated with the final Phase 2 LNG liquefaction development (for
16 example, throughput and liquefaction technology), any current economic analysis has too great of a level
17 of uncertainty to be reliable. As such, an additional feasibility assessment has not been undertaken by
18 FortisBC at this time. Instead, a qualitative assessment (subsection 2.2 of Appendix O) was conducted to
19 describe the uncertainty associated with a Net Zero Path for the proposed Project as well as potential
20 options that could be feasible to achieve net zero.

21 **1.7.5 Alternative Means of Carrying Out the Proposed Project**

22 This subsection provides information on various options FortisBC considered as part of the proposed
23 Project. Assessment of the alternatives to the proposed Project identified that the expansion of an existing
24 site with connections to the existing gas distribution system, rather than the development of a new site, is
25 the most appropriate alternative for the provision of gas system resilience. To provide resilience, the LNG
26 storage should be as close to the end users as viable (reducing the potential for a disruption between the
27 user and the storage location) and connected to existing infrastructure. The existing Tilbury LNG site
28 meets both of these requirements.

29 FortisBC evaluated the following alternative design, technology, and logistics options for the
30 proposed Project:

- 31 ▪ Liquefaction driver technology
- 32 ▪ Cooling technology
- 33 ▪ Flare technology
- 34 ▪ Construction material delivery

35 Details of the alternatives considered are discussed in the following subsections. Discussion of
36 disproportionate effects, based on Gender-based Analysis Plus (GBA+) (IAAC 2021), is included when such
37 effects were identified. Alternatives were assessed based on the following criteria:

- 38 ▪ Technical feasibility
- 39 ▪ Construction and operation cost
- 40 ▪ Safety
- 41 ▪ Footprint
- 42 ▪ GHG emissions

- 1 ▪ Environmental risk
- 2 ▪ Changes to health, social, or economic conditions
- 3 ▪ Effects to Indigenous interests

4 **1.7.5.1 Liquefaction Driver Technology**

5 Compressing refrigerants and changing their phase is a critical step in cooling the feed gas
6 to -162 degrees Celsius (°C) to produce LNG. FortisBC considered both gas-fired and electric-drive
7 compression for the liquefaction trains, relying on 5 decades of operation experience with electric-drive
8 LNG facilities (Tilbury LNG and Mt. Hayes LNG). Both of these compression technologies are proven, and
9 the lifecycle economic trade-offs of each are well understood. The assessment of the alternative drivers
10 identified electric-drive compression as the preferred alternative due to the environmental characteristics
11 of electric drive. High-level calculations indicate that the decision to utilize electric-drive compression
12 rather than gas-fired compression avoids approximately 250,000 tonnes of direct CO₂ emissions annually,
13 or approximately 10 to 15 million tonnes of CO₂ over the projected 40-year or longer life of the proposed
14 Project. Table 1.7-2 summaries the driver technology alternatives assessed.

Table 1.7-2. Driver Technology Alternatives Assessment

Criteria	Gas-fired Compression	Electric-drive Compression
Technical feasibility	Most LNG facilities currently rely on gas-powered compression. This technology is well understood and proven in the LNG industry. Using gas as an energy source leverages the gas stream coming into the liquefaction facility.	Electric drives have been used successfully at Tilbury and Mt. Hayes facilities for 5 decades. Electric drives are not commonplace in the LNG industry due to high energy demand and the need for additional electrical infrastructure.
Construction and operation cost	This alternative is the lowest capital cost alternative, leveraging existing gas delivery systems. Maintenance costs are well understood; operating costs are subject to the costs of fuel and carbon.	This alternative involves increased operational costs to purchase electricity compared to using gas-fired generation. Increased capital costs are associated with the additional transformer, powerline, and substation (although, in the case of Tilbury, existing electrical transmission systems will be leveraged to reduce this capital cost).
Safety	Gas-powered generation has several decades of proven safe operating history in a variety of industries, including LNG.	Electric drives have proven to be safe at the Tilbury and Mt. Hayes LNG facilities.
Footprint	This alternative has slightly larger footprint requirements than electric drives; however, no ancillary structures (for example, substations) are needed.	This alternative has a smaller footprint than gas-powered electricity generation but requires transformers, substations, and similar facilities.
GHG emissions	The use of gas-powered compressions would result in an additional 250,000 tonnes of direct CO ₂ emissions from the proposed Project annually.	The use of electric-drive compression avoids approximately 250,000 tonnes of direct CO ₂ emissions annually, or approximately 10 to 15 million tonnes of CO ₂ over the projected 40-year or longer life of the proposed Project.

