

Laurentia Project: Port of Quebec Deep-Water Wharf – Beauport Sector



DRAFT ENVIRONMENTAL ASSESSMENT REPORT

November 2020



Impact Assessment
Agency of Canada

Agence d'évaluation
d'impact du Canada

Canada



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Catalogue No: EnXXX-XXX/XXXXF
ISBN : XXX-X-XXX-XXXXXX-X

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This document has been issued in French under the title:

RAPPORT PROVISOIRE D'ÉVALUATION ENVIRONNEMENTALE – Projet Laurentia : Quai en eau profonde dans le port de Québec – Secteur de Beauport



Summary

The Quebec Port Authority (the proponent) proposes to extend the line of the existing wharf eastward by 610 metres in order to operate a deep-water terminal dedicated to containerized general cargo.

The 31.7 hectare Project would include the construction of a new berth and a retaining dyke that would allow the development of an additional 17 hectares of backshore space. The Project also includes the construction of railways and road access, the reconfiguration of two rainwater outlets and Henri-Bourassa Boulevard with the addition of an overpass, as well as the redevelopment of part of the Port of Quebec's existing land for truck loading and the partial relocation of the recreation and tourism area for the development of the operations support area and empty container storage.

The Canadian Impact Assessment Agency (the Agency) is carrying out an environmental assessment of the Project in accordance with the *Canadian Environmental Assessment Act* (2012) (CEAA 2012). The Project is subject to CEAA 2012 as it was designated on July 31, 2015, by the Minister of the Environment and Climate Change under subsection 14(2): "The Minister may, by order, designate a physical activity that is not prescribed by regulations made under subsection 84(a) if, in the Minister's opinion, either the carrying out of that physical activity may cause adverse environmental effects or public concerns related to those effects may warrant the designation." The environmental assessment continues under CEAA 2012 as it was initiated prior to the coming into force of the *Impact Assessment Act*.

The submitted Project did not undergo a provincial environmental assessment, but collaboration has been ongoing with the *Ministère de l'Environnement et de la Lutte contre les changements climatiques du Québec* (MELCC) for port expansion projects currently under assessment by the Agency, including that of the proponent. The approach, developed in the spirit of the *Canada-Quebec Agreement on Environmental Assessment Cooperation*, provides for the participation of the Quebec government in the federal environmental assessment under the coordination of the MELCC. MELCC's participation ensures the integration of provincial expertise and perspectives with those of the federal government at each stage of the environmental assessment process.

This draft Environmental Assessment Report was completed following a technical review of the Environmental Impact Statement and additional documentation from the proponent, and after an assessment of the potential environmental effects of the Project by the Agency, supported by an Environmental Assessment Committee composed of Environment and Climate Change Canada, Fisheries and Oceans Canada, Health Canada, Parks Canada, Transport Canada, Natural Resources Canada, the Laurentian Pilotage Authority, the Canadian Coast Guard and the MELCC.

As part of the environmental assessment, the Agency also took into account the concerns and comments of the Huron-Wendat Nation, the *Grand Conseil de la Nation Waban-Aki*, the Mohawk First Nations of Kahnawà:ke, Kanesatake, and Akwesasne, the Innu First Nations of Essipit, Pessamit and Pekuakamiulnuatsh (Mashteuatsh), and the Wolastoqiyik (Maliseet) Wahsipekuk First Nation. It also took into account the comments of citizens' groups, environmental and economic groups, as well as the public.

In conducting this environmental assessment, the Agency considered the effects that the Project is likely to have on the following components:

- Those under federal jurisdiction, as described in subsection 5(1) of the CEAA 2012;



- Those that are directly related to or result from federal decisions enabling the Project to be carried out in accordance with subsection 5(2) of the CEAA 2012;
- Species mentioned in the *Species at Risk Act* and their critical habitat, as well as species designated as threatened or vulnerable under the Quebec *Act Respecting Threatened or Vulnerable Species*;
- Species designated by the Committee on the Status of Endangered Wildlife in Canada.

The Agency also considered the factors set out in subsection 19(1) of the *Canadian Environmental Assessment Act* (2012). In light of concerns raised by the public and various experts from federal and provincial governments, the Agency identified the effects on air quality and human health caused by road and rail transportation associated with the project, which would take place in the borough of *La Cité-Limoilou*, as another factor relevant to the environmental assessment under paragraph 19(1)(j) of CEAA 2012¹. The issues mainly concern the activities planned during the construction and operational phases in relation to air quality, noise and light management.

The environmental assessment conducted by the Agency identified the following key potential environmental effects:

- Air quality effects related to air contaminant emissions;
- Transboundary effects resulting from greenhouse gas emissions;
- Loss or alteration of wetlands caused by the presence of Project infrastructure or activities;
- Loss of terrestrial environments (soil and vegetation) linked in particular to soil contamination and the spread of invasive alien species;
- Effects on fish and fish habitat resulting from Project infrastructure and activities that would take place in or near water that could result in mortality and disturbance of individuals and loss and alteration of aquatic habitat, including through noise, water contamination and changes in water regime;
- Disturbance of birds, their eggs and nests as well as habitat loss and modification caused by the Project's infrastructure and activities that could result in disturbance by noise, light and human presence;
- Effects on Striped Bass, Bank Swallow, Nighthawk, Peregrine Falcon, Chimney Swift, Monarch and Victorin's Water-hemlock, which are special status species due, in particular, to the disturbance by noise, light and human presence caused by the Project's infrastructure and activities;
- Effects on human health resulting from air contaminant emissions, noise and light emissions caused by the Project's infrastructure and activities;
- Effects on First Nations' use of lands and resources for fishing and cultural practices caused by environmental changes on fish and fish habitat;
- Effects on commercial fishing, recreational fishing, recreational activities, such as kite-surfing, and other recreational activities caused by changes to the environment on wind patterns, aquatic habitats, wetlands or landscape that could affect fish and fish habitat as well as air and water quality;
- Effects on natural and cultural heritage as well as archaeological and historical resources caused by the modification of the landscape.

¹ <https://iaac-aeic.gc.ca/050/evaluations/document/132490>



The proponent has committed to incorporating mitigation measures into the Project that would avoid or minimize its adverse effects. Compensation measures are also proposed to offset residual adverse effects, if any. The Agency has identified key mitigation and follow-up measures required to avoid significant adverse environmental effects by taking into account the measures proposed by the proponent, the opinion of government authorities and comments received from First Nations and the public. However, these measures taken together would not sufficiently mitigate the potential effects of the Project to conclude that these residual effects are not significant.

The Agency is of the opinion that the Project is likely to cause significant adverse environmental effects, including:

- Significant direct and cumulative residual adverse environmental effects on fish and fish habitat due to destruction and permanent alteration of habitat, even with the application of mitigation, monitoring, compensation and follow-up measures;
- Significant direct and cumulative residual adverse environmental effects on air quality and human health due to increased emissions of particulate matter and contaminants from fossil fuel combustion during both the construction and operational phases of the terminal in an environment previously saturated with airborne contaminants;
- Significant direct and cumulative residual adverse environmental effects on the current use of lands and resources for traditional purposes, particularly fishing activities and
- Significant direct and cumulative residual adverse environmental effects on socio-economic conditions due to effects on sport and commercial fisheries.

Furthermore, the Agency concludes that the Project is not likely to cause significant adverse environmental effects on other components of the environment under federal jurisdiction, taking into account the implementation of mitigation measures.

In the event that the Minister of the Environment and Climate Change determines that the Project is likely to cause significant adverse effects, the Minister will refer to the Governor in Council the question of whether these effects are justified in the circumstances. If the Governor in Council determines that these effects are justified in the circumstances, the Minister will set out the conditions for carrying out the Project in his CEAA 2012 Decision Statement. The conditions set out by the Minister of the Environment and Climate Change would be legally binding on the proponent.

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List of abbreviations and acronyms

| Abbreviation/Acronym | Definition |
|----------------------|--|
| Agency | Impact Assessment Agency of Canada |
| CEAA 2012 | <i>Canadian Environmental Assessment Act 2012</i> |
| COSEWIC | Committee on the status of endangered wildlife in Canada |
| IAA | <i>Impact Assessment Act</i> |
| IAS | Invasive alien species |
| EIS | Environmental Impact Statement |
| QPA / the proponent | Quebec Port Authority |
| SARA | <i>Species at Risk Act</i> |
| TEU | Foot equivalent units (number of containers measure) |
| The minister | Minister of Environment and Climate Change Canada |
| The Project | Laurentia project: Port of Quebec deep-water wharf – Beauport sector |
| This report | Draft environmental assessment report |



Glossary

| Word | Definition |
|--|--|
| Benthic fauna | Animal species living at the bottom of the water. |
| Critical habitat | As defined in the Species at Risk Act, habitat necessary for the survival or recovery of a listed wildlife species that is identified as such in a recovery strategy or action plan developed for the species. |
| Environmental Impact Statement | The document prepared by the proponent that identifies and assesses the environmental effects of the Project, and the measures proposed to mitigate those effects, in accordance with the Environmental Impact Statement Guidelines provided by the Agency. |
| Environmental Impact Statement Guidelines | A document prepared by the Agency that identifies the requirements for the preparation of the Environmental Impact Statement. This document specifies the nature, scope and extent of the information required from the proponent for the Project. |
| Fine particulate matter (PM _{2.5}) | Airborne particulate matter with a mass median diameter less than 2.5 micrometres. |
| Environmental monitoring | Establishment of periodic or continuous controls or verification, according to a predetermined schedule, relating to one or more environmental components. Monitoring is generally aimed at determining the degree of compliance with established requirements or at observing the condition and trends of specific components of the environment over time. |
| Federal lands | In the case of this project and as defined in CEAA 2012, “federal lands” means: Lands that belong to Her Majesty in right of Canada, or that Her Majesty in right of Canada has the power to dispose of, and all waters on and airspace above those lands. |
| Follow-up program | A program, whose elements are outlined by the Agency, to verify the accuracy of environmental assessment predictions and verify the effectiveness of mitigation measures. |
| Government experts | Experts from the governments of Canada and Quebec who collaborated in the environmental assessment process for the project and who are described in sections 3.3 and 3.4 of the environmental assessment report. |
| Indigenous use | Current use of lands and resources for traditional purposes, as described in paragraph 5(1)(c) of CEAA 2012. |



| | |
|--|--|
| Mitigation Measures | Measures to eliminate, reduce or limit the adverse environmental effects of a designated project. This includes measures to repair any damage caused to the environment by these effects, in particular by replacement, restoration or compensation. |
| Particulate matter (PM ₁₀) | Airborne particulate matter with a mass median diameter less than 10 micrometres. |
| Tidal range | The difference in level between high-water and low water of the tide. |
| Total particulate matter (TPM) | Airborne particulate matter with an upper size limit of approximately 100 micrometres in aerodynamic equivalent diameter. |

1 Introduction

The Quebec Port Authority is proposing an extension of the current wharf line 610 metres to the east, of which 450 metres will be new wharf line and the remainder rockfill, in order to operate a deep-water terminal dedicated to general containerized cargo (figure 1). The Project, with a surface area of 31.7 hectares, would include the construction of a new berth and seawall that would allow for the development of 17 hectares of additional space behind the wharf. The Project also involves the construction of railroads and vehicle accesses; reconfiguration of outfalls and Henri Bourassa Boulevard, with the addition of a viaduct; the rehabilitation of a portion of the current Port of Quebec lands for truck loading; and the relocation of a portion of the recreational and tourist area to allow for the development of the operational support area and the storage of empty containers.

1.1 Purpose of the Environmental Assessment Report

The purpose of this Draft Environmental Assessment Report is to provide a summary of the information and analyses considered by the Impact Assessment Agency of Canada (the Agency) in reaching its conclusion on whether the Project is likely to cause significant adverse environmental effects, after the implementation of the proposed mitigation measures. The Minister of the Environment and Climate Change will consider the final environmental assessment report, which will include comments from First Nations², the public, the proponent, federal authorities and the government of Québec on this draft version of the report, before making a decision under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

² First Nations consulted: Huron-Wendat, W8banaki , Kahnawà:ke Mohawk, Kanesatake Mohawk, Akwesasne Mohawk, Essipit First Nation, Pekuakamiulnuatsh Takuhikan (Mashteuiatsh), Pessamit First Nation, Wolastoqiyik (Maliseet) Wahsipekuk.

Figure 1 Laurentia project localization



Englobe, 2020

1.2 Scope of Environmental Assessment

1.2.1 Environmental assessment requirements

On August 28, 2019, the *Impact Assessment Act* (IAA) came into force, repealing CEAA 2012. However, in accordance with the transitional provisions of IAA, the environmental assessment of this Project is being continued under CEAA 2012 as if that Act had not been repealed.

The Project is the subject of an environmental assessment because it was designated on July 31 2015, by the Minister of the Environment and Climate change under subsection 14(2) of CEAA 2012, subsequently to a designation request from the proponent. Following the designation of the Project by the Minister, the Agency began its environmental assessment on August 10, 2015. Because the Project was not an activity designated by the *Regulations Designating Physical Activities*, the proponent was not required to provide a Project description under subsection 8(1) of CEAA 2012. The Agency then held consultations on the draft environmental impact statement guidelines from August 10 to September 9, 2015, before submitting the final version to the proponent on October 16, 2015, followed by an updated version on November 2, 2015.

The Project is not subject to a provincial environmental assessment³ but it is the subject of an environmental assessment collaboration agreement between the Agency and Québec's Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC). This collaboration agreement includes the Quebec government's participation in the federal environmental assessment of the Project. The MELCC's participation ensures that provincial perspectives will be integrated into those of the federal government at each step of the environmental assessment process.

1.2.2 Elements taken into consideration during the assessment

The Agency published guidelines for the proponent to help prepare for the environmental impact statement (EIS). The EIS guidelines describe environmental impacts and factors to be taken into consideration in environmental assessment and are available on the Canadian Impact Assessment Registry⁴. The proponent optimized the Project in January 2020 and added new physical activities. On February 12, 2020, the Agency notified the proponent that the potential adverse environmental impacts of these activities would also have to be assessed⁵.

The scope of the environmental assessment includes port infrastructure, road and rail transportation on the project site, as well as navigation related to the project that takes place in the Quebec Port Authority's jurisdiction area. Shipping in the St. Lawrence River, Estuary and Gulf downstream of the project and its effects are therefore not included in the scope of the assessment. This decision is based on the relatively

³ On 16 April 2020, the Supreme Court of Canada dismissed the application for leave to appeal a 2019 Québec Court of Appeal decision that found that some provincial environmental requirements did not apply to activities under federal jurisdiction carried out on the territory of the Port of Quebec (*Attorney General of Québec v. IMTT-Québec Inc.*, 2019 QCCA 1598).

⁴ <https://www.ceaa-acee.gc.ca/050/evaluations/document/132339>

⁵ <https://iaac-aeic.gc.ca/050/documents/p80107/133865F.pdf>



small increase in shipping related to the project (between 52 and 156 ships per year), the existing regulations governing navigation and its effects on marine mammals and the limited influence of the proponent on shipping activities beyond its jurisdiction area.

Also, as part of the Whale Protection Initiative and the Oceans Protection Plan Collaborative Initiative on the Cumulative Effects of Marine Activities on the St. Lawrence and Saguenay rivers, the Government of Canada is working with Indigenous groups, scientists, non-governmental organizations, marine industry representatives and provincial governments to better understand the potential impacts of shipping activities on cetaceans and other valued components of marine and coastal ecosystems. Together with its partners, the Government of Canada is developing and implementing several measures to protect marine mammals in the Estuary and Gulf of St. Lawrence, whether through collision risk reduction or underwater noise abatement.

Vessels heading to the Port of Quebec will have to comply with the measures implemented by Transport Canada, Parks Canada, and Fisheries and Oceans Canada to protect vulnerable marine mammals, including the St. Lawrence beluga whale population and the North Atlantic right whale. For example, the Minister of Transport puts in place annually mandatory measures for the protection of right whales in the Gulf of St. Lawrence under the *Canada Shipping Act*, prohibiting ships from sailing at speeds greater than 10 knots in areas identified as being frequented by right whales. These protection measures will be updated periodically to take into account the evolution of the ecological context, scientific knowledge and available technologies.

Pursuant to section 19(1) of CEAA 2012, the federal environmental assessment shall include a consideration of the following factors:

- Environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project and any cumulative environmental effects that are likely to result from the Project in combination with other physical activities that have been or will be carried out;
- The significance of the environmental effects;
- Comments from the public;
- Mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project;
- The requirements of the follow-up program in respect of the Project;
- The purpose of the Project;
- Alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means;
- Any change to the Project that may be caused by the environment;
- In response to public concerns, the Agency identified project-related road and rail transportation activities in the Cité Limoilou borough and their potential air quality and human health impacts as an additional element to include in the environmental assessment under paragraph 19 (1)(j) of the CEAA 2012.

The Agency considered the expert advice of the Government of Québec, comments from First Nations and the public, and Indigenous knowledge, pursuant to subsection 19(3) of the CEAA 2012. Under subsection 79(2) of the *Species at Risk Act*, the Agency, as the responsible authority, took into consideration the Project's adverse effects on species listed on the List of Wildlife Species at Risk (Schedule 1 to the *Species at Risk Act*) and their critical habitats. The environmental assessment also deals with species designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), as well as species listed under the Québec Act respecting threatened or vulnerable species. The Agency has ensured that measures consistent with any applicable recovery strategy and action plan are taken to avoid, or mitigate and monitor adverse effects on species at risk, should the Project proceed.

Other decisions or the exercise of the following powers under other federal legislation may also be required before the Project can proceed (table 1). Therefore, in accordance with subsection 5(2) of the CEAA 2012, the environmental assessment considered changes to the environment (atmosphere, sound and light, as well as surface and ground water) that could result from these decisions and exercise of powers, as well as any effects on health, socio-economic conditions, physical or cultural heritage, as well as construction, locations or matters of historical, archaeological, paleontological or architectural interest.

Table 1 Decisions that may be required by other federal legislation in order for the Project to proceed

| Federal legislation | Type of federal decision that may be required | Project component, activity, or effect related to decision |
|---|---|--|
| <i>Fisheries Act, section 35</i> | Authorization | Alteration, disruption or destruction of fish habitat. |
| <i>Species at Risk Act, section 73</i> | Agreement or permit | Activities affecting listed wildlife species, any part of their residence or critical habitat. |
| <i>Canada Marine Act, sections 28 and 46</i> | Exercise of powers granted to the Quebec Port Authority | Operate a port and acquire the land needed to deliver a project. |

The valued components assessed by the Agency are presented in table 2. Valued components are environmental and socio-economic features of the environment that may be affected by the Project and that have been identified to be of concern by the proponent, the Agency, First Nations or the public. The Agency focused its assessment of the effects on the valued components pursuant to subsections 5(1) and 5(2) of CEAA 2012, and on species at risk, pursuant to subsection 79(2) of the *Species at Risk Act*.

Table 2 Valued components selected by the Agency

| Valued component | Legislative requirements | Rationale |
|--|---|--|
| Air quality | CEAA ⁶ 2012: 5(2)b)(i) | The Project may cause air contaminant emissions and affect air quality in an airshed known for having a contaminant load that already impacts human health. Air quality in Québec City's central neighbourhoods is an issue monitored by government bodies and is of concern to the population of the region. |
| Transboundary effects – Greenhouse gas emissions | CEAA 2012: 5(1)b)(ii) and 5(1)b)(iii) | The Project could result in emissions of greenhouse gases that could contribute to increased atmospheric levels worldwide and climate change. Effects on atmospheric greenhouse gas levels are assessed, since they affect changes crossing provincial or international borders. |
| Wetlands⁷ | CEAA 2012: 5(2)a) | The Project may cause wetland loss or alterations owing to the construction of new infrastructure or through project-related activities. In addition to being habitats for many flora and fauna species, these environments fulfill a number of critical ecological and socio-economic functions. |
| Fish and fish habitat, including special-status species and marine plants⁸ | CEAA 2012: 5(1)a)(i) and 5(2)a) SARA: ⁹ 79(2) | The Project is likely to affect fish, aquatic invertebrates and their habitats, including special-status species and their habitats. It may lead to the loss or alteration of habitats through the installation of new infrastructure and activities that would be carried out in and near the water. It could also lead to mortality and disturbed individuals through Project activities and changes (temporary or permanent) to the aquatic environment (noise, water quality, changes to the moisture regime, etc.). |
| Birds, including special-status species, and their habitats | CEAA 2012: 5(1)a)(iii) – (MBCA ¹⁰ protected birds) CEAA 2012: 5(1)b)(i) – birds on federal lands 5(2)a) – birds not protected by the MBCA SARA: | The Project is likely to affect birds (migratory and non-migratory), including special-status species and their habitats. The Project could lead to the loss or alteration of habitats owing to the building of new infrastructure and Project activities. The Project could also cause disruption through noise (changes to the soundscape), luminosity and human presence (people, vehicles and infrastructure). The Project could also cause bycatch and behavioural changes and affect bird health. |

⁶ CEAA: *Canadian Environmental Assessment Act* (2012)

⁷ As defined in: Environment Canada, 1991. Federal Policy on Wetland Conservation, 16 pages.

⁸ Special-status species include species listed under federal (Annex 1 of the *Species at Risk Act*) and provincial legislation (list of species designated as threatened or vulnerable in Quebec and species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)).

⁹ SARA: *Species at Risk Act*
¹⁰ MBCA: *Migratory Birds Convention Act*

| Valued component | Legislative requirements | Rationale |
|--|---|---|
| | 79(2) – Birds at risk | |
| Other special-status species | CEAA 2012: 5(1)b)(i) – species on federal lands 5(2)a) SARA: 79(2) – species at risk | The Project is likely to affect special-status species and their habitat. It could lead to the loss or alteration of habitat as a result of the building of new infrastructure and activities. The Project could also cause disruption through noise (changes to the soundscape), luminosity and human presence (people, vehicles and infrastructure). |
| Risk to human health | CEAA 2012: 5(2)b)(i) – population of the region | The Project could cause changes to the environment, including air and water quality and the soundscape and luminosity, that are likely to affect the health of the region's population. |
| Current use of lands and resources for traditional purposes by Indigenous peoples | CEAA 2012: 5(1)c)(iii) | The Project could produce changes to the environment, especially to the terrestrial environment, as well as to fish and fish habitat, which could have an impact on First Nations' current use of lands and resources for traditional purposes, such as fishing. |
| Socio-economic conditions | CEAA 2012: 5(1)c)(i) – Indigenous peoples 5(2)b)(i) – population of the region | The Project could cause alterations or the loss of aquatic habitats or wetlands or alter the landscape or wind conditions and could affect fish and their habitat, in addition to water and air quality. These changes could have repercussions on the socio-economic conditions of the First Nations and the region's population, including access to recreational and tourism activities (swimming, water sports, etc.), sport, traditional and contemporary fishing activities, and any traditional or contemporary activities practised by the First Nations or the population of the region. |
| Natural and cultural heritage | CEAA 2012: 5(1)c)(ii) and (iv) – Indigenous peoples 5(2)b)(ii) and (iii) – population of the region | The Project could alter the landscape in the local area and lead to disruptions of natural, cultural, historic, archaeological, paleontological or architectural sites from the standpoint of First Nations or the population of the region. |



1.2.3 Methodology and approach

The Agency, in conjunction with the environmental assessment technical committee and the government of Québec, has defined and assessed the Project's adverse environmental impacts based on various sources of information, including:

- The environmental impact statement submitted by the proponent in October 2016;
- Additional information provided by the proponent during the environmental assessment;
- The comments, concerns and knowledge of the public and First Nations;
- The advice of federal and Québec government experts.

The Agency studied the adverse impacts on the valued components in accordance with the Agency's Operational Policy Statement¹¹. The Agency's assessment included both direct effects from the Project and those effects that may result from predicted changes to the environment. The Agency then determined the residual effects after taking mitigation measures into account (including compensation programs) proposed by the proponent and those deemed necessary by the Agency. The Agency used a matrix to determine the importance of the low, moderate and high level adverse residual impacts on each of the valued components. The definitions or limits of each of the criteria are presented in Annex A.

The Agency found that the high-level adverse residual impacts are significant under the CEAA 2012, while the moderate to low-level residual impacts are considered inconsequential. The assessment criteria defined by the Agency for characterizing the significance of residual adverse effects after taking into account mitigation measures are as follows:

- **Magnitude:** indicates the degree of change that a valued component would undergo as compared to the baseline conditions. The magnitude assessment takes into account the ecological and social context of the component. Magnitude may take into account the time the effect would occur, e.g., refer to a phase in the life cycle of the component (migration, reproduction, feeding, etc.) or to a period during which a cultural, spiritual or recreational practice would be initiated by a First Nation or population (hunting season);
- **Extent:** Geographical area over which the adverse impacts would occur;
- **Duration:** period of time during which the adverse impacts would be felt;
- **Frequency:** pace at which the adverse impacts would occur during a given period;
- **Reversibility:** likelihood that a valued component would recover from the Project's adverse impacts.

¹¹ Determine the likelihood that a designated project will have significant negative environmental impacts under the Canadian Environmental Assessment Act (2012)

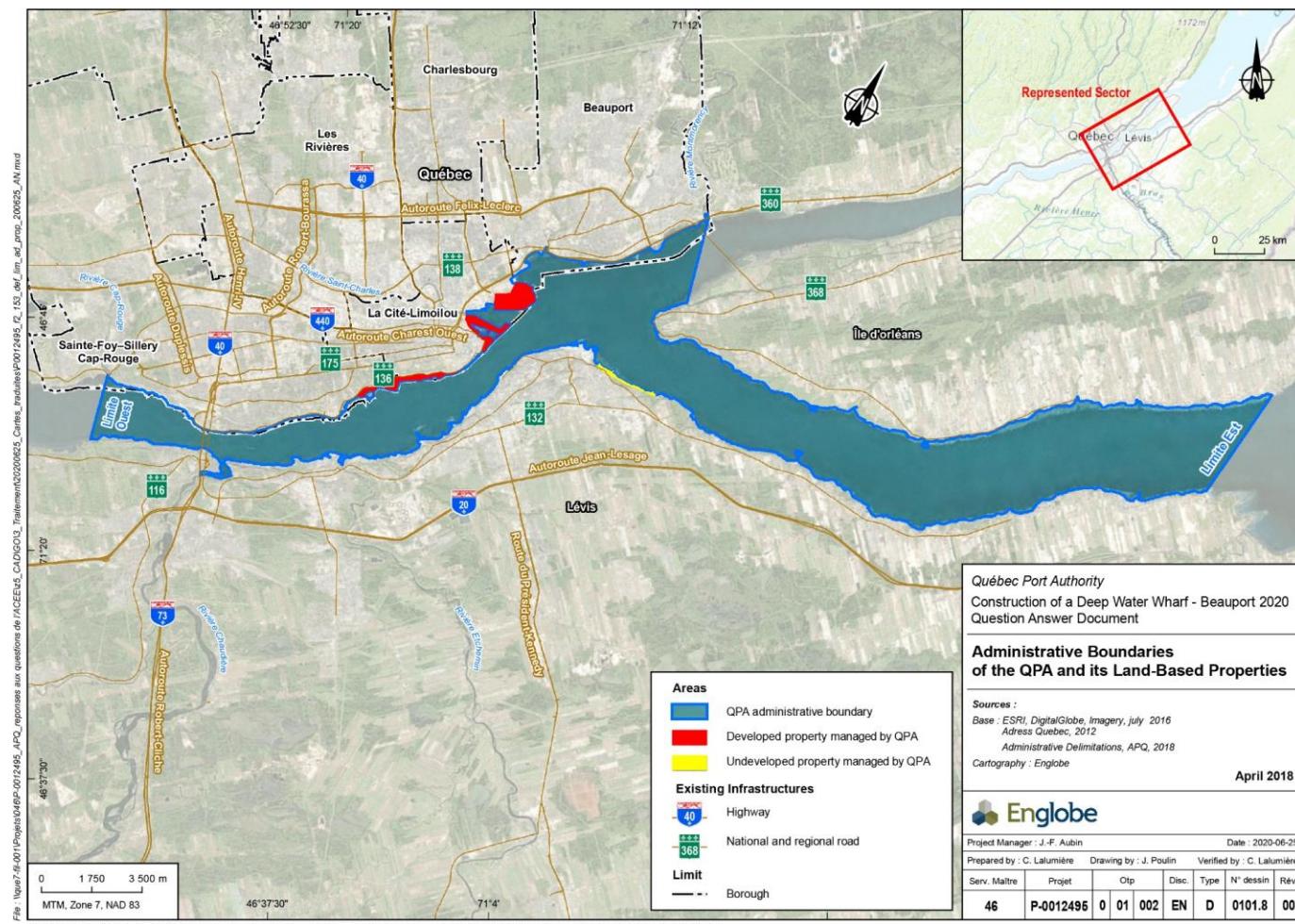


Spatial boundaries identify the geographic areas within which the potential effects from the Project may occur (figures 2 and 3). Generally speaking, this report takes into account the following spatial boundaries, established by the proponent in its impact statement:

- **Work site:** the site of the planned work, including a 500 metres strip along the periphery, excluding the western boundary of the Dufferin-Montmorency highway. All the construction work will be carried out within this area, as well as activities that would be occurring during the operation of the new port facilities;
- **Study area:** this area is used to obtain better representativeness of the valued components of the biological and human environments that are nearby or likely to be used, but primarily owing to environmental and social concerns;
- **Extended study area:** this area is used to assess the effects on environmental valued components over a broader geographic area;
- **Airshed area:** this area is used to assess the Project's impact on air quality, as well as at the health and socio-economic levels;
- **Quebec Port Authority administrative boundary zone:** under the *Canada Marine Act*, this zone consists of the navigable waters under the Quebec Port Authority. This area is used to assess the Project's impacts on the valued components of the environment and describe the use of navigable waters.

Temporal boundaries are set to take into account all Project activities likely to cause adverse environmental effects. This report takes into account the temporal boundaries of the construction and operational phases. The port infrastructure construction phase is estimated to last 36 months, once permits and authorizations are obtained. The operating phase is estimated at more than 75 years, which is the serviceable life span of the planned port facilities. No closure phase is considered, since no medium or long term cessation of operations is anticipated by the Quebec Port Authority.

Figure 2: Administrative boundaries of the Quebec Port Authority and its land-based properties



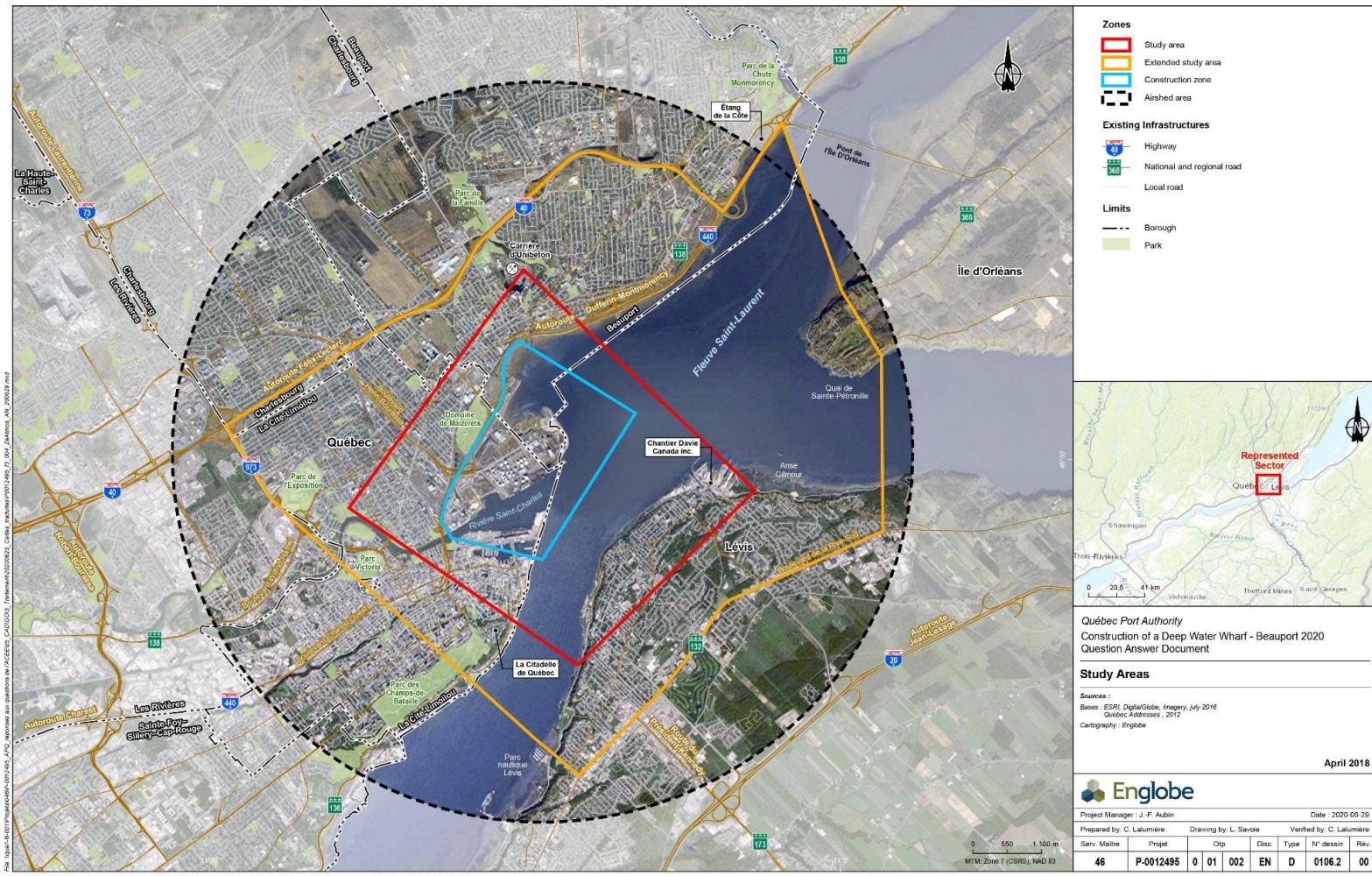
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Figure 3: Project study areas



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2 Project Overview

2.1 Project Location and Regional Context

The Project is located on federal lands belonging to the Quebec Port Authority, within the administrative boundaries of the Beauport borough in Québec, near the Cité Limoilou Borough (Québec). This area along the St. Lawrence River covers approximately 90 hectares and is mostly used for industrial activities. Some recreational activities also take place in the Beauport port sector, namely in the Baie de Beauport. Parts of this Project encroach upon the traditional territories of several Indigenous peoples (see chapters 6 and 7 of this report).

