Impact Assessment Agency of Canada

ANALYSIS OF LNG CANADA DEVELOPMENT INC'S PROPOSED CHANGES TO THE LNG CANADA EXPORT TERMINAL PROJECT DECISION STATEMENT CONDITIONS

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1. Introduction

LNG Canada Development Inc. proposed the construction and operation of the LNG Canada Export Terminal Project (the Project), a natural gas liquefaction facility and marine terminal for the export of liquefied natural gas (LNG) in the District of Kitimat, British Columbia. The proposed project would convert natural gas to LNG, approximately 26 million tonnes per annum, for export to global markets. The Project is expected to have a life of at least 25 years. The Project has begun construction.

1.1 Impact Assessment Act

On August 28, 2019, the *Impact Assessment Act* (IAA) came into force, repealing the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). Section 184 of the IAA provides that Decision Statements issued under CEAA 2012 are deemed to be Decision Statements under the IAA and, therefore, subject to the provisions of the IAA. In addition, the former Canadian Environmental Assessment Agency is now the Impact Assessment Agency of Canada. In this report, the term "Agency" refers to either the former Canadian Environmental Assessment Agency or the current Impact Assessment Agency of Canada.

1.2 Assessment History

The Project was subject to an environmental assessment pursuant to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and B.C.'s *Environmental Assessment Act*. The federal environmental assessment was conducted by means of substitution in accordance with the *Memorandum of Understanding between the Canadian Environmental Assessment Agency and the British Columbia Environmental Assessment Office* (EAO) *on Substitution of Environmental Assessments (2013)*.

As part of the substituted process, the EAO submitted to the Agency an Assessment Report that informed the former Minister of Environment and Climate Change's environmental assessment decision under CEAA 2012. The EAO prepared the Assessment Report in consultation with an Advisory Working Group, made up of federal, provincial, and local government representatives with mandates and skill sets relevant to the review of the Project, as well as representatives of Haisla Nation, Gitga'at First Nation, Gitxaała Nation, Kitselas First Nation, Kitsumkalum First Nation, Lax Kw'alaams Band, and Metlakatla First Nation. The Agency also provided advice to the EAO in relation to fulfilling the requirements related to CEAA 2012.

The former Minister of Environment and Climate Change issued a Decision Statement under CEAA 2012 for the Project on June 17, 2015, following the substituted environmental assessment process, and determined that the Project is likely to cause significant adverse environmental effects. In accordance with subsection 52(2) of CEAA 2012, the decision was referred to the Governor in Council on the matter of whether the significant adverse environmental effects were justified in the circumstances. In accordance with paragraph 52(4)(a) of CEAA 2012, the Governor in Council decided that the significant adverse environmental effects

that the Designated Project is likely to cause are justified in the circumstances and the Project may proceed. The Decision Statement contains 87 legally-binding conditions, which include mitigation measures and follow-up program requirements that the proponent must comply with throughout the life of the Project.

1.3 Purpose of this report

On August 18, 2020, the proponent submitted to the Agency an application for amendment (the application) requesting a change to the mitigation measures contained within the conditions of the Decision Statement for the Project to address feasibility issues encountered in implementing some conditions. The application contained a letter, a technical memorandum, and a field monitoring report outlining the proposed changes to the conditions within the Decision Statement, the potential effects within federal jurisdiction in association with these changes, and a summary of consultation activities with Indigenous groups. On September 4, 2020 the Agency requested from the proponent a fulsome consultation report to inform this analysis.

This report provides a summary of the proponent's proposed changes to the mitigation measures contained within the conditions and an analysis of whether these changes may result in adverse effects within federal jurisdiction that may not have been considered in the environmental assessment.

2. Proposed Changes

The proponent is proposing to amend the language of Condition 3.9 of the Decision Statement to include a pinniped-specific exclusion zone of 180 decibels in order to reflect the differences between marine mammal taxonomic groups present in the Project area.