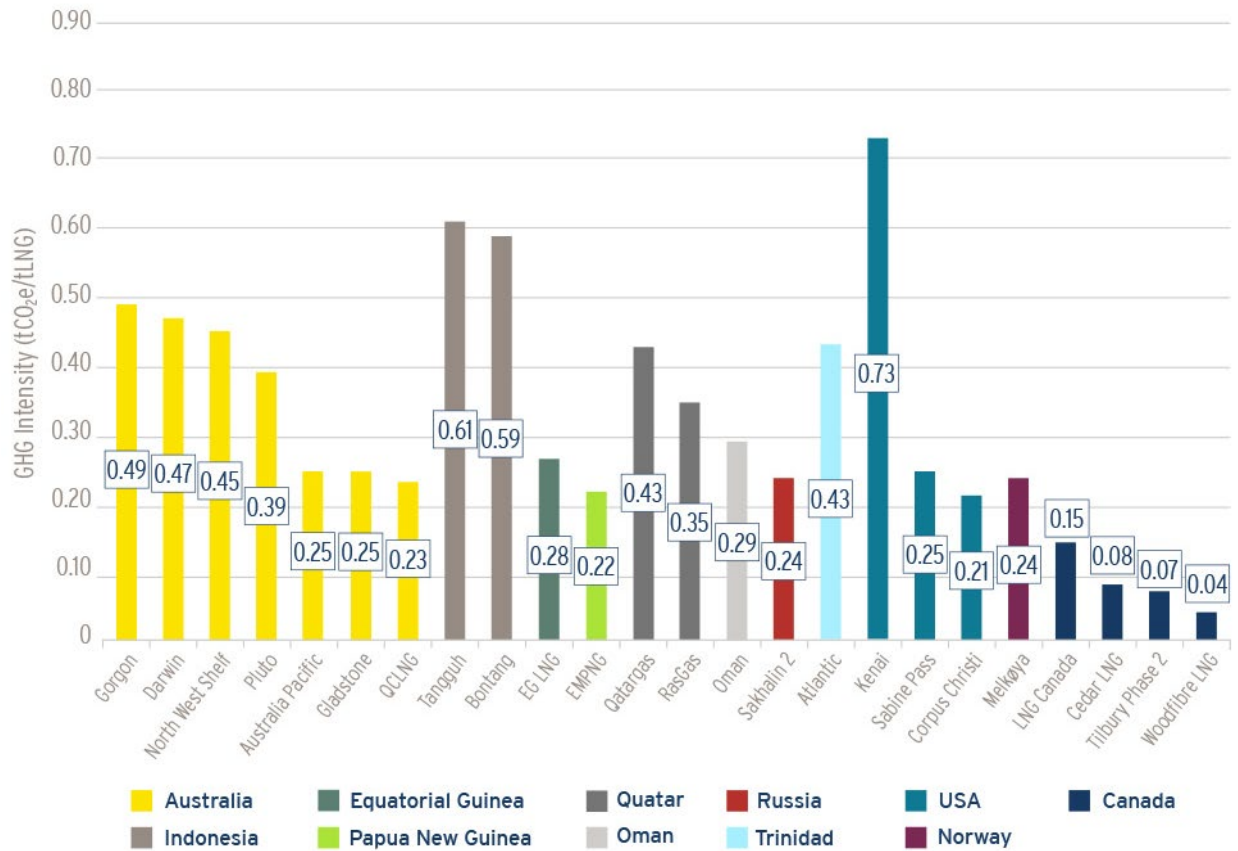
Table 1.7-2. Driver Technology Alternatives Assessment