The Project site is located on inhabited land. The residences and buildings nearest to the projected wharf line are 1.8 kilometres from the borough of Beauport and 1.9 kilometres from the borough of Cité-Limoilou. The city of Lévis, located on the south shore of the St. Lawrence, is 1.5 kilometres from the proposed Project and the municipality of Sainte-Pétronille, on Île d'Orléans, is 4.1 kilometres away. Québec has a population (2016) of 531,902, Lévis has a population of 143,414, and Sainte-Pétronille has a population of 1,041, with an average population density (number of people per square kilometre) of 1,171, 320 and 240, respectively. Specifically, the boroughs of Beauport and Cité-Limoilou have respective populations of 80,925 and 107,885, with an average population density of 1,089 and 4,864 people per square kilometre.

2.1.1 Changes to the Project during the environmental assessment

An initial environmental impact statement was submitted on March 11, 2016. At the time, the area behind the wharf was separated into three distinct zones for various transhipment activities, including dry bulk, liquid bulk and containers. In December 2017, the proponent announced a change in the Project's design and purpose in order to meet an economic need, by changing the use of the wharf to container storage only. In May 2019, the Quebec Port Authority signed a commercial agreement with Hutchison Port Holdings Limited and the Canadian National Railway Company (CN). The agreement resulted in changes to the Project to optimize the container terminal concept from an operational standpoint. New physical activities were added to the Project as a result of the improvements proposed by the proponent.¹²

¹² Letter from the Agency to the proponent from February 12, 2020, for the determination of new physical activities and the information request concerning the optimization document for the Laurentia project [French only]: <https://iaac-aeic.gc.ca/050/documents/p80107/133865F.pdf>

2.2 Project Elements

2.2.1 Project components

The main components of the Project are listed in tables 3 and 4. Their geographic locations are illustrated in figures 4 and 5.

Table 3: Main Project components

| Component | Description |
|------------------------------|--|
| Wharf | <ul style="list-style-type: none"> Extension of Wharf 53 by 610 metres into deep water (16 metres in depth at low tide), including a 450 metres long berth and rockfill, so as to operate a 31.7 hectares terminal. Rockfill seawall between the projected wharf line and the shore to allow for the development of additional space behind the wharf constituted of precast reinforced concrete caissons. |
| Area behind the wharf | <ul style="list-style-type: none"> 17 hectares of additional space behind the wharf for maintaining and storing general containerized cargo. The estimated functional capacity for this area is 700,000 twenty foot equivalent units per year (TEU/year).¹³ An area of approximately 4.3 hectares for port operations, including four 86 metre electric semi-automatic STS (Ship-to-Shore) gantry cranes used to load, unload and handle containers. A container storage area of approximately 8 hectares designed to store full, refrigerated and empty containers. Most of the full and empty containers would be stored in five rows of nine containers long stacked six containers high (17.4 metres). The refrigerated containers and some of the full containers would be stacked two containers high. Overhead gantries on semi-automated electric rails with a maximum height of 32 metres would be used for storage. A train loading area of approximately 5.9 hectares for loading containers onto trains and unloading them. This area would have five 450 metre tracks, a switch system and a track approximately 350 metres long for maintaining and repairing train cars. A truck loading area of approximately 3.6 hectares with space to load and unload 10 trucks simultaneously. A gatehouse of approximately 4.34 hectares for trucks to control site access and truck transit on the terminal. An area of 0.6 hectare dedicated to operations support including buildings, parking spaces, and spaces to store and maintain equipment. |

¹³ Twenty-foot equivalent unit per year (TEU): Unit used to measure container capacity. Most containers are 20, 40 or 53 feet in length. To measure volumes, these lengths are converted into twenty-foot equivalents. Therefore, a 20-foot-long container has a 1 to 1 ratio, and a 40-foot-long container has a 2 to 1 ratio (meaning it is equal to two TEUs) (ENGLOBE, 2020a, *Optimisation au projet Laurentia et effets présenté à l'Agence d'évaluation d'impact du Canada [AEIC]* page 2-6).

| Component | Description |
|--|---|
| Permanent access ways | <ul style="list-style-type: none"> • Permanent railways that connect the train loading area to CN's marshalling yard in Beauport and that have an approximately 700 metres double transition rail and an approximately 540 metres single rail. • New access via two counterflow lanes north of Henri-Bourassa Boulevard to connect to the western side of the snow dump and the overpass located slightly to the east. • A new section approximately 578 metres long that would connect to the new overpass going over the transitional tracks in order to provide access to Québec City's snow dump, its filtration and biomethanization plant and to users of the Baie de Beauport. • An overpass approximately 27 metres long allowing the passage of train convoys and ensuring the safety of road users. • Reconfiguration of Henri-Bourassa Boulevard; reduction from four lanes to three lanes for approximately 415 metres to allow for the relocation of IMTT Québec Inc.'s rail yard. • A new section approximately 350 metres long, and reconfiguration and relocation of the current gatehouse in its right-of-way to provide access to Beauport's industrial sector in the Port of Quebec. • A service road of approximately 924 by 7.5 metres on the eastern side of the double railway track in order to facilitate maintenance on the railway. |
| Relocation of IMTT Québec Inc.'s rail yard and relocation of current activities | <ul style="list-style-type: none"> • Dismantling of existing rails and fences; • Stripping and levelling the ground; • Installation of drainage systems and underground electrical installations; • Backfilling, compacting and resurfacing; • Installation of infrastructure and equipment required for the truck access bungalow (substation, secondary building for maintenance, bungalow and equipment, fences, etc.) |
| Visual and acoustic barrier | <ul style="list-style-type: none"> • Visual and acoustic barrier that will serve as a sound abatement wall between the recreational area of the Baie de Beauport and the container terminal, made from recycled containers and plant arrangements with an approximate length of 575 metres and a height ranging from 3 to 8.5 metres. • Site fence between the industrial and recreational areas during the construction phase. |
| Reconfiguration of the recreational tourism area | <ul style="list-style-type: none"> • Moving the watch tower to the northeastern point of the recreational tourism area. • Permanent launch ramp from the seawall and configuration of the adjacent property without any additional encroachment into the river's right-of-way. |
| Temporary infrastructure (construction phase) | <ul style="list-style-type: none"> • Temporary access roads: <ul style="list-style-type: none"> Extension of Henri-Bourassa Boulevard from rue du Ressac to reach the main work site. Two access roads from rue du Ressac, one connecting to plot two (area of 3,000 square metres) destined for work site facilities and one connecting to plot three (area of 12,000 square metres) reserved for the dewatering |

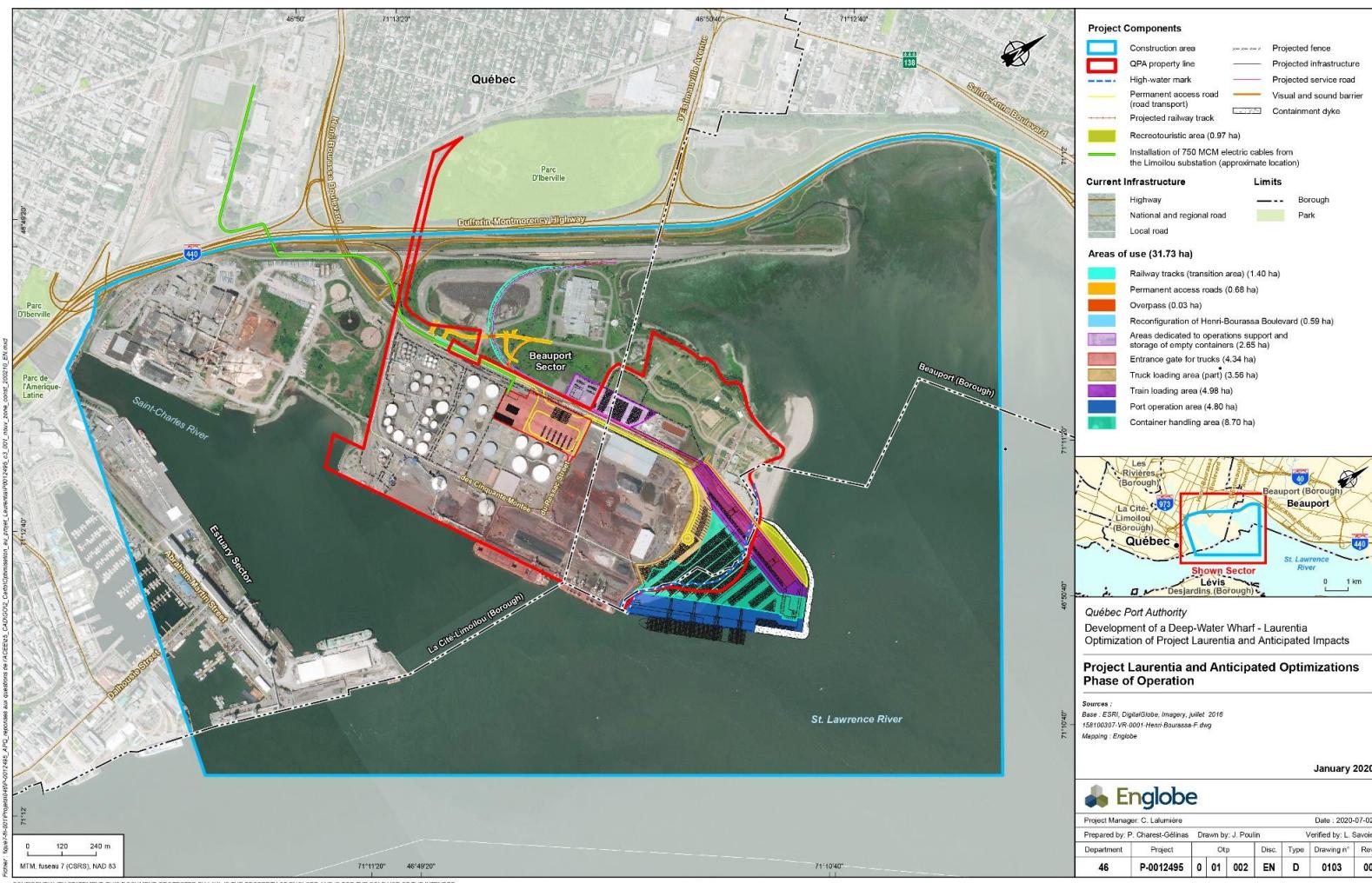
| Component | Description |
|-----------|--|
| | <p>tank for contaminated sediment and the collection tanks for dewatering water.</p> <ul style="list-style-type: none"> • A temporary railway approximately 660 metres long alongside Henri-Bourassa Boulevard that extends into the area behind the wharf. The railway will be used to transport construction materials arriving from a quarry. • Settling tank for uncontaminated sediments on the port-side bank behind the wharf being built in order to dry out the uncontaminated sediments before using them to backfill the area behind the new wharf. • Temporary factory on wharf No. 26 (plot one) to produce concrete to be used in the construction of the caissons needed for the new wharf. • Area for work site operations, including site trailers and storage areas for equipment and materials (plot two). • Dewatering tank for contaminated sediments and collection tanks for dewatering water (plot three) to dewater contaminated sediments before transporting them to an authorized site. • Transhipment area for contaminated sediments at wharf No. 49 (plot four) in order to reduce the risk of contaminating the river and runoff water. • Area for the handling and temporary storage of small boats and a small boat launch within the planned rockfill. |

Figure 4: Project components in the construction phase



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Figure 5: Project components in the operational phase



Englobe 2020b



2.2.2 Project activities

The activities required to complete the Project are described in table 5 according to the Project's life cycle phases, namely construction and operation. No closing date has been scheduled for the infrastructure necessary for handling, storing and transporting containers. The new port installations will not be subject to any shutdowns in the medium to long term.



Table 4: Project activities and duration

| Physical activities | Description of activities |
|---|--|
| Construction Phase : Duration approximately 5 years | |
| Work site preparation | <ul style="list-style-type: none">• Clearing, stripping, levelling, filling, compacting and resurfacing the land.• Installing infrastructure for rain drainage and cleaning the site.• Taking down the existing buildings and fences.• Protecting underground utilities such as water and sewer mains and underground cables when applicable.• Installing the infrastructure and equipment necessary in the area (main operations building, parking lot, lighting, fences, etc.). |
| Construction work on land | <ul style="list-style-type: none">• Excavating approximately 5,000 cubic metres, dismantling and disposing of tracks, removing the ballast stone to reuse it when constructing the permanent railways and the temporary railway.• Excavating approximately 30,000 cubic metres of soil and adding approximately 10,000 cubic metres of granular material to develop and use the connecting track of a section of the railway from the terminal to the CN's marshalling yard in Beauport.• Dismantling the current access roads for the snow dump, the biomethanization plant and the Baie de Beauport.• Transporting the filling materials needed for the reconfiguration of Henri-Bourassa Boulevard and the permanent access roads.• Adding granular material for the reconfiguration of Henri-Bourassa Boulevard and the permanent access roads (54,000 cubic metres) and the overpass (1,500 cubic metres).• Dynamic compacting or vibrocompacting to densify the ground beneath the electric gantry cranes.• Installing concrete beams to support the front and back gantry crane rails.• Relocating other materials or infrastructure when reconfiguring a portion of the land currently in use by industrial users of the Port of Quebec for the truck loading zone.• Dismantling and relocating IMTT Québec Inc.'s marshalling yard needed for the construction of the gatehouse for trucks.• Installing a water main system, a fire protection system and a storm sewer system.• Removing the vegetated slope for the construction of the visual and acoustic barrier, reusing the soil on-site or transporting material off-site, and levelling and compacting the soil. |



| Physical activities | Description of activities |
|---|--|
| | <ul style="list-style-type: none">• Modifying and extending the City of Québec's emergency outflow by approximately 100 metres and the outflow coming from Arrimage du Saint-Laurent's sedimentation tank by approximately 120 metres.• Installing the ballast (bearing layer for railways) and paving the service road for the installation of the railways.• Preparing the steel reinforcements, formwork, concrete pouring, and form stripping for the slab and retaining walls and paving for the construction of the overpass.• Installing the infrastructure and the equipment needed for the truck gatehouse (substation, secondary building for maintenance, booths and equipment, fences, etc.). |
| Construction work in water and configuration of the space behind the new wharf | <ul style="list-style-type: none">• Fabricating, installing and filling 15 reinforced concrete caissons for the construction of the wharf.• Filling in the area behind the wharf and carrying out soil densification work.• Installing anti-scouring slabs, installing the wharf accessories, including bollards, docking fenders, fixed ladders, etc.• Constructing the rockfill seawall.• Capital dredging to the operating and docking area, namely hydraulic dredging (mostly) and mechanical dredging (for contaminated sediments and large rocks).• Using the uncontaminated dredged sediments to fill the area behind the wharf and granular material from a quarry that will be transported by train to complete the filling.• Dynamic compacting or vibrocompacting to solidify the ground behind the wharf.• Managing the contaminated sediments and transporting them to an authorized location. |
| Water management | <ul style="list-style-type: none">• Managing all runoff water on all work sites including wharf No. 54.• Managing waste water with chemical toilets.• Managing the water from the settling tank for uncontaminated sediments and from the sediment dewatering tank.• Managing waste snow. |
| Transportation of materials and vehicle traffic | <ul style="list-style-type: none">• Transporting 1,217,748 cubic metres of material needed to fill the area behind the wharf and build various infrastructure. This is equivalent to 7,400 trucks, 1,353 concrete mixers, and 243 of 90 car trains.• Transporting fill materials and granular materials for road work outside the current boundaries of the proponent's land that will require 4,374 trucks and 190 concrete mixers. |



| Physical activities | Description of activities |
|---|---|
| Waste management and disposal | <ul style="list-style-type: none">• Storing final waste (debris, scrap, non-reusable objects and materials) in a container designated for that purpose.• Managing recyclable waste and transporting it to appropriate locations.• Storing hazardous materials according to applicable regulations and transporting them to authorized locations. |
| Restoration activities | <ul style="list-style-type: none">• Developing the <i>Trame Verte</i>¹⁴ around the port area. |
| Operational Phase : Duration approximately 75 years | |
| Use of the deep-water wharf | <ul style="list-style-type: none">• Operating an approximately 31.7 hectares deep-water container terminal.• Annual storage capacity of 700,000 twenty-foot equivalent units. |
| Transportation and vehicle traffic | <ul style="list-style-type: none">• Transporting 90% of containers by train and 10% of containers by truck, where the volume carried by train would be 630,000 twenty-foot equivalent units and the volume carried by truck would be 70,000 twenty-foot equivalent units.• Using intermodal trains for transportation—1 train for import and 1 for export every day, 7 days a week, with a maximum train length of 12,000 feet.• Transporting an estimated 90 trucks per day, 6 days per week, for a total of 23,378 truckloads per year. |
| Infrastructure maintenance | <ul style="list-style-type: none">• Cleaning terminal surfaces and roads, removing snow, maintaining equipment for rainwater management, repairing road surfaces, maintaining rails, replacing lighting equipment, repairing wharf ladders, painting, and other maintenance work. |
| Maintenance dredging and sediment management | <ul style="list-style-type: none">• Maintenance dredging using a mechanical dredge.• Transporting uncontaminated sediments to the Quebec Port Authority's property designated for that purpose and transporting contaminated sediments to an authorized location. |

¹⁴ The Port of Quebec's *Trame Verte* project consists in integrating plant islands strategically positioned on the port territory, so as to create green interfaces between the port territory and the community.



| Physical activities | Description of activities |
|---|---|
| Supply activities | <ul style="list-style-type: none">Resupplying ships with drinking water and fuel. |
| Water management | <ul style="list-style-type: none">Managing runoff water with a storm sewer system and management equipment (sediment traps, sediment barriers, infiltration devices, hydrodynamic separators, geotextile tubes, watertight tarps) to reduce suspended matter.Managing waste water using waste water storage tanks. The water will be disposed of outside the property of the Quebec Port Authority.Managing waste snow by collecting it and transporting it to the sites authorized by the City of Québec.Managing bilge water, black water and grey water through a mandated shipping agent and a service provider that specializes in collecting this kind of waste. |
| Navigation | <ul style="list-style-type: none">Receiving 52 to 156 ships at the wharf per year.Facilitating maximum use of the wharf by container ships estimated at 13,100 twenty foot equivalent units. |
| Management of invasive alien species | <ul style="list-style-type: none">Managing aquatic invasive alien species with water ballast management techniques according to applicable regulations. |
| Waste management | <ul style="list-style-type: none">Storing final waste (debris, scrap, non-reusable objects and materials) in a container designated for that purpose.Managing recyclable waste according to applicable standards and requirements.Collecting international waste by sweeping. Disposing of cargo waste according to applicable laws. |



2.3 Other Factors Considered Under Paragraph 19(1)(j) of the *Canadian Environmental Assessment Act* (CEAA 2012)

Because of the concerns raised by the public, the Agency identified the impact of road and rail transportation associated with the Project and their potential effects on air quality and human health in the Cité-Limoilou borough as another factor to consider in the environmental assessment under paragraph 19(1)(j) of the CEAA 2012.¹⁵ These activities are not within the scope of the environmental assessment, but the information and concerns collected, summarized in chapter 8, will be taken into account in the Minister's decision. The issues raised focus primarily on transportation activities outside the Project site during the construction and operational phases with respect to managing air quality, noise and light.

¹⁵ <https://iaac-aeic.gc.ca/050/evaluations/document/132490>

3 Consultation Activities and Advice Received

The Agency has prepared this draft version of the environmental assessment report taking into account comments from the public, Indigenous peoples and government experts. Local and traditional knowledge about the Project location was also considered in identifying potential environmental effects. The Agency, in collaboration with the environmental assessment technical committee, conducted consultation activities with the public and Indigenous peoples at key stages of the process. These activities, which were posted on the Canadian Environmental Assessment Registry,¹⁶ deal with the following documents:

- The draft Environmental Impact Statement Guidelines (August 10 to September 9, 2015);
- The summary of the proponent's Environmental Impact Statement (January 4 to February 10, 2017);
- Updating the Project and the impact statement (May 29 to June 28, 2019; an additional comment period to take into account Project repurposing).

In this fourth and final comment period, the Agency is seeking comments on this draft report and conditions under which the Minister's Decision Statement could be supported. This report includes the Agency's conclusions and recommendations. After considering the comments received from the public, Indigenous peoples and government experts about this draft report, the Agency will finalize the Environmental Assessment Report and submit it to the federal Minister of Environment and Climate Change so that he may issue his decisions under the CEAA 2012.

3.1 Crown Consultation

3.1.1 Crown Consultation conducted by the Agency

The federal government has a duty to consult Indigenous peoples and, where appropriate, provide accommodation when considering decisions that may adversely affect established or potential Indigenous or treaty rights protected by section 35 of the *Constitution Act, 1982*. Consultation with Indigenous peoples is also undertaken more broadly as an important part of good governance, valuable policy development and sound decision-making. Indigenous peoples have a unique role to play in the environmental assessment of projects. The Agency recognizes the special constitutional relationship between the Crown and Indigenous peoples and the special knowledge, perspectives and interests they bring to the process.

For the purposes of the environmental assessment, the Agency served as the Crown Consultation Coordinator to facilitate a whole-of-government approach to consultation. The First Nations invited to participate in the consultations are those whose potential or established Indigenous or treaty rights could potentially be adversely affected by the Project. These are:

¹⁶ <https://ceaa-acee.gc.ca/050/evaluations/proj/80107?&culture=en-CA>

- Huron-Wendat Nation
- W8banaki Nation
- Mohawk First Nation of Kahnawà:ke
- Mohawk First Nation of Kanesatake
- Mohawk First Nation of Akwesasne
- Essipit First Nation
- Pekuakamiulnuatsh First Nation (Mashteuatsh)
- Pessamit First Nation
- Wolastoqiyik (Maliseet) Wahsipekuk First Nation

The Agency consulted with First Nations in a manner that was integrated into the environmental assessment process. During the environmental assessment process, the Agency provided opportunities for these First Nations to communicate their concerns and views on the Project through phone calls, emails, letters and face-to-face meetings. In addition, First Nations were invited to participate in public consultations. A number of First Nations consulted provided written comments at various stages of the assessment. These comments were intended to provide observations on the content of the documents submitted for consultation, as well as to raise concerns and address the issues raised by the impact mitigation measures. Despite communication sent to Kanesatake and Awesasne First Nations, these First Nations have not provided information to the Agency or the proponent regarding their uses and rights and the potential effects of the project on these uses and rights. First Nations are now invited to comment on the draft version of this environmental assessment report.

Through its Participant Funding Program, the Agency administers funding to support the participation of potentially affected Indigenous peoples in the environmental assessment process. A total of \$180,420.47 from the Participant Funding Program was allocated to the following First Nations (table 5).

Table 5: Funding allocated to First Nations by the Participant Funding Program

| Indigenous Community | Amount Allocated |
|--|---------------------|
| Nation huronne-wendat | \$57,243.30 |
| Grand Conseil de la Nation Waban-Aki | \$31,609.02 |
| Mohawk Council of Kahnawà:ke | \$39,850.00 |
| Pekuakamiulnuatsh Takuhikan (Mashteuatsh) | \$15,780.00 |
| Conseil de la Première Nation des Innus Essipit | \$15,922.50 |
| Wolastoqiyik (Maliseet) Wahsipekuk First Nation | \$57,290.00 |
| Conseil des Innus de Pessamit | \$3,800.00 |
| TOTAL | \$221,494.82 |

The Agency proposed consultation plans to these First Nations detailing consultation activities at different stages of the environmental assessment. These plans were then adapted according to the needs expressed during a teleconference on December 15, 2015, with Essipit and Pekuakamiulnuatsh

(Mashtueiatsh) Innu First Nations and during meetings organized with the Huron-Wendat Nation on December 8, 2015, as well as with the Mohawk Council of Kahnawà:ke on December 9, 2015. These meetings were also an opportunity to present the CEAA 2012 environmental assessment process and the next steps in the assessment of the Project. On June 3, 2016, the Agency again met with the Huron-Wendat Nation with the goal of further discussing the opportunities for consultation throughout the environmental assessment process. Another objective of this meeting was to separate the roles and objectives of the consultations held by the Agency from those of the proponent. The Agency met with the Grand Conseil de la Nation Waban-Aki as well as the Mohawk Council of Kahnawà:ke on February 14 and 22, 2017, respectively, to hear their concerns and comments regarding the environmental impact statement and present the path forward for the environmental assessment. Between January 15 and March 27, 2019, the Agency met with the Wolastoqiyik (Maliseet) Wahsipekuk First Nation, the Innu First Nation of Essipit, the Innu First Nation of Pessamit, the First Nation of Pekuakamiulnuatsh (Mashtueiatsh), the Mohawk Council of Kahnawà:ke, the Grand Conseil de la Nation Waban-Aki as well as the Huron-Wendat Nation regarding updates to the Project and to present the Agency's methodology for assessing impacts on Indigenous or treaty rights. Between January and October 2020, the Agency met and had various exchanges on several occasions with these same First Nations regarding the assessment of impacts on their rights in a spirit of ongoing collaboration.

The main concerns raised related to the following:

- The Project's impact on certain migratory species of fish of concern, including Atlantic and lake sturgeon;
- The impact of the Project on fish and fish habitat, particularly on the striped bass, an endangered species;
- The potential impacts of the Project on their rights (especially fishing rights) and customary laws;
- The cumulative effects of increased navigation (vessel traffic) resulting from the various port-related projects on the St. Lawrence River;
- The importance of consulting with First Nations on mitigation or compensation measures that may affect their Indigenous rights;
- Access to territory and knowledge transfer.

Details on the comments and concerns identified are listed in section 5.9 regarding current uses of lands and resources for traditional purposes and in section 7 regarding impacts on Indigenous and treaty rights. Appendix D summarizes the Crown's consultations with Indigenous groups. All of these comments have been considered in preparing this report.

In addition, the Agency undertakes to invite First Nations potentially affected by the Project to discuss this draft report and hear their comments and concerns.

3.1.2 Indigenous engagement activities organized by the proponent

Information obtained by the proponent about the Indigenous groups' current uses of lands and resources for traditional purposes, as well as the proponent's assessment of potential impacts of the Project on Indigenous or treaty rights, helped to inform the federal government's consultation process. As early as spring 2015, the proponent engaged with the First Nations identified by the Agency to discuss issues and concerns. Consultations and engagement activities organized by the proponent included:

- Contact by email and phone;
- Face-to-face meetings, working meetings, information and document sharing;
- A permanent working panel with the Huron-Wendat Nation;
- A survey questionnaire;
- Tours of the Port of Quebec facilities were given for representatives of the Mohawks of Kahnawà:ke and the Huron-Wendat, among others;
- The possibility of producing additional studies with the Huron-Wendat Nation.

3.2 Public Consultation

3.2.1 Public consultation conducted by the Agency

As described above, the Agency provided three opportunities to participate in the environmental assessment process by submitting comments and concerns directly to the Agency or through the Environmental Assessment Registry. The Agency also considered comments received throughout the environmental assessment process. The people and groups that expressed an interest in the Project were directly informed by email or phone of the consultation opportunities. The Agency also held an open house session, as well as three public meetings with the proponent and experts from the governments of Canada and Québec during the review of the Environmental Impact Statement. These consultations, which brought together about 350 people, were held in Québec City. The open house was held on January 31, 2017, and the three public meetings on February 1 and 2, 2017. An external moderator was brought in for the public meetings to facilitate public involvement. These consultation activities provided opportunities for members of the public to learn more about the environmental assessment process and the Project, as well as to comment on the proponent's Environmental Impact Statement.

On January 12, 2017, prior to the open house session and public meetings, the Agency met with citizen groups that may be more directly affected by the Project and that had expressed an interest in meeting with the Agency. The purpose of this meeting was to inform the groups of the consultation opportunities, prepare them for the consultations on the Environmental Impact Statement and inform them of the next steps in the environmental assessment.

Following the Project's repurposing and the proponent's updates to the impact statement, the Agency held an additional public consultation period between May 29 and June 28, 2019, to hear the public's and First Nations' concerns about this repurposing and the potential new effects.

The main concerns raised by the public in the consultation related to the following:

- Air quality
- Human health related to air quality, noise disturbance and other disturbances
- Fish and fish habitat
- Project scope
- Validity of the proponent's economic assessment of the Project

- Management of contaminated sediments
- Risk of accidents and malfunctions
- Nautical sports
- Birds and their habitats
- Landscape
- Cumulative effects
- Project rationale and purpose, and alternatives considered
- Increase in transportation (marine, land and rail)
- Role of the Québec government in the federal environmental assessment process

The Agency supported public participation in the environmental assessment of the Project through its Participant Funding Program. A total of \$29,529.84 was allocated to the organizations listed in table 6. A number of other citizen groups and organizations also submitted comments that are available on the Canadian Impact Assessment Registry.

Table 6: Funds allocated to Participant Funding Program organizations

| Recipient | Amount Allocated |
|---|--------------------|
| Accès Saint-Laurent Beauport | \$2,266.91 |
| Association des kitesurfers et véliplanchistes de Québec | \$572.61 |
| Comité de vigilance des activités portuaires de Québec | \$3,800.00 |
| Comité ZIP de Québec et Chaudière-Appalaches | \$1,552.00 |
| Conseil régional de l'environnement de la Capitale-Nationale | \$3,800.00 |
| Équiterre | \$4,868.37 |
| Nature Québec | \$3,800.00 |
| Organismes des bassins versants de la Capitale | \$3,500.00 |
| Stratégies Saint-Laurent | \$1,200.00 |
| Initiative citoyenne de vigilance du Port de Québec | \$4,169.95 |
| TOTAL | \$29,529.84 |

Details on the comments and concerns identified in relation to the Project, predicted effects on valued components and changes to the environment are listed in sections 4, 5 and 6.

3.2.2 Public involvement activities organized by the proponent

The proponent solicited the involvement of local residents, residents of Québec City, Île d'Orléans and Lévis, as well as people interested in the Project regardless of geographic location. In addition, the proponent consulted other interested parties and those that may be affected by the Project, including industries, environmental and community groups, economic groups, municipal, provincial and federal governments, First Nations, corporations and various committees.

Since 2012, the public consultation, engagement and communication activities organized by the proponent include the community relations committee (comité de cohabitation port), Baie de Beauport users forum, open houses, news media, an information booklet, newsletters, citizen information day, a phone line and an email address dedicated to the Project. In addition, the proponent held individual meetings with 134 interested parties, including groups or stakeholders, as well as a plenary meeting with elected municipal officials from Québec City.

3.3 Participation of Federal Government and Other Experts

Pursuant to section 20 of CEAA 2012, federal authorities in possession of specialist or expert information or knowledge with respect to the designated Project provided advice in relation to the draft Environmental Impact Statement Guidelines, the proponent's Environmental Impact Statement and the proponent's responses to information requests from the Agency. The federal authorities also submitted comments and observations for the preparation of this draft report and potential conditions that will support the Minister's decision.

The following federal authorities provided advice at each stage of the environmental assessment process by providing expertise and knowledge relevant to the Project based on their area of jurisdiction.

- Fisheries and Oceans Canada: fish and fish habitat¹⁷ including aquatic species at risk as well as regulatory provisions under the *Fisheries Act* and the *Species at Risk Act*;
- Environment and Climate Change Canada: weather and climate, air quality and greenhouse gases, quality of surface water and groundwater, soil and sediment quality, hydrodynamic conditions, accidents and malfunctions, migratory birds; species at risk (other than fish and marine mammals), application of the Federal Policy on Wetland Conservation and regulatory responsibilities under the *Canadian Environmental Protection Act*, the *Migratory Birds Convention Act*, the *Species at Risk Act*, and subsection 36(3) of the *Fisheries Act*;
- Natural Resources Canada: Hydrogeology, geological features, seismic movements, and regulatory and statutory responsibilities under the *Explosives Act* and *Explosives Regulations*;
- Transport Canada: Marine and rail transportation safety, navigation protection, ballast water management, prevention of marine incidents, and response readiness in the event of a marine incident (environmental emergency), as well as regulatory and legal responsibilities under the *Navigation Protection Act* and the *Shipping Act*;
- Health Canada: the Project's potential health risks induced by changes to air quality, noise disturbances and water quality;
- Parks Canada: Archaeological resources located on federal port lands and waters;

¹⁷ Definition of fish under the *Fisheries Act*: 2(1)(a) Fish includes parts of fish; b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals (*poissons*) Fish and fish habitat: as defined in the *Fisheries Act*.

- Laurentian Pilotage Authority: marine traffic and pilotage services in the St. Lawrence and Saguenay Rivers, as well as regulatory and legal responsibilities under the *Pilotage Act*.

3.4 Participation of Québec Government Experts

The Project was not submitted for a provincial environmental assessment but is the subject of a Canada–Quebec Agreement on Environmental Assessment Cooperation between the Agency and Québec's Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC) for port expansion projects currently being assessed by the Agency. The agreement provides for the Government of Quebec's participation in the federal environmental assessment of the Project. The MELCC's environmental assessment experts participate in the environmental assessment technical committee by sharing their concerns and comments, as well as the advices of Quebec government experts. The Quebec government's areas of expertise presented in table 7 are incorporated at each steps of the federal environmental assessment. The final advice of the Government of Quebec will be reflected in the final version of the Agency's report.

Table 7 Expertise of the MELCC and other Québec departments consulted

| Area of Expertise | |
|--|---|
| Biological Environment | <ul style="list-style-type: none"> • Vegetation and Wetland Resources • Wildlife and Wildlife Habitat • Birds and Bird Habitat • Mammals • Special-status Species • Alien Invasive Species |
| Physical Environment | <ul style="list-style-type: none"> • Air Quality and Noise • Surface and Groundwater Quality • Sediment Quality • Soil Quality • Hydrogeology and Hydrodynamics • Sedimentology |
| Human Environment | <ul style="list-style-type: none"> • Lands and Resource Use • Public Health (noise, air quality, odours) • Archaeological Heritage on Land and Underwater • Built Heritage Resources and Cultural Heritage Landscapes |
| Technological Risks and Emergency Measures | <ul style="list-style-type: none"> • Management of Health, Safety and the Environment • Management of Technological Risks and Emergency Measures |



4 Project Justification and Alternatives Considered

4.1 Purpose of the Project

The proponent proposes a 15 metre deep terminal to accommodate large vessels (13,100 TEU) that cannot currently dock in St. Lawrence River ports (Englobe, 2020i). To achieve its objectives, the proponent states that the port must acquire new infrastructure, while generating sufficient revenues to maintain its existing infrastructure. It states that the port has reached the limits of its capacity since its land is fully occupied and its terminals are used to their full capacity. The proponent believes that, due to the optimization of the project and the partnership with Hutchison Ports and CN, the expansion of the Port of Quebec would help take full advantage of the assets of the St. Lawrence trade corridor and Canada's international trade opportunities (Englobe, 2020a). In terms of job creation, the proponent estimates that 3,010 direct and 2,327 indirect jobs would be generated during the construction phase and 457 direct and 316 indirect jobs during the operational phase. The direct and indirect value added¹⁸ would amount to \$450.6 million for Québec and \$525.9 million for Canada during the construction phase, and a total of \$86.3 million annually during the operational phase.