2.1 Proposed Changes Details

As part of the Decision Statement for the Project, conditions were established whereby the proponent would be required to exclude marine mammals from any underwater noise generating construction activities above a certain noise threshold in order to mitigate effects to marine mammals.

Condition 3.9 of the Decision Statement states that:
To avoid detrimental behavioural change in or injury to marine mammals, the Proponent shall establish and maintain a marine mammal exclusion zone for all construction activities where underwater noise levels are anticipated to exceed 160 decibels at a reference pressure of one micropascal.

The proponent has cited technical and economic feasibility concerns with this condition as currently written. The proponent states that based on the regular presence of harbour seals and Steller sea lions in the Project construction area throughout the fall-winter period, a 160 decibel marine mammal exclusion zone applied to harbour seals and Steller sea lions would lead to regular and prolonged, full shut downs of pile installation due to seals or sea lions entering and/or remaining in the marine mammal exclusion zone for sustained

periods. The Agency has confirmed through site visits the feasibility issues with excluding pinnipeds, as currently required in the conditions.

The proponent has proposed the following revisions to condition 3.9 (proposed revisions to existing condition language in **bold**):

*To avoid detrimental behavioural change in or injury to marine mammals**, including cetaceans and pinnipeds,** the Proponent shall establish and maintain **a** marine mammal exclusion zone**s** for all construction activities where underwater noise levels are anticipated to exceed 160 decibels **or 180 decibels** at a reference pressure of one micropascal. In doing so, the Proponent shall:*

- *Identify the construction activities that generate underwater noise levels greater than 160 decibels **or 180 decibels**, and the periods of time when those activities will occur;*
- *Establish the boundary of **an** exclusion zone for each construction activity at the distance from the activity that the underwater noise level reaches 160 decibels **for cetaceans and 180 decibels for pinnipeds;***
- *employ a marine mammal observer and specify the role of that person in observing and reporting marine mammals in the exclusion zone**s** during construction activities identified in condition 3.9.1;*
- *specify the circumstances in which construction activities identified in condition 3.9.1 must stop or not start if a marine mammal is sighted in **an** exclusion zone by the observer referred to in condition 3.9.3 and not re-start until the marine mammal has moved out of the **relevant** exclusion zone; and*
- *specify mitigation measures, such as sound dampening technology and soft-start procedures to reduce construction noise levels in the exclusion zone.*

3. Potential Adverse Environmental Effects from Proposed Changes

3.1 Fish and Fish Habitat

Effects to fish and fish habitat were assessed during the initial environmental assessment of the Project and mitigation measures and follow-up requirements were developed. The Decision Statement includes related conditions.

3.1.1 Proponent's Assessment

The environmental assessment for the Project assessed the potential effects to marine mammals (including seals and sea lions) during the construction period, including harm (hearing injury) or behavioural effects. With the implementation of the proposed measures, the proponent concluded in its Environmental Assessment Application that underwater noise during construction and pile installation was anticipated to adversely affect few marine mammals, relative to their abundance in Kitimat Arm/Douglas Channel and in British Columbia waters. It concluded that these potential changes in behaviour would not have an adverse effect on the population viability of marine mammals in BC. In its assessment, the proponent used conservative assumptions, including the assumption that piles would be installed with impact piling methods

during the construction period, as opposed to vibratory installation methods that produce less underwater noise in comparison.

The environmental assessment report (EAO, 2015) concluded that no significant residual effects (injury or mortality and behavioural change) to marine mammals (including seals and sea lions) resulting from underwater noise during construction are likely after the implementation of the proposed mitigation measures. The effects were characterized as moderate in magnitude, local in extent, short term in duration, multiple and irregular in frequency, and reversible in a context that has moderate to high resilience.

During the environmental assessment, the National Oceanic and Atmospheric Administration (NOAA) pre-2016 injury thresholds, and disturbance thresholds (root mean square sound pressure level) were applied. For impulsive sound, such as impact pile driving, the injury threshold for pinnipeds applied was 190 decibels and the disturbance threshold applied was 160 decibels. However, currently in Canada there are no regulatory requirements or guidance regarding underwater sound thresholds for injury or behavioural disturbance to marine mammals.