Criteria	Gas-fired Compression	Electric-drive Compression
Environmental risk	The use of gas-fired compression generates air emissions, such as NO _x and SO _x , that could result in additional acidification and eutrophication potential effects if not mitigated.	None
Changes to health, social, or economic conditions	Increased direct air emissions	No direct emissions
GBA+ ^a	Increased air emissions could interact with local residences and other sensitive receptors on private property as well as Indigenous Peoples and recreational users.	Decreased potential effects related to air emissions to local residences and other sensitive receptors on private property as well as Indigenous Peoples and recreational users.
Effects to Indigenous interests	Potential effects to Indigenous interests associated with this technology alternative have been identified. FortisBC continues to engage with Indigenous nations, seeking feedback on the proposed Project and Indigenous interests.	No effects to Indigenous interests associated with this technology alternative have been identified. FortisBC continues to engage with Indigenous nations seeking feedback on the interactions between the proposed Project and Indigenous interests.

^a Based on information and Provincial guidelines in Section 13 (B.C. EAO 2020)

- 1 The proposed Project's commitment to electric drives powered by BC Hydro's 98-percent clean and
- 2 renewable electric supply will substantially reduce the CI of LNG production. This would mean the
- 3 proposed Project will produce LNG with one of the lowest CIs in the world (approximately
- 4 0.07 tCO₂e/tLNG⁴) prior to the implementation of additional emissions reduction technologies, such as
- 5 the use of drop-in fuels, which could reduce the CI to 0.01 tCO₂e/tLNG (Figure 1.7-5).

⁴ Changes to the CI estimation process, such as that related to electricity grid related emissions and Global Warming Potentials, make direct comparisons to other LNG project CIs difficult. Until there is a standardized process, CIs are only roughly comparable.



1
 2 **Figure 1.7-5. Estimated Carbon Intensities for Operational Global Liquefied Natural Gas Facilities**
 3 *Source: Delphi Group, 2019.*
 4 *Note: CCS = carbon capture and storage*

5 **1.7.5.2 Cooling Technology**

6 Cooling natural gas to -162 degrees Celsius produces waste heat that needs to be removed from the
 7 refrigeration system using a cooling technology. FortisBC considered two options for cooling technology.
 8 Air cooling is routinely used for LNG production; however, due to the proximity to the Fraser River, water
 9 cooling was also a potential option. Table 1.7-3 summaries the cooling technology alternatives assessed.

Table 1.7-3. Cooling Technology Alternatives Assessed

Criteria	Air Cooling	Water Cooling
Technical feasibility	Air cooling has been successfully used globally for decades and at Tilbury since 2019, but it is not as efficient as water cooling due to lower density. There is some design uncertainty in sizing cooling fans as a result of the variability in air temperatures.	Water cooling can be up to 35 percent more efficient than air cooling. Additional proposed Project infrastructure would be required for water inlet and discharge. Large volumes of fresh water are readily available from the Fraser River, which is located adjacent to the proposed Project Site.

Table 1.7-3. Cooling Technology Alternatives Assessed

Criteria	Air Cooling	Water Cooling
Construction and operation cost	Capital and operating costs are both less than water cooling, as inlet and discharge structures are not required; however, there are energy (electrical) requirements for the fan banks.	This alternative involves high capital costs due to the need to construct inlet and discharge structures, as well as the cooling towers. Maintenance and operational costs are forecast to be greater than air cooling.
Safety	None	None
Footprint	Onsite footprint is required for fan banks.	Offsite footprint is required to remove and discharge Fraser River water, as are onsite cooling towers and water lines.
GHG emissions	None	None
Environmental risk	There is potential for additional noise from fan rotation during operation.	Water cooling would require water withdrawal from the Fraser River that is fish habitat, and a subsequent discharge of warm water back to the Fraser River.
Changes to health, social, or economic conditions	None	Unknown; detailed analysis of the effects of warmer water being introduced to the Fraser River were not conducted.
GBA+ ^a	None	None
Effects to Indigenous interests	Although Indigenous nations have not provided feedback on the interactions between the proposed Project and Indigenous interests, FortisBC anticipates there may be potential effects to Indigenous interests associated with this technology alternative.	Although Indigenous nations have not provided feedback on the interactions between the proposed Project and Indigenous interests, FortisBC anticipates that withdrawal from and discharge to the Fraser River would interact with Aboriginal Rights related to fish and fish habitat.