First Nations and the public have raised concerns about the project's justification, its rationale and the environmental effects of the proponent's chosen solution. In addition, the issue of the economic viability of the project and competition with the United States east coast ports and other Canadian ports was also raised by the public.

4.2 Project Alternatives

Under CEAA 2012, the environmental assessment of a Project shall consider the technically and economically achievable alternatives and their environmental effects.

The location

Fisheries and Oceans Canada considers that important habitats for several fish species, including already sensitive populations, would be affected by the project. The project risks to destroy a striped bass spawning ground, an endangered specie under the Species at Risk Act, feeding and movement areas for lake sturgeon and Atlantic sturgeon and a gathering area for American shad reproduction. According to

¹⁸ Value added is a measure of the net output of an industry. Value added is essentially the difference between total income and the sum of production expenditures (materials, intermediate, services, etc.). Once all intermediate inputs (intermediate consumer goods and services needed to produce the good or service) are subtracted, the value added to the economy (GDP) by the activities of the industry is obtained.

Fisheries and Oceans Canada, it would be extremely difficult to identify offset projects to mitigate these losses.

Since 2015, Fisheries and Oceans Canada, the Ministère des Forêts, de la Faune et des Parcs du Québec and the Agency have informed the proponent on the risks of significant effects on fish and fish habitat associated with the location chosen to carry out the project. The proponent was asked to examine other sites for the project that would have less consequences on fish and fish habitat, particularly striped bass. In response to these requests, the proponent maintains that the Beauport sector is the only possible location to carry out its project.

The proponent emphasizes that the carrying out of the Project cannot be considered outside the limits of the lands it administers. Although the Quebec Port Authority is an autonomous entity, its powers remain limited and governed by letters patent. Moreover, it is Transport Canada that determines the sites entrusted to the proponent for management. The proponent also maintains that the carrying out of the Project outside its properties would render impossible any intermodal link, centralization of operations and synergy with the Port's current activities. According to the proponent, these factors would impose constraints on the Project which, combined with the acquisition process, would compromise the Project's feasibility or timeline.

Thus, three locations (figure 6) within the limits of the lands managed by the Quebec Port Authority were the object of a multicriteria analysis to determine the optimum site from the technical, economic, environmental and social point of view. It should be noted that the Estuary sector, shown in figure 6, was not considered in the multi-criteria analysis due to the lack of space resulting from the presence of active users and the impossibility of demonstrating economic and technical feasibility.

The locations studied are (Englobe, 2020d):

- Beauport sector;
- Lévis – Pointe De La Martinière sector; and
- Anse au Foulon sector.

Following this analysis, the proponent concludes that the location that represents the best overall performance is the Beauport sector.

Regarding the environmental criteria, the proponent considers that the Beauport sector is the one that minimizes the losses and disturbances for the aquatic environment, in particular because the Anse au Foulon et Lévis - Pointe De La Martinière sites involve a much higher volume of dredging. However, the Agency notes that the analysis does not account for the relative quality of the habitats (aquatic and terrestrial) that would be disturbed by each of the options presented by the proponent. Fisheries and Oceans Canada further considers that the Project would affect important habitats for several fish species, particularly a spawning area for the striped bass, an endangered species according to the *Species at Risk Act*, the lake sturgeon, the Atlantic sturgeon and the American shad. According to Environment and Climate Change Canada, the description of the species at risk should have been reviewed and improved for each site to better assess its significance. The relative weight of each species in the comparison between the sites should have been adjusted to account for its status and its abundance and range. The Mohawk Council of Kahnawà:ke and the Grand Conseil de la Nation Waban-Aki raised the importance of the study area for certain ecological functions of fish and fish habitat.

Regarding the technical and economic criteria, the Beauport sector would offer advantages due to the lower construction cost and the possibility of taking advantage of the developments already in place. From a technical point of view, the topography of the Beauport sector would offer the advantage of being the same as that of the future wharf. According to the proponent, this aspect would facilitate the development of the area behind the wharf and optimize operation of the intermodal terminal. This same topographical aspect would facilitate access to the site and land transportation of containerized cargo, unlike the Anse au Foulon and Lévis - Pointe De La Martinière sites, where significant technical challenges would have to be overcome to ensure access to the site, resulting in significant costs. On the other hand, the Beauport sector offers the advantages of intermodality for marine operators who would already benefit from a marshalling yard, as well as the road network and the railway tracks serving the Port of Quebec sector. Other flexibility and complementarity criteria in terms of handling and storage areas for containerized and non-containerized cargo, as well as solid bulk and liquid bulk cargo, add to the Beauport sector's advantages for the development of the new terminal. Contrary to the sites of Anse au Foulon and Lévis - Pointe De La Martinière, the selection of the Beauport sector would favour centralization of operations and complementarity of the current activities of the Port and those projected for the new terminal.

The proponent points out that the Beauport site nonetheless could generate high costs for the design and development of offset projects, particularly due to the presence of species at risk. Fisheries and Oceans Canada also reminded the proponent that the costs of the offset measures can be considerable, in view of the magnitude of the surfaces concerned, the habitat functions affected and the complexity of carrying out the projects. The Agency notes that little information is provided by the proponent concerning the environmental costs generated by this location in terms of compensation, monitoring and surveillance.

Concerning the social criterion, the Beauport site presents a greater distance between the residences and the projected infrastructures than the sites of Anse au Foulon and Lévis - Pointe De La Martinière. According to the proponent, this choice would limit the potential effects of the Project on the human environment in terms of air quality and the noise environment, among others (Englobe, 2020d). The air emissions in the Port of Quebec sector are currently very close to the limit values for health and this situation is cause for concern for Health Canada. Given the importance of the existing industrial activities in the sector, as well as dust emissions and the increase in road and railway transportation outside the Port's limits, the social and psychological impacts on an already vulnerable population inhabiting the nearby neighbourhoods prove to be a major issue. The public raised concerns about the choices of locations studied by the proponent and proposed to examine the possibility of acquiring new lands and carrying out the Project farther downstream to reduce the effects on the natural and human environment. In this regard, the public expressed concerns about the pressure exerted by the Project on the neighbouring community, where the population's living conditions and health are considered at risk, and by the impacts on Baie de Beauport, especially on recreational and tourism activities such as kite-surfing.

Figure 6: Potential studied locations for project realization



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Englobe, 2018b



Berth development

Three solutions for the orientation and configuration of the new wharf were evaluated (Englobe, 2018b):

1. 0 degree relative to the current wharf line
2. 12 degrees relative to the current wharf line
3. 17 degrees relative to the current wharf line

An orientation of 17 degrees was chosen for navigation and mooring safety reasons, and to limit the effect of the direct impacts of ice fields borne by the ebb tides on the future wharf (Englobe, 2018). According to the proponent, this option would reduce the encroachment on the seabed compared to the other options. In economic terms, the chosen solution would involve a lower construction and offset cost.

Wharf construction methods

Three wharf construction solutions were considered (Englobe, 2018b):

1. Circular steel sheet pile cells
2. Concrete slabs supported on steel piles
3. Reinforced concrete caissons

The reinforced concrete caisson option was chosen because this structure would better withstand ice and shocks by vessels and would have greater longevity and lower maintenance costs than the other two options. These factors would also reduce the interventions in the aquatic environment.

Caisson construction methods

Three solutions for manufacturing of reinforced concrete caissons were considered (Englobe, 2018b):

1. Drydock method
2. Launching ramp
3. Submersible barge

The submersible barge was chosen because it would be facilitated by the depth of the water, adapted to this type of work. The temporary floating equipment would not necessitate provisional construction on the site and would have few potential effects on the river environment. Moreover, the cost of use of a submersible barge would be lower than the costs for the other two options considered.

Manoeuvring and mooring area

Three solutions for the manoeuvring and mooring area were considered (Englobe, 2020a):

1. 2007 concept (area of 166,055 square metres)
2. 2015 concept (area of 132,120 square metres)
3. Optimized concept (area of 72,085 square metres)

The optimized concept was chosen because it causes less disturbance of the aquatic environment, while ensuring the safety of the ship manoeuvring and mooring area. The optimized solution would involve a smaller area to be dredged and a lower volume of sediments to manage than the other two solutions. Consequently, the deterioration of the fish habitat, the potential effect on species at risk, the offset cost and the nuisances related to dredging operations would be less.



Dredging methods

Three solutions for the dredging method were considered (Englobe, 2018b):

1. Mechanical dredging
2. Hydraulic dredging
3. Reliance on both dredging methods

The mixed method was chosen because it would limit the effect on the fish habitat due to the duration of the work, as well as resuspension of sediments, both of which would be limited. The hydraulic dredge is anticipated for non-contaminated sediments, while the mechanical grab dredge would be used for the sectors with contaminated sediments, when the compactness of the sediments is high or when there are large-diameter rocks on the seabed.

Management of non-contaminated sediments

Two solutions for management of non-contaminated sediments were considered (Englobe, 2018b):

1. On-site reclamation (sub-base of the area behind the wharf)
2. Off-site disposal

The first solution was chosen because the majority of the dredged sand would have an adequate gradation. Moreover, this solution involves a lower management cost and less impact than the off-site option. Because there would be no off-site transportation by truck, the on site reclamation option would also involve a reduction of air pollutants, dust and noise.

Management of contaminated sediments

Three solutions for management of contaminated sediments were considered (Englobe, 2018b):

1. Impervious geotextile (geotube) dyke
2. Dewatering pond for contaminated sediments and their use in a cement matrix
3. Dewatering pond for contaminated sediments and their off-site disposal

The third solution was chosen because it does not present uncertainties and because the sediments cannot be reclaimed. The risks of contamination of the biological environment would be lower than for the first two options.

Extension of the Ville de Québec emergency outfall

Two solutions for the extension of the Ville de Québec emergency outfall were considered (Englobe, 2018b):

1. Short route connecting to the facade of the new wharf
2. Route bypassing the new wharf

The proponent chose the first option because it allows maintenance of the current direction of the pipe and because its construction cost would be lower than the route bypassing the new wharf. There would be no environmental or social advantages between the two proposed solutions.



Extension of the railway right of way

Three solutions for the extension of the railway right of way were considered (Englobe, 2020a):

1. South of Boulevard Henri-Bourassa
2. North of Boulevard Henri-Bourassa (2018 version)
3. North of Boulevard Henri-Bourassa (2020 version)

The proponent chose the third option due to the partnership with CN. This option makes it possible to keep the Beauport marshalling yard operational for the other users and keep the train manoeuvres as far as possible from the residences.

Visual and acoustic screen

Three solutions for the visual and acoustic screen were considered (Englobe, 2018b):

1. Vegetated embankment
2. Container wall
3. Concrete wall

The proponent chose the second solution because it would allow optimization of the work and storage area of the container terminal due to a narrower width (three metres) compared to the vegetated embankment (20 metres) and offers better potential for use and integration for recreational purposes compared to the concrete wall. However, the construction cost of the container wall would be higher than for the vegetated embankment, but less than for the concrete wall. Concerning the visual and acoustic screen, the public raised concerns in relation to the options analysis and the justification of the container wall solution in the context of the Baie de Beauport Users Forum.

The Agency's analysis and conclusion

For each of the Project's key components, the proponent described the technically and economically achievable alternatives and identified their environmental effects. The proponent's assessment considered the profitability, technical applicability and reliability of the options and the effects on the valued environmental components selected, effects on selected valued components and input from Indigenous communities. Based on its review of the analysis, the Agency is of the opinion that the proponent has sufficiently assessed feasible alternatives to the project for the purposes of the environmental effects assessment under CEAA 2012.

5 Predicted Effects on Valued Components

5.1 Air Quality

The Agency is of the opinion that the project is likely to cause significant adverse residual environmental effects on air quality given that it would contribute to the degradation of air quality in an area where it is already a human health issue. During the construction phase, the project would emit total particulate matter (TPM) into the air, nitrogen dioxide and formaldehyde in excess of applicable standards or criteria. Exceedances would also be observed for fine particles ($PM_{2.5}$) and nickel. During the operational phase, the project would emit nitrogen dioxide and acetaldehyde in excess of the applicable standards or criteria, while contributing to exceedances for total particulate matter (TPM), fine particulate matter ($PM_{2.5}$) and nickel in the air. Particulate matter emissions and contaminants would result from the use of fossil fuels during both the construction and operational phases, while transportation and handling of granular materials, as well as excavation and backfilling activities, would be added during the construction phase. Since the reference values for some contaminants are already high, the Agency concludes that exceedances of standards and criteria are to be expected a few days per year and are likely to have a negative effect on air quality and human health (section 5.7) despite the limited contribution of the project.

This section describes the effects of the project on air quality. The effects of the project on human health, including those related to air quality, are discussed in section 5.7. Transboundary effects, in this case greenhouse gas emissions, are discussed in section 5.2. The following subsections present the information considered by the Agency in its analysis to conclude on the significance of the project's effects on air quality, including the opinions and comments of the expert departments, First Nations consulted and the public.

5.1.1 Description of the component “air quality”

This section deals with changes in the atmospheric environment caused in particular by the emission of major contaminants, including particulate matter (total particulate matter (TPM), inhalable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$), organic compounds, metals, gaseous contaminants, dust deposition and odour emissions (Englobe, 2020c).

The study area selected by the proponent to assess the effects of the project on air quality is the airshed zone (figure 3, chapter 1). This zone would take into account an area of high environmental and social concern. It is defined by a six-kilometre radius around the project's focal point (Englobe, 2020c). The study area encompasses productive (e.g. Beauport flats, Beauport River), used (e.g. Baie de Beauport beach, St. Lawrence River, marinas, public spaces, cruise ships area) and inhabited (Québec City and Lévis neighbourhoods) environments.

The effects of the project on air quality and, consequently, on human health are among the main concerns raised by the public during the environmental assessment process. Residents of La Cité-Limoilou borough are particularly concerned about the project. These concerns are also shared by government authorities with expertise related to air quality (Environment and Climate Change Canada) and human health (Health



Canada), because the project is part of a living environment where air quality is already an issue for human health.

The public, and more specifically residents of La Cité-Limoilou, requested during the environmental analysis that the effects of road and rail transportation related to the project, but which would take place outside the limits of the proponent's territory (transportation of containers by truck and train to their destinations), be taken into account in the environmental analysis. These concerns were exacerbated when the proponent announced, in December 2017, that the project was changing its vocation from a multipurpose terminal to a container terminal, thereby generating greater truck and rail freight traffic in the borough of La Cité-Limoilou. In light of these concerns, the Agency asked the proponent, pursuant to paragraph 19(1)(j) of CEAA, 2012, to provide information on the effects of emissions from rail and road transportation generated by the project and which would take place outside the limits of the Port of Quebec in the borough of La Cité-Limoilou. In response to this request, the proponent decided to include emissions from this transportation in its analysis without distinguishing them from direct emissions from the project (Englobe, 2020c).

Ambient air description

To describe the baseline ambient air condition, the proponent relied on data collected at various sampling stations throughout the airshed area. Thus, 42 contaminants were considered during sampling periods, generally between 2010 and 2017, at nine distinct stations. Of these nine stations, six were installed by the Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC) (Vieux-Limoilou, Beaujeu, De Vitré, Beaucage, Saint-Charles Garnier and Georges-Maranda in Lévis) while the three others belong to the proponent (2nd, 3rd and 8th Avenue) (Englobe, 2020c).

The proponent compared the data from the sampling stations to the standards of the *Règlement sur l'assainissement de l'atmosphère* (RAA) and the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards 2020 and 2025 (CAAQS). Based on a detailed analysis of the nine stations, several exceedances of the RAA and CAAQS standards and criteria (2020 and 2025) are observed. Nickel, total particulate matter (TPM) and fine particulate matter ($PM_{2.5}$) are repeatedly exceeded at several stations. The proponent has paid particular attention to these contaminants, which are of concern to the public and government authorities (Englobe, 2020c).

Total Particulate Matter (TPM)

Concentrations for total particulate matter (TPM) show exceedances of the RAA standards at six of the seven stations measuring this type of air contaminant. According to the proponent, the sources contributing to these emissions are wood burning, transportation and industrial activities. The proponent points out that, based on a recent judgment¹⁹, the contribution of Port of Quebec activities to the dust found by the citizens of the borough of La Cité-Limoilou would be negligible, particularly since the implementation of measures to reduce dust emissions (Englobe, 2020c). For dust deposition, the proponent compared its results with the former RAA standard of 120 g/m³ over a 24-hour period. This standard had been determined, among other things, to limit nuisance problems and effects on visibility (Fisheries and Oceans Canada, 1976 in Walsh and Brière 2018). Total particulate matter (TPM) is less likely to cause health effects because it consists largely of coarse

¹⁹ Judgment of March 4, 2020, in the case of Véronique Lalande and Louis Duchesne against Compagnie d'Arrimage de Québec Ltée and l'Administration portuaire de Québec (No. 200-06-000169-139)



particles that penetrate less deeply into the respiratory tract. However, these particles can cause allergic or irritating effects (Walsh and Brière 2018).

Fine Particles ($PM_{2.5}$)

For fine particulate matter ($PM_{2.5}$), four out of six stations show exceedances of the RAA or CAAQS standards and criteria, i.e. 27 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) over a daily period and 8.8 $\mu\text{g}/\text{m}^3$ over an annual period.

The emission sources for these particles would be the same as for total particulate matter (TPM). However, fine particles ($PM_{2.5}$) settle more slowly and can be moved over greater distances. Thus, according to the proponent, they could come from as far away as the U.S. Midwestern United States, Southern Ontario and the East Coast of the United States (Englobe, 2020c).

According to a study carried out by the Direction de la Santé publique in 2019 (Direction de la Santé publique de la Capitale-Nationale du Québec, 2019), wood heating would be the main source of particulate emissions ($PM_{2.5}$ and PM_{10}) on the Local Community Services Centres (CLSC) Limoilou-Vanier and Basse-Ville territories. The decrease observed for these particles over the years is mainly due to the gradual phase-out of wood heating and the replacement of fireplaces by more efficient heating systems.

Nickel and other metals

Nickel concentrations exceed the RAA standard for all analyzed stations. The proponent indicates that the emission of nickel particulate matter is a known issue that is present in the airshed area (Englobe, 2020c). According to Walsh (2018), the origin of the nickel was established in 2013 and would have come from the transhipment of ore concentrate at the Port of Quebec. According to the proponent, this observation must however be put into perspective with the actions implemented in the port's territory over the last few years. The continuous improvement of transhipment operations, the optimization of the equipment used and the implementation of mitigation measures would have effectively reduced nickel emissions (Englobe, 2020c). According to the Direction de santé publique, the situation does indeed seem to have improved in recent years (Direction de santé publique, 2018).

Some air sampling stations also show exceedances for other metals, including arsenic, copper, manganese and zinc. High concentrations of metals in the air are believed to result from industrial operations, including Québec City's incinerator, and dust generation from road and rail transport (Englobe, 2020c).

Other contaminants

Stations measuring nitrogen dioxide (NO_2) and ozone show exceedances. Nitrogen dioxide (NO_2) is a precursor to the formation of ozone in combination with volatile organic compounds (VOCs). However, no stations report concentrations of volatile organic compounds (VOCs). Although, according to *National Pollutant Release Inventory* (NPRI) data, several industries report emissions of volatile organic compounds (VOCs). Like fine particulate matter ($PM_{2.5}$), ozone can be transported over long distances and it is possible that sources outside the airshed area may contribute to the degradation of ambient air quality (Englobe 2020c).



Odours

No odour baseline conditions were submitted by the proponent.

General observations on ambient air quality

The airshed area, including the borough of La Cité Limoilou, already has loaded baseline conditions for contaminants. According to the proponent, any addition of contaminants could result in the standards or criteria being exceeded. It is aware that its project will make a non-zero contribution to the already degraded baseline conditions (Englobe 2020c).

According to Walsh's report (2018), the air quality in the borough of La Cité-Limoilou is representative of an urbanized environment and, in general, the standards and criteria for air quality are respected. The annual average concentrations of contaminants meet the reference thresholds for all contaminants except nickel. However, exceedances are observed for certain daily standards such as total particulate matter (TPM), fine particulate matter ($PM_{2.5}$) and, to a greater extent, nickel. The main sources responsible for the contaminant concentrations measured at the stations would be road transportation, fossil fuels and wood heating, to which would be added, for certain contaminants, industrial and port activities (Walsh and Brière, 2018).

The data collected at the Vieux-Limoilou station is of greater concern to the Direction de la santé publique de la Capitale-Nationale du Québec. This station is located 2.5 km southwest of the project center and was selected to establish initial values for several contaminants as part of the air emission modeling for the project. According to the report by the Direction de la santé publique de la Capitale-Nationale du Québec (2019), air quality problems in the vicinity of this station are a priority because residents and people frequenting the neighbourhood have significant exposure to pollutants in a context where the health of residents is poorer than in other neighbourhoods in the city of Québec and where environmental and socio-economic risks are cumulative. According to this report, the average concentrations of fine particulate matter ($PM_{2.5}$) and nitrogen dioxide are higher than at the other sampling stations. Exceedances of fine particulate matter ($PM_{2.5}$) at the annual MELCC criteria are also recorded. Exceedances of daily reference values for total particulate matter (TPM) and fine particulate matter ($PM_{2.5}$) are also more frequent at the Vieux-Limoilou station than at other air quality measurement stations in the region. Finally, exceedances of reference values are observed for inhalable particles (PM_{10}) (annual and daily), ozone (1 and 8 hours), sulphur dioxide (SO_2) (daily), arsenic (annual) and nickel (daily) (Englobe 2020c).

5.1.2 Analysis of potential effects and proposed mitigation measures

The proponent used the U.S. Environmental Protection Agency (EPA) dispersion model to predict how emissions from stationary and mobile sources during the construction and operation phases of the project would disperse within the airshed area (Englobe 2020c). According to Environment and Climate Change Canada, this methodology generally meets the criteria set out in the Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC) *Air Quality Dispersion Modelling Guidelines*²⁰ for most of the model input data.

²⁰ <http://www.environnement.gouv.qc.ca/air/atmosphere/guide-mod-dispersion.pdf>

The dispersion study considered criteria air contaminants (CACs) including nitrogen dioxide (NO_2), carbon monoxide (CO), sulphur dioxide (SO_2), ammonia (NH_3) and particulate matter (TPM, PM_{10} and $\text{PM}_{2.5}$). It has also addressed some toxic contaminants including diesel particulate matter and volatile organic compounds (VOCs) such as formaldehyde, metals and polycyclic aromatic hydrocarbons (PAHs) (Englobe, 2020c).

Lastly, the proponent took into account the presence of air contaminants already present in the environment by adding initial concentrations to the atmospheric dispersion model to determine the effect of the project on air quality. These initial concentrations were derived in particular from measurements taken at the Vieux-Limoilou sampling station. Data for sulphur dioxide (SO_2), nitrogen dioxide (NO_2), fine particulate matter ($\text{PM}_{2.5}$), inhalable particulate matter (PM_{10}) and total particulate matter (TPM) from the years 2014 to 2016 were used. For other contaminants, where available, initial concentrations were taken from Schedule K of the *Règlement sur l'assainissement de l'atmosphère* (RAA) or MELCC criteria. The proponent also considered wind erosion of sediment storage ponds (including that for contaminated sediments) in the modeling study and took into account the Canadian Council of Ministers of the Environment (CCME) *Canadian Ambient Air Quality Standards*²¹ (CAAQS) and criteria from the MELCC (2018) RAA for the interpretation of the results (Englobe 2020c). For diesel particulate matter, acetaldehyde, acrolein and odour, no initial concentrations were included in the atmospheric dispersion modeling, which Health Canada believes complicates the interpretation of the results.

Atmospheric dispersion modeling was applied to a grid of 1,737 receptors corresponding to sectors of interest (La Cité Limoilou residential sector, Baie de Beauport park and beach, Domaine de Maizerets) or sensitive receptors (hospitals, local community service centers, early childhood centers, schools, long-term care hospitals and private seniors' residences) in the study area.

According to the proponent, the modelling is based on conservative assumptions since the scenarios chosen often represent the worst-case scenario, i.e., using the year that would emit the most particulate matter (year 2), a situation where all motorized vehicles operate at the same time and at all times, in addition to considering the use of so-called conservative initial concentrations and the use of conservative assumptions. These emission scenarios would thus lead to an overestimation of air emissions (Englobe, 2020c).

Environment and Climate Change Canada is of the opinion that most emission sources have been adequately described according to recognized practices. However, it is of the opinion that the proponent has chosen optimistic scenarios. Uncertainty would remain with respect to the modelled concentrations of contaminants, particularly nitrogen dioxide (NO_2), and the extent of their dispersion. For example, the proponent considered in its modelling that mitigation measures would reduce dust from unpaved roads by 80%, which Environment and Climate Change Canada considers too high. The use of such a rate in the modelling could underestimate the concentrations of particulate matter (TPM, PM_{10} and $\text{PM}_{2.5}$) and the rates of dust deposition. On the other hand, the proponent did not consider concentrations of certain phenomena in the modelling of particulate matter (PM), such as the presence of humidity in the air, which leads to a decrease in the dispersion of the dust plume. According to Environment and Climate Change Canada, this factor, among others, could lead to a slight overestimation, particularly of modelled total particulate matter (TPM) concentrations.

²¹ https://www.ccme.ca/fr/current_priorities/air/ncqaa.html



Lastly, Environment and Climate Change Canada points out that despite the use of high mitigation rates, results still show hourly and daily exceedances. These exceedances could pose risks to sensitive receptors even if they occur over short periods. Environment and Climate Change Canada states that it is therefore important to qualify the effects described by the proponent.

Construction phase

The construction activities would consist of the development of structures that will require a significant amount of granular material to be transported and handled on-site over a three-year period. Only the second year was considered in the modeling, as it would represent the year when the quantities of granular material transported to the site would be the highest (Englobe, 2020c).

Table 8 presents the main substances whose maximum concentrations would cause the various standards to be exceeded during construction.



Table 8: Summary of Maximum Concentrations of Selected Ambient Air Contaminants during Terminal Construction in Year 2

| Contaminant | Period | Maximum Project Contribution (A) ⁽¹⁾ | | Initial concentration (B) | | Total concentration (C = A + B) ⁽²⁾ | | Standard or criterion | |
|--|------------|---|------------|---------------------------|------------|--|------------|-----------------------|-------------------------|
| | | µg/m3 | % standard | µg/m3 | % standard | µg/m3 | % standard | µg/m3 | Type |
| • Volatile Organic Compounds (VOCs) | | | | | | | | | |
| • Formaldehyde | 15 minutes | 85 | 228% | 3 | 8,1% | 88 | 237 % | 37 | RAA ⁽³⁾ |
| • 1,3-butadiene | Annual | 0,00041 | 0,14% | 0,27 | 90% | 0,3 | 90 % | 0,3 | CAAQS ⁽⁴⁾ |
| Metals | | | | | | | | | |
| • Arsenic | Annual | 6,4 x 10-6 | 0,21% | 0,0027 | 90% | 0,0027 | 90 % | 0,003 | RAA |
| • Nickel (PM ₁₀) | 24 hours | 0,0054 | 39 % | 0,079 | 564% | 0,0844 | 603 % | 0,014 | RAA |
| Particulate matter⁽⁵⁾ and nitrogen dioxide | | | | | | | | | |
| • | 24 hours | 27 | 90% | 20 | 67% | 47 | 157% | 30 | RAA |
| • PM _{2,5} attenuation) | (80%) | 7,7 | 28% | 25 | 93% | 33 | 121% | 27 | CCAAQ ₍₂₀₂₀₎ |
| • | Annual | 0,56 | 6,3% | 9,7 | 110% | 10 | 117% | 8,8 | CCAAQ ₍₂₀₂₀₎ |
| • PM10 attenuation) | (80%) | 19 | 31% | 48 | 80% | 67 | 111% | 60 | 60 ⁽⁶⁾ |
| • TPM attenuation) | (80%) | 184 | 153% | 104 | 87% | 288 | 240% | 120 | RAA |
| • Nitrogen Dioxide (NO ₂) | 1 hour | 523 | 126% | 107 | 26% | 630 | 152% | 414 | RAA |
| | 1 hour | 204 | 258% | 98 | 104% | 230 | 291% | 79 | CCAAQ ₍₂₀₂₅₎ |
| | 24 hours | 227 | 110 % | 75 | 36 % | 302 | 146 % | 207 | RAA |
| | | 9,7 | 9,4 % | 16 | 16 % | 26 | 25 % | 103 | RAA |
| | Annual | 9,0 | 39 % | 16 | 70 % | 25 | 109 % | 23 | CCAAQ ₍₂₀₂₅₎ |



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Note: Results in bold and red indicate that a criterion or standard has been exceeded. Concentrations in yellow indicate are concentrations that meet the criterion or standard.

- (1) Maximum concentrations calculated outside the industrial zone, outside the 300 m buffer zone beyond the marine terminal on the river and inside the Baie de Beauport recreational zone over the modelling period (2008 - 2012). Bolded results indicate an exceedance of a criterion or standard.
- (2) Total concentrations: Summation of the maximum concentrations for the terminal and the initial concentrations.
- (3) RAA: MELCC *Règlement sur l'assainissement de l'atmosphère*
- (4) CAAQS: Canadian Council of Ministers of the Environment Ambient Air Quality Standards
- (5) For all PM: With mitigation measures to reduce emissions from unpaved roads at the site by 80% and emissions for loading, unloading and handling of fill by approximately 70%.
- (6) Old proposed but not endorsed Canada-wide Standard: three-year average of the annual 98th percentile of daily 24-hour average concentrations.



Nitrogen Dioxide

For Nitrogen Dioxide (NO_2), the concentrations modeled for the project contribution exceed the RAA standards and CAAQS criteria for both hourly and daily periods. Maximal concentrations range from 110% to 258% of the standard or criterion depending on the period. These maximal concentrations reach up 291% when the initial concentrations are taken into account (table 8).

Fine Suspended Particulate Matter (PM)

To calculate particulate emissions, the proponent used a scenario without mitigation measures for emissions from traffic on unpaved roads (Case A) and a scenario with mitigation measures aimed at a mitigation rate of 80% (Case B) (SNC-Lavalin, 2020). The results show exceedances of the daily standard for total particulate matter (TPM), inhalable particulate matter (PM_{10}) and fine particulate matter ($\text{PM}_{2.5}$) for both scenarios. Without mitigation measures, significant exceedances of the RAA daily standard for total particulate matter (TPM) are obtained for an area that includes the borough of La Cité-Limoilou as well as part of other boroughs in Québec City and Lévis (Map 3.7 in Englobe, 2020c), due in part to an initial concentration that is already 87% of the standard. The area of potential exceedance of the standard would be reduced with the application of mitigation measures, but would still extend to part of the borough of La Cité-Limoilou (Map 3.8 in Englobe, 2020c). The same trend is also observed for inhalable particles (PM_{10}) and fine particles ($\text{PM}_{2.5}$), for which exceedances would also still be observed despite mitigation measures, but over a smaller area.

Other contaminants

Standards and criteria are met for most of the other substances analyzed except for nickel and formaldehyde. For nickel, whose ambient concentration already exceeds the RAA standard (564%), the project would contribute 39% of the daily standard. For formaldehyde, maximum concentrations would reach 228% of the standard for the project alone and 237% of the standard based on the initial concentration. These two substances are contaminants of concern for users of the Baie de Beauport recreational area.

Dust deposits

Dust deposition was studied according to the two scenarios described above (case A, without mitigation measures and case B, including mitigation measures). The application of an 80% attenuation rate for the calculation of dust deposition would reduce the deposition due to the project to a level slightly higher than current deposition.

Odours

During the construction phase, modeling related to diesel engine exhausts indicates odor levels above the odour threshold²². However, there would be no exceedances of the MELCC air quality criteria. The proponent indicates that no information is available on the potential for odour generation in contaminated and non-contaminated sediments (Englobe, 2020c).

²² The odour threshold is the lowest concentration of the substance that can be detected by a group of subjects.

Proposed mitigation measures and follow-up program

Mitigation measures proposed by the proponent during the construction phase cover transportation, traffic, management of particulate emissions, as well as excavation and backfilling activities that would take place on its territory (Englobe, 2020r).

One of the most important measures considered by the proponent is the use of rail to import the majority of fill material instead of trucking. For Year 2 (the year used for modelling), the proponent estimates that this measure would result in a reduction of approximately 33,500 trucks and approximately 77,000 trucks for the entire construction phase (Englobe, 2020c). Emissions from rail transportation are lower than those from truck transportation.

The proponent also proposes to apply dust suppression as often as possible and to pave the road surfaces, which would allow it to achieve an 80% reduction in particulate emissions. While watering the loaded embankment in trains would reduce particle lift by a factor of about 70%, according to the proponent, during loading, unloading and handling. Similarly, regular cleaning and watering of the train material unloading area and the work areas near the rear platform would prevent the re-suspension of particles in the air. To reduce potential contaminant emissions during the use of the concrete plant, the proposed measures are based on the *Good Housekeeping Practices Guide for GHP Plants* (ABQ, 2016). Finally, the proponent would like to encourage the contractor who would carry out the work to use the most recent machinery possible in order to use machinery with the lowest emissions (Englobe, 2020c).

The proponent presented a dust management plan covering the concrete production plant and paving activities, with the objectives of controlling particulate emissions to the air, installing a meteorological station and implementing an air quality monitoring program (Englobe, 2020r).

The proponent wishes to improve its air quality monitoring and follow-up program in relation to its current activities and by including follow-up measures targeting particulate matter ($PM_{2.5}$ and TPM) specifically. The proponent excludes the monitoring of other contaminants that would lead to exceedances, notably because it considers that the project's contribution to these contaminants is marginal (PM_{10} and nickel) or because no concrete measures can be implemented (formaldehyde and nitrogen dioxide). The proponent excludes dust fallout from its monitoring and explains that the use of dust jars is no longer encouraged by the MELCC. Particulate matter monitoring would thus make it possible to track dust indirectly and complaint management would allow it to take note of specific situations (Englobe, 2020c).