The proponent states in its application for amendment that experience during the first season of marine construction has shown that the blanket 160 decibel exclusion zone for the protection of marine mammals should not be applicable to pinnipeds (i.e. harbour seals and Steller sea lions). Field measurements during mitigated impact pile installation (i.e. use of bubble curtains) have confirmed that the 160 decibel exclusion zone distance is 762 m. Based on this, the proponent anticipates that marine construction will be subject to regular and prolonged, full shut downs of pile driving due to seals or sea lions entering and/or remaining in the 160 decibel exclusion zone.

The proponent proposes a pinniped specific exclusion zone of 180 decibels in order for marine construction to be technically and economically feasible. Field measurements during mitigated impact pile installation (i.e. use of bubble curtains) have confirmed that this distance is 76 m. Additionally, as part of the requirements of the conditions set out in the provincial Environmental Assessment Certificate, a marine mammal monitoring plan was developed in consultation with provincial authorities and Indigenous groups. This plan includes a pinniped-specific exclusion zone of 150 m. Below is a summary of the proponent's analysis provided in its application for amendment as to why an 180 decibel exclusion zone is not anticipated to be detrimental and result in adverse effects to the health of individuals or population viability in BC of harbour seals or Steller sea lions.

- Seals and sea lions have been regularly observed by trained marine mammal observers throughout the construction period with no apparent behavioural effects or displacement from habitat. Similar observations have occurred at other projects in BC (e.g. Rio Tinto and Westridge Terminal).
- Project construction will occur adjacent to existing terminals (i.e. Rio Tinto) within an established industrial area used extensively by seals and sea lions for decades with existing contributions of underwater noise to the acoustic environment. Seals and sea lions have habituated to some extent to underwater noise levels from historical and existing industrial activity.
- Both the harbour seal and Steller sea lion populations are healthy and growing under existing conditions. In particular, the current annual increase in the growth rate of the Steller sea lion population is high at 3.8%, despite existing underwater noise levels in BC.
- Engineering plans have been refined and the proponent has modified its construction methods to use predominantly vibratory piling methods to reduce underwater noise levels during construction. Impact

pile installation is only used for approximately 10-15 minutes to seat each pile with up to eight piles installed per day.

- The current practice in BC is to apply exclusion zones to eliminate or reduce potential adverse effects to marine mammals, including seals and sea lions. In the specific case where marine mammals, specifically seals and sea lions, remain in high numbers during the construction period, other projects in BC (e.g. Rio Tinto and Westridge Terminal) have applied practical exclusion zones during in-water construction works where pinnipeds are common.
- Hearing injury from limited, short-term impact pile installation methods after the implementation of a 180 decibels pinniped-specific exclusion zone is not anticipated.
- Potential localized, short-term, and reversible behavioural effects from pile installation noise (primarily vibratory methods) are not anticipated to be detrimental and result in adverse effects to the health of individuals or population viability in BC of harbour seals or Steller sea lions.

The proponent concludes that the use of a 180 decibel pinniped-specific exclusion zone during in-water impact pile installation is unlikely to be detrimental or adverse to individual health or the health and viability of harbour seal or Steller sea lion populations in BC. This is consistent with the environmental assessment predictions of no significant residual effects to marine mammals (including seals and sea lions) after the implementation of proposed mitigation measures, and verification of sound levels during impact pile installation during the construction period.

3.1.2 Views Expressed

Fisheries and Oceans Canada (DFO) provided advice to the Agency that the proposed modifications to condition 3.9 in the Decision Statement are not expected to increase the extent to which the effects of the Project, as assessed during the environmental assessment, are adverse. DFO also advised the Agency that additional modification to the mitigations may be warranted, including:

- Stop work procedures should be implemented prior to marine mammals entering an area of potential harm.
- The 150m pinniped exclusion zone is more conservative than modelled distance to the 180 dB_{RMS} re: 1 µPa exclusion zone (76m). The amended conditions could identify that the pinniped exclusion zone be either 150m or where noise levels exceed 180db, whichever is more conservative under specific environmental conditions.