^a Based on information and Provincial guidelines in Section 13 (B.C. EAO 2020)

1 Due to the relative advantages, limited environmental interactions, and proven nature of the technology,
2 FortisBC has selected air cooling for inclusion in the proposed Project development concept.

3 1.7.5.3 Flare Technology

4 Flares are a common feature of LNG facilities and act as safety devices designed to safely relieve pressure
5 and prevent the uncontrolled release of flammable gases during unplanned operational disruptions.
6 During Early Engagement, concerns related to public safety and flaring were raised. For this reason,
7 FortisBC assessed three types of flare technologies for the proposed Project:

- 8 ▪ Multipoint ground flare
- 9 ▪ TEGF
- 10 ▪ Elevated flare

11 Table 1.7-4 summarizes the flare alternatives assessed. FortisBC believes that a TEGF, despite having the
12 highest capital cost of the alternatives assessed, has the least potential environmental effects, and will
13 advance this alternative to detailed design.

Table 1.7-4. Flare Alternatives Assessed

Criteria	Multipoint Ground Flare	TEGF	Elevated Flare
Technical feasibility	Proven technology in common use at oil and gas facilities	A newer, but proven technology	Most common type of flare used at petrochemical facilities
Construction and operation cost	Capital cost expected to be comparable or slightly less than the TEGF	Highest capital cost	Lowest capital cost
Safety	There may be onsite restrictions associated with thermal radiation zones. This alternative has an operating destruction efficiency of more than 98 percent and effectively manages offsite safety concerns related to uncontrolled gas releases. Multiple burners increase safety through redundancy.	The TEGF has limited thermal radiation restrictions. This alternative has an operating destruction efficiency of more than 98 percent and effectively manages offsite safety concerns related to uncontrolled gas releases. Multiple burners increase safety through redundancy.	There may be onsite restrictions associated with thermal radiation zones. There may be public perception issues associated with visible flames. This alternative has an operating destruction efficiency of more than 98 percent and effectively manages offsite safety concerns related to uncontrolled gas releases.
Footprint	This alternative requires the largest footprint. No or limited thermal setback is required due to enclosure.	This alternative requires marginally more surface footprint than an elevated flare. No or limited thermal setback is required due to enclosure.	This alternative involves the smallest physical footprint but requires a thermal radiation setback.
GHG emissions	The GHG emissions are similar for all flare types, with negligible differences in destruction efficiencies. Frequency and duration of use are the main determinant of GHG emissions.	The GHG emissions are similar for all flare types, with negligible differences in destruction efficiencies. Frequency and duration of use are the main determinant of GHG emissions.	The GHG emissions are similar for all flare types, with negligible differences in destruction efficiencies. Frequency and duration of use are the main determinant of GHG emissions.
Environmental risk	The larger open footprint increases the potential for wildlife interactions with open flames, in addition to visual effects when flaring. Multiburner flares operate at a lower flame velocity and create less noise compared to elevated flares.	TEGFs limit the opportunity for wildlife interactions with flames and have the lowest noise and flame-related visual effects.	This alternative involves the greatest potential for wildlife interactions with open flames, is the loudest of the flare types due to high flame velocity and involves the greatest visual effects due to the elevated position.