The monitoring and follow-up program includes mechanisms for responding to non-compliance. These mechanisms include verifying the origin of the exceedances, suspending work to determine the source, and applying corrective measures if the cause of the exceedances comes from the work site. Otherwise, the proponent anticipates that the activities would continue.

Environment and Climate Change Canada is of the opinion that the measures recommended in the quality monitoring program and the dust management plan are appropriate and should be implemented with the following recommendations in mind:

- Concentrations of nickel, nitrogen dioxide (NO_2), inhalable particulate matter (PM_{10}) and formaldehyde should be added to the monitoring during the construction phase. The initial concentration of these contaminants in the air justifies their monitoring in order to evaluate the real contribution of the project and to allow the implementation of additional means of reduction, if



necessary. This monitoring would allow the accuracy of the model to be verified and informed decisions to be made regarding the application of mitigation measures.

- Dust deposition should be added to the monitoring program, at least during periods of maximum dust emission since dust deposition is a major concern for nearby residents.
- The proponent anticipates that site management will use wind direction or weather conditions to determine whether the source potentially responsible for the exceedances is on-site or elsewhere. Environment and Climate Change Canada is of the view that this measurement lacks precision due to variability in wind direction and gust potential and recommends that a structured methodological approach be developed to support verification of the origin of particulate matter exceedances.

With respect to odours, the proponent would pay particular attention during monitoring to odours that could generate nuisances (Englobe, 2020c). Monitoring and follow-up efforts would be integrated into the proponent's current good practices, and a complaint handling system would allow for the collection of potential reports.

Finally, due to anticipated exceedances of particulate matter and other contaminant concentrations and uncertainties in air emissions modelling results, Environment and Climate Change Canada believes that it is necessary to develop and implement mitigation measures to limit air emissions and minimize the potential adverse effects of the project on air quality.

Operational phase

Emissions from operations and equipment during the operational phase would consist mainly of gaseous contaminants from engines (equipment and marine, land and rail transportation), and fugitive emissions of dust from paved and unpaved roads. The effects would come mainly from maritime activities within the proponent's area of jurisdiction, road transportation within the borough of La Cité-Limoilou, rail transportation (on-site and off-site), as well as from the Beauport marshalling yard and vehicle traffic inside the terminal. The modeling is based on a typical weekday operation at full capacity of the terminal.

Of the Criteria Air Contaminants (CACs) (table 9), only nitrogen dioxides (NO_2) and particulate matter (PM) show exceedances of the standards and criteria during the operating phase. Exceedances are also observed for nickel and acetaldehyde. Some exceedances are already observed by considering only the initial concentration, which demonstrates a previously saturated baseline conditions (SNC-Lavalin, 2020).



Table 9: Summary of Maximum Criteria Air Contaminant (CAC) Concentrations Calculated in Ambient Air for Terminal Operation

| Contaminants | Periods | Maximum terminal contributions (1) (2) (A) | | Initial concentrations (B) | | Total concentrations (C = A + B) | | Guiding values | |
|--|-----------|---|------------|----------------------------|------------|----------------------------------|------------|----------------|--------------|
| | | µg/m³ | % standard | µg/m³ | % standard | µg/m³ | % standard | µg/m³ | Standard or |
| NO₂ | 1 hour | 165 | 40% | 107 | 26 % | 272 | 66% | 414 | RAA |
| | 1 hour | 92 | 82% | 98 | 87 % | 161 | 142% | 113 | CAAQS (2020) |
| | 1 hour | 92 | 117% | 98 | 124 % | 161 | 204% | 79 | CAAQS (2025) |
| | 24 hours | 38 | 18% | 75 | 36 % | 113 | 54% | 207 | RAA |
| | Annual | 8,2 | 7,9% | 16 | 16 % | 24 | 23% | 103 | RAA |
| | Annual | 8,0 | 25% | 16 | 50 % | 24 | 75% | 32 | CAAQS (2020) |
| | Annual | 8,0 | 35% | 16 | 70 % | 24 | 104% | 23 | CAAQS (2025) |
| TPM | 24 hours | 25 | 21% | 104 | 87 % | 129 | 107% | 120 | RAA |
| PM₁₀ | 24 hours | 2,7 | 4,5% | 48 | 80 % | 51 | 84% | 60 | Suggested |
| PM_{2,5} | 24 hours | 2,1 | 6,9% | 20 | 67 % | 22 | 74% | 30 | RAA |
| | 24 hours | 1,0 | 3,8% | 25 | 93 % | 26 | 96% | 27 | CAAQS (2020) |
| | Annual | 0,41 | 4,7% | 9,7 | 110 % | 10 | 115% | 8,8 | CAAQS (2020) |
| Volatile Organic Compounds (VOCs) | | | | | | | | | |
| Acetaldehyde | 4 minutes | 3,1 | 102% | n/a | n/a | 3,1 | 102% | 3 | C (MELCC) |
| Metals | | | | | | | | | |
| Arsenic | Annual | 3,7 x 10-6 | 0,12% | 0,0027 | 90 % | 0,0027 | 90% | 0,003 | (RAA) |
| Nickel (PM₁₀) | 24 hours | 0,0010 | 6,8% | 0,079 | 564 % | 0,080 | 571% | 0,014 | (RAA) |

Note : Results in bold and red indicate that a criterion or standard has been exceeded. Concentrations in yellow indicate concentrations that meet the criterion or standard.

(1) Maximum concentrations calculated outside the industrial zone, outside the 300 m buffer zone beyond the marine terminal on the river and inside the Baie de Beauport recreational zone over the modelling period (2008 - 2012). Bolded results indicate an exceedance of a criterion or standard.

(2) Maximum contributions are based on the static values of standards or criteria. For the RAA, these are the maximums over the entire simulation period. For the CAAQS, these are 3-year averages of annual averages or annual 98th percentiles of daily averages (PM_{2,5}, PM₁₀) or annual 98th percentiles of daily hourly maximums (NO₂).

(3) For this substance, there is no initial concentration to consider, the criteria correspond to the addition allowed for the project. The 4-minute concentrations are applicable at the 99th percentile on an annual basis.

Nitrogen Dioxide

The nitrogen dioxide (NO_2) concentrations modeled for the project (project contribution) are below the RAA standards and above the CAAQS criteria for the hourly period in 2025. These exceedances increase for the 2025 standard and exceed the 2020 standard when the initial concentrations are added. Calculated hourly and daily nitrogen dioxide (NO_2) concentrations exceed the CAAQS for 2020 in the borough of La Cité Limoilou and exceed the CAAQS for 2025 at all sensitive receptors (SNC-Lavalin, 2020). It should be noted, however, that the initial concentration of nitrogen dioxide already exceeds this future standard, which represents a particular challenge for the ambient environment.

Particulate Matter (PM)

Total TPM particulate matter concentrations show an exceedance of the daily RAA standards. These exceedances would be observed at the Baie de Beauport Recreational Park where the modelled daily concentration of fine particles ($\text{PM}_{2.5}$) is close to the CAAQS criteria for 2020. At the annual level, the concentration of fine particles ($\text{PM}_{2.5}$) exceeds the CAAQS standard for 2020 due to high initial concentrations. Exceedances cover the entire airshed area, including all areas of interest and sensitive receptors. Annual concentrations of diesel particulate matter are highest near the site. Results show exceedances for daily and annual periods for total particulate matter (TPM) at the RAA and for fine particulate matter ($\text{PM}_{2.5}$) at the CAAQS for 2025. Fine particulate matter ($\text{PM}_{2.5}$) emissions are also very close to the CAAQS criteria for 2020.

Other Contaminants

MELCC criteria are met for most volatile organic compounds (VOCs) with the exception of acetaldehyde, which reaches 102% of the RAA standards in the absence of initial concentration (SNC-Lavalin, 2020). This exceedance would be observed at the edge of the site, i.e. in the industrial zone along the railway line. Environment and Climate Change Canada notes that the estimate of the initial concentration of acetaldehyde in Québec City is higher than the emissions from the project and could reach 700% to nearly 1200% of the standard.

Metal-related standards and criteria are met for most substances except for nickel, whose ambient concentration is 564% of the RAA standard, with the project contributing 6.8% of the daily standard.

For arsenic, although there is no anticipated exceedance, the initial concentration is 90% of the RAA standard and the project's contribution would be 0.12% of the standard (SNC-Lavalin, 2020). The curves in SNC-Lavalin's Map 4.15 (2020) indicate that the highest concentrations are along the railway platform and infrastructure and decrease rapidly beyond these limits.

Dust deposits

The results for the operational phase indicate that the movement of vehicles on the roads would cause the majority of the dust fallout and would represent only a small part of the current deposition (initial state). The maximum quantities of these deposits would be located on the project site, on Charest and Henri-Bourassa boulevards and on the Dufferin-Montmorency highway (SNC-Lavalin, 2020). The results were obtained without the application of a mitigation rate that is generally in the order of 5%-10% of emissions in the best case (according to US EPA guides). The proponent indicates that at the maximum of the new terminal

operation, additional deposits equivalent to a maximum of 4.4% of current deposits and 2.5% of the old RAA assessment criterion would be generated (Englobe, 2020c). Environment and Climate Change Canada believes that in most cases, paved roads are not a significant source of dust if they are well maintained.

Odours

During the operational phase, modeling related to diesel engine exhausts shows that there would be odor levels above the odor threshold. However, the number of exceedances is lower than that allowed by the MELCC air quality criteria which tolerate up to 175 exceedances of 1 odour unit per cubic meter (o.u./m³) per year (Englobe, 2020c).

Proposed mitigation measures and follow-up program

The proponent considers that the optimizations made to the project during the environmental analysis (semi-automated terminal, rail transportation preferred to trucking, electric and hybrid equipment and power supply system for ships) as well as the good practices and measures it already applies in its current operations would be sufficient to limit the project's effects on air quality. Therefore, no additional mitigation measures are planned during the operational phase. However, the proponent intends to promote traffic avoidance in the borough of La Cité-Limoilou to truck drivers on road routes. It also indicated that certain initiatives, such as the development of the Urban Park - *Trame Verte*, would help reduce the project's effects on air quality in the sector (Englobe, 2020r).

Based on modeling results for the operations phase and despite mitigation measures, operations would generate exceedances for acetaldehyde and nitrogen dioxide (NO₂) that would be exacerbated by ambient levels. Taking into account the initial concentration, total particulate matter (TPM), fine particulate matter (PM_{2.5}) and nickel would also show exceedances of the standards and criteria.

The proponent undertakes to implement an air quality monitoring program whose objectives would be to validate whether project activities during the operating phase generate exceedances of the guide values for particulate matter and to ensure that ambient air quality in the Port of Quebec sector remains stable or improves. To achieve this, it proposes to use the three air quality monitoring stations used during the monitoring stage of the construction phase. The targeted contaminants would be the same as during the construction phase, i.e. fine particles (PM_{2.5}) and total particulate matter (TPM). As with the follow-up and monitoring program during the construction phase, the proponent would compare the results of the follow-up to the most restrictive standards or criteria between the CAAQS and the RAA. The results would also be compared with the concentrations predicted by the atmospheric modeling study. The proponent proposes to conduct continuous sampling for the first three months of operation. A weekly review would then be conducted in order to improve, if necessary, the monitoring program in place. Then, if no exceedances are observed or no concerns are raised, a monthly assessment would be conducted (Englobe, 2020c).

As with monitoring during the construction phase, Environment and Climate Change Canada recommends adding monitoring of inhalable particulate matter (PM₁₀), nitrogen dioxide (NO₂) and acetaldehyde to the monitoring program.



Environment and Climate Change Canada also considers that monitoring for the first three months alone would not be sufficient, as this may not be representative of the average or maximum activity expected in a given year. According to Environment and Climate Change Canada, a certain amount of time would be required before reaching the normal course of operations. In addition, the pace of operations could also fluctuate throughout the year and with the seasons. Therefore, Environment and Climate Change Canada recommends that the duration of the follow-up be revised taking into account the activities that would take place on the site and the growth of the port's operations (more representative periods of activity and traffic).

The proponent also proposes an annual monitoring of the ambient air quality in the industrial-port zone in continuity with that carried out for the port's current activities. It would then use the sampling stations on 3rd and 8th Avenues as well as Old Limoilou. The proponent does not provide detailed information on the follow-up currently being carried out. The data from these stations would be used to establish an annual portrait of air quality in the borough of La Cité-Limoilou.

Environment and Climate Change Canada encourages the proponent to pursue this initiative in the borough of La Cité-Limoilou and to integrate it into its follow-up program.

Finally, Environment and Climate Change Canada is of the opinion that, in general, the environmental effects have been well documented by the proponent. As with the construction phase, it considers that mitigation measures must be developed and rigorously implemented to limit air emissions and minimize the adverse effects of the project on air quality.

5.1.3 Agency analysis and conclusions on residual effects

Effects analysis

In its analysis, the Agency considered the effects of the Project on air quality resulting from the activities included in the scope of the Project, namely the construction and operation of the container ship terminal located within the boundaries of the Proponent's property and navigation within its area of jurisdiction. The effects on air quality related to road and rail transportation in the borough of La Cité-Limoilou are discussed in section 6.3.5.

In general, project activities will produce gaseous air pollutants (combustion products) and dust. The contaminant dispersion study has shown that project activities are likely to result in increased concentrations of particulate matter (TPM, PM₁₀ and PM_{2.5}), nitrogen dioxide, formaldehyde and nickel in the atmosphere beyond the RAA or CAAQS standards during the construction phase, while during operation, port activities could result in exceedances of the RAA or CAAQS standards for total particulate matter (TPM), fine particulate matter (PM_{2.5}), nitrogen dioxide, acetaldehyde and nickel.

In addition, exceedances were calculated in all areas of interest and at sensitive receptor locations in the study area for fine particulate matter (PM_{2.5}) (construction and operation), the 2025 hourly CAAQS for nitrogen dioxide (NO₂) (construction and operation), and the RAA standard for nickel (construction). For other contaminants, infrequent small exceedances (typically in the range of 0-2% of the time) were calculated in some areas of interest and at some sensitive receptor locations for the daily standards for particulate matter (PM_{2.5}, TPM and PM₁₀) and NO₂, and the 15-minute standard for formaldehyde. Exceedances are slightly more frequent (up to 10% of the time) in the Baie de Beauport recreational area.

The Agency relies on the advice of Environment and Climate Change Canada to conclude that the project is likely to cause significant adverse environmental effects on air quality due to increased emissions of particulate matter into the air and contaminants from the use of fossil fuels in an environment previously saturated with air contaminants. Uncertainties remain regarding particulate matter emissions and dust deposition during the construction phase since rather optimistic assumptions were considered. Uncertainties also persist for modelled flue gas concentrations and more specifically for nitrogen dioxides for the construction and operational phases.

The Agency understands that while these exceedances are likely common in the region and would not be entirely attributable to the project, the situation needs to be addressed carefully, particularly given the potential links to human health risks associated with diesel exhaust and particulate air emissions.

The Agency agrees with Environment and Climate Change Canada that it is difficult to assess the combined effectiveness of the planned mitigation measures to reduce contaminant emissions from the project. Their overall effectiveness could only be demonstrated at the time of their application on-site. It is therefore essential that the mitigation measures be rigorously implemented and that a follow-up program confirm the nature, magnitude and intensity of residual air quality effects so that corrective measures can be taken, if necessary.

Agency findings

At the end of its analysis and according to the evaluation criteria and decision grid presented in appendix A, the Agency concludes that the project is likely to cause significant adverse environmental effects on air quality (appendix B), despite the optimizations made by the proponent during the environmental analysis and the consideration of the key mitigation measures detailed below. The additional contribution of the project in an environment where air quality is already significantly affected, particularly with respect to total particulate matter (TPM), fine particulate matter (PM_{2.5}), nitrogen dioxide, nickel and diesel particulate matter, would likely result in a significant deterioration of air quality in surrounding residential neighbourhoods and public places. The Agency concludes that the significance of the effects would be high for the following reasons:

- The intensity of the effects of the project would be high since the atmospheric contribution of the project would increase the concentrations of contaminants of potential concern to exceed the CAAQS (2020 - 2025) or MELCC RAA criteria;
- The project would result in a long-term regional change as the effects would extend beyond the local study area (airshed area) and would be felt over a period of more than five years;
- This change would be irreversible and continuous over time.

Identification of key mitigation measures

The Agency has taken into consideration that air quality in the region is already affected and will continue to deteriorate due to the concentration of combustion and dust generation activities. In some areas of the airshed, conditions are considered to be near or already exceed federal and provincial air quality standards or criteria. The project would result in additional exceedances or increase the magnitude of existing exceedances. The effects of air quality degradation on human health are discussed in section



5.7, while the cumulative effects on air quality and human health are discussed in sections 6.3.5 and 6.3.6.

The Agency has identified the key mitigation measures likely to reduce the potential effects of the project. However, these measures would not sufficiently mitigate the potential effects to render the residual effects insignificant. To identify the key mitigation measures, the Agency took into account the mitigation measures proposed by the proponent, the opinions of government authorities, as well as the comments received from the First Nations consulted and the public:

For the construction phase

- Use rail transportation (instead of trucking) to import the majority of fill material to the job site;
- Reduce wind erosion and airborne particulate emissions:
 - Clean work areas and traffic areas continuously during work hours and at the end of each day using a mechanical broom (broom, water jet and vacuum). Regularly clean and water the train backfill material unloading area and work areas near the rear platform during backfilling to prevent airborne particles from becoming airborne;
 - Water dry soils as needed to minimize dust generation during stripping or grading, keeping the surface wet;
 - Stabilize or quickly restore the work area to avoid wind erosion. When soils are excavated, continuously backfill exposed soils or cover them with impermeable covers as soon as the work is completed (daily) to limit wind erosion or rain leaching. Pay particular attention to wind erosion when preparing the site and when laying out the vegetated slope;
 - Cover with tarpaulins any loads that may release particles into the air;
 - Cover dykes, settling pond walls, piles of material (gravel and sand) and dredged sediments with waterproof tarps. Ensure that the impermeable covers are effective;
 - Use a dust suppressant to reduce the emission of particles into the air. The attenuation rate to be achieved should be 80%. The proponent shall develop and implement a procedure to ensure that this mitigation rate is achieved. Take all necessary measures to ensure compliance with this procedure;
 - Paving the entire site in the shortest possible time;
 - Do not handle granular materials in high winds or when the wind is blowing towards sensitive receptors; otherwise use dust suppressors to minimize dust generation. The proponent must measure wind speed and, when the wind reaches 19 kilometres per hour or more, measures must be put in place to reduce wind erosion. The proponent must implement concrete measures to enforce these measures;
 - Use water cannons to reduce the emission of particles into the air. An operating procedure should be developed to specify the activities and conditions that require their use, as well as their frequency and mode of operation. For example, if a water cannon is used during operations, frequently check that it is positioned correctly and that it optimally controls dust;
 - Limit the height at which the material is unloaded and the distance over which it will fall freely to reduce the emission of particles into the air.
- Immediately stop construction activities if conditions could result in dust and contaminant emissions to sensitive receptors (activities could then be moved to another area);

- Install and regularly maintain dust collectors or devices to reduce particulate emissions in areas where operations may generate dust;
- Optimize the logistics of equipment movement to control transportation in order to avoid unnecessary emissions and increase efficiency of use (develop an efficient road routing system on the worksite, schedule vehicle and equipment movements and work methods to minimize time and distances traveled);
- Limit vehicle travel speeds to less than 15 kilometres per hour and put in place concrete measures to enforce these measures;
- Operate switching locomotives that meet, as a minimum, the Tier 4 emissions standards as set out in the *Locomotive Emission Regulations*;
- Prohibit engine idling and put in place concrete measures to enforce these measures;
- Specific mitigation measures for the use of the concrete plant:
 - Install the concrete plant in an area where exposure to prevailing wind is minimal;
 - Install and maintain dust collectors on a regular basis;
 - Stored all granular materials with a particle size of less than 3 millimetres (bulk cement, bentonite and similar fine dry materials) required for the concrete plant in silos;
 - Maintain a high moisture content of the aggregates to reduce particulate emissions to the air through wind erosion;
 - Use all effective means to protect aggregate piles or other materials from wind to prevent wind erosion;
 - Arrange piles (shape/geometry) to minimize the exposed surface area of aggregate stockpiles and reduce wind erosion. For example, use windproof fences/screens or platforms below ground level;
 - Minimize the number of raw material transfer points and close them partially or completely;
 - Minimize the height of fall of conveyors or hoppers.

For the operational phase

- Acquire port equipment equipped only with electric motors rather than hybrid (electric/diesel) motors corresponding to what was used for air emission modeling. This will include, but is not limited to, the following equipment: quay gantry cranes, rail cranes and cantilever rail cranes, if not hybrid (automated tractor trucks, automated horizontal transport vehicles, stacking cranes and empty container carts);
- Keep traffic areas clean to minimize dust generation when trucks pass by;
- Maintain driveways and running surfaces, and repair surfaces when required;
- Use trucks that are in good working order and meet ECCC on-road and off-road emission standards;
- Carry out a preliminary and regular inspection of the machinery to ensure its good condition and proper operation, particularly the exhaust and anti-pollution systems;
- Limit the speed of vehicles to less than 15 km/h and put in place concrete measures to enforce these measures;
- Operate switching locomotives that meet, as a minimum, the Tier 4 emissions standards as set out in the *Locomotive Emission Regulations*;

- Prohibit engine idling and put in place concrete measures to enforce these measures;
- Provide incentives for container trucking to use the Félix-Leclerc and Dufferin-Montmorency highways. Truckers should only use Henri-Bourassa Boulevard for local deliveries or when traffic on the above-mentioned highways is diverted;
- Provide for the use of locomotives with automatic engine shutdown and restart to reduce contaminant emissions associated with idling on the project site;
- Establish monitoring and communication practices to issue warnings to vessels discharging excessive amounts of smoke;
- Install the necessary equipment for the electrical connection to the ships' berths as provided for in the design measures of the project;
- Develop, prior to operation and in consultation with Environment and Climate Change Canada, and implement life cycle air emission reduction plan for various contaminants, including specific non-threshold contaminants associated with engine exhaust including diesel particulate matter, for the life of the project. This plan should specify reduction measures to be implemented and quantifiable targets.

Need for follow-up and follow-up requirements

Uncertainties have been raised about the effectiveness of air quality mitigation measures. In order to verify the predictions of effects on air quality and the effectiveness of the proposed mitigation measures, the Agency recommends that a follow-up program, which includes the following requirements, be developed and implemented:

Follow-up during the construction phase

Develop and implement a follow-up program in consultation with the relevant authorities, including:

- Develop the sampling specifications before the beginning of the work and send them to the Agency, Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques du Québec for review and recommendations;
- Develop a structured methodological approach to determine whether the source responsible for particulate matter criteria exceedances is construction. Develop a contingency plan in the event that site sources exceed the applicable criteria. Submit relevant documents to the Agency, Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques du Québec the methodological approach and the contingency plan for review and recommendations;
- Install the new sampling stations required for monitoring before work begins and follow the recommendations of the Ministère de l'Environnement et de la Lutte contre les changements climatiques du Québec's *Lignes directrices concernant les stations d'un réseau de surveillance de la qualité de l'air*²³ and the Ambient Air Monitoring Protocol by the CCME²⁴;
- The following substances should be monitored during the construction phase: fine particles (PM_{2.5}), inhalable particles (PM₁₀), total particles (TPM), formaldehyde, nitrogen dioxide and nickel;

²³ http://www.ceaeq.gouv.qc.ca/accreditation/pala/DR12SCA09_lignes_di_stations.pdf

²⁴ https://www.ccme.ca/files/Resources/air/pm_ozone/pm_oz_cws_monitoring_protocol_pn1456_e.pdf

- Compare the results of parameter monitoring to the most restrictive standards or criteria between the CAAQS and the RAA;
- Dust deposition during periods of maximum dust emission should also be monitored.

Air quality monitoring during the operational phase:

Develop and implement a detailed air quality monitoring program, including air quality sampling specifications (sampling methods and frequency and parameters to be analyzed):

- Include air quality monitoring in the borough of La Cité-Limoilou in the project monitoring program. Submit the detailed follow-up program to the Agency, Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques du Québec for review and recommendations;
- Compare the results of parameter monitoring to the most restrictive standards or criteria between the CAAQS and the RAA;
- Determine the response mechanisms in the event of non-compliance with the criteria;
- Track the following substances : Fine particles (PM_{2.5}), inhalable particles (PM¹⁰), total particulate matter (TPM), Acetaldehyde and nitrogen dioxide;
- If air degradation is observed in the borough of La Cité-Limoilou, take steps in collaboration with the *Comité intersectoriel sur la contamination environnementale dans l'arrondissement La Cité-Limoilou* (CICEL) to implement measures that will make it possible to establish an action plan.

5.2 Transboundary Environmental Effects – Greenhouse Gas Emissions

The Project could lead to residual transboundary environmental effects related to greenhouse gas emissions. However, the Agency is of the view that the adverse transboundary environmental effects are not likely to be significant since the greenhouse gas emissions attributable to the Project would be relatively low in volume compared to provincial and national greenhouse gas emission levels. Under the maximum terminal operations scenario, annual emissions of about 20,000 tonnes of CO₂ equivalent²⁵ would be generated. This volume would represent 0.0256% of Québec's total greenhouse gas emissions and 0.0028% of Canada's total, based on 2017 emission levels recorded by Environment and Climate Change Canada. Average annual emissions over the three years of construction would be lower and would total approximately 6,800 tonnes of CO₂ equivalent.

The following subsections present the information considered by the Agency in its analysis to decide on the significance of the Project's effects on the transboundary environmental effects and, more specifically, greenhouse gas emissions, including advice and comments from expert departments, First Nations consulted and the general public.

²⁵ Emissions of CO₂, CH₄ and N₂O are calculated by multiplying the emission rate of each substance by its global warming potential relative to CO₂ equivalent.

5.2.1 Description of the component “greenhouse gas emissions”

Greenhouse gases are atmospheric gases that absorb and re-emit infrared radiation resulting in the warming of the lower levels of the atmosphere. They are recognized as being one of the causes of climate change that can have a variety of impacts on ecosystems and human health. The main greenhouse gases include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), ozone (O₃), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). Greenhouse gas estimates are usually expressed in units of kilotonnes of carbon dioxide equivalent per year (CO₂ equivalent per year). These gases disperse at the global scale and, under CEAA 2012, are considered to have transboundary environmental effects.

Under the *Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere*, the Québec government collects data on greenhouse gases released by Québec businesses. Any individual who operates an establishment with greenhouse gas emissions of 10 kilotonnes of CO₂ equivalent per year or higher is required to report their greenhouse gas emissions every year. At the federal level, under the *Canadian Environmental Protection Act* (1999), the reporting threshold has been 10 kilotonnes of CO₂ since 2017. Any facility with greenhouse gas emissions of at least 10 kilotonnes of CO₂ equivalent per year is required to report their emissions to Environment and Climate Change Canada.

In 2017, total greenhouse gas emissions in Québec were 78,635 kilotonnes of CO₂ equivalent while total emissions across Canada were 714,000 kilotonnes of CO₂ equivalent²⁶. The sector producing the most greenhouse gas emissions in Québec in 2017 was transportation (road, air, marine and rail) with 34,056 kilotonnes of CO₂ equivalent²⁷. In 2017, 1,620 facilities in Canada reported a total of 263,000 kilotonnes of greenhouse gas emissions under Environment and Climate Change Canada’s Greenhouse Gas Reporting Program. CO₂ represented the majority of the total reported emissions (80%), while CH₄ and N₂O emissions each represented 13% and 5%, respectively. In 2017, the largest quantity of greenhouse gas emissions in Canada was generated in oil and gas extraction, accounting for 26% (188,000 kilotonnes of CO₂ equivalent). This was followed by the transportation sector, which represented 25% (approximately 178,600 kilotonnes of CO₂ equivalent) and the construction sector, which represented 12% (85,400 kilotonnes of CO₂ equivalent). Of the Canadian facilities reporting emissions in 2017, approximately 11% emitted 250 kilotonnes of CO₂ equivalent or higher.

5.2.2 Analysis of potential effects and proposed mitigation measures

The Essipit, Pessamit and Pekuakamiulnuatsh (Mashteuatsh) Innu First Nations raised concerns with regard to the Project’s impact on greenhouse gas emissions. Concerns were also expressed by certain organizations and the public about the larger and broader context of the greater Québec City area and, more specifically, about greenhouse gas emissions related to road and rail traffic in urban areas. Citizens also raised questions about how the Project aligns with greenhouse gas emissions reduction targets in Québec and Canada. Due to the concerns raised by the public, the Agency identified road and rail traffic

²⁶ <https://www.canada.ca/content/dam/eccc/documents/pdf/cesindicators/ghg-emissions/2020/greenhouse-gas-emissions-en.pdf>

²⁷ <http://www.environnement.gouv.qc.ca/changements/ges/2017/Tableaux-emissions-annuelles-GES-1990-2017.pdf>

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activities in the borough of Cité-Limoilou that are associated with the Project and could impact air quality and human health as a matter relevant to the environmental assessment under paragraph 19(1)(j) of CEAA 2012. In response to this request, the proponent decided to include emissions from transports in its analysis without distinguishing them from direct emissions from the Project (Englobe, 2020c). Thus, the proponent's inventory of contaminant and greenhouse gas emissions includes direct sources within the limits of the borough of Cité-Limoilou from road and rail traffic and within the administrative limits of the Quebec Port Authority on the seaway from vessels and other marine vehicles (Englobe, 2020c).

The greenhouse gas emissions evaluated by the proponent for the construction and operational phases are primarily those associated with fuel combustion, namely CO₂, CH₄, N₂O and black carbon. The proponent calculated emissions related to the Project by adding the contribution of each emitted gas to global warming, as recognized by Environment and Climate Change Canada²⁸.

The greenhouse gas emissions considered during the construction phase are those generated by vessels transporting materials, locomotives and other combustion systems. The three years of construction would generate 5,594, 7,138 and 7,622 tonnes of CO₂ equivalent, respectively.

The greenhouse gas emissions considered during the operational phase are those generated by vessels, tugs, trucks, Canadian National Railway locomotives, the proponent's locomotives, and the refrigerated containers of other vehicles (Englobe, 2020c). Greenhouse gas emissions related to the consumption of electricity from Québec's public network were also taken into consideration by the proponent.

The total emissions generated per year under the maximum terminal operations scenario would be between 5,600 and 20,000 tonnes of CO₂ equivalent²⁹, which represents 0.0072% to 0.0256% of Québec's total greenhouse gas emissions and 0.0008% to 0.0028% of Canada's total greenhouse gas emissions, based on 2017 emission levels recorded by Environment and Climate Change Canada. The portion of these emissions associated solely with container handling activities on the Project site, i.e., the direct emissions for this Project, would be a maximum of 5,359 tonnes of CO₂ equivalent. The majority of emissions, a maximum of 14,545 tonnes of CO₂ equivalent, would be associated with container freight transport off the Project site by third parties, including Canadian National Railway and commercial truckers. Estimates of greenhouse gas emissions generated for one year of operation at maximum capacity, a maximum of 19,916 tonnes of CO₂ equivalent, are presented in table 10. For comparison purposes, the 10 largest greenhouse gas emitters in Canada generated between 4,784,797 and 11,782,560 tonnes of CO₂ equivalent. The 10 largest greenhouse gas emitters in Québec generated between 763,285 and 1,186,808 tonnes of CO₂ equivalent.

²⁸ Contribution of the main greenhouse gases to global warming in tonnes of CO₂ equivalent: CO₂ = 1; CH₄ = 25; N₂O = 298; black carbon = 900.

²⁹ The emission of each gas is calculated by reporting it as "tonnes of carbon dioxide equivalent" (Englobe, 2020c).

Table 10 Project-related greenhouse gas emissions generated on the Project site and in Cité-Limoilou over 1 year of operations at maximum capacity

| Description of source | Estimated greenhouse gas emissions (tonnes per year) | | | | |
|---------------------------------------|--|--------------|---------------|--------------|--|
| | Carbon dioxide | Methane | Nitrous oxide | Black carbon | Total CO ₂ equivalent emissions |
| Maritime transport¹ | 8,684 | 0.817 | 0.234 | 3.815 | 12,207 |
| Road transport² | 573 | 0.024 | 0.033 | 0.085 | 661 |
| Rail transport³ | 423 | 0.022 | 0.139 | 0.115 | 568 |
| New terminal⁴ | 5,916 | 0.194 | 0.421 | 0.47 | 6,480 ⁵ |
| Total | 15,596 | 1.057 | 0.828 | 4.484 | 19,916 |

Source: Englobe, 2020c.

¹ Vessels and tugs (emissions within the proponent's administrative limits only).

² Trucks (emissions within the borough of Cité-Limoilou only).

³ Canadian National Railway locomotives (emissions within the borough of La Cité-Limoilou only).

⁴ Proponent's locomotives, refrigerated containers, vehicles, electricity.

⁵ Addition of 12 tonnes of CO₂ equivalent per year for electricity.

Environment and Climate Change Canada is of the view that the scenario used by the proponent to estimate greenhouse gas emissions is optimistic and not conservative. Indeed, the proponent has included electric and hybrid equipment in the Project design. This approach would mean that the Project's greenhouse gas emissions could be higher than those estimated if, for example, not all of the electrical or hybrid equipment could be acquired and installed or if contractors and clients did not use equipment that meets the latest standards (Tier 4). The effect of the project on greenhouse gas emissions may have been underestimated.

Mitigation and follow-up measures set out by the proponent

In order to reduce the Project's greenhouse gas emissions, the proponent proposes mitigation measures (Englobe, 2020r). As part of these measures, the proponent indicates that the containers will be transported mainly by rail (90%) rather than road (10%) and that the terminal will use best practices and technology to minimize greenhouse gas emissions (Englobe, 2020c). The proponent states that additional greenhouse gas reduction measures will be put in place following the annual review of greenhouse gas emissions during the construction and operational phase, if required.

Environment and Climate Change Canada indicates that the proponent's proposed greenhouse gas mitigation measures for construction and operation are initiatives to reduce greenhouse gas emissions, but without providing full details on their implementation, and indicating that they would be required to the extent possible. This approach introduces uncertainties in the analysis of the Project's greenhouse gas emissions and the measures needed to reduce them. Environment and Climate Change Canada considers the implementation of the measures identified by the proponent to be essential to mitigate the potential effects on greenhouse gas emissions.