The proponent consulted on the measures contemplated by this amendment application during the development of its marine mammal monitoring plan required under its provincial environmental assessment certificate. The proponent also provided this amendment application and associated technical reports to the following Indigenous Nations: Haisla, Gitga'at, Gitxaala, Kitselas, Kitsumkalum, Lax Kw'alaams, Metlakatla Nations, along with the Métis Nation BC. No substantive comments from Indigenous groups had been raised at the time of writing this report.

The Agency held a public comment period on the proposed amendments to the Decision Statement between December 10 and January 25, 2021. The Agency only received comments the Douglas Channel Watch, an environmental conservation organization. The organization outlined concerns with draft analysis as well as suggested revisions to the proposed amended conditions. Specifically the organization suggested additional

limitations on impact pile-driving, a 200-250 metre exclusion zone for pinnipeds, and a monitoring program to determine if Project activities were resulting in behavioural changes to marine mammals.

In response to the comments provided by Douglas Channel Watch the proponent provided the Agency with information regarding their monitoring program for marine mammals. The Proponent indicated that visual monitoring is conducted every two days for one week prior to commencement of piling to establish background information on marine mammal species presence, locations and behaviours. During piling and ground improvement activities, marine mammal observers are placed near and at a distance from the exclusion zone. Information is tracked and recorded including description of observed species, number of individuals, group size and behavours, as well as any action taken such as suspension of piling activities.

3.1.3 Agency's Analysis and Conclusions

Section 68 of the *Impact Assessment Act* (IAA) provides the Minister with the legislative authority to amend a Decision Statement including adding new conditions, removing existing conditions or modifying existing conditions. The Minister must be of the opinion that adding, removing or modifying a condition does not increase the extent to which the effects of the Project, as assessed during the environmental assessment, are adverse.

The Agency's analysis focuses on whether modifying the conditions in the Decision Statement, as proposed by the proponent, will increase the extent to which the effects of the Project, as assessed during the environmental assessment, are adverse.

Based on the information provided by the proponent and the views provided by DFO the Agency does not consider the changes to the conditions as proposed by the proponent to increase the extent to which the effects of the Project, as assessed during the environmental assessment, are adverse.

The injury threshold for pinnipeds, according to NOAA guidance used for the environmental assessment, is considered to be 190 decibels. The proposed 180 decibel exclusion zone for pinnipeds would not increase the extent to which pinnipeds are injured by underwater noise as it is more conservative than 190 decibels.

Regarding behavioural changes to pinnipeds, the threshold for pinnipeds according to the NOAA guidance used for the environmental assessment is 160 decibels. The proposed 180 decibels exclusion zone would result in pinnipeds being exposed to underwater noise levels that could result in behavioural change; however, due to the evidence provided by the proponent, the populations of both Stellar sea lion and harbour seals are reported to be thriving in an environment where industrial activity is already present and do not seem to show behavioural effects from pile driving activities at the Project site and neighbouring Rio Tinto site. DFO did not provide advice that they had concerns with population viability of either species. The Agency also notes that the effects would be short-term, localized and reversible once construction is complete.

The Agency further considers that the proponent has stated that pile driving techniques have changed to consist mostly of vibratory pile driving and agrees with DFO that further modifications to the conditions, beyond what has been proposed, could further mitigate behavioural effects to pinnipeds.

In response to the comments provided by Douglas Channel Watch, the Agency has added an additional requirement to the conditions for the proponent to report the occasions when impact pile driving has been

implemented due to vibratory pile driving not being technically feasible. The Agency is satisfied with the proponent's monitoring program for marine mammals and has not made further changes to the conditions based on the comments received from Douglas Channel Watch.