Table 1.7-4. Flare Alternatives Assessed

Criteria	Multipoint Ground Flare	TEGF	Elevated Flare
Changes to health, social, or economic conditions	Disruption to plant operation will result in short-term flaring. During this event, the flare will produce air emissions. This alternative involves minimal noise and light emissions.	Disruption to plant operation will result in short-term flaring. During this event, the flare will produce air emissions. This alternative involves minimal noise and light emissions.	When operating, the flare will produce air emissions including black smoke. Due to the high flame speed and elevated position, the noise and visual effects will be the greatest of the flare types considered.
GBA+ ^a	Decreased potential effects related to noise and light to local residences and other sensitive receptors on private property as well as Indigenous Peoples and recreational users.	Decreased potential effects related to noise and light to local residences and other sensitive receptors on private property as well as Indigenous Peoples and recreational users.	Increased potential effects related to noise and light to local residences and other sensitive receptors on private property as well as Indigenous Peoples and recreational users.
Effects to Indigenous interests	No effects to Indigenous interests associated with the proposed Project related to this technology alternative have been identified. FortisBC continues to engage with Indigenous nations, seeking feedback on the proposed Project and Indigenous interests.	No effects to Indigenous interests associated with the proposed Project related to this technology alternative have been identified. FortisBC continues to engage with Indigenous nations, seeking feedback on the interactions between the proposed Project Indigenous interests.	Potential effects to Indigenous interests associated with this technology alternative have been identified. FortisBC continues to engage with Indigenous nations, seeking feedback on the proposed Project and Indigenous interests.

^a Based on information and Provincial guidelines in Section 13 (B.C. EAO 2020)

1 Due to the relative advantages, limited environmental interactions, and proven nature of the technology,
2 FortisBC has selected the TEGF technology for inclusion in the proposed Project development concept.

3 **1.7.5.4 Material Transportation**

4 FortisBC initially proposed that modularized liquefaction trains will be constructed at an offsite location
5 and delivered to the proposed Project Site by barge (as the larger modules will be too large to allow road
6 delivery). In addition, a considerable volume of construction bulk material will need to be transported to
7 the proposed Project Site, such as gravel, piping, structural steel, and cable. Due to the proximity of the
8 site to the Fraser River, delivery of construction materials by barge was considered a viable alternative.
9 Delivery of bulk construction materials solely by barge is not viable due to unloading constraints at the
10 MOF and because several local suppliers are not located on the river or other barge-accessible locations.

11 As described in subsection 1.5.5, engagement undertaken on construction logistics alternatives led to the
12 FortisBC decision to remove waterborne delivery of modules and construction materials to the proposed
13 Project Site during construction as an avoidance mitigation measure. Construction materials, equipment,
14 and any other deliveries to the proposed Project Site during construction will be by road freight on existing
15 roads and highways. As described in subsection 1.5.5, the proposed Project will utilize smaller modules
16 transportable by highway.

1 FortisBC will proceed with completing the Application for an EAC consistent with the AIR, which the
 2 B.C. EAO sought consensus on and published on February 24, 2022. This Application will assess
 3 two alternative means for delivery of bulk construction materials to the proposed Project Site during
 4 construction, including transportation by road or by a combination of road and barge. Table 1.7-5
 5 summaries the material transportation alternatives assessed.