5.2.3 Agency analysis and conclusions on residual effects

Agency's analysis and conclusions

The Agency is of the view that the Project is not likely to cause significant adverse transboundary environmental effects (appendix B) given its small contribution to greenhouse gas emissions at the provincial and national level and the implementation of mitigation measures proposed by the proponent. Total emissions generated per year under the maximum terminal operations scenario would be approximately 20,000 tonnes of CO₂ equivalent³⁰, which includes direct emissions and those related to off-site container transport. These emissions amount to 0.0256% of total greenhouse gas emissions in Québec and to 0.0028% of total emissions in Canada, based on 2017 emission levels recorded by Environment and Climate Change Canada. However, the effects of greenhouse gas emissions would be global, long-lasting and irreversible due to the persistence of CO₂ in the atmosphere.

The Agency notes Canada's commitment to implement the Canada-wide Framework on Clean Growth and Climate Change, to strengthen existing greenhouse gas reduction measures and to introduce new ones in order to exceed Canada's emission reduction target by 2030. As such, any greenhouse gas emissions from the Project, despite the measures that will be put in place, could result in an adverse residual effect. Environment and Climate Change Canada recommends that the proponent analyze the possibility to compensate for some or all of its greenhouse gas emissions through the purchase of offset credits or through the purchase of offset credits or through the development of off-site Project opportunities leading to a reduction in greenhouse gas emissions or the establishment or increase of carbon sinks as it proposes.

Key mitigation measures to avoid significant effects

The Agency identified several key mitigation measures to reduce the effects of the Project on air quality, which will also contribute to reducing greenhouse gas emissions, including making shore power facilities available to vessels (section 5.1). The Agency is of the view that the proponent must implement every available mitigation measure to reduce the Project's contribution to Greenhouse gas emissions. The proponent is also required to monitor and report its Greenhouse gas emissions to Environment and Climate Change Canada and the Québec government every year if emissions exceed the reporting threshold currently set at 10 kilotonnes of CO₂ equivalent per year. To identify the key mitigations measures, the Agency took into account the mitigation measures proposed by the proponent, the advices of government authorities, as well as the comments received from First Nations consulted and the public:

Construction phase

- Use machinery of the optimum size for the needs of the work (avoid over-specification);
- Use rigorous planning to optimize operating time;
- Select sites for storage, recovery and disposal of materials near construction activities.

³⁰ Emissions of CO₂, CH₄ and N₂O are calculated by multiplying the emission rate of each substance by its global warming potential relative to carbon dioxide.

Operational phase

- Optimizing loading and unloading operations at the terminal (automation and programming of logistic sequences), allowing in particular a significant reduction in the movement of mobile equipment on-site (reducing the energy consumption of hybrid equipment).
- Develop and implement a greenhouse gas emissions reduction plan for the life of the project. This plan should specify reduction measures to be implemented and quantifiable targets.

Need for follow-up and requirements of follow-up

A green house gas inventory is carried out annually by the proponent for its activities under the Green Alliance certification program. It also mentions that an annual assessment of greenhouse gas emissions during the construction and operational phase will be made. Based on the emissions date, the Agency recommends the following follow-up program that would make it possible to judge the effectiveness of the mitigation measures:

- Collect the data and measures implemented in the annual review of the environmental and social monitoring and follow-up program;
- Develop the greenhouse gas monitoring program to specify how it intends to monitor greenhouse gases and what additional measures, if any, could be applied;
- Plan a monitoring program within the property limits that takes into account the nature of the activities carried out in the port and the periods of representative activities and traffic;
- Review the frequency of monitoring in the airshed area for the period of operation based on the activities that will take place at the harbour and the increasing capacity of the harbour.

5.3 Wetlands

The Agency believes that the Project is unlikely to cause significant adverse residual environmental effects on wetlands and their ecological and socio-economic functions since the proponent would avoid all wetlands. As such, the Project would not result in any loss or disturbance of wetland areas or functions. However, a program to monitor the evolution of the wetlands will have to be implemented to verify the accuracy of the environmental assessment's conclusions. In particular, the monitoring will have to verify that changes in hydrodynamic conditions and in the sedimentological regime that would be induced by the Project's infrastructure would not have an adverse effect on the wetlands and their functions during the operational phase. Monitoring of the changes in the wetlands as well as adaptive measures, if necessary, will have to be implemented.

The following subsections present the information considered by the Agency in its analysis to conclude on the significance of the Project's effects on wetlands, including the advices and comments of the expert departments, First Nations consulted and the public.

5.3.1 Description of the component “wetlands”

The wetlands likely to be affected by the Project are located on federal public lands owned by the Quebec Port Authority. The federal and provincial governments recognize the importance of wetlands, notably

through the *Federal Policy on Wetland Conservation* (the Policy; Environment Canada, 1991) and the *Act respecting the conservation of wetlands and bodies of water*.

The main objective of the Policy is to promote the conservation of Canada's wetlands to sustain their ecological and socio-economic functions, now and in the future (Environment Canada, 1991). It requires the Government of Canada to consider the Policy, its objectives and strategies when taking any action or undertaking any activity that may have an impact on a Canadian wetland. The Quebec Port Authority is responsible for applying this policy because it manages public lands on which wetlands are located. For its part, the Agency must take this into consideration in its environmental assessment report if the Project affects wetlands. One of the strategies (Strategy 2) of the Policy is to engage all federal departments to commit to no net loss³¹ of wetland functions: (i) on federal lands and waters, (ii) in areas influenced by the implementation of federal programs where wetland loss or degradation has reached critical proportions, and (iii) in areas where federal activities affect wetlands designated as ecologically or socio-economically important to a region (Environment Canada, 1991).

It is important to note that the Port of Quebec is located in an area where wetland loss or degradation has reached critical proportions and which is identified in the appendix³² of the Implementation Guide for the Environment Canada Policy (1996). Environment and Climate Change Canada also considers these wetlands to be of ecological importance, particularly for migratory bird habitats. Lastly, these wetlands are part of both a Waterfowl Conservation Area and an Important Bird Area.

For wetlands located on Crown lands in Québec, the Quebec *Act respecting the conservation of wetlands and bodies of water* calls for the application of the “avoid, reduce, compensate” sequence and advocates at all times an approach that ensures the consolidation of functional ecosystems, rather than the restoration of fragmented and degraded environments. Environment Canada’s Implementation Guide for Federal Land Managers (1996) also advocates for this sequence to be applied to avoid any net loss of function.

Wetland reference condition

The study area selected by the proponent to assess the effects of the Project on wetlands and their functions is the construction zone (see chapter 1, figure 3). Several types of wetlands are present in the construction zone and are located mainly in the southwestern inlet and along the Dufferin-Montmorency highway (Englobe, 2020e). These include two bulrush marshes (13.5 hectares), a broad-leaved arrowhead marsh (3.2 hectares), a zizany marsh (2.7 hectares), a shrub swamp (0.4 hectare) and a treed marsh (1.7 hectares). Wetlands occupy a total area of 53.2 hectares, or 9 % of the site area (figure 7).

The proponent described the habitat functions of the wetlands. According to the proponent, wetlands in the work area are used as migratory stopover and breeding areas for birds; as spawning and feeding areas for fish; as breeding areas for amphibians; as feeding areas for turtles; and as wintering areas for several species of birds, turtles and frogs. All the wetlands in the southwestern inlet as well as those surrounding Baie de Beauport are recognized as staging areas that play an important role for different species of birds (Englobe, 2020e) in spring and fall. According to Fisheries and Oceans Canada, the Beauport site straddles both a river estuary and a shallow bay favourable to the growth of young life

³¹ No net loss of wetland functions means compensation for any functions lost through wetland destruction.

³² The Federal Policy on Wetland Conservation: An Implementation Guide for Federal Land Managers



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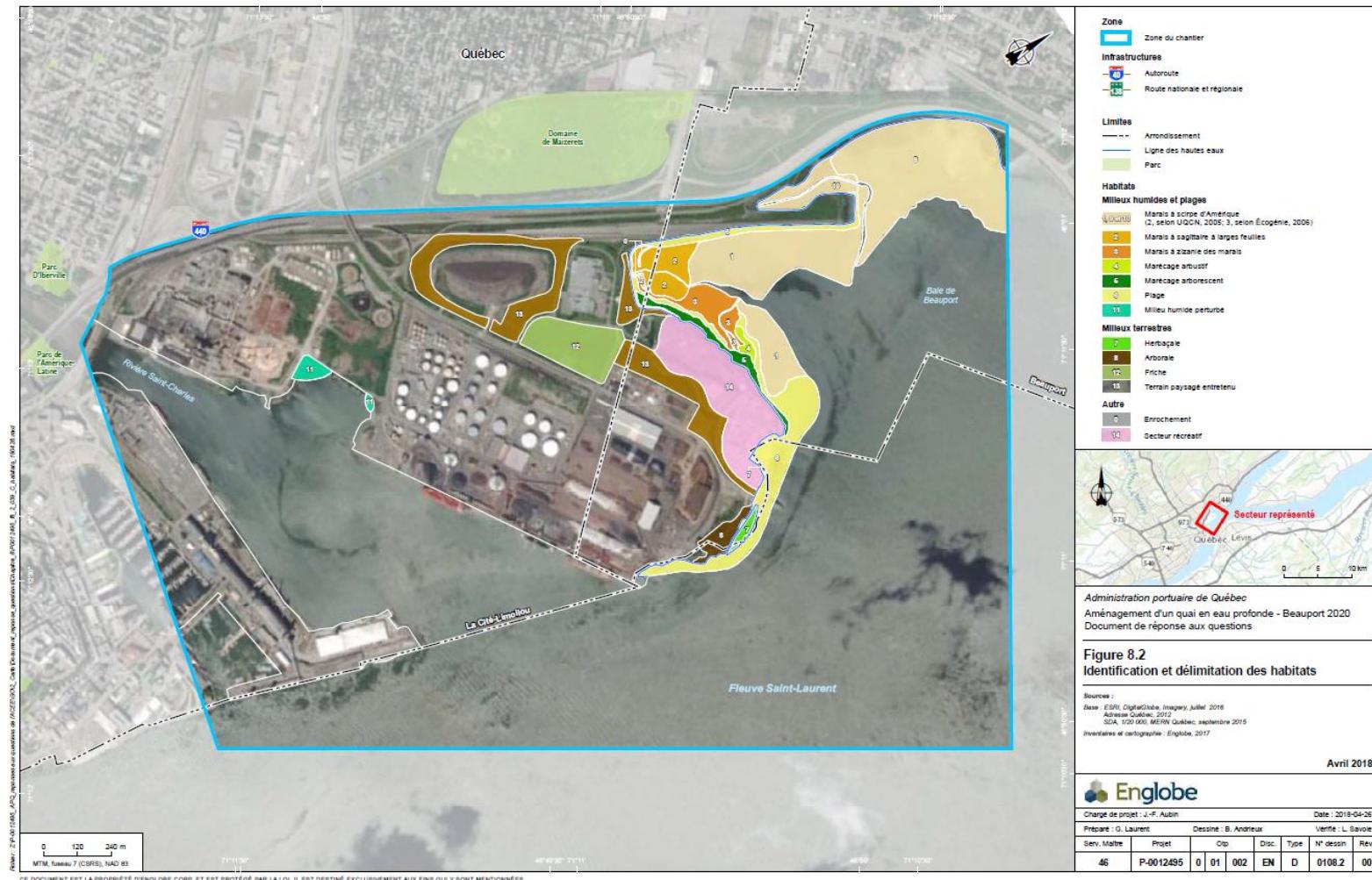
stages of several fish species. Fisheries and Oceans Canada indicates that several fish species use it to complete part of their life cycle by taking advantage of its location near the brackish waters of the St. Lawrence Estuary, notably American shad, designated a vulnerable species under Québec's *Act respecting threatened or vulnerable species*, and striped bass, an endangered species under the *Species at Risk Act*. The proponent states that the intertidal marshes in the work area are a relatively rare habitat in the study area and are considered important for the species that reside there in terms of feeding, reproduction and resting. Environment and Climate Change Canada agrees with the proponent's description of the wetlands and considers these habitats important.

The proponent did not describe other functions of wetlands, but points out that, generally speaking, wetlands are recognized as the most productive ecosystems due to the complex interactions between the water, soils, microorganisms, plants and animals that constitute them (Englobe, 2016). They also contribute to water quality and the environment. The proponent also indicates that the Beauport sector is used year-round for the practice of ornithology (Englobe, 2016).



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Figure 7: Identification of habitats related to terrestrial environments, wetlands and beaches



Source : Englobe, 2020e



5.3.2 Analysis of potential effects and proposed mitigation measures

The wetlands present in the work area, located mainly in the southwestern inlet and along the Dufferin-Montmorency highway, would not be affected by the Project. According to the proponent, no loss of wetland area or function is expected (Englobe, 2020e) during the construction phase. In the operational phase, the presence of the wharf and the area behind the wharf would lead to a decrease in long-term sediment transport over the wetlands. Indeed, once the Project is completed, the presence of the port extension would lead to a lower net transport of sediment northward than at present which could result in a beach setback. Completion of the Project would decrease the effect of transporting sediment over the wetlands and increase the beach setback, and the volume of sediment transported to the sandy spit and the southwestern inlet would be lower. As a result, the proponent does not anticipate any effect on the quality, distribution or functions of the wetlands located in Baie de Beauport or in the southwestern inlet during the operational phase (Englobe, 2020e). Environment and Climate Change Canada is satisfied with the proponent's interpretation of sediment transport and the progression of the sandy spit of the southwest inlet following Project completion.

Concerns have been raised by the Huron-Wendat Nation regarding wetland compensation projects, specifically in relation to the risk of loss or degradation of wetlands should the annual monitoring report show that the Project has an adverse effect them. Certain First Nations, including the Grand Conseil de la Nation Waban-Aki and the Mohawk Council of Kahnawà:ke, are concerned about the effects of port projects on wetlands and the loss of these environments in the St. Lawrence River.

Mitigation and follow-up measures proposed by the proponent

The proponent made sure to avoid wetlands. Thus, the proponent does not anticipate any permanent loss and considers that no mitigation measures directly aimed at protecting wetlands are necessary. The proponent nevertheless proposes general mitigation measures for good management to ensure that the work does not affect habitats (Englobe, 2020r).

Environment and Climate Change Canada is of the opinion that the proposed Project meets the primary objective of no net loss of wetland function of the Wetlands Conservation Policy and considers that the residual adverse environmental effects have been satisfactorily described by the proponent. However, it is of the opinion that uncertainty remains as to the long-term effects on wetlands in the Baie de Beauport or in the southwestern inlet that would be associated with the morpho-sedimentological changes caused by the Project. Follow-up of these effects would help address this uncertainty. Environment and Climate Change Canada therefore considers that a follow-up of the wetlands is necessary to ensure the accuracy of the environmental assessment and to verify whether the new port infrastructures will have a significant influence on the evolution of the wetlands of the southwestern inlet. The proponent proposes monitoring the wetlands based on inventories that would make it possible to track their evolution by analyzing changes in the surface area of the wetlands and their floristic composition. The follow-up inventories would provide a list of the plant species present and the percentage of cover by validating the boundaries and surface areas of the environments. The presence of new species as well as the composition of the substrate would also be documented. In this way, the progression of facultative wetland species or terrestrial species would indicate that the environment tends to evolve towards a terrestrial environment, while an increase in the



predominance of obligate wetland species could suggest the opposite. The monitoring would be carried out in years 1, 3 and 5 of operation and the proponent would ensure that the recommendations of the report produced in year 5 are followed. The proponent would submit a proposal for an extension to the Agency and to Environment and Climate Change Canada if further follow-up is required (Englobe, 2020e). The proponent justifies that a five-year period is sufficient to determine whether changes are occurring in the wetlands or that there is no effect. An inter-year comparison would also be carried out (Englobe, 2020r).

According to Environment and Climate Change Canada, detecting changes in the composition or distribution of wetlands could take several years and the monitoring period must be long enough to assess the maintenance of wetland integrity over the long term. Should adverse effects on wetlands be detected during monitoring, adaptive management measures such as compensatory measures may be required to meet the Policy's objective of no net loss of wetland functions. Thus, Environment and Climate Change Canada recommends that the follow-up proposed by the proponent be extended beyond the five-year period to adequately document the effects over time on wetlands.

With respect to the net transport of sediment northward, which could lead to an increase in beach retreat and a decrease in the volume of sediment transported to the sandy spit and to the southwestern inlet, the proponent indicates that a morpho-sedimentary follow-up is planned in order to document the evolution of the Baie de Beauport beach. The proponent intends to partner with the Department of Geography at Université Laval to include the beach in a larger research Project conducted by this team. Environment and Climate Change Canada recommends that this monitoring be included in the follow-up program because it will allow the evolution of erosion processes and sediment transport to be tracked. It considers that this monitoring, combined with that of the evolution of wetlands, will provide a better understanding of the effects of the Project on hydrodynamics and its influence on the sensitive and important biological environments of the Baie de Beauport. This monitoring is presented and discussed in section 5.8.

5.3.3 Agency analysis and conclusions on residual effects

Analysis of the effects

An important history of backfilling in the St. Lawrence River near Québec City occurred between 1927 and 1987, when nearly 270 hectares were destroyed or altered by backfilling or dredging, according to Fisheries and Oceans Canada. Québec's Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC) estimates that the zone's original area in Baie de Beauport sector, including the mouth of the Saint-Charles River, is equivalent to 614 hectares and that due to past activities, including the installation of wharves 50-51-52-53 at the Port of Quebec, the construction of the Dufferin-Montmorency highway and the development of Champlain Boulevard, the river has already been reduced by 239 hectares of wetlands and bodies of water, i.e., 39 percent of its surface area.

Although the proponent does not anticipate any net loss of wetlands, maintaining the remaining wetlands in this portion of the St. Lawrence River is important. Environment and Climate Change Canada and Fisheries and Oceans Canada recognize their critical role in maintaining several species, including those with a precarious status. Wetlands are also recognized and used by many ornithologists, including the Club des ornithologues de Québec and other wildlife observers. As such, in addition to fulfilling important ecological functions, these environments also have a socio-economic role.

Based on the Policy and the advices of experts (Fisheries and Oceans Canada, Environment and Climate Change Canada), the Agency considers that the Project is unlikely to cause significant adverse environmental effects on wetlands since the proponent has avoided any encroachment and the Project would not result in any loss of functions. However, in order to verify the accuracy of the environmental assessment and to ensure that the infrastructure that would be put in place would not have a significant impact on these wetlands, the Agency considers that a follow-up of the evolution of the wetlands as well as a morpho-sedimentary follow-up are necessary during the operational phase to monitor the evolution of erosion processes and sediment transport. These follow-ups would make it possible to determine whether the new infrastructures have unanticipated adverse effects and, if so, to implement adaptive measures to reduce these effects.

Need for monitoring and monitoring requirements

Monitoring changes in the area and composition of wetlands

- Develop, prior to operation and in consultation with Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques, and implement a monitoring program for wetlands based on inventories that would make it possible to follow the evolution of their surface area and floristic composition;
- Conduct follow up in operating years 1, 3, 5, 7 and 10;
- Monitor the evolution of wetlands in the southwest embayment and Beauport Bay, including bulrush marshes (excluding marshes 9 and 10 identified in figure 7), swamps with marsh weir and marshes with broad-leaved Sagittarius;
- Conduct inventories according to the principles of the simplified botanical method of the Guide de caractérisation des milieux humides du Québec méridional (Bazoge *et al.*, 2015);
- Provide a list of the plant species present as well as the percentage of overlap and validate the boundaries and areas of the environments;
- Documenting and locating new plant species and documenting substrate composition;
- Make a comparison between each year of monitoring and take into account the morpho-sedimentological monitoring to determine if the evolution of the beach and the sand spit leads to changes in the wetlands;
- In the event that negative effects on wetlands are detected during monitoring, propose adaptive management measures such as compensatory measures in order to meet the Policy's objective of no net loss of wetland functions;
- Following the results of the follow-up determine in consultation with Environment and Climate Change Canada whether the follow-up should continue beyond 10 years.

The Agency considers that the morpho-sedimentological monitoring program should include the following elements:

- Develop, prior to operations and in consultation with Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques, a morpho-sedimentological monitoring program that will make it possible to track the evolution of erosion processes and quantify coastal sedimentary movements. The morpho-sedimentary monitoring should make it possible to analyze the hydrosedimentary behaviour of the beach following the project and to

determine if the sedimentary balance remains the same. The monitoring should also document the effects of the project on the surrounding biological environments, particularly those of Beauport Bay:

- In the event that negative effects on the surrounding environment are detected during the follow-up, propose, in consultation with Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques, adaptive management measures to reduce the effects of the project.
- Conduct follow up in operating years 1, 3, 5, 7 and 10;
 - In the event that the monitoring results show phenomena (e.g. erosion or sediment displacement) that are more intense than anticipated, determine in consultation with Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques whether parameters should be added to the monitoring program or measures should be applied to reduce the intensity of these phenomena;
- Following the analysis of the results, determine in consultation with Environment and Climate Change Canada, the Ministère de l'Environnement et de la Lutte contre les changements climatiques, those in charge of the recreation and tourism site and its users, determine the measures or actions necessary to put in place to maintain the beach while making sure not to harm the surrounding biological environment and more specifically the wetlands of the southwestern embayment;
- Following analysis of monitoring results, determine in consultation with Environment and Climate Change Canada and the Ministry of Environment and Climate Change if monitoring should continue beyond 10 years.

5.4 Fish and Fish Habitat, Including Aquatic Invertebrates and Special Status Species

The Agency is of the view that the Project would cause significant adverse residual environmental effects on fish and fish habitat, including aquatic invertebrates and special status species, given habitat destruction and permanent alteration, even after the application of mitigation, monitoring, offset and follow-up measures. The aquatic environment that would be affected by the Project is particularly vulnerable, complex and rare in the St. Lawrence Estuary region and offers a complete set of habitat functions suitable for several fish and invertebrate species, including the striped bass, the Atlantic sturgeon, the lake sturgeon, the American shad, the American smelt and the hickorynut. In the sector, fish intensively use intact breeding, spawning, rearing and shelter habitats. The Project would destroy one of the only two breeding habitats identified to date for the Striped Bass St. Lawrence River population.

The following subsections present the information taken into account by the Agency in its analysis to conclude on the significance of the Project's effects on fish and fish habitat, including aquatic invertebrates and special status species, including the advice and comments of the expert departments, First Nations consulted and the public.



5.4.1 Description of the component "fish and fish habitat, including aquatic invertebrates"

The analysis of the effects on "fish and fish habitat", including aquatic invertebrates, considers fish and fish habitats, such as spawning grounds and rearing, growth and feeding areas, as well as aquatic invertebrates and their habitats. The Agency considered the fish and aquatic species listed in Schedule 1 of the *Species at Risk Act* or for which the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommends a status under the *Species at Risk Act*. The species designated or likely to be designated under Québec's *Act respecting threatened or vulnerable species* were also considered.

Description of fish and aquatic invertebrate habitat

The study area selected by the proponent to assess the effects of the Project on fish and fish habitat, including aquatic invertebrates, is the extended study area (figure 3, chapter 1). The Project is located in the estuary, in the last portion of the river to be influenced by freshwater tides, which are semi-diurnal with very high amplitude. The proponent described the principal aquatic ecosystems found in the work site area by separating them as follows: Baie de Beauport, beach, the estuary of the St. Charles River, the main channel of the St. Lawrence River and the wharf, the area behind the wharf and dredging area (Englobe, 2020h).

Baie de Beauport is characterized by weak currents varying according to the tides and by a shallow depth (Englobe, 2020h). According to the proponent, it forms a significant, dynamic and unique feeding and growth habitat, because it is mostly sheltered from the river's main currents, subject to high tides, rich in nutrients and consisting of fresh water and submerged and emergent vegetation. This would be a rare situation in the river between the estuary and the river section (Englobe, 2017).

At the end of Wharf 53, a sand-shingle beach extends to the southwest embayment³³. The aquatic area of the beach generally has no aquatic vegetation. According to the proponent, the longshore currents induced by the tides favour the drift of larvae and young fish and probably allow them to reach the calmer water area of Baie de Beauport (Englobe, 2020h).

The mouth of the estuary of the St. Charles River, which flows directly into the work site area, is a dynamic environment and the strength and direction of the current speed vary significantly depending on the tides. A small whitewater spawning ground used by walleye in spring is found at the foot of the dam (Englobe, 2020h). The habitat of the estuary of the St. Charles River is composed of a deep and wide area at its mouth and a narrower and shallower area further upstream. A special aspect of the estuary of the St. Charles River is the presence of a circular current (gyre) induced by the tidal currents in the river. This gyre is probably the origin of the great abundance of young fish of several species, including striped bass and American shad (Englobe, 2020h).

The main channel of the St. Lawrence River is composed of a bare substrate subject to significant variations of current speed and direction. The depths are significant and aquatic vegetation is absent (Englobe, 2020h).

³³ The southwest embayment corresponds to the narrower part of the Baie de Beauport where the tides flow into the Du Moulin Stream.

Finally, the wharf area, the area behind the wharf and the dredging area consist of sand, gravel, pebbles and shingles. More specifically, the topography of the river bed of the dredging area is highly variable, with a deeper area upstream, followed by a shallower portion. The hydraulic features of this area are special. The river and tidal currents create a rotary current and a shear area³⁴ (Englobe, 2020h).

The subaqueous noise environment of the extended study area is influenced by noise sources that vary during the year, particularly by recreational navigation in summer and ice noise in winter. Commercial navigation and port activities extend year round and are the main source of anthropogenic noise in the study area (Englobe, 2018c).

Fisheries and Oceans Canada is of the view that the entire Beauport sector forms a sensitive environment offering a complete set of habitat functions (breeding, rearing, feeding, shelter) suitable for several fish species and is especially important for fish, due to its strategic location, its complementary habitats and its rarity in the St. Lawrence River Estuary.

Description of aquatic wildlife (fish and aquatic invertebrates)

The description of aquatic wildlife (fish and invertebrates) in the extended study area was produced from the existing documentation and completed by several characterization studies conducted by the proponent between 2013 and 2019. According to the proponent, a total of 43 species were captured, including American shad, yellow perch, white sucker and white perch (Englobe, 2020h). Fisheries and Oceans Canada is of the view that the inventories conducted and the distribution of fish species presented by the proponent are valid.

The proponent analyzed the potential presence of special status fish species (appendix 8.1 of Englobe, 2018b) and identified five species present in the work site area (table 11) (Englobe, 2020h).

³⁴ Area where two forces are exerted parallel to each other in opposite directions

Table 11 List of special status fish species under federal and provincial legislation

| Species | Situation | | |
|---|------------------------------------|------------------------------------|---|
| | Vernacular name Scientific name | SARA ³⁵ (Schedule 1) | COSEWIC ³⁶ |
| Striped Bass St. Lawrence River population <i>Morone saxatilis</i> | Endangered | Extinct | Not listed |
| American shad <i>Alosa sapidissima</i> | Not listed | No information | Vulnerable |
| Atlantic sturgeon, St. Lawrence population <i>Acipenser oxyrinchus</i> | Not listed | Threatened | Likely to be designated as threatened or vulnerable |
| Lake sturgeon, Great Lakes and Upper St. Lawrence population <i>Acipenser fulvescens</i> | Not listed | Threatened | Likely to be designated as threatened or vulnerable |
| American eel <i>Anguilla rostrata</i> | Not listed | Threatened | Likely to be designated as threatened or vulnerable |

Striped Bass St. Lawrence River population

The historical indigenous striped bass population of the St. Lawrence River was decimated in the late 1960s. Starting in 2002, individuals from the Miramichi River in New Brunswick were introduced into the St. Lawrence River. Since 2011, the St. Lawrence River population, which is the subject of a recovery strategy, is listed as an “endangered” species in Schedule 1 of the *Species at Risk Act*. The recovery plan for the species seeks to restore a striped bass population capable of reproducing and sustaining itself in the St. Lawrence Estuary and of integrating itself into the biological community without disturbance (Robitaille et al., 2011). A new version of the recovery strategy was proposed in 2019 and the public consultation on this strategy ended in September 2019 (Fisheries and Oceans Canada, 2011, proposed version). This recovery strategy is not final or approved.

In December 2019, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) reassessed the situation of the historical indigenous striped bass population of the St. Lawrence River and assessed its status as “extinct”, because the newly established fish do not come from the historical population of the St. Lawrence River. The COSEWIC recommends that the situation of the population present in the St. Lawrence be assessed. The COSEWIC also plans to reassess all of Canada’s striped bass populations by 2022. In the absence of a change of legal status of the striped bass population present in the St. Lawrence under the *Species at Risk Act*, the recommendations of the Recovery Strategy for the Striped Bass are still valid.

The striped bass population present in the St. Lawrence River uses the Project site and the St. Lawrence River from Gentilly, located upstream from the Project site, to Rivière-Ouelle, on the south shore of the

³⁵ *Species at Risk Act*,

³⁶ Committee on the Status of Endangered Wildlife in Canada

³⁷ *Act respecting threatened or vulnerable species*

River, and up to and including the Saguenay Fjord on the north side. Several sightings have been reported beyond this area and overlap, downstream, with the distribution of the Gulf of St. Lawrence population (Fisheries and Oceans Canada, 2019).

The proponent made significant inventory efforts to describe the use of the extended study area by striped bass. Thus, since 2015, the proponent has conducted several field operations to document the spawning activities, use by juveniles and movement of striped bass (telemetric monitoring). According to the proponent, data suggests that the striped bass that gather in Baie de Beauport use a large area (280 hectares) opposite the southwest tip of Baie de Beauport. The telemetric monitoring has also allowed the proponent to identify four potential spawning areas. The biggest would be located upstream from the outlet of Lake St. Pierre. The second biggest would be at the mouth of the watershed of the South River at Montmagny and two secondary spawning grounds would be found in the river section between Québec and the outlet of Lake St. Pierre and in the Beauport sector. Thus, the relative importance of the Beauport spawning ground would be low, according to the proponent.

Contrary to the proponent, Fisheries and Oceans Canada considers the end of the Beauport Peninsula to be a very important breeding area for the Striped Bass St. Lawrence River population, in particular due to its intensive use and rarity. This finding is based on the data gathered by Québec's Ministère des Forêts, de la Faune et des Parcs, which confirms that a striped bass spawning ground is located on the Laurentia Project site (L'Italien et al., 2020). To date, only the Beauport site and the watershed of the South River at Montmagny have been identified as important for breeding and as capable of contributing significantly to the growth of this population. Nonetheless, some signs of breeding activity have been reported over the past few years concerning a third site located in the Archipelago of Lake St. Pierre. A research Project to validate this hypothesis is being conducted jointly by the Québec's Ministère des Forêts, de la Faune et des Parcs and by the Wabanaki Nation, as well as the Quebec Port Authority. However, it is unknown for the time being whether these spawning activities contribute significantly to the reproduction of the striped bass population. According to the Ministère des Forêts, de la Faune et des Parcs, the data and information available to date suggest that eggs and larvae produced upstream in the St. Lawrence River have a reduced chance of survival. Their production would therefore have little influence on the striped bass population dynamics (L'Italien et al., 2020).

Finally, Fisheries and Oceans Canada considers that the entire shallow area of Baie de Beauport corresponds to good-quality habitats for the growth of young striped bass.

American shad

The American shad is a fish that is born in fresh water, migrates to the marine environment where it reaches maturity, and returns to fresh water to breed. In Québec, it is found from the Upper St. Lawrence to the Gulf during the migration period. In the spring, it ascends the Estuary to reach the spawning grounds³⁸.

With respect to this species' use of aquatic habitats, the proponent concludes that it is unlikely that a spawning area is in the work site area. However, there are several signs that suggest spawning activities occur in the immediate vicinity of Wharf 53. Fisheries and Oceans Canada also assesses that the proposed

³⁸ Taken from Liste des espèces fauniques menacées ou vulnérables au Québec, Ministère des Forêts, de la Faune et des Parcs https://www3.mffp.gouv.qc.ca/faune/especes/menacees/fiche.asp?noEsp=10&_ga=2.113391687.1337332116.1600279378-1333823922.1599741986



backfill site presents a significant habitat function related to the American shad's reproductive process, including congregations of breeding individuals. Such sites would be rare in this portion of the St. Lawrence Estuary based on current information.

According to the proponent, Baie de Beauport and the shallow sectors of the estuary of the St. Charles River constitute a feeding and growth habitat for young American shad (Englobe, 2020h). Fisheries and Oceans Canada considers that the rearing habitats located at the tip of the port peninsula are particularly important because of the sustained catches made during the inventories conducted by the proponent.

Lake sturgeon and Atlantic sturgeon

The distribution of the lake sturgeon, Great Lakes and Upper St. Lawrence population, extends from the Great Lakes to Saint-Roch-des-Aulnaies, about 125 kilometres east of Québec City (Moisan and Laflamme, 1999). The Atlantic sturgeon population of the St. Lawrence is mainly found east of Trois-Rivières as far as the Estuary and also extends beyond the Gulf of St. Lawrence (Species at Risk Public Registry, 2020). Thus, in the part of the St. Lawrence downstream from Trois-Rivières, these two species share the same territory.

Following fieldwork, the proponent observed that lake sturgeon used the estuary (juveniles and adults) and the mouth (juveniles) of the St. Charles River, Baie de Beauport (juveniles) and the underwater embankments located on both sides of the river (juveniles and adults). However, no breeding would be present in the work site area (Englobe, 2020h).

For the Atlantic sturgeon, the juveniles use the entire estuary of the St. Charles River at a stratum depth ranging from 10 to 20 metres. The mouth of the estuary and the underwater embankment on the left bank of the main channel are also used. The adults seem to prefer the relatively deep sectors (between 20 and 50 metres) (Englobe, 2020h).

According to Fisheries and Oceans Canada, and based on the proponent's data, the estuary areas of the St. Charles River, including those that would be backfilled and dredged for the Laurentia Project, are important for the feeding and movement of juveniles and adults of the two sturgeon species.

American eel

In Canada, the American eel is found in all fresh water, estuaries and marine waters that have access to the Atlantic Ocean, from Niagara Falls in the Great Lakes to the middle of the Labrador coast (Species at Risk Public Registry³⁹).

According to the proponent, the majority of the migrating eels in the Project sector use the channel south of Île d'Orléans. The estuary of the St. Charles River would be an inhospitable habitat for the species. Thus, the eels detected in the estuary of the St. Charles River would be in passage or would stay there for short periods. The proponent suggests that the area used by certain eels before they enter brackish water would consist of a large sector, including the portion of the river between Québec-Lévis and Île d'Orléans (Englobe, 2020h). Fisheries and Oceans Canada has not raised any concerns about this species.