The Agency is therefore of the view that modifying the key mitigation measures contained as conditions in the Decision Statement, as follows, will not increase the extent to which the effects of the Project, as assessed during the environmental assessment, are adverse:

3.6 The Proponent shall apply low-noise methods or sound dampening technologies to reduce adverse effects to fish **and marine mammals** from exposure to underwater noise during pile installation**. In doing so, the Proponent shall:**

3.6.1 minimize impulsive noise emitted by construction activities, including by giving preference to the use of vibratory pile-driving over impact pile-driving unless not technically feasible;

3.6.2 report annually the occurrence(s) when impact pile-driving was implemented including a description of why vibratory pile driving was not technically feasible; and

3.6.3 use sound attenuation device(s) when impact pile-driving underwater.

3.9 To avoid detrimental behavioural change in or injury to marine mammals, the Proponent shall ~~establish and maintain a marine mammal exclusion zone for all construction activities where underwater noise levels are anticipated to exceed 160 decibels at a reference pressure of one micropascal~~**implement a marine mammal detection and response plan during all construction activities that pose a risk to marine mammals**. In doing so, the Proponent shall:

3.9.1 identify the construction activities that generate underwater noise levels greater than 160 decibels **and 180 decibels at a reference pressure of one micropascal** and the periods of time when those activities will occur;

3.9.2 **for cetaceans,** establish the boundary of the exclusion zone for each construction activity **identified in condition 3.9.1** at the distance from the activity where underwater noise level reaches 160 decibels;

3.9.3 for all other marine mammals, including pinnipeds, establish the boundary of the exclusion zone for each construction activity identified in condition 3.9.1 at the distance from the activity where underwater noise level reaches 180 decibels or at a distance of 150 metres, whichever is the greater distance;

3.9.**4**~~3~~ employ a marine mammal observer and specify the role of that person in observing and reporting marine mammals in the exclusion zone(**s) identified in conditions 3.9.2 and 3.9.3** during construction activities identified in condition 3.9.1;

3.9.**5**~~4~~ **stop construction activities identified in condition 3.9.1 if marine mammals are observed within the exclusion zone(s) or reasonably appear to be about to enter the exclusion zone(s) identified in condition 3.9.2 and 3.9.3;**

3.9.6 start or restart activities only once it has been visually confirmed that the marine mammal(s) are not within the exclusion zone(s) or if a minimum of 30 minutes has elapsed since the marine mammal was last sighted within the exclusion zone(s); ~~**specify the circumstances in which construction activities identified in condition 3.9.1 must stop or not start if a marine mammal is sighted in the exclusion zone by the observer referred to in condition 3.9.3 and not re-start until the marine mammal has moved out of the exclusion zone;**~~ and

3.9.**7**~~5~~ specify mitigation measures, such as sound dampening technology and soft-start procedures to reduce construction noise levels in the exclusion zone.

3.2 Rights of Indigenous Peoples

The environmental assessment assessed impacts to Indigenous rights. Indigenous groups identified that both seals and sea lions were hunted in the marine environment. Changes to the abundance and availability of species through direct injury, behavioural changes and loss of habitat as well as restrictions on access to identified valued traditional use locations could impact hunting of seals and sea lions. The nature and extent of the impacts on hunting depends on the sensitivity of each wildlife species and habitat type, the nature and timing of the disturbances, and the effectiveness of mitigation. A change in the exclusion zone for pinnipeds would not change the availability of habitat or cause restrictions on access but has the potential to cause direct injury and behavioural change to seals and sea lions. If direct injury or behavioural changes did occur, this could in turn effect abundance and availability of the species and therefore hunting success.

In section 2, the Agency has determined based on the information from the proponent, the advice from DFO and the results of the consultation conducted by the proponent that changes to the pinniped exclusion zone would not result in direct injury or behavioural change in seals and sea lions. Therefore the Agency does not consider that there will be additional impacts to hunting of seals and sea lions as a result of these proposed changes.

4. Conclusion

Based on the information provided by the proponent, and the views provided by DFO, the Agency does not consider the changes to the conditions as proposed by the proponent to increase the extent to which the effects of the Project, as assessed during the environmental assessment, are adverse.