Table 1.7-5. Material Transportation Alternatives Assessed

Criteria	Road	Barge	Combined Road and Barge Hybrid
Technical feasibility	<p>Delivery of prefabricated module components to the site by road is not feasible due to their size and weight.</p> <p>Delivery of construction materials is feasible because loads can be separated into acceptable size and weight combinations, but this will result in an increase in truck traffic in the local area.</p>	<p>Delivery of modules is necessary due to the large load-carrying capacity of barges.</p> <p>The number of barges that can deliver bulk construction materials is limited due to the size of the MOF (single barge only) and the time required to unload a barge.</p>	<p>This alternative is highly feasible. It provides the most operational flexibility and allows loads to be transported in the most efficient way (that is, bulky heavy loads are transported by barge, and lighter more compact loads are transported by truck).</p> <p>Up to 50 barge deliveries are expected to be needed to deliver modules, and up to 200 barge deliveries could be used to deliver bulk construction materials and reduce truck traffic by one third.</p>
Construction and operation cost	<p>This alternative is the lowest capital cost option because no additional infrastructure needs to be constructed to receive truck deliveries.</p>	<p>This alternative is the highest capital cost option because a MOF needs to be constructed to receive barges.</p>	<p>This alternative involves the same capital cost as barge delivery alternative.</p>
Safety	<p>Road travel is statistically less safe than barge travel and is an interaction between proposed Project construction and the public (TSB 2022; Transport Canada n.d.).</p>	<p>Statistically barge delivery is a safer alternative than road traffic, and the large payload size results in fewer transits.</p>	<p>Decreased number of truck deliveries makes this alternative safer than only delivering materials by road (reducing the interactions with the public), but not as safe as only using barges for deliveries.</p>
Footprint	<p>No effect to the proposed Project Footprint</p>	<p>Requires MOF, increasing the size of the site footprint</p>	<p>Requires MOF, increasing the size of the site footprint</p>
GHG emissions	<p>Trucking is expected to result in 1,233 tonnes of CO₂e emissions over the 3- to 6-year construction period.^a</p>	<p>Barge transportation is expected to result in 65 tonnes of CO₂e emissions over the 3- to 6-year construction period.^a</p>	<p>A hybrid delivery approach in which barge utilization is maximized (approximately 250 barge deliveries) is expected to result in 1,030 tonnes of CO₂e emissions over the 3- to 6-year construction period.^a</p>

Table 1.7-5. Material Transportation Alternatives Assessed

Criteria	Road	Barge	Combined Road and Barge Hybrid
Environmental risk	Potential effects related to trucking may result in an increase in GHG and airborne CAC emissions. This alternative has the greatest potential for wildlife-vehicle collisions.	Potential effects related to vessel transport may result in an increase in GHG and airborne CAC emissions. This alternative presents the lowest risk of wildlife-vehicle collisions due to the least truck traffic.	Potential effects related to vessel transport may result in an increase to GHG and airborne CAC emissions. This alternative presents a lower risk of wildlife-vehicle collisions than the road only alternative due to decreased truck traffic.
Changes to health, social, or economic conditions	Increased truck traffic in the Lower Mainland may contribute to road congestion around the site.	Increased transportation-related air emissions.	Increased transportation-related air emissions.
GBA ^{a,b}	Potential effects to people and businesses involved in the construction industry, including local industrial and commercial businesses accessed by truck routes on Tilbury Island and in adjacent industrially zoned areas. Potential effects are related to increased traffic due to commuting workers as well as heavy truck transport of equipment and materials.	Potential effects related to increased heavy truck transport is reduced. Potential effects are related to increased traffic due to commuting workers does not change.	Potential effects related to increased heavy truck transport is reduced. Potential effects are related to increased traffic due to commuting workers does not change.
Effects to Indigenous interests	Indigenous nations provided specific feedback on the interactions between this alternative and Indigenous interests. FortisBC anticipates there may be potential effects to Indigenous interests associated with this technology alternative.	Indigenous nations provided specific feedback on the interactions between this alternative and Indigenous interests. As a result, the proposed Project will no longer utilize any waterborne delivery of modular components and bulk construction materials to the proposed Project Site during construction.	Indigenous nations provided specific feedback on the interactions between this alternative and Indigenous interests. As a result, the proposed Project will no longer utilize any waterborne delivery of modular components and bulk construction materials to the proposed Project Site during construction.

^a Construction is expected to take between 3 to 6 years. FortisBC has assumed construction will take 3 years to be conservative.

^b Based on information and Provincial guidelines in Section 13 (B.C. EAO 2020)

Note:

CO₂e = carbon dioxide equivalent

1 Potential effects from construction of the MOF and barge delivery vessels to the MOF are described in
2 each VC assessment subsection. The removal of these activities is considered as an avoidance mitigation
3 measure in the determination of potential residual effects.

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