³⁹ <https://species-registry.canada.ca/index-en.html#/species/891-632>



Aquatic invertebrates

According to the proponent, the substrate of the deep-water area of the estuary of the St. Charles River is colonized by benthos, mostly bivalves, followed by amphipods and oligochetes (worms). These species constitute prey sought by the lake sturgeon and the Atlantic sturgeon. The area near Wharf 53 is composed of more diversified benthic fauna than the estuary of the St. Charles River (Englobe, 2020h).

Inventories were produced for freshwater mussels in the areas at risk of being affected by the work to verify the presence of four special status species, the alewife floater, the elephantear, the spike and the hickorynut (table 12).

The vast majority of the mussels observed were invasive species. The indigenous mussel species identified during the inventories include the eastern elliptio, the eastern lampmussel, the plain pocketbook and the black sandshell. No live freshwater mussel with species at risk status was found in the sampled area. However, one empty shell valve of the hickorynut was found, as well as another one with a morphology similar to the elephantear. According to the proponent, the presence of these shells would not be an indication that live special status mussels are present in the work site area or its immediate perimeter.

According to Fisheries and Oceans Canada, the hickorynut is present in this sector of the St. Lawrence River. The physical habitat conditions identified at the work site are hospitable to the presence of the species. Thus, it is possible that the inventories carried out by the proponent did not detect the presence of the species, particularly in the presence of individuals buried at certain stations (especially the juvenile stages). Fisheries and Oceans Canada therefore considers that the hickorynut is potentially present in the work site area.

Table 12 List of special status freshwater mussel species

| Species | Situation | | |
|---|------------------------------------|-----------------------|---|
| Vernacular name | SARA ⁴⁰ (Schedule 1) | COSEWIC ⁴¹ | ATES ⁴² |
| Alewife floater <i>Anodonta implicata</i> | - | - | Likely to be designated as threatened or vulnerable |
| Elephantear <i>Elliptio crassidens</i> | - | - | Likely to be designated as threatened or vulnerable |
| Spike <i>Elliptio dilata</i> | - | - | Likely to be designated as threatened or vulnerable |
| Hickorynut <i>Obovaria olivaria</i> | Endangered | Endangered | Likely to be designated as threatened or vulnerable |

5.4.2 Potential effects and proposed mitigation measures

According to the proponent, construction and placement of the reinforced concrete caissons, the wharf, the area behind the wharf and the containment dyke, construction and operation of a concrete plant, dredging and management of the sediments, management of the soil and runoff water, extension of the outfalls and consolidation of the soil would result in effects on the aquatic fauna during the construction phase. An increase in the subaqueous noise level, suspended particulate matter, fine particle sediment and nocturnal light intensity would be expected. This could have effects on the breeding, rearing and migration functions of the aquatic fauna. During the operational phase, the presence of the wharf and the area behind the wharf, including the visual and acoustic screen, port operations, management of runoff water and wastewater, marine traffic, maintenance dredging and sediment management could have effects on the aquatic fauna, including permanent habitat loss for aquatic fauna (Englobe, 2020h).

⁴⁰ Species at Risk Act,

⁴¹ Committee on the Status of Endangered Wildlife in Canada

⁴² Act respecting threatened or vulnerable species

Destruction and permanent alteration of fish and aquatic invertebrate habitat

According to the proponent, the Project would generate a permanent loss of 12.8 hectares of aquatic habitat due to encroachment by the terminal. The Project would also permanently modify 8.6 hectares of habitat, including 7.7 hectares in the dredging area and 0.9 hectare at the location planned for the containment dyke. A total of 21.4 hectares of habitat would be affected by the Project (Englobe, 2020h). The proponent anticipates little change in the composition and characteristics of the fish populations in general after the Project, because for the species not at risk, no key habitat or habitat judged essential would be affected. For the walleye spawning ground at the foot of the Joseph-Samson Dam, the proponent does not foresee significant effects that are likely to affect it.

According to the proponent's analysis, the potential effects in the operational phase on the fish species at risk would affect the juvenile Atlantic sturgeons and adult and juvenile lake sturgeons that primarily use the estuary of the St. Charles River as a feeding habitat. The striped bass and American shad rearing habitats in the estuary of the St. Charles River and Baie de Beauport, as well as the striped bass spawners whose spawning area includes the footprint of the wharf, the area behind the wharf and the dredging area, would also be affected (Englobe, 2020h).

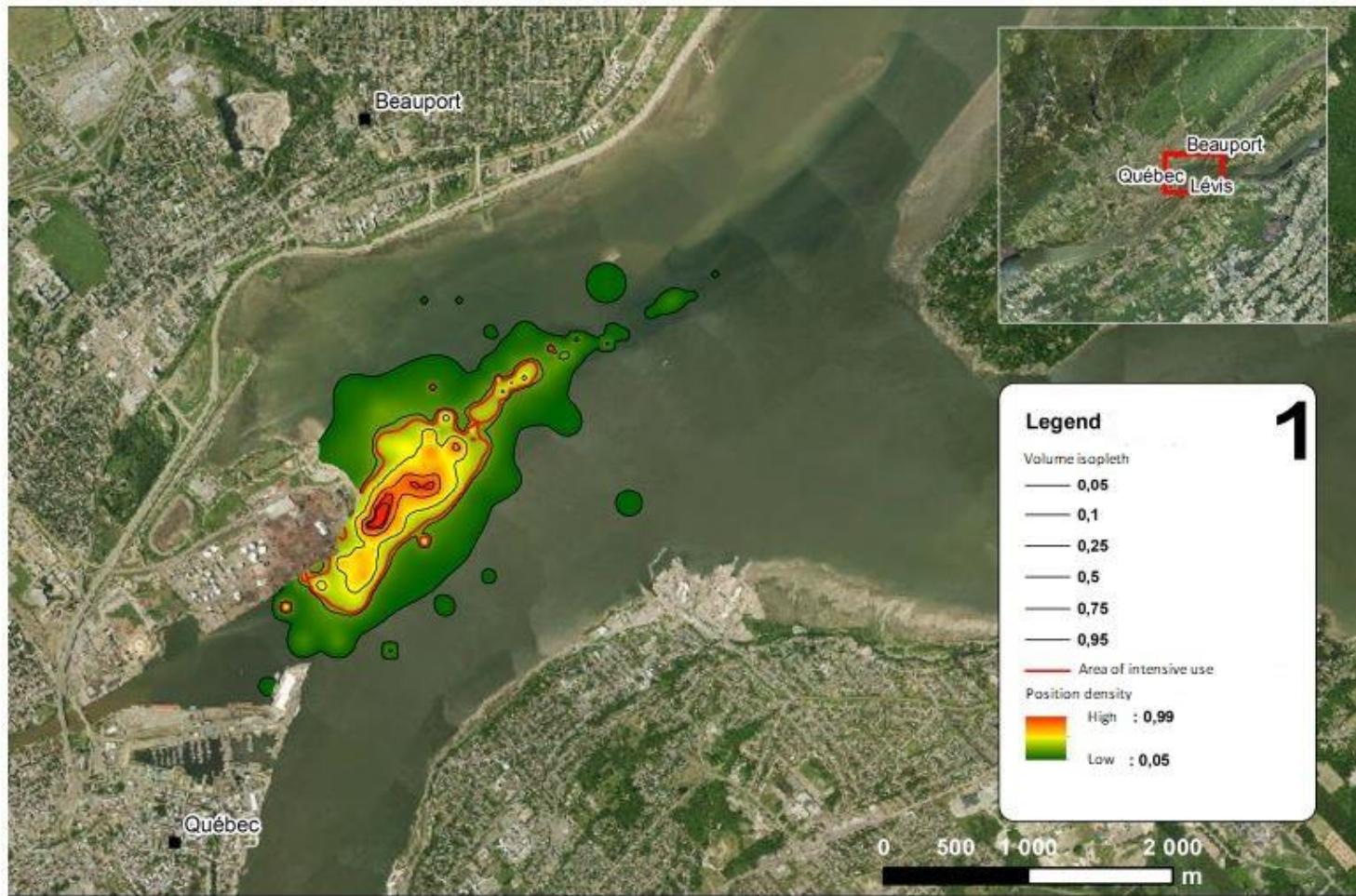
Fisheries and Oceans Canada considers that the proponent's identification and description of use of the habitats are deficient and that its interpretation of certain habitat functions, particularly for the striped bass, the lake sturgeon, the Atlantic sturgeon and the American shad, biases its analysis of the Project's environmental effects.

According to Fisheries and Oceans Canada, the area of the projected wharf, located both in Baie de Beauport and the estuary of the St. Charles River, would affect one of the two breeding habitats identified to date for the striped bass, feeding and movement areas confirmed for lake sturgeon and Atlantic sturgeon juveniles and adults, rearing areas used in particular by striped bass, American smelt and American shad, as well as important habitats playing a role in the reproductive process of the American shad (congregation of spawners). An important growth habitat for the Atlantic sturgeon and lake sturgeon juveniles would also be affected by the Project.

Based on available information, including a recent report by the Québec's Ministère des Forêts, de la Faune et des Parcs on the *Dynamics and breeding habitats of the reintroduced striped bass population* (L'Italien *et al.*, 2020), Fisheries and Oceans Canada finds that all of the Project's backfill and dredging areas are located in the area used intensively for striped bass breeding. Fisheries and Oceans Canada also notes that a gradient of increasing use is observed as one leaves the periphery of the home range identified for reproduction and approaches the tip of the harbour peninsula (figure 8). Figure 8 illustrates the density of striped bass frequenting the project site during the spawning period. The more the colour tends towards red, the more the density of striped bass increases. The project would thus completely destroy an area of higher reproductive use at the Beauport site. This zone of high use corresponds to a small area located directly at the tip of the port end and encompasses a significant proportion of the individuals' locations in a very small area of the overall home range.



Figure 8 Illustration of the core density of the group of striped bass frequenting Beauport Bay and the project site during the reproduction period (May 12 to June 26) from 2015 to 2018.



Source: L'Italien et al., 2020 (Traduction made by the Agency)

Fisheries and Oceans Canada also finds that according to the results of the proponent's hydrodynamic and sediment studies, the Project would modify the hydrodynamics of the bodies of water over large areas. The Project would generate significant accelerations and reductions of the current speeds depending on certain tidal phases, over large areas located in the striped bass breeding habitat. These changes would cumulatively affect nearly 50 hectares of the overall area that can be used by the striped bass for breeding in the area, including the entire area of intensive use. According to Fisheries and Oceans Canada, the reproductive success of the striped bass (fertilization of eggs, maintenance of the eggs in the water column, etc.) directly depends on favourable hydrodynamic conditions that attract the species' spawners. Fisheries and Oceans Canada indicates that it is difficult to assess precisely the effects these changes could have on the conditions of attraction and the quality of the area for striped bass breeding, but considers these hydraulic changes would add uncertainties and risks that could contribute to the destruction of the area most intensively used for striped bass breeding. The risk that the use of the Beauport site by striped bass spawners will be greatly diminished or become uninteresting for the species would also be increased. Moreover, the hydraulic conditions favouring congregation of striped bass are unknown and there is no reason to affirm that the impact of this change to the flow on striped bass activities will be low or negligible.

According to Fisheries and Oceans Canada, dredging would involve the significant loss of feeding and movement habitats for lake sturgeon and Atlantic sturgeon over an area of 21.4 hectares. The Project would also involve localized changes to the hydrodynamics of the bodies of water, which could influence the hydrosedimentary regime favourable to the benthic fauna that are part of the diet of the sturgeon species. These changes will be notable (particularly the speed accelerations) in certain areas and during certain tidal phases. Although it is difficult to assess the impact these changes could have on the quality of the habitats affected, Fisheries and Oceans Canada considers that they would be added to all the threats that already exert pressure on these fragile populations.

Fisheries and Oceans Canada assesses that the Project would destroy shallow, good-quality rearing habitats for American shad over approximately 4.5 hectares and nearly 660 linear metres of shoreline. The Project would also destroy a large area linked to the breeding process for this species, including congregations of spawners. According to the current information, these sites appear to be rare in this portion of the St. Lawrence Estuary. These habitat losses for the American shad would be added to all the threats that already exert pressure on this fragile population, which could favour a population reduction.

Due to the physical habitat characteristics and the number of young of the year that were captured by the proponent in 2013, particularly at the proposed backfill site, Fisheries and Oceans Canada consider that a rearing area of approximately 2000 square metres for American smelt would be destroyed by the proposed backfill.

Finally, because uncertainties persist regarding the inventories conducted to determine the presence of hickorynuts, Fisheries and Oceans Canada considers that, if the species is present, mortality could occur due to riverbed encroachments and dredging and habitat loss for this species, which would be added to the other losses and permanent alterations of fish habitat. However, the adverse impacts on the species could be avoided by relocating the hickorynuts before the work and thus avoiding individual mortality. Thus, should the proponent obtain an authorization under the *Species at Risk Act*, Fisheries and Oceans Canada could require additional surveys prior to the work in order to relocate any individuals that would be detected.

The proponent submitted an offset program that may be required as part of the application of the *Fisheries Act* to offset the effects of the destruction and alteration of fish habitat that is intended to provide similar or higher quality foraging habitat. It also proposes specific developments to improve the habitats of striped

bass and American shad young of the year. Finally, it seeks to ensure that the Project's effects are positive or at least counterbalance the Project's adverse effects on the striped bass population. However, the proponent admits that it is complex and uncertain to offset the loss of spawning areas for a pelagic species like the striped bass. For this reason, the proponent proposes to develop rearing areas to improve the species' recruitment success and habitat productivity. To mitigate the uncertainties related to the loss of spawning areas, the proponent also suggests a scientific research program to acquire knowledge of the population present in the St. Lawrence River (Englobe, 2020h).

According to Fisheries and Oceans Canada, some of the offset proposals are relevant to counterbalance losses for certain habitats and prized species, such as walleye or American smelt. Other proposals could potentially be adequate to compensate for losses among sensitive species, such as striped bass juveniles. However, Fisheries and Oceans Canada specifies that the impossibility of replacing certain habitat losses in their entirety could have significant consequences for several species. High risks of permanent habitat losses persist, particularly for the striped bass breeding area, the Atlantic sturgeon and lake sturgeon adult and juvenile feeding and movement areas, and the American shad congregation area.

First Nations shared concerns about the effects the Project could have on the migratory species, such as the striped bass, the lake sturgeon, the Atlantic sturgeon and the American shad, which are prized and fished by their communities. They are also concerned about the choice and effectiveness of the offset projects that would be implemented to counterbalance the habitat losses. They assume that the proposed measures (Englobe, 2020r) would not be sufficient to offset the value of the lost habitats. In the event that a *Fisheries Act* authorization is issued, compensation measures considered sufficient by the Department of Fisheries and Oceans Canada would be required.

The Grand Conseil de la Nation Waban-Aki points out that the Project's location seems to have significant importance for the health and recovery of the striped bass population and for the health and certain migratory fish populations, including the sturgeon. The striped bass is also a prized species, whose recovery could support a fishery in the portion of the St. Lawrence River included in their customary territory. The Mohawk Council of Kahnawà:ke indicates it is concerned about the potential reduction of migratory species populations, such as the lake sturgeon, the striped bass and the American shad, at traditional sites following the construction and operation of the terminal.

The public's comments call into question the necessity of proceeding with major backfilling in the river to carry out the Project, particularly to create a warehousing area, saying this is in contradiction with the conservation and protection of species of special concern, including the striped bass St. Lawrence River population. Indeed, for several citizens and environmental conservation organizations, backfilling and dredging in an area identified as a striped bass St. Lawrence River population breeding area is contrary to the efforts deployed over the past few decades for its reintroduction into the Estuary. It would also be problematic to engage in major dredging, considering that this activity was one of the leading causes of the extirpation of the striped bass from the River in the 1960s. The public fears that the habitat loss caused by the Project threatens the survival of the species in this area.

Water quality changes related to dredging and sediment management

Dredging activities during the construction phase

In all, approximately 453,229 cubic metres of sediment, including 24,933 cubic metres of contaminated sediment, would be dredged in the aquatic environment over a two-year period in the manoeuvring and mooring area and in the construction area of the new Wharf 54. According to the proponent, the increase in suspended particulate matter, mainly due to dredging, could temporarily alter the water quality and the fish habitat, including rearing and growth areas of the young fish. Sedimentation of fine particles could cause clogging of the spawning areas and thus compromise the survival of the eggs. Suspension of particles in water could induce fish to avoid the work area and affect filtering aquatic organisms, such as freshwater mussels.

The baseline sediment status is based on the integration of the results of numerous characterizations carried out since 2012 (Englobe, 2018e). In summary, the proponent has identified two classes of sediments, "uncontaminated" and "contaminated". Sediments that present, for at least one contaminant, a concentration equal to or greater than the Occasional Effect Concentration (OEC) of the assessment guide Criteria for the Evaluation of Sediment Quality in Québec and Application Frameworks: Prevention, Dredging, Restoration (Environment Canada and Ministère du Développement durable, de l'Environnement et des Parcs, 2007) are considered contaminated and will be managed and dredged separately from non-contaminated sediments. The proponent has also established a relationship between the granulometry and colour of sediments and their level of contamination (Englobe, 2018e). Thus, finer sediments (mainly limestone or silt) have a black colour and higher levels of contamination than coarser sediments, which are mainly sand and beige in colour (Englobe, 2020k).

Environment and Climate Change Canada is of the opinion that the description of the baseline condition is adequate. The sediment characterizations carried out are considered representative (number of characterizations, depths covered and number of samples collected). Environment and Climate Change Canada considers the approach used by the proponent to estimate the volumes of contaminated sediments and to differentiate between "contaminated" and "non-contaminated" sediments to be conservative. This would help reduce the environmental risk associated with the proposed dredging operations. With respect to the results of the contaminated sediment characterizations, Environment and Climate Change Canada is of the opinion that the contamination is generally not of concern.

To reduce the Project's effects and ensure a certain efficiency during dredging, the proponent would prefer hydraulic dredging for uncontaminated sediment and mechanical dredging for the surface layer, the contaminated sediments and the sediments around the contaminated sediments. Hydraulic dredging limits the amount of sediment re-suspended in the water column while mechanical dredging allows for greater accuracy. The proponent proposes to include a 30 centimetres buffer zone around the dredged area when it contains contaminated sediment, to prevent it from being dredged and managed as non-contaminated sediment. Mechanical dredging would also allow monitoring to validate the colour and granulometry of the dredged sediment, characteristics that are highly correlated with contamination levels.

Environment and Climate Change Canada is of the opinion that the choice of dredging techniques and the methodology proposed by the proponent are appropriate to reduce the risk of environmental effects. However, it is possible that the excavation of sediment, contaminated or not, may expose underlying contamination that would not have been identified during the various characterizations. To mitigate this uncertainty, Environment and Climate Change Canada recommends that the proponent conduct a follow-up on the quality of sediment that would be exposed by dredging to ensure their safety and plan corrective



measures if necessary. Should such contamination be discovered, solutions such as complete removal by additional dredging or dredging and then capping of the residual contaminated area should be considered.

The proponent proposes several mitigation measures to reduce the emission of suspended solids and wishes to limit dredging operations to the minimum necessary (Englobe, 2020r). The proponent also proposes that no dredging activities be carried out during the striped bass spawning period, which according to the proponent takes place from May 18 to June 15, nor during the period when an increased presence of the year's young has been observed, i.e. from July 1 to 30. Instead, Fisheries and Oceans Canada recommends that in-water works be carried out outside the sensitive period for fish including striped bass, lake sturgeon, American shad and rainbow smelt. Fisheries and Oceans Canada therefore recommends that the work be carried out between October 1 and April 30 and that the duration of work in the aquatic environment be kept to a minimum.

During dredging activities, real-time monitoring of the suspended solids generated by the Project in the aquatic environment is planned using two turbidimeters. The data would be validated on a daily basis at punctual sampling points. These turbidimeters would also be used to monitor suspended solids during the backfilling of the backshore, the filling and use of geotextile tubes, and the dismantling of the uncontaminated sediment settling pond. The results of these turbidimeters would be compared to the turbidity values established prior to the work (in 2020) to determine the level of suspended solids in relation to the reference state of the aquatic environment. This reference state would be represented by a curve describing the relationship between turbidity values obtained in the laboratory and their suspended solids concentrations (TSS-Turbidity curve). Environment and Climate Change Canada recommends that the calibration of this curve be completed on-site (*in situ*) during the work to ensure that the reference state of the site is taken into account during construction activities. In the event that predetermined alert thresholds are exceeded, the proponent would implement intervention mechanisms to reduce the risk of adverse effects on aquatic fauna and its habitat. Turbidimeters would be moved in real time during construction to document possible increases in suspended solids. For validation purposes, three conventional turbidimeters would be installed in areas outside the influence of dredging. Recorded measurements would be collected monthly and would be used to validate or interpret, *a posteriori*, the data from the continuous monitoring of the two main turbidimeters. Environment and Climate Change Canada recommends that the proponent evaluate the possibility of replacing the three conventional turbidimeters with continuously linked turbidimeters to facilitate the explanation of exceedances of criteria at the work site, or allowing for more rapid corrective measures. (Englobe, 2020k).

Finally, should alert thresholds be exceeded, the proponent would put in place intervention mechanisms to reduce the risks to the aquatic environment. Contingency mechanisms are also provided for in the event of accidental discoveries of contaminated sediment (Englobe, 2020k).

Sediment management during construction

Uncontaminated sediment dredged by hydraulic dredging would be sucked and pumped as sludge into the sediment settling pond located at the location of the back wharf. According to the proponent, this pond would have the capacity to settle the entire volume of dredged sludge, thus limiting the suspended solids in the dewatering water. A spillway system would allow this water to be sampled prior to its return to the receiving environment to ensure that it meets the discharge criteria established in consultation with Environnement and Climate change Canada and the ministère du Développement Durable, de l'Environnement et de la Lutte contre les changements climatiques. This sediment, once dewatered, would be used as backfill material in the backwater (Englobe, 2020k).

Part of the uncontaminated sediment settling pond would be constructed with geotextile tubes filled with the upper portion of the soil excavated on the site, as needed. The water that would percolate from these tubes would flow into the environment, which could lead to degradation of the water quality of the river if the soil used were contaminated or if suspended particulate matter escaped. However, the proponent does not anticipate effects on the receiving environment because no contaminated soil would be used, the soil that would be used is coarse, and the suspended particulate matter should be filtered by diffuse flow on the beach separating the pond from the river. The proponent does not envision measures to collect and treat the percolation water. In the event of a failure leading to emission of suspended particulate matter during filling of the geotextile tubes, the proponent foresees that the monitoring stations for suspended particulate matter in the aquatic environment would allow detection of any increase exceeding the limits associated with the receiving environment. In case this happens, mitigation measures would be deployed (Englobe, 2020k and Englobe, 2020r).

The uncontaminated sediment settling pond would be developed near the river at a site potentially contaminated by stockpiling of contaminated soil. To ensure the quality of the soil underlying the piles, the proponent foresees characterization up to the lowest elevation for the pond before the soil is excavated. If contamination is present, this soil would be sent off site for disposal and clean soil would be used to fill the geotextile tubes (Englobe, 2020l).

The contaminated sediment would be placed in a dewatering pond constructed to avoid contamination of the soil and runoff water. Once dewatered, sediment will be managed off site according to the regulations in force. The water from the dewatering pond would be directed to a mobile unit designed to comply with the City of Québec's municipal requirements for discharge into the sanitary sewer. The monitoring program includes sampling of these waters to verify compliance with the City of Québec's sanitary sewer discharge by-law. Contingency mechanisms are provided for in the event that the mobile unit is not sufficiently effective or if operational exceedances are observed (Englobe, 2020k).

Environment and Climate Change Canada considers the addition of a mobile treatment unit to be an important improvement to ensure that the water from the dewatering pond for the contaminated sediment would not affect the quality of the water discharged and complies with the City of Québec's sanitary sewer discharge by-law, especially. This unit could be adjusted according to the results obtained during the analysis of its effluent.

To ensure that dewatering of the contaminated sediment does not affect groundwater, the proponent plans to monitor groundwater quality by the use of observation wells (existing or to be installed). A characterization of the land receiving the dewatering pond would be performed before and after the work to confirm that it had no effect on the soil in place and restore the site to its initial condition, as applicable (Englobe, 2020l).

Finally, the dismantling of the contaminated sediment dewatering basin would be done in a sequence that would reduce the risk of contamination of the existing soil. The materials in this basin would be transported and used as backfill in the backshore (Englobe, 2020k). According to the proponent's various studies, these materials could come from the land that would likely be contaminated, or from clean materials imported from a quarry. Environment and Climate Change Canada is of the opinion that under no circumstances should materials or soils forming the foundation of the contaminated sediment dewatering basin be sent to the back wharf to be mixed with non-contaminated sediment in order to avoid contamination of the receiving environment.

Dredging and sediment management in the operational phase

During the operational phase, the vessel approach area will require maintenance dredging. This work would be subject to separate environmental impact assessments⁴³. An on site (*in situ*) characterization prior to dredging would be carried out to establish the nature and level of contamination of the sediment to be dredged and monitoring measures specific to each dredging operation would be established and implemented. The level of monitoring of the dewatering water quality of sediment from maintenance dredging would be dictated by the level of *in situ* contamination of the sediment to be dredged.

Contaminated sediment could be dewatered by various methods, but the proponent would prefer to transfer the sediment directly to a truck or other watertight means of transport to an authorized site based on their environmental quality. The scenario where sediment would first be dewatered on-site is also considered by the proponent. In this scenario, the dewatering water would be characterized and managed according to its environmental quality. If it meets the City of Québec's sanitary sewer discharge criteria, it could be discharged to the sanitary sewer. If the criteria are not met, the water will be pumped into a tanker truck and then disposed of in an authorized location in accordance with applicable regulations. If the sediment is not contaminated, the dewatering water could be discharged to the proponent's storm sewer system for treatment by a settling pond or a hydrodynamic separator. Under this scenario, monitoring will be limited to validating that the dewatering water is directed to a management system to capture suspended solids (Englobe, 2020k).

Water quality changes related to soil and groundwater management

Concerning the soils in terrestrial environments, the presence, excavation, remediation and management of contaminated soils could result in contamination of surface or groundwater quality and thus end up in the aquatic environment. To determine how the soils to be remediated during the work should be reused or managed, environmental soil characterizations were carried out on the parcels or lands on which the work is planned. The proponent compared contamination levels to the recommendations of the Canadian Council of Ministers of the Environment (CCME) and to the generic criteria for soils of Québec's Ministère de l'Environnement et de la Lutte contre les Changements climatiques du Québec (MELCC). More than 300,000 cubic metres of soil would be excavated, of which approximately 34,000 cubic metres have contaminant concentrations exceeding the limit values of the *Canadian Soil Quality Guidelines* (CSQG) - Industrial Use or MELCC "C" criteria. The proponent commits to respecting the principle of non-degradation for the reuse of soil on the site and emphasizes that it would avoid any dilution or cross-contamination during the handling and transportation of contaminated materials. The proponent also undertakes to characterize the soils to confirm that their environmental quality meets the requirements established for reuse on the site. No excavated soil will be reused in the back dock area or other areas near the high-water mark. Soil that cannot be reused on-site would be disposed of off-site according to current regulations (Englobe, 2020l).

Concerning the groundwater monitoring, the proponent proposes to install six observation wells upstream hydraulically⁴⁴ of the new container handling, port operations and train loading facilities. Environment and Climate Change Canada points out that the groundwater table will extend through the sediment backfilled under the wharf before reappearing in the river, since the level of the backfill would be six metres above

⁴³ According to section 82 of the *Impact Assessment Act*, the Quebec Port Authority, as a federal authority that manages federal land, must determine whether the projects proposed on federal land is likely to have significant effects before they are carried out. The entire area under the jurisdiction of the Quebec Port Authority in the St. Lawrence River is on federal land.

⁴⁴ "Upstream hydraulically" means a higher point in terms of groundwater flow.

tidal level. Thus, the observation wells would not capture contaminants from the new facilities since the groundwater will flow towards the river and not towards the wells.

Environment and Climate Change Canada is of the opinion that the data generated by the sampling campaigns to determine soil and groundwater quality provide a good picture in the areas targeted by the work. Nevertheless, it recommends that soil characterization be improved or completed so that the number of samples is representative of the excavation and backfill areas confirmed with greater precision by the final plans and specifications. It also recommends that the proponent install observation wells in the newly developed areas, in addition to those already proposed, in order to monitor groundwater in the extension of the water table.

Environment and Climate Change Canada is concerned about the risk associated with bringing contaminated soils closer to the aquatic environment, even if the level of contamination of these soils is below the CCME *Canadian Soil Quality Guidelines* (CSQG) thresholds. Indeed, the backfilling of contaminated soils on a portion of the site, even if they do not come into direct contact with groundwater, can be a potential source of contamination of groundwater and, indirectly, of surface water (river) by increasing the risk of contaminant migration in the soil pore water. In accordance with the precautionary principle, Environment and Climate Change Canada is of the opinion that the proponent should avoid bringing soils with concentrations of a substance above background levels into the aquatic environment.

Finally, the proponent proposes to reuse without restriction on the Project site soils that contain substances with concentrations below CCME's CSQG for agricultural use. Environment and Climate Change Canada reminds the proponent that these guidelines should rather be used as site remediation objectives and not as a threshold limit that could potentially increase the level of contamination on a site. Environment and Climate Change Canada recommends that the proponent take into consideration local ambient soil concentrations in the receiving environment by, among other things, but not limited to, avoiding increasing contaminant concentrations in soils, even if soil quality is below the CCME *Canadian Soil Quality Guidelines* (CSQG) thresholds.

Water quality changes related to surface water

The runoff water flowing onto the work site during the construction phase or onto the terminal during the operational phase could also affect the water quality of the aquatic environment if this water transports contaminants or suspended particulate matter. The existing land area where the redevelopment of Wharf 54 would take place is serviced by the proponent's existing stormwater system. The outfalls of this network flow into the St. Lawrence River or the St. Charles River estuary after passing through primary treatment equipment (retention of suspended particles) (Englobe, 2018b).

During the construction phase, runoff would be controlled by temporary facilities set up at the start of construction and directed to a final discharge point. At all times, the runoff water potentially in contact with suspended particulate matter that could be contaminated (presence of contaminated soil) would be recovered by temporary infrastructures. During installation and use of the concrete plant, measures would be deployed to reduce the risks that particles (contaminated or not) end up in the runoff water (Englobe, 2020r). In particular, cleaning of the equipment used for production of concrete structures (caisson) would be performed in a dedicated washing area and the proponent would require the contractor to deploy a process water management system (Englobe, 2020m).

The concrete caissons used for the construction of the dock line would be fabricated using forms placed on a submersible barge stored along Wharf 26 or along a spacer barge. These forms would be filled with concrete from concrete mixers parked at the edge of the wharf (Englobe, 2020m). Environment and



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Climate Change Canada is of the opinion that the proponent should plan mitigation measures in addition to those already planned to limit the risks of concrete spills into the aquatic environment during the manufacture of these concrete caissons. Additional mitigation measures are justifiable given the quantity of concrete used to manufacture the caissons, the duration of the pour for each caisson (more than 24 hours), the complexity of the tasks performed and the river movements due to currents and tides.

Finally, a cofferdam would be deployed to recover the runoff water during excavation of the soil of the vegetated embankment. The water would be pumped into an emergency water accumulation pond to then be treated (Englobe, 2020m).

At the end of the construction work, the temporary installations would be dismantled so as to avoid the discharge of contaminants into the environment (water and soil) (Englobe, 2020m).

In the operational phase, the new container terminal would be equipped with the rainwater collection system accounting for the site's characteristics and requirements. This system would be equipped with hydrodynamic separators to avoid the discharge of oils and sediments into the river water (Englobe, 2020a). To further reduce the effects of the terminal's activities on water quality, the proponent plans to pave the work surfaces and install suspended particulate matter capture equipment in the storm sewer system. This water management equipment would be inspected periodically to ensure its good working order, efficiency and sealing (Englobe, 2020l). Finally, concerning long-term maintenance of the runoff water management equipment during the operational phase, the new installations would be added to the proponent's environmental management plan and thus would be inspected, cleaned or replaced so that runoff water management remains optimum. The monitoring of swimming water quality in the recreational beach area is also planned by the proponent in conjunction with the City of Québec (Englobe, 2020m).

Contrary to the proponent's assumption, Environment and Climate Change Canada considers that there is a risk that contaminants other than suspended solids and petroleum hydrocarbons may be found in runoff from the new wharf during the operational phase. Industrial activities would take place there, such as road and rail transportation, storage and movement of containers using gantry cranes or other heavy equipment, as well as the refuelling of ships with fuel and fuel oil. Some containers could contain dangerous goods that could spill as a result of a malfunction or accident. In addition, Wharf 54 would be an extension of existing port areas where solid and liquid bulk storage takes place, and it is likely that contaminated runoff from the existing areas could find its way into the storm water system of the new wharf. Environment and Climate Change Canada therefore recommends that surface water quality monitoring be conducted at the outfalls of the stormwater system once the operational phase has begun. At minimum, petroleum hydrocarbons (C10 to C50), metals and metalloids, polycyclic aromatic hydrocarbons (PAHs) as well as parameters representative of winter icebreaking activities should be the parameters monitored and integrated into the proponent's annual monitoring program. Furthermore, Transport Canada recommends that the wharf and the container handling area be built with a slope that is not oriented towards the river in order to prevent contaminant spills into the river water.

Changes to the subaquatic noise environment and the nocturnal light environment

During the construction phase, the proponent anticipates an increase in the ambient subaquatic noise level due to the construction activities, including piledriving and dredging. According to the proponent, piledriving can trigger very high amplitude noises and generate pressure that can cause injuries to or physiological effects on fish. However, because the fish will not stay near the work site, the proponent considers that the work is unlikely to result in effects on or injuries to aquatic fauna. Behaviour changes would be observed, such as avoidance of the work areas (Englobe, 2020n). Regarding the noise generated by the dredging



activities, the proponent foresees minor effects (behaviour changes) on aquatic fauna during the construction phase (Englobe, 2018c).

During the operational phase, the growth of marine traffic and port activities could translate into a rise in ambient noise proportional to the increase in the number of ships circulating in the port's waters. The noise and turbulence related to ship manoeuvres are likely to disturb the fish, particularly juvenile Atlantic sturgeons and juvenile and adult lake sturgeons, which use the estuary of the St. Charles River. The striped bass spawners would suffer similar disturbances. Finally, the proponent plans to perform maintenance dredging outside the periods of use of the area by the species at risk, which would limit the potential effects of noise generated by this activity on these fish (Englobe, 2018c).