The Agency considers that the proponent has stated that pile driving techniques have changed to consist mostly of vibratory pile driving and agrees with DFO that further modifications to the conditions, beyond what has been proposed, could further mitigate behavioural effects to pinnipeds.

The Agency is therefore of the view that modifying the key mitigation measures contained as conditions in the Decision Statement, as indicated in section 3.1.3 and Table 1, will not increase the extent to which the effects of the Project, as assessed during the environmental assessment, are adverse.

The Agency is also of the view that the rights of Indigenous peoples will not be additionally impacted due to the changes to the Decision Statement.

Table 1: Comparison between original conditions and proposed revised conditions

Original version (Decision statement 2015)	**Proposed revision**
3.6 The Proponent shall apply low noise methods or sound dampening technologies to reduce adverse effects to fish from exposure to underwater noise during pile installation.	3.6 The Proponent shall apply low noise methods or sound dampening technologies to reduce adverse effects to fish and marine mammals from exposure to underwater noise during pile installation. In doing so, the Proponent shall:
	3.6.1 minimize impulsive noise emitted by construction activities, including by giving preference to the use of vibratory pile-driving over impact pile-driving unless not technically feasible;
	3.6.2 report annually the occurrence(s) when impact pile-driving was implemented including a description of why vibratory pile driving was not technically feasible; and
	3.6.3 use sound attenuation device(s) when impact pile-driving underwater.
3.9 To avoid detrimental behavioural change in or injury to marine mammals, the Proponent shall establish and maintain a marine mammal exclusion zone for all construction activities where underwater noise levels are anticipated to exceed 160 decibels at a reference pressure of one micropascal. In doing so, the Proponent shall:	3.9 To avoid detrimental behavioural change in or injury to marine mammals, the Proponent shall implement a marine mammal detection and response plan during all construction activities that pose a risk to marine mammals. In doing so, the Proponent shall:
3.9.1 identify the construction activities that generate underwater noise levels greater than 160 decibels and the periods of time when those activities will occur;	3.9.1 identify the construction activities that generate underwater noise levels greater than 160 decibels and 180 decibels at a reference pressure of one micropascal and the periods of time when those activities will occur;
3.9.2 establish the boundary of the exclusion zone for each construction activity at the distance from the activity where underwater noise level reaches 160 decibels;	3.9.2 for cetaceans, establish the boundary of the exclusion zone for each construction activity identified in condition 3.9.1 at the distance from the activity where underwater noise level reaches 160 decibels;
	3.9.3 for all other marine mammals, including pinnipeds, establish the boundary of the exclusion zone for each construction activity identified in

	condition 3.9.1 at the distance from the activity where underwater noise level reaches 180 decibels or at a distance of 150 metres, whichever is the greater distance;
3.9.3 employ a marine mammal observer and specify the role of that person in observing and reporting marine mammals in the exclusion zone during construction activities identified in condition 3.9.1;	3.9.4 employ a marine mammal observer and specify the role of that person in observing and reporting marine mammals in the exclusion zones identified in conditions 3.9.2 and 3.9.3 during construction activities identified in condition 3.9.1;
3.9.4 specify the circumstances in which construction activities identified in condition 3.9.1 must stop or not start if a marine mammal is sighted in the exclusion zone by the observer referred to in condition 3.9.3 and not re-start until the marine mammal has moved out of the exclusion zone; and	3.9.5 stop construction activities identified in condition 3.9.1 if marine mammals are observed within the exclusion zone(s) or reasonably appear to be about to enter the exclusion zone(s) identified in condition 3.9.2 and 3.9.3;
	3.9.6 start or restart activities only once it has been visually confirmed that the marine mammal(s) are not within the exclusion zone(s) or if a minimum of 30 minutes has elapsed since the marine mammal was last sighted within the exclusion zone(s); and
3.9.5 specify mitigation measures, such as sound dampening technology and soft-start procedures to reduce construction noise levels in the exclusion zone.	3.9.7 specify mitigation measures, such as sound dampening technology and soft-start procedures to reduce construction noise levels in the exclusion zone.