The anthropogenic changes to the nocturnal light environment may have effects on fish, including American shad, striped bass and walleye, particularly on migration of species, changes to feeding and breeding behaviours, and competitive and predatory interactions (Englobe, 2020h). In the construction phase, the increase in nocturnal light intensity would be due, in particular, to dredging activities, construction and placement of concrete caissons. The proponent expects that the young walleye stages will be more affected because they are attracted by light (Englobe, 2020h).

In the operational phase, the proponent foresees that the deployment of a lighting system along the new Wharf 54 and in the warehousing area would trigger a change in the nocturnal aquatic light environment at the edge of the facilities. These changes could modify the behaviour of the aquatic organisms that frequent the illuminated area. The turbidity of the water would have the effect of reducing the penetration depth of light in the water. The proponent proposes to deploy measures to reduce the effects of lighting on fish (Englobe, 2020h and Englobe, 2020r).

5.4.3 Agency analysis and conclusions on residual effects

Analysis of the effects

The Agency relies on the advice of Fisheries and Oceans Canada to conclude that adverse effects and uncertainties would persist regarding the valued component, fish and fish habitat. The Project would cause significant habitat losses and adversely affect several species, including the striped bass, the lake sturgeon, the Atlantic sturgeon and the American shad. In particular, Fisheries and Oceans Canada considers that the fish habitat losses that would be caused by the Project have not been avoided, mitigated and offset sufficiently and that the Project would cause adverse effects on fish and fish habitat.

According to Fisheries and Oceans Canada, no avoidance or mitigation measure can significantly reduce the adverse effects of the Project on striped bass. Although the proponent proposes relevant offset measures to counterbalance the habitat loss for young striped bass, these could not offset all the habitat losses of this species. Moreover, based on the current scientific knowledge, offsetting the lost breeding habitats would not be possible, given the nature and complexity of the characteristics attracting striped bass.

The Agency relies on the advice of Fisheries and Oceans Canada to conclude that the Project would involve current changes that would be observed in varied habitats used by a multitude of fish species. These changes would be significant in certain areas and for certain tidal phases and would affect cumulatively several dozen hectares. According to Fisheries and Oceans Canada, it is difficult to assess the precise impact of these changes on the quality of the habitats affected. These hydraulic changes would add uncertainties and risks that could contribute to the destruction of the area most intensely used for



striped bass breeding. The presence of the infrastructure and their impact on the dynamics of the currents could irreversibly invalidate the present habitat functions.

The Agency finds that the Project would involve loss of feeding and movement habitat for the Atlantic and lake sturgeon species. These losses and the hydrosedimentary changes would add to the threats facing these already fragile sturgeon populations. Given the criteria met by the Beauport site habitats that would be affected by the Project (preferred habitat, concentrated presence of juveniles during feeding and major dredging), the Agency relies on the advice of Fisheries and Oceans Canada and concludes that there is a great risk that the Project will exert pressure on the two species of sturgeon.

The Project would also destroy quality rearing habitats for the American shad and an important area related to the breeding process for this species. These sites are rare and these losses would be added to all of the threats already exerted on this fragile population.

Concerning the changes to ambient noise and the nocturnal light environment during construction and operation phases, the Agency relies on the advice of Environment and Climate Change Canada to determine that the rigorous implementation of mitigation, monitoring and follow-up measures (Englobe, 2020r) during the different phases of the Project would allow reduction of the effects on the aquatic environment related to management of soil, sediments, runoff water and dredging activities. However, Fisheries and Oceans Canada points out that the work methods, including their overlap with the sensitive periods, if applicable, still have to be assessed if an authorization is issued under the *Fisheries Act*.

Concerning the changes to nocturnal ambient noise and luminosity during construction and operation, the Agency considers that the measures proposed by the proponent would be sufficient to reduce the adverse effects on fish and fish habitat.

Analysis of harmful effects on species at risk

The Agency finds that the Project, as proposed, risks affecting two aquatic species listed in Schedule 1 of the *Species at Risk Act* with “species at risk” status, namely the striped bass and the hickorynut.

The Project would destroy an important breeding habitat of the Striped Bass St. Lawrence River population. The Project’s harmful effects could not be lessened, avoided or controlled by measures compatible with the species recovery plan. Fisheries and Oceans Canada is of the view that, according to the current scientific knowledge, the destruction or alteration of striped bass breeding habitat identified at Beauport would risk hindering the recovery of the Striped Bass St. Lawrence River population and the objectives of the recovery strategy, due to the importance and rarity of the breeding sites currently identified. The species recovery strategy identifies the development of port infrastructure, including dredging, as the principal threat to the Striped Bass St. Lawrence River population. Considering the permanent nature of the infrastructure, their magnitude and the impossibility of making corrections after the fact, the risk generated by this type of development is high, especially when it involves high value habitat of limited size that cannot be recreated. Thus, the Agency concludes that carrying out the Project as proposed represents a high risk for the Striped Bass St. Lawrence River population and would not be compatible with its survival or reestablishment.

Moreover, Fisheries and Oceans Canada considers that carrying out the Project, in its current form, could not be authorized under the *Species at Risk Act*. The Minister of the Environment and Climate Change will respond in December 2020 to COSEWIC's recommendation to change the status of the Striped Bass St. Lawrence River population. COSEWIC plans to reassess the status of all striped bass populations in Canada in 2022.

Concerning the hickorynut, the Agency relies on the advice of Fisheries and Oceans Canada to conclude that conducting an inventory before the work and, as applicable, relocation of the individuals detected, would lessen the risk of mortality resulting from the Project.

Agency conclusion

Further to analysis and based on the assessment criteria presented in appendix A, the Agency concludes that the Project is likely to lead to significant adverse environmental effects on fish and fish habitat, including aquatic invertebrates and special status species (appendix B), despite accounting for the key mitigation measures detailed below. The Project would result in destruction and permanent alteration of important habitats for several species, whose survival already faces several threats. This destruction would limit or reduce the ability of fish to use these habitats. Finally, the destruction of the striped bass breeding habitat could not be offset and would hinder the reestablishment of the species. The Agency concludes that the significance of the effects would be high for the following reasons:

- The magnitude of the Project would hinder the maintenance of the population of several fish species and no measure (avoidance, mitigation or offset) could be deployed to significantly reduce the effects on the special status species;
- The Project would result in long-term regional effects because several of the fish species that would be affected by the Project are part of migratory populations, with a regional geographic distribution, and travel long distances. The effects thus would extend beyond the local study area. The effects would be felt over a long term, because several habitats would be lost permanently;
- Alteration of rare, complex, valuable habitats would be continuous during the operational phase and habitat alteration and destruction would be irreversible over time.

Determination of key mitigation measures

The Agency has identified the key mitigation measures that could mitigate several potential effects of the Project. However, all of these measures combined could not mitigate the Project's potential effects sufficiently to render the residual effects insignificant. To identify the key mitigation measures, the Agency considered the mitigation measures proposed by the proponent, the advice of the government authorities, and comments received from First Nations consulted and the public.

Specific measures for fish

- Carry out interventions in water outside sensitive periods for fish, particularly striped bass, Atlantic sturgeon, lake sturgeon, American shad, and American smelt. Determine these sensitive periods in consultation with the competent authorities and limit the duration of the work in the aquatic environment to the minimum;
- Carefully recover all the captive fish in the confined or isolated sections of the work site and return them immediately to the aquatic environment, in a sector favouring their survival, to avoid any fish morbidity;
- During placement of piles:
 - Recover the drilling mud and deposit in a terrestrial environment;
 - Use vibration instead of hammering, unless this is not technically feasible;



- Start the piledriving work to allow the fish to leave the immediate area of the work. Gradual startup should begin with minimum machine power, gradually increasing to optimum power;
- If a shutdown longer than 20 minutes is anticipated between two piledriving periods, repeat the gradual startup procedure;
- Drive the piles using a noise enclosure around the pile. This noise enclosure must allow a reduction of the sound power (L_w) generated by piledriving of at least 10 A-weighted decibels (dBA).
- These specific fish mitigation measures are not a substitute for any other legislative or legal requirements applicable to fish and fish habitat, including those under the *Fisheries Act* and the *Species at Risk Act*. Nor are they a guarantee that an authorization or permit will be issued under these other acts or regulations. In the event that the proponent receives a favourable decision under CEAA 2012, the proponent will be required to, amongst other things, develop a compensation plan to meet the requirements of the *Species at Risk Act* and the *Fisheries Act* to offset its impact on affected aquatic species and their habitats, in consultation with Fisheries and Oceans Canada.

Measures specific to freshwater mussels

- Gather and relocate the freshwater mussels before construction of the containment dyke. In consultation with the competent authorities and before the work, determine the areas where this collection is necessary, identify the host site favourable to the species, and determine the gathering and relocation methods;
- In consultation with Fisheries and Oceans Canada, determine the areas where hickorynuts are likely to be found, develop and conduct an inventory to detect their presence and, as applicable, relocate the individuals in an adequate habitat for the species.

Measures specific to work in the aquatic environment and sediment management

- Implement effective measures to surround the work area in the aquatic environment in order to confine suspended sediments (e.g., turbidity curtain). In particular, implement control measures to protect Beauport Bay during work in the aquatic environment;
- Prior to the commencement of the dredging required for the construction of the designated project, develop and implement measures to reduce emissions of contaminants and suspended solids to the environment, including:
 - During the transport and deposition of sediments;
 - For the management of dredged material and dewatering water.
- Mechanically dredge contaminated sediments using the dredging cone method or any other equivalent method that targets the contaminated sediments that need to be dredged.
 - Dredge an additional 30 centimetres around the area of contaminated sediment and manage it as contaminated sediment;
 - Use an impervious bucket when dredging contaminated sediment;
 - Minimize the distance between the dredge bucket and the barge to the lowest technically feasible distance when filling the barge;

- Once the dredging of the contaminated sediments is completed, carry out an additional dredging passage (clean-up passage) to recover contaminated sediments that may have settled on the bottom of the dredging cone;
- Complete a visual inspection of the particle size and colour of the dredged material from the dredging cone to verify that all contaminated sediments have been dredged.
- Delineate, before dredging begins, the areas in which dredging will be undertaken. The proponent shall not undertake any dredging outside these areas ;
- Carry out dredged sediment transhipment work over a watertight basin to recover the water and sediment discharged in order to avoid any release of dredged material or water from dredging into the aquatic environment;
- Identify and implement, in consultation with Environment and Climate Change Canada, mitigation measures to limit the risk of concrete or contaminant spills into the aquatic environment during the fabrication of concrete caissons on the submersible barge;
- Install and use a mobile treatment unit to treat the effluent from the contaminated sediment settling pond prior to discharge into the municipal sewer in order to comply with municipal regulatory obligations related to the quantity and quality of water discharged into the sewer systems and waterways on the territory of the agglomeration of Québec City;
- Develop, prior to the start of operations and in consultation with Environment and Climate Change Canada, a protocol for the characterization and management of sediments that will be dredged during maintenance dredging. In developing the protocol, the proponent must:
 - Identify how the proponent will carry out in situ characterization of the sediments to determine their contamination levels;
 - Determine the methods for the management and disposal of sediment, dredged material and dewatering water that the proponent will be able to implement during dredging based on the results of the characterization referred to in the condition;
 - Carry out, before the beginning of each maintenance dredging period, a characterization of the sediments to be dredged. The proponent shall identify and implement methods for the management and disposal of sediment, dredged material and dewatering water, taking into account the results of the characterization, to mitigate environmental effects on the aquatic environment.

Measures specific to surface water management

- Apply erosion and sedimentation control measures during all phases of the project in the project work area to limit the input of sediment to the aquatic environment during any activity associated with the project. The proponent shall:
 - Consider periods of flooding, heavy precipitation and frost when developing these measures;
 - Periodically maintain any measures implemented and repair any damaged measures in a timely manner.
- Capture runoff from the project during all phases of the project and treat runoff that does not meet the prevention provisions of the *Fisheries Act* before releasing it into the environment during all phases of the project.
- Promote the percolation of resurgent water into the soil during the excavation of contaminated soils.

- Clean equipment and vehicles that are likely to carry contaminated soil or sediment, in a designated washing area where water is collected and treated during all phases of the project.
- During the operation of the concrete manufacturing plant:
 - Capture runoff from the concrete batch plant site and direct it to the proponent's storm water system and install sediment traps in all catch basins;
 - Set up a watertight basin to recover the washing water from the production equipment of concrete structures for recycling in the process water;
 - Transfer the excess washing water to a water treatment basin by tanker truck;
 - Empty the sludge by dump truck and manage it off-site by a specialized firm.
- During the construction phase, clean the traffic lanes, particularly on the route used by dump trucks transporting contaminated dredged sediments to the dewatering basin (continuous use of a mechanical broom). Install sediment traps in all catch basins located along this route;
- Collect snow and dispose of it in an authorized location during all phases of the project;
- Install systems capable of recovering suspended solids and surface oils in each of the sumps on the new dock.

Specific measures for soil and groundwater management

- Take into account the *Canadian Soil Quality Guidelines* of the Canadian Council of Ministers of the Environment and the generic criteria for industrial soils set out in appendix 2 of the Intervention Guide - Soil Protection and Rehabilitation of Contaminated Sites of the Ministère de l'Environnement et de la Lutte contre les Changements climatiques du Québec before reusing any soil excavated as part of the designated project in order to respect the principle of non-degradation of soils. The proponent must:
 - Not reuse any excavated soil that exceeds the "C" criteria for industrial soil as set out in appendix 2 of the Guide d'intervention - Protection des sols et réhabilitation des terrains contaminés of the Ministère de l'Environnement et de la Lutte contre les Changements climatiques du Québec and dispose of such soil in an authorized location;
 - Not reuse any excavated soil to backfill the area of the back wharf and any other area located near the high-water mark.
- Respect the principle of non-degradation of soils:
 - Do not increase contaminant concentrations in soils, even if current concentrations are below the CCME Canadian Soil Quality Guidelines (CSQG) thresholds;
 - Any excavated soils that are reused on site must contain concentrations lower than CCME and MELCC criteria (industrial use), and concentrations lower than those measured in the soils in the backfill areas;
 - Manage soils with concentrations of a substance in excess of background levels to avoid disposing of them near an aquatic environment.
- Backfill the area of the back wharf or other areas near the high-water mark (recurrence of 2 years of pre-project) with dredged sediments with concentrations below the Occasional Effects Concentration (OEC) and materials of terrestrial origin, including soils, whose quality meets Criterion A;

- Do not use on the QPA's property any soil excavated as part of the upgrading work on the used snow disposal site carried out by the City of Québec, even if this soil meets the criteria established by the QPA for reusing soil excavated as part of the Laurentia project;
- Continuously backfill exposed soils or cover them with waterproof tarps as soon as the work is completed (daily) to limit the possibility of wind erosion or rain leaching;
- Use biodegradable oils in the equipment used for backfilling the backshore;
- Design contaminated sediment dewatering and recovery ponds to ensure sufficient capacity for the storage of contaminated sediment during the work, as well as to ensure the watertightness and stability of the structures;
- Provide a watertight dumpster for trucks used to transport contaminated sediment from Pier 49 to Parcel 3;
- Cover the surface of the back wharf with asphalt or concrete and install a storm sewer system on the back wharf;
- Design the stormwater collection system based on-site requirements and applicable best practices. Subdivide the entire terminal watershed into containment zones to isolate a specific area in the event of a hazardous material spill. Provide each containment area with an oil, water and sediment separation device with downstream shutoff valves to prevent discharge to the river.

Specific measures during temporary work site closure

- Stabilize and temporarily protect the disturbed soils presenting a risk of erosion and sediment transport to the aquatic environment, using methods adapted to the site, the duration of the work site closure and the period of the year;
- Ensure that the measures deployed to limit the intake of sediments from the work site to the aquatic environment function adequately and that they are maintained before the work site closure.

Need for follow-up and follow-up requirements

Under the *Canadian Environmental Assessment Act* (CEAA, 2012), a follow-up program means a program verifying the accuracy of the environmental assessment of a designated Project and determining the effectiveness of any mitigation measures. The Agency is of the view that no follow-up program would allow a sufficient reduction of the uncertainties related to the Project regarding fish and fish habitat, including aquatic invertebrates, to ensure that the Project would not have a significant effect. However, for the effects that could be mitigated, the Agency recommends the follow-up program below, which would make it possible to judge the effectiveness of the mitigation measures.

- Monitoring of suspended solids in the aquatic environment:
 - Develop, prior to construction and in consultation with Environment and Climate Change Canada, a plan to monitor suspended solids generated by the project. As part of the implementation of this follow-up:
 - Establish baseline conditions for the work area in terms of turbidity and ambient levels of suspended solids prior to the start of dredging and backfilling of the backshore area;

- Calibrate the turbidity-suspended-matter curve established by the proponent on-site, when dredging and backfilling of the backshore begins, to ensure that it is representative of conditions in the work area at the time of the work;
 - Monitor, during dredging and backfilling of the backshore, maximum variations in suspended solids concentrations using turbidimeters positioned according to the progress of the dredging and backfilling work;
 - Position the turbidimeters according to the progress of dredging and backfilling of the backshore in order to capture the maximum variations in suspended solids (SS) concentrations;
 - If the suspended solids requirement in the receiving environment is exceeded, implement additional measures such as reducing the opening speed of the discharge valves on the hydraulic dredge or reducing the discharge speed of the dredge pumps.
- Monitoring during hydraulic dredging to ensure continuous monitoring of sediments that are pumped into the settling basin to prevent dredging of contaminated sediments:
 - Gradually characterize the sediments that would be hydraulically dredged using a bucket, 48 hours prior to dredging, for each parcel or surface unit to be dredged in order to validate that these are non-contaminated sediments.
 - Continuously monitor sediments pumped into the settling basin during hydraulic dredging for signs of contamination. If such contamination is discovered and in consultation with the relevant authorities, determine and implement solutions including complete removal by additional dredging or dredging and capping of the residual contaminated area.
 - Monitoring of effluent from the uncontaminated sediment settling pond:
 - Perform daily monitoring of suspended solids concentrations at the settling pond weir;
 - Develops and implements mitigation measures in the event that alert thresholds are exceeded.
 - Monitoring of contaminated sediment dewatering ponds:
 - Monitor, through dewatering pond sampling and laboratory characterization following sample settling, the quality of water from the dewatering ponds, including water quality parameters related to the minimum requirements for discharge to the City of Québec sanitary sewer;
 - Conduct sampling on a daily basis, unless monitoring demonstrates that water quality meets the minimum requirements over a period of at least two weeks, in which case the proponent shall conduct sampling on a weekly basis;
 - Develop and implement mitigation measures if monitoring results show any exceedance of the minimum requirements for discharge to the City of Québec sanitary sewer.
 - Monitoring runoff water to ensure that temporary facilities are in good condition and efficient and that runoff water meets criteria:
 - Monitoring the concentration of suspended solids and petroleum hydrocarbons (C10 to C50) in the storm system outlet of Parcel 4;
 - Monitor the concentrations of suspended solids, petroleum hydrocarbons (C10 to C50) and pH at the end of the stormwater system in the block where the concrete plant will be located;

- Develop and implement modified or additional mitigation measures if monitoring results show exceedances of the established criteria.
- Soil and groundwater quality monitoring:
 - During the construction and operation phases, develop and implement a groundwater quality monitoring program using the six observation wells installed upstream hydraulically from the new facilities and additional observation wells in the newly developed areas. The following parameters will be monitored at least twice a year: petroleum products (HP (C10-C50), F1-BTEX, F2-F4, PAHs and VOCs), pH, sulfide, phenolic compounds, available cyanides, PCBs, ammonia nitrogen, chlorides, total fluoride, phthalates and finally metals and metalloids. Integrate the results into the proponent's annual monitoring program;
 - Develop and implement modified or additional mitigation measures if monitoring results show exceedances of established criteria.
- The proponent shall submit to the Agency, the competent authorities and the First Nations, at the end of construction, a report on the management carried out by the proponent during construction of contaminated and non-contaminated soils and dredged sediments. The proponent shall submit the following information:
 - A balance sheet of contaminated soils disposed of off-site (including volume, source, location of disposal, environmental quality and carrier used);
 - A balance sheet of non-contaminated soils moved and reused in the work area (particularly in terms of volume and environmental quality);
 - An assessment of the sediments dredged and managed in the construction site area (in particular in terms of volume and environmental quality);
 - A map(s) of the work area showing the location of soils and sediments.

5.5 Birds and Their Habitats, Including Endangered Species

The Agency is of the opinion that the Project is not likely to cause significant adverse residual environmental effects on birds and their habitats and on bird species at risk, taking into account the application of the recommended mitigation, offset, monitoring and follow-up measures. Habitat loss, noise and traffic disturbance, and unintentional mortality from collisions with overhead structures are potential effects of the Project on birds. In particular, the project could have adverse effects on shorebirds during the spring and fall migration periods because resting habitat would be lost. However, an offset program could reduce the adverse effects of these losses. With regard to the bank swallow, the installation of artificial nesting boxes would allow the species to continue to nest in the area, provided that the sustainability of the nesting boxes is ensured.

The following subsections present the information the Agency considered in its analysis in order to reach conclusions on the significance of the effects of the Project on birds, including species at risk, and their habitats, as well as the advices and comments of provincial and federal government departments, First Nations consulted and the public.



5.5.1 Description of the component "birds, including species at risk, and their habitats"

The analysis of the effects on birds and their habitats component takes into consideration both migratory⁴⁵ and non-migratory⁴⁶ birds and their habitats. The Agency considered the birds listed on Schedule 1 of the *Species at Risk Act* and for which the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommends a status. Species designated or likely to be designated under Québec's *Act respecting threatened and vulnerable species* were also considered.

The area selected by the proponent to assess the effects of the Project on birds and their habitats is designated as the study area (SA) as shown in figure 3, chapter 1. However, the proponent described only the habitats present in the work area (Englobe, 2020x). Due to its urban and industrial character, only 3% of the work site area has natural terrestrial environments. These habitats consist of grasslands, shrubbery, man-made wastelands, urban parks, maintained grounds and a beach (Englobe, 2018c). Environment and Climate Change Canada confirms that no critical habitat designated under the *Species at Risk Act* is present in the study area.

With respect to wetlands, a detailed description is provided in section 5.3 (Wetlands). These wetlands are important habitats for birds and are part of both an Important Bird Area and a Waterfowl Concentration Area. Environment and Climate Change Canada notes that the banks of the St. Lawrence River and the southwest embayment to the Beauport sector are important spring and fall staging areas for many species of waterfowl.

The use of the work area by birds, including special-status species, during the wintering, nesting and spring and fall migration periods was described by the proponent based on existing documentation and inventories conducted in 2015, 2016 and 2018 (Englobe, 2020x).

During the summer period, 46 species were identified in the inventories and the proponent estimated the number of breeding pairs to be 135 in the work area. The spotted sandpiper and the killdeer are the only shorebirds believed to breed in the area. According to the proponent, the southwestern embayment with its intertidal marsh would have favourable habitat for waterfowl chick rearing. Mallards have been confirmed as breeders, while northern shoveler, gadwall and the Red head are possible breeders. Among landbirds, 16 bird species are classified as probable or possible breeders. These are mostly passerines which prefer open habitat, edge habitat or disturbed wasteland environments (Englobe, 2018c).

The work area would be used by other avian species for feeding or resting. Some of these species would be late migrants, such as the semipalmated sandpiper and semipalmated plover, while others would nest elsewhere but use the work site area for feeding purposes, such as the chipping, northern cardinal and northern woodpecker (Englobe, 2018c).

According to Environment and Climate Change Canada, in the 1970s and 1980s, the Baie de Beauport area was frequented from mid-July to the end of October by several thousand shorebirds. However, the abundance of the species in this family of birds has declined by about 40 % in recent years (NABCI, 2019) and the site is used much less now. The presence of five shorebird species during spring migration and ten species during fall migration has been confirmed by the proponent. The most numerous species are the

⁴⁵ Migratory Birds: birds protected by the *Migratory Birds Convention Act* and listed in the schedule to that Act.

⁴⁶ Non-migratory birds: birds that are not protected under the *Migratory Birds Convention Act*.



semipalmated plover, tiny sandpiper, semipalmated sandpiper and spotted sandpiper. Most of the shorebirds that were observed in the downstream portion of the southwest inlet on the rocky beach, where they went resting or feeding.

With regard to the habitats of the southwest embayment, they are used mainly by waterfowl and other aquatic birds. In the spring, snow geese are by far the most abundant species, while in the fall, the main species observed are the mallard, black duck, blue-winged teal and green-winged teal. During the spring migration, 24 species of passerines were observed in the terrestrial environments along with northern flickers, rock pigeons, mourning doves and turkey vultures. Finally, some species, such as the black-capped chickadee, blue jay and American crow, are considered resident species; they use the habitats in the work area year-round (Englobe, 2018c).

Species at risk

With respect to bird species at risk, the proponent carried out an analysis of the potential for their occurrence in the work area (Englobe, 2018c). Three species have a high potential for occurrence and 12 have a medium potential (table 13).

The presence of the common nighthawk during the nesting period was confirmed in 2015 during an inventory conducted for the project, but not during later inventories in 2016 and 2019. This species breeds in a wide range of open habitats and lays its eggs on bare ground. The open habitats present in the work area meet the species nesting requirements (Englobe 2020x).

A colony of bank swallows nests each year in the steep slopes of the beach and the southwest embayment of the Port of Quebec. The proponent built a nesting box for bank swallows in 2015 very close to the nesting site. This artificial nesting box plays an important role in the success of this colony. Since this nesting box was located in the planned work area, a new nesting box was built in 2018 to offset the destruction of the natural nesting site and the nesting box built in 2015 which had to be relocated. Monitoring of this new nesting box (2018) has shown that it is used intensively by swallows. In 2019, the 2015 nesting box infrastructure was moved to a location near the 2018 nesting box (Englobe, 2020x).


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Table 13 Status bird species potentially present on the project site

| Species Common name | Potential | Confirmed presence in the construction zone | Status | | |
|-------------------------|---|--|---------------------------------|-----------------------|--|
| | | | SARA ⁴⁷ (Schedule 1) | COSEWIC ⁴⁸ | Provincial ⁴⁹ |
| Common nighthawk | High | Breeder observed in 2015, but not in 2016 and 2019 | Threatened | Special Concern | Likely to be designated threatened or vulnerable |
| Bank swallow | High | Yes, colony present on the site | Threatened | Threatened | No status |
| Barn swallow | High: Due to the presence of buildings and wetlands. Occurrences in the Beauport sector | No | Threatened | Threatened | No status |
| Hudsonian godwit | Medium: Only on the shores of the St. Lawrence River during migration. Records exist from Pointe de Maizerets. | No | No status | Threatened | No status |
| Whip-poor-will | Medium: Some habitats in the construction area could be favourable for this species. Records exist from Boisé Chevalier, a woodland in Beauport. | No | Threatened | Threatened | Likely to be designated threatened or vulnerable |
| Peregrine falcon | Medium: Reported presence within the port area. Bunge grain silo conducive for nesting. Records exist from near the construction area. | No | Special concern | Not at risk | Vulnerable |

⁴⁷ Species at Risk Act

⁴⁸ Committee on the Status of Endangered Wildlife in Canada

⁴⁹ Act respecting threatened or vulnerable species (Québec)


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| Species Common name | Potential | Confirmed presence in the construction zone | Status | | |
|---|--|--|---------------------------------|-----------------------|--|
| | | | SARA ⁴⁷ (Schedule 1) | COSEWIC ⁴⁸ | Provincial ⁴⁹ |
| Barrow's goldeneye, eastern population | Medium: No nesting potential. Could be present during migration. | No | Special concern | Special concern | Vulnerable |
| Short-eared owl | Medium: Observations exist from the Maizerets Domaine area. | No | Special concern | Special concern | Likely to be designated threatened or vulnerable |
| Chimney sweep | Medium: Southwest embayment and river banks can provide feeding habitat. Several records exist from near the work area. | No | Threatened | Threatened | Likely to be designated threatened or vulnerable |
| Canadian warbler | Medium: Records exist from near the work area. | No | Threatened | Threatened | Likely to be designated threatened or vulnerable |
| Red-necked phalarope | Medium: Could use the southwest embayment during migration period. Some records exist from Baie de Beauport. | No | Special concern | Special concern | No status |
| Eastern wood pewee | Medium: Some records, but the species' preferred habitats are not present in the work area. | No | Special concern | Special concern | No status |
| Bald eagle | Medium: No preferred habitat in the construction area. Some records exist from near the work area. | No | No status | No status | Vulnerable |
| Rusty blackbird | Medium: Potential habitat on the edge of the | No | Special concern | Special concern | Likely to be designated threatened or vulnerable |


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| Species Common name | Potential | Confirmed presence in the construction zone | Status | | |
|------------------------|---|---|---------------------------------|-----------------------|--------------------------|
| | | | SARA ⁴⁷ (Schedule 1) | COSEWIC ⁴⁸ | Provincial ⁴⁹ |
| | southwest embayment. Records exist from near the work area. | | | | |
| Caspian tern | Medium : Could use the work area during migration. | Yes, observed in 2015 during the migration period in the Baie de Beauport. No nesting potential. | No status | No status | Threatened |



5.5.2 Analysis of potential effects and proposed mitigation measures

According to the proponent, site preparation, the construction of the various port infrastructure, sediment dredging and management, the use of machinery and the development of land and rail transportation routes would have an impact on birds and their habitats during the construction phase. In the operational phase, the presence of the wharf and the rear wharf including the noise barrier, port operations, stormwater and wastewater management, land and marine traffic as well as maintenance dredging and sediment management could have an impact on birds and their habitats. The effects would be due to habitat loss and disturbance, noise and traffic disturbance, and the risk of mortality in the event of collision with structures (Englobe, 2020x).

Habitat loss and disturbance (without numbering)

According to the proponent, Project encroachment would result in a permanent loss of bird habitat of 7.5 hectares (figure 9). Affected habitats would be shrubbery (1.4 hectares), grassland (0.4 hectares), anthropogenic and recreational areas (3.2 hectares), and the pebble-sand beach (2.5 hectares). However, the proponent does not foresee any encroachment on or modification of wetlands (section 5.3). An encroachment of 13.7 hectares in the aquatic environment is nonetheless planned (Englobe, 2020x).

Effects of habitat loss or disturbance during the nesting season (without numbering under "habitat loss and disturbance" subsection)

During the nesting period, the proponent estimates that no more than five breeding pairs that use open habitat or transitional habitat would be affected by the loss of habitat caused by the linear infrastructure and the development of dewatering basin for contaminated sediment. On the shoreline, project-related habitat losses would affect approximately two breeding pairs of sandpipers and possibly one pair of mallards. Finally, the transformation of 1.8 hectares of human-modified environments could affect ten pairs of breeding birds, including the song sparrow and the rusty blackbird (Englobe, 2020x).

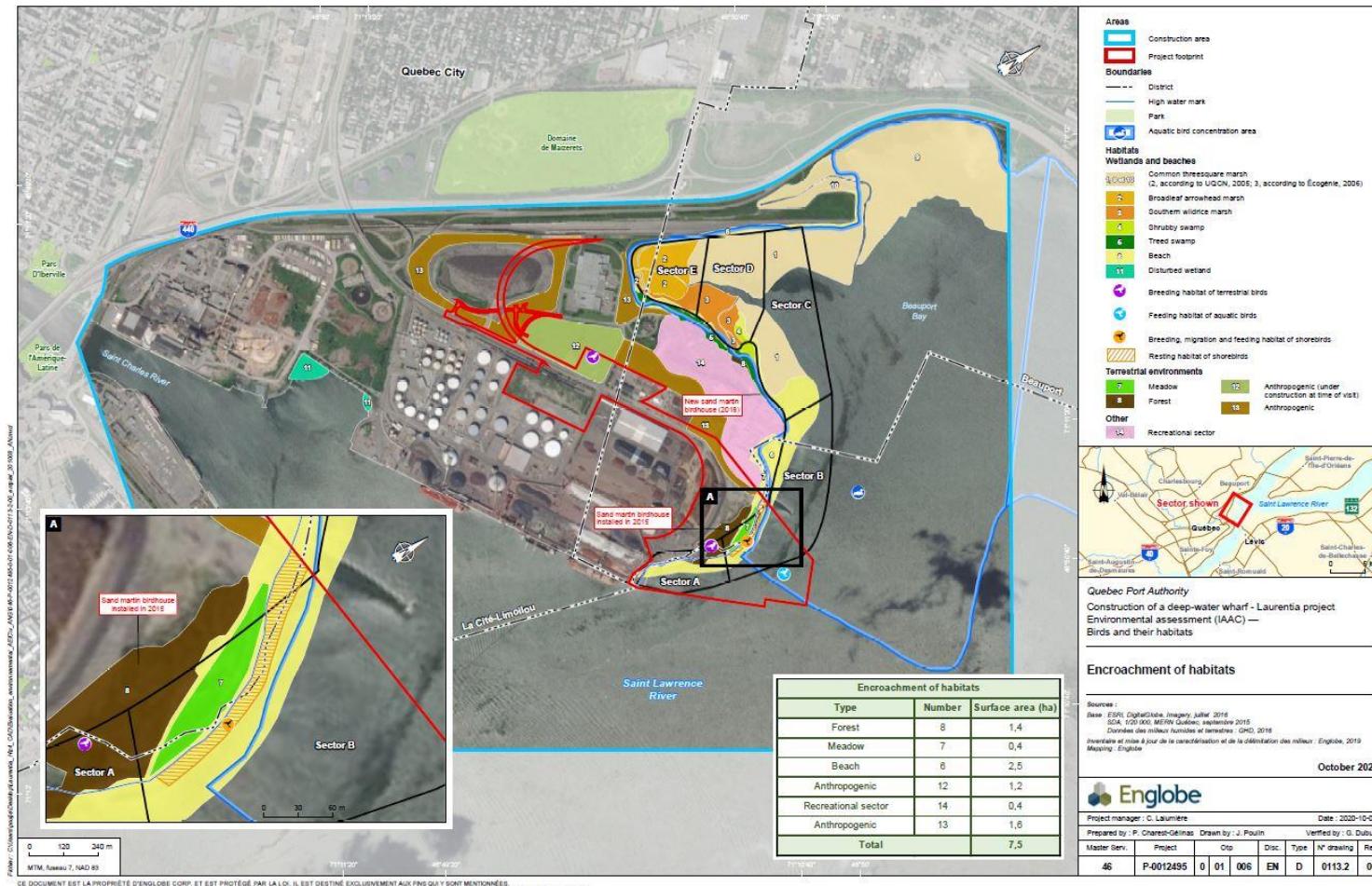
The dozen nests in the bank swallow colony on the eroded slopes of the beach would be destroyed by the encroachment of the Project. However, since the effectiveness of using an artificial nesting box to offset for the loss of natural habitat has been demonstrated since 2015, no net loss of nesting habitat is expected to occur in the Project. The proponent has undertaken to continue its follow-up and maintenance program to ensure the sustainability of this nesting box for bank swallows. The proponent plans to cover the piles of stored granular material with a tarp to prevent bank swallows from using them for nesting (Englobe, 2020x). Environment and Climate Change Canada is concerned about the proponent's proposed *Trame Verte* (Englobe, 2020x) which could have adverse effects on bank swallows that use artificial nesting boxes. Planting trees near the nesting boxes could provide cover that would favour the presence of predators (falcon, hawk) and allow them to attack swallows. Environment and Climate Change Canada therefore recommends that the immediate area around the bank swallow boxes remain open and free of vegetation.

With regard to the common nighthawk, following the targeted inventories in 2016 and 2019, the proponent estimates, that the work area does not have any nesting habitat for this species. However, the proponent's monitoring program does include monitoring for the presence of this species in order to intervene in a timely manner if an individual decides to nest in the work area (Englobe, 2020x).



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Figure 9 Project encroachment onto the different types of bird habitat on the project site and location of the swallow nesting box



Source: Englobe, 2020x



The high potential for the presence of the barn swallow is associated with man-made structures such as docks, buildings, bridges, etc., together with wetlands in the vicinity of the work area. However, no individuals of this species were observed during the inventories. With respect to the chimney swift and the peregrine falcon, individuals were observed flying over the work area, but no nesting was observed. Consequently, the proponent does not anticipate any effect on these three species at risk (Englobe, 2020x).

Site preparation and infrastructure construction would require tree clearing and brush removal on 3.6 hectares of land. These activities would take place before mid-April to avoid the nesting period and a verification of the presence of active nests would be carried out by an ornithologist before the activities begin. Thus, if a nest is discovered, a buffer zone would be established to allow the bird to complete its nesting cycle. The work can only be carried out once an ornithologist has confirmed that the chicks have left the nest and the surrounding area.

Environment and Climate Change Canada is satisfied with the proponent's description of the potential environmental effects. It has pointed out, however, that the loss of nesting and feeding habitat would have potential effects, particularly on breeding pairs that would have to relocate to similar habitats nearby, if available. If these habitats become more scarce, this could increase the density of birds in the same habitat and lead to a scarcity of resources and an increase in predation. The Department also points out that habitat destruction and degradation contribute directly or indirectly to the decline of some more vulnerable species. Some pairs of birds will succeed in establishing themselves elsewhere, while others will not be able to, because of their greater vulnerability to disturbance of their breeding habitat, intra- and interspecific competition or predation.

Effects of habitat loss or disturbance on migrating birds (not numbered under "habitat loss and disturbance" subsection)

During the migration period, backfilling of the rear wharf would result in permanent habitat losses of habitat affecting the beach (2.5 hectares) and the aquatic environment (13.7 hectares), which are habitats used by many waterbird species during spring and fall migration. One end of the waterfowl concentration area would be affected by this encroachment.

Specifically, backfilling of the rear wharf would result in permanent loss of the sand-cobble beach, which provides habitat for shorebirds during spring and fall migration. The area where sandpipers concentrate to the greatest extent during high tide is small and would be limited to the industrial and recreational beach. The loss of the 2.5 hectare area of beach would reduce the resting habitat available at high tide during shorebird migration by approximately 3,346 square metres. The proponent indicates that the resting area at high tide associated with the Baie de Beauport recreational beach would be maintained and available to shorebirds that use it as a feeding area. At the request of Environment and Climate Change Canada, the proponent has produced an analysis to document the availability of habitats required by shorebirds within an area corresponding approximately to the administrative limits of the Port of Quebec's aquatic zone. This analysis identified resting areas available within five kilometres of the Baie de Beauport feeding area. The proponent concludes that the permanent loss of resting habitats would not result in fragmentation of the functional unit comprising the Baie de Beauport feeding area, since other habitats are available nearby along the Côte de Beaupré and around Île d'Orléans. In light of this analysis, the proponent is not proposing offset project. However, it has proposed follow-up that would specifically involve assessing the use of the resting area of the recreational beach during the construction and operation of the Project (Englobe, 2020x).



Environment and Climate Change Canada is concerned about the permanent loss of spring and fall migration habitat (resting habitat) for shorebirds in relation to the loss of the sand-pebble beach. It is of the opinion that the proponent's estimate of the area of available habitat (feeding and resting) is too high, as the proximity of woodlands and the presence of rows of trees or areas of human disturbance means that some habitat would likely not be used because of the potential for predation and disturbance. Environment and Climate Change Canada emphasizes the importance of providing resting habitat at high tide for shorebirds, as they use it until feeding habitat becomes available again with the falling tide. Feeding habitats are less likely to be used if there is no resting habitat nearby.

Environment and Climate Change Canada is of the opinion that some uncertainty persists regarding the effects of the loss of quiet areas of the industrial beach on shorebird species. Given the general decline in shorebird numbers in recent years, it recommends that the principle of no net loss be applied and that specific offset measures for shorebird resting sites at high tide be developed. The Department believes that, contrary to the proponent's position, it is unlikely that the portion of the beach located in the recreation and tourism zone will still be available for shorebirds following construction of the wharf and the rear wharf, since shorebirds are likely to avoid using this section of the beach because of the disturbance associated with recreational activities.

Disturbance from noise, traffic and night lighting (without numbering)

Activities associated with the construction of the facilities, including transportation and traffic, would cause significant increases in noise levels at the periphery of the work area. Certain construction activities, such as the use of heavy machinery and pile driving, would generate more noise during the construction phase and could disturb the activities of certain bird species, including nesting. According to the proponent, the noisy work could cause stress for nesting birds as well as the abandonment of nests and the displacement of nesting pairs to other areas. This could affect the reproduction of certain birds and create intraspecific competition for nesting territory if they move to less noisy sectors. The proponent indicates that the sector in which the Project is located is already noisy and that the birds frequenting the surrounding environment have adapted to the disturbance and noise. The main species that would be affected by this effect are aquatic birds, such as gulls, waterfowl and shorebirds. Disturbance of the noise climate could disturb these birds that frequent the area surrounding the construction site, especially near the sand-cobble beach during the periods of greatest use, i.e. the fall migration period of shorebirds (Englobe, 2020x).

During the operations phase, the main effect on birds would be disturbance from routine activities such as transhipment, storage, handling and traffic, as well as from night lighting and maintenance work. According to the proponent, the disturbance effects would be similar to those during the construction phase, but on a smaller scale due to the limited transmission of noise. The proponent indicated that the noise level during project operation would not compromise the use of nearby habitats by birds during the nesting period or spring and fall migration periods (Englobe, 2020x).

According to the observations made by the proponent during monitoring of the artificial nesting boxes for bank swallows in 2019, noise disturbance from port activities does not seem to modify the behaviour of the swallows. The proponent also indicated that the success rates calculated for the new nesting box during the 2019 inventory suggest that the colony of bank swallows is adapted to the noise and light conditions associated with the industrial port zone that have existed in this sector for several decades (Englobe, 2020x).

Finally, the mitigation measures (Englobe, 2020r) designed to reduce noise for the human population would also benefit birds. Environment and Climate Change Canada recommends continuing the monitoring



already begun, considering the recent installation of nesting boxes and their monitoring, as this would also be useful for addressing any remaining uncertainty regarding the noise disturbance effects of the project on bank swallows.

Risk of mortality from collision with structures (without numbering)

During the operating phase, the height of the cranes (86 metres) and the attractive effect of the lights present on such high structures are of concern to Environment and Climate Change Canada, which has asked the proponent to further document this issue and take it into account in its analysis. These structures could have impacts on birds that fly into them, particularly during migration periods and especially in the presence of fog. Light pollution can disorient migratory birds and this type of pollution causes thousands of fatal collisions with man-made structures each year.

According to the proponent, nighttime deaths are often caused by collisions with structures, mostly guy wires (a bar or cable used to hold them in place), or glass surfaces, which are more difficult for birds to see. The proponent indicated that red light, commonly used on towers and other tall structures, is believed to interfere with birds' ability of birds to follow geomagnetic cues. It would therefore be advisable to avoid the use of such lights and to install shields above the lights to prevent scattering of light skyward.

The proponent indicated that, during container unloading activities, the four gantry cranes would be in operation approximately 53 % of the time; the proponent undertook to turn off the lighting system when the cranes are not in use. Finally, according to climate data for Jean-Lesage Airport for the period between 2009 and 2019, fog and reduced visibility conditions occurred for periods ranging from 54 to 114 hours annually, or 0.6 to 1.3 % of the time. The proponent points out that these data must be interpreted with caution, however, since fog conditions may be more frequent along the St. Lawrence River. The proponent considers that bird mortality resulting from collisions with structures would be low due to the absence of guy wires and large areas of reflective glass portal cranes lighting will only be on when the cranes are in operation. Finally, the proponent undertakes to monitor bird mortality at the port site resulting from collisions with structures and to take corrective action if necessary (Englobe, 2020x).

5.5.3 Agency analysis and conclusions on residual effects

Effects analysis

The Agency concludes that the Project is not likely to cause significant adverse effects on land or water bird species with healthy and resilient populations, provided that all key mitigation measures are implemented in a timely manner. The Agency relies on the advice of Environment and Climate Change Canada in reaching this conclusion.

However, uncertainties remain regarding the potential effects of the Project on shorebirds. Indeed, shorebirds have experienced large population declines in recent years and any loss of habitat may have consequences for them. In this regard, Environment and Climate Change Canada has pointed out the uncertainties relating to the quality and use of replacement habitats in the area adjacent to the Project and on a regional scale given their relative scarcity in the study area. The permanent nature of the losses caused by the Project adds to these uncertainties. Finally, although the proponent refers to voluntary initiatives to which it has committed, including the Québec Metropolitan Community's *Trame Verte*, it is not currently possible to assess the extent to which these initiatives would help mitigate the Project's effects on shorebirds. For these reasons, and to ensure that the project does not cause significant adverse

environmental effects on shorebirds, the Agency is of the opinion that offset measures specific to high tide rest areas for shorebirds must be put in place.

Analysis of harmful effects on species at risk

The Agency notes that the Project, as proposed, could affect five bird species listed on Schedule 1 of the *Species at Risk Act* as "threatened": the bank swallow, common nighthawk, barn swallow, chimney swift and peregrine falcon.

The Agency is of the opinion that the Project is unlikely to have adverse effects on barn swallows, chimney swifts and peregrine falcons since these species do not nest in the Project work area and the only observations of chimney swifts and peregrine falcons consisted of individuals flying over the Port of Quebec.

In the case of the bank swallow, the installation of artificial nesting boxes allowed the species to reproduce and continue to use this habitat provided that the proponent ensures the sustainability of the nesting boxes over time by continuing to monitor and maintain them. The Agency recommends continuing to monitor the use of the nesting boxes in view of their recent installation, and to address any remaining uncertainties regarding the noise disturbance effects of the Project on this species.

The common nighthawk was not observed during the 2016 and 2019 inventories. However, bare ground areas could attract these birds during the nesting period. In keeping with the recommendation of Environment and Climate Change Canada, the Agency is of the opinion that monitoring this species during the construction and operational phases, as well as the implementation of measures in the event that nesting is observed, would ensure that the species is not harmed.

Agency findings

Following its analysis and based on the assessment criteria presented in appendix A, the Agency concludes that the Project is not likely to cause significant adverse environmental effects on birds, including species at risk, and their habitats (appendix B), taking into account the application of the key mitigation measures described below. Habitat loss, noise and traffic disturbance, and potential mortality from collisions with structures could be potential effects of the Project on birds. The Agency concludes that the level of significance of the effects would be moderate for the following reasons:

- The magnitude of the Project's residual effects on birds, including species at risk, and their habitats, would be low since the shorebird offset Project would reduce effects during migration and the bank swallow nesting box, if it is permanent, would allow the species to continue to use the area during the nesting period. No other species would be impacted in a way that would affect an important phase of its life cycle;
- The Project would result in residual effects that would be local in scope and long term in duration, since the habitat losses would be permanent and their effects would be felt indefinitely;
- The residual effects of the Project would be irreversible and would occur continuously since the habitat losses are permanent.

Determination of key mitigation measures

The Agency has identified the key mitigation measures required to ensure that the proposed Project does not cause significant adverse residual environmental effects on birds, including species at risk, and their



habitats. It has taken into account the mitigation measures proposed by the proponent (Englobe, 2020r), the advice of government authorities, as well as the comments received from First Nations consulted and the public. These measures are as follows:

General measures:

- Put measures in place to protect birds and to avoid harming, killing or disturbing migratory birds or destroying, disturbing or taking their nests and eggs. In this regard, the proponent shall follow Environment and Climate Change Canada's *Avoidance Guidelines* in order to reduce the risk to birds. The measures that the proponent implements as part of the designated Project are in compliance with the *Migratory Birds Convention Act, 1994*, the *Migratory Birds Regulations* and the *Species at Risk Act*. These include, but are not limited to the following:
 - Determine breeding season dates, for years in which activities that could affect nesting are carried out;
 - In the case of a nest discovered by chance, or during an inventory carried out by an ornithologist, to avoid destroying the nest any eggs it may contain (incidental take), define a protective buffer zone appropriate to the species, where no work will be authorized until the chicks have permanently left the vicinity of the nest.
- During construction and operation, maintain the nesting boxes in a condition that allows them to be used by shore martins, in particular by keeping the area around the nesting box open.

Shorebird resting habitat offset Project:

- The proponent shall develop, in consultation with Environment and Climate Change Canada, and shall implement offset measures for shorebird resting habitat prior to the construction phase. According to Environment and Climate Change Canada's *Operational Framework for the Use of Conservation Allowances*, if it is not possible to implement the offset measures before adverse effects occur, the best option is to implement offset measures during the construction phase at the same time as the activities that would result in adverse effects. Thus, it is recommended that the principle of no net loss be applied and that specific offset measures for high tide resting areas for shorebirds be developed and implemented. The proponent shall submit the measures to the Agency and appropriate authorities for review and comment prior to implementation;

Need for follow-up and follow-up requirements

A follow-up program is required in order to verify the accuracy of the environmental assessment and to determine the effectiveness of the mitigation measures to avoid harm to birds, including species at risk.

The Agency considers that the follow-up program should include the following elements:

- Identify activities or operations that may have an effect on birds, including species at risk, and for each of these, determine the measures to be put in place to ensure that the nuisance or disturbance is minimized, particularly during the nesting period. The monitoring program will have to pay particular attention to bird species at risk, including the common nighthawk and the bank swallow, which are likely to use certain areas of the Project site, particularly areas where there is no vegetation;

- Develop and implement a management plan in the event of bird mortality or abnormal bird behaviour. Should such events or situations occur, the proponent shall contact the Canadian Wildlife Service of Environment and Climate Change Canada and take appropriate corrective action;
- Follow up on status updates for bird species monitored and identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and listed under the *Species at Risk Act*;
- Put in place additional measures to mitigate the effects of the Project on affected species in the event that the status of a species changes during the implementation of the monitoring program.

Tracking for shore swallows:

- Continue to monitor the bank swallow nesting boxes to ensure the continued success of their use by the species during the construction and operational phases. Monitoring must be done over a sufficiently long period of time to ensure that the colony is maintained over the long term. Monitoring should, at a minimum, be annual during the construction phase and during the three years following construction, and every five years thereafter throughout the life of the Project's operation;
- Develop and implement follow-up to determine whether noise generated by the construction work and the new terminal's operations is having an adverse environmental effect on the species and implement corrective measures if required.

Monitoring of the shorebird offset Project:

- Develop, in consultation with Environment and Climate Change Canada, and implement follow-up of the offset project for shorebirds to ensure its success and implement corrective measures if required.

5.6 Other Species with Special Status

The Project may have residual effects on special status species other than those described in sections 5.4 (Fish and Fish Habitat) and 5.5 (Birds and Bird Habitat). The Agency is of the opinion that the Project would not cause significant adverse residual environmental effects on other special status species, taking into account the application of the mitigation and follow-up measures recommended below. The following subsections present the information considered by the Agency in its analysis, including the advices and comments of the expert departments, First Nations consulted and the public.

5.6.1 Description of the component "other special status species"

This analysis focuses on species with special status, i.e. species that benefit from legal protection or that are considered under federal and provincial legislation, such as the *Species at Risk Act* and the Québec *Act respecting threatened or vulnerable species* (QARTOVS), or for which the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommends a status under SARA, as well as species likely to be designated under the Québec *Act respecting threatened or vulnerable species*.

The study area selected by the proponent to assess the effects of the Project on special-status fauna and flora is the construction zone (figure 3, chapter 1). A description of the habitats in this area is summarized in sections 5.3 (Wetlands) and 5.5 (Birds and their Habitats).

The proponent has conducted an analysis of the potential presence of species with precarious status (appendix 8.1 of Englobe, 2018b) in the work area (table 14), which identified six species of vascular plants with special status (Victorin's Tiger Beetle, Parker's Eriocaulon, Ochraceous Strophostyle, Dwarf Zizania, Victorin's Gentian and Canada Lily), two terrestrial mammals (Pygmy Weasel and Grey Bat), five arthropods (Broad-spotted Trechin, Two-spotted Beetle, Nine-spotted Beetle, Fritillary and Monarch) and three reptiles (Green Snake, Map Turtle and Snapping Turtle) with high or medium potential. This analysis was based on the habitat criteria of each species whose range overlaps with the site area. The inventories carried out by the proponent targeted Victorin's gentian and Victorin's hawk beetle var. *victorinii* as well as birds and turtles.

Table 14 : List of special status species other than those described in sections 5.4 and 5.5

| Species | Potential | Inventories carried out for the Project | Location | | |
|---|---|--|---------------------------------|-----------------------|--|
| | | | SARA ⁵⁰ (Schedule 1) | COSEWIC ⁵¹ | QARTOVS ⁵² |
| Vernacular name (Scientific name) Type of species | | | | | |
| Victorin's Cicutaire <i>(Cicuta maculata var. victorinii)</i> Vascular plant | High The construction zone includes a preferred habitat (spartan grassland) for this species in the southwest embayment . | GHD ⁵³ , 2015a No comments | Concerned | Concerned | Threatened |
| Eriocaulon de Parker <i>(Eriocaulon parkeri)</i> Vascular plant | High The work area includes a preferential habitat (spartan grassland) for this species in the southwest embayment . | No specific inventory | Not at risk | Not at risk | Threatened |
| Ochracer Strophostyle <i>(Strophostyles helvola)</i> | High | No specific inventory | Not rated | Not rated | Likely to be designated threatened or vulnerable |

⁵⁰ Species at Risk Act

⁵¹ Committee on the Status of Endangered Wildlife in Canada

⁵² Act respecting threatened or vulnerable species (Québec)

⁵³ GHD, 2015a. Result of the inventory to verify the presence of Victorin's gentian and Victorin's sharpshooter var. victorinii in Appendix B8 in GHD, 2016


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| | | | | | |
|--|---|----------------------------|------------|------------|--|
| Vascular plant | The work area includes preferred habitat (freshwater estuarine environments). A mention (QNHDC ⁵⁴) in 1999 in the Baie de Beauport sector. | | | | |
| Dwarf Zizanie <i>(Zizania aquatica var. brevis)</i> | High The QNHDC reports two mentions near the construction zone. However, the mentions are not recent. | No specific inventory | Not rated | Not rated | Likely to be designated threatened or vulnerable |
| Vascular plant | | | | | |
| Green Snake <i>(Liochlorophis vernalis)</i> | High Preferred habitat present in the work area (grassy areas near wet and bushy areas). According to the QNHDC, the species is present in the Capitale-Nationale region. | No specific inventory | Not rated | Not rated | Likely to be designated threatened or vulnerable |
| Reptile | | | | | |
| Victorin Gentian <i>(Gentianopsis virgata subsp. Victorinii)</i> | Medium The work area includes a preferential habitat (spartan grassland) for this species in southwest embayment . | GHD6, 2015a No comments | Threatened | Threatened | Threatened |
| Vascular plant | | | | | |
| Canada Lilies <i>(Lilium canadense)</i> | Medium Species associated with moist forests. Some areas of the work area could correspond to a habitat. | No specific inventory | Not rated | Not rated | Vulnerable to harvest |
| Vascular plant | | | | | |

⁵⁴ Centre de données du patrimoine écologique


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| | | | | | |
|---|---|--|-----------|-----------|--|
| Pygmy weasel <i>(Mustela nivalis)</i> Mammal | Medium Preferential habitat present near the southwest embayment, however the strong human presence limits its potential. No occurrence reported to the QNHDC within a 8 kilometres radius. | No specific inventory | Not rated | Not rated | Likely to be designated threatened or vulnerable |
| Grey bat <i>(Lasiurus cinereus)</i> Mammal | Medium Could take advantage of the isolated trees and the wooded and hunted area above the water bodies. No occurrences reported to the QNHDC within an 8 kilometres radius. | No specific inventory | Not rated | Not rated | Likely to be designated threatened or vulnerable |
| Map turtle <i>(Graptemys geographica)</i> Reptile | Medium Sectors favourable for the species present in the construction zone, notably the south shore of southwest embayment . Traffic on the Baie de Beauport beach reduces the chances that the species will use it as a nesting site. Mention at the Maizerets Domain. Important physical barrier by the Dufferin Montmorency highway. | GHD ⁵⁵ , 2015b No comments | Concerned | Concerned | Vulnerable |
| Snapping turtle <i>(Chelydra serpentine)</i> Reptile | Medium The species could use the dense herbaceous marshes of the southwest embayment. Only one mention in the Beauport tidal flats. | GHD6, 2015b No comments | Concerned | Concerned | No status |

⁵⁵ GHD, 2015. Wildlife inventories - birds and turtles in Appendix B10 in GHD, 2016


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| | | | | | |
|---|---|-----------------------|-----------|----------------|--|
| Wide scrap machine <i>(Trechus crassiscapus)</i> Insect | Medium The marshes of the southwest embayment could be favourable to the species. | No specific inventory | Not rated | Not rated | Likely to be threatened or vulnerable |
| Two-spotted ladybug <i>(Adalia bipunctata)</i> Insect | Medium This species has a preference for trees and shrubs rather than low plants. The construction site area includes this type of habitat. | No specific inventory | Not rated | Not rated | Likely to be designated threatened or vulnerable |
| Nine Point Beetle <i>(Coccinella novemnotata)</i> Insect | Medium The construction site area has preferential habitats for this species. | No specific inventory | No status | Endangered | Likely to be designated threatened or vulnerable |
| Mixed fritillary <i>(Euptoieta claudia)</i> | Medium The construction site area has preferential habitats for this species. | No specific inventory | No status | No information | Likely to be designated threatened or vulnerable |
| Monarch <i>(Danaus plexippus)</i> Insect | Medium The species is associated with milkweed and could use the plants that are in the construction area. | No specific inventory | Concerned | Endangered | No status |

The habitats that will be directly affected (habitat loss) by the Project are not conducive (disturbed habitats) to most species at risk with a high or medium potential presence in the work area. However, the southwest embayment is a rich and particular environment with intertidal marshes, freshwater estuarine environments and shorelines and has several characteristics of preferred habitats for several species at risk.

In terms of vascular plants, the southwest embayment could be home to special-status vascular plants such as Victorin's gentian, Parker's eriocalon, ochraceous strophostyle, dwarf weed, and Canada lily (Englobe, 2018b). In 2015, the proponent conducted inventories to determine if Victorin's sharpshooter and Victorin's gentian were present on their property in the Baie de Beauport sector (GHD and Consultants Ltd., 2015a). No specimens were observed during the surveys. Wetland and vegetation characterizations were also conducted in 2015 (GHD and Consultants Ltd. 2016a), 2016 (GHD and Consultants Ltd., 2016b) and 2019 (Englobe, 2019; appendix A) and did not identify any plant or wildlife species at risk.

For wildlife species, the baseline status is essentially based on existing documentation, and additional inventories were conducted to determine the presence of certain special-status species in the work area. Inventories were conducted in 2015 (GHD, 2015b. Wildlife inventories - birds and turtles in appendix B10 in GHD, 2016a) which targeted snapping and map turtles. The proponent has not identified or observed any wildlife species of precarious status in the work area (GHD, 2020g). No specific inventory of species at risk has been conducted since 2015. Environment and Climate Change Canada points out that although no incidental observations of wildlife species at risk were made during the characterizations of terrestrial and riparian habitats carried out in 2016 and 2019, it believes that it is not possible to rule out the possibility that one or more of these species may be present in the work area.

It is also important to note that during the proponent's characterization of the vegetation in 2019 (Englobe, 2019; appendix A), several invasive alien species were observed, some of which could be in competition with native species, particularly species with precarious status. However, according to the proponent, the majority of these invasive alien species have been identified in the anthropogenic wastelands surrounding the Québec City snow dump and the two other sectors bordering the Baie de Beauport recreational sector, an area that is heavily anthropized.

5.6.2 Analysis of potential effects and proposed mitigation measures

No potential effects are anticipated by the proponent on special-status wildlife and plant species during the construction or operational phases. The environments that will be completely destroyed (herbaceous and arboreal) are colonized by relatively common flora and no floral species with a precarious status have been identified. Moreover, these environments do not display habitat characteristics conducive to the presence of floral species with precarious status since they favour intertidal environments (Englobe, 2020e).

The Agency is concerned about the introduction and spread of invasive alien species that could compete with native species and degrade the quality of habitats in the southwest embayment. The proponent has raised this threat to native vegetation as a whole, but this threat could also affect habitats suitable for species at risk. For example, vehicle and construction machinery traffic and the transportation of granular materials could contribute to the introduction and spread of invasive alien species in the work areas, and thus adversely affect the quality of habitats favourable to species at risk.



With respect to wildlife species, the proponent points out that the habitats within the Project's footprint are also not very conducive to special-status wildlife species since they are composed of environments typical of industrial zones, particularly industrial wastelands that are poorly or not at all maintained. Although the aquatic environment contains more suitable habitat (particularly for fish), riparian environments would also be unlikely to be considered important habitats for a special-status wildlife species other than avifauna (Englobe, 2020g). Thus, the proponent mentions that should a special-status wildlife species inhabit the work area, the anticipated effects would be the same as those anticipated for terrestrial wildlife in general, i.e. the loss of 4.6 hectares of habitat and disturbance by noise (Englobe, 2018b and Englobe, 2020g).

The proponent proposes mitigation measures to reduce the effects on terrestrial and riparian environments (Englobe, 2020e) as well as on terrestrial wildlife and its habitat (Englobe, 2020r) that also target species at risk. Among other things, during the construction phase, measures include the revegetation of disturbed areas immediately after the end of the construction work to ensure rapid vegetation recovery and other noise-related measures aimed at reducing disturbance to terrestrial wildlife. The proponent is also planning mitigation measures to reduce the risk of introducing or spreading invasive alien species in the construction area.

5.6.3 Agency analysis and conclusions on residual effects

Effects analysis

The construction zone is an industrialized environment where mainly marginal, disturbed and small areas of habitat are found. No special status species was observed during the field visits conducted by the proponent. However, only four species at risk, the Victorin's shrew, Victorin's gentian, map turtle and snapping turtle, were the subject of targeted inventories. Uncertainty therefore remains as to the presence of the other special-status species. Environment and Climate Change Canada has raised these limitations in terms of the efforts and results of the inventories. However, it is of the opinion that avoiding work in wetlands is the best mitigation measure to reduce the risks of adverse effects on potentially present amphibian and plant species at risk and their potential habitats.

Analysis of harmful effects on species at risk

According to the Victorinian Gentian Recovery Strategy (Environment Canada, 2012) and the Victorinian Shrew Management Plan (Environment Canada, 2011), these two species are endemic to the province of Québec and occupy the intertidal freshwater or slightly brackish water areas of the St. Lawrence River estuary. Several threats have been identified for these two species, including shoreline infilling, infrastructure development, trampling and invasive plants. The population and distribution objectives are first to maintain and increase the population size and, if possible, to increase the population of these two species in the long term throughout their range. Since the occurrences of these two species are known and neither has been recorded in the construction zone (CZ) work area, the Agency concludes that the Project is unlikely to have adverse effects on them.

According to the management plans for map turtles (Environment and Climate Change Canada, 2019) and snapping turtles (Environment and Climate Change Canada, 2020), their late maturity and potential threats to their habitat make these species vulnerable to population decline. Threats include direct mortality due to motorboat collisions (map turtle), habitat loss and degradation, and bycatch in commercial fisheries. Thus,



the management objectives for these species are to maintain and, where possible, increase the spread and abundance of the population by reducing the major threats. Given that the potential habitats (southwestward return) for these species will not be affected by the Project and that no presence was detected by the proponent during the inventories, the Agency concludes that the Project is unlikely to have adverse effects on these species.

According to the monarch butterfly's management plan (Environment and Climate Change Canada, 2016), the threats to this butterfly species are mainly related to their wintering grounds in Mexico, which are degrading or disappearing. The increased use of herbicides and associated declines in the milkweed that the butterfly's caterpillars exclusively feed on are a threat throughout its range, including Canada. In order to substantially reduce the risk of extinction, the long-term goal is to protect the monarch's migration phenomenon, which occurs in three countries (Canada, United States and Mexico). Considering that the Project affects a small area of terrestrial environment and does not affect the wintering grounds, the Agency concludes that the Project is unlikely to have harmful effects on this species. However, the Agency encourages the proponent to include milkweed among the native species during revegetation and thus favour the monarch in its caterpillar stage.

For the nine-point ladybug, no recovery strategy has been written to date. According to the *Species at Risk Public Registry*⁵⁶, this species has declined significantly and is now rarely seen. The precise causes of the decline are unknown. Possible threats include the introduction of non-native ladybugs and reduced habitat quality through pesticide use. Thus, based on the available information, taking into account the small area of terrestrial habitat that would be lost, and given that this species is rarely observed and the habitat does not appear to be limiting, the Agency concludes that the Project is unlikely to have adverse effects on this species.

Environmental groups, the public and First Nations have expressed concerns in relation to special status species of aquatic fauna (chapter 5.4) and birds (chapter 5.5). First Nations consider that any effect on these species is important and should be avoided.

Agency's conclusion

Based on the advice of Environment and Climate Change Canada and considering that the construction work area is an industrialized environment that supports mostly marginal, disturbed and small area habitats, the Agency is of the opinion that the Project is not likely to have significant adverse effects on special status species (appendix B). However, the habitats in the southwest embayment could support some of these species. The proponent does not foresee any effect on the habitats in the southwestern re-entry during the construction or operational phase and does not anticipate that the presence of the new infrastructure will have an adverse influence on them (see section 5.3). However, as described in section 5.3, a follow-up will have to be put in place to verify the accuracy of the environmental assessment of the Project and to verify whether it has an influence on the wetlands of the southwest embayment.

Finally, the Agency considers that the measures proposed by the proponent would reduce the risks of introduction and spread of invasive alien species.

⁵⁶ <https://www.canada.ca/fr/environnement-changement-climatique/services/registre-public-especes-peril.html>



Based on its analysis, the Agency concludes that the level of effect on special status species (other than fish or birds) would be low for the following reasons (appendix A) :

- The magnitude of the Project's effects would be low since the habitat that will be lost or disturbed by the Project is an industrialized environment that supports mostly marginal, disturbed and small area habitats. The inventories conducted by the proponent and targeting certain special status species have not detected the presence of these species. The effects would not adversely affect the maintenance or management or recovery of one or more of these species;
- The Project would result in a long-term, one-time change to the environment, particularly on disturbed and marginal habitats;
- Adverse effects would be continuous and partially reversible over time.

Determination of key mitigation measures

The Agency has identified the key mitigation measures required to ensure that there are no significant adverse environmental effects on special status species. It took into account the mitigation measures proposed by the proponent, the advices of government authorities, as well as the comments received from First Nations consulted and the public. The key mitigation measures are as follows:

- Delineate in the field, before deforestation begins, the areas where deforestation would be necessary. Deforestation outside these areas should not occur unless required for safety reasons;
- Carry out, before the beginning of the work, a delimitation of the environments colonized by invasive alien floristic species in order to properly identify them;
- Specify in the contractors' technical specifications that the granular materials used must come from a source free of invasive alien species;
- Clean machinery that will be used in areas colonized by invasive alien species before using it elsewhere on the site. Provide washing stations in areas not conducive to seed germination and away from streams, water bodies and wetlands;
- If invasive alien species are visible in work areas, eliminate them by burying them on-site where excavation will take place, in a 2-metre-deep pit, then covering them with at least 1 metre of unaffected material, or by disposing of them in an authorized engineered landfill;
- Revegetate disturbed areas immediately after the end of the construction work to ensure a quick recovery. Follow seeding rates prescribed by the manufacturer.

Need for follow-up and follow-up requirements

In order to verify the accuracy of the environmental assessment and to ensure that the infrastructures that would be put in place would not have a significant impact on these wetlands, the Agency considers that a follow-up of the evolution of the wetlands is necessary during the operational phase. This monitoring is discussed in more detail in section 5.3.

5.7 Human Health (Physical and Psychological)

The Agency considers that the Project is likely to cause significant adverse residual environmental effects on human, physical and psychological health, given that it would contribute to the degradation of air quality in a living environment where several environmental and socio-economic health risk factors are already present and known.

This section describes the project's effects on human health (physical and psychological). The following subsections present the information that the Agency considered in its analysis to conclude on the significance of the project's effects on health, including advices and comments of expert departments, First Nations consulted and the public.

5.7.1 Description of the component “human health”

This section deals with the effects of the Project on physical and psychological human health resulting from the changes caused by the Project on the environment and, more specifically, on air quality, noise and the quality of water used for recreational purposes and drinking water.

The study area selected by the proponent to assess the effects of the Project on human health is the expanded study area (figure 3, chapter 1). This zone includes the inhabited areas of Québec City (Limoilou, Maizerets, Saint-Jean-Baptiste, Beauport and Old Québec City and its tourist area), Lévis and Île d'Orléans (Saint-Pétronile) that are likely to be affected by the Project's environmental effects (Englobe, 2018d).

The Project area is part of the industrial-port complex that includes the Port of Quebec, a paper mill, municipal waste treatment facilities, and the recreational and tourism infrastructure and businesses described in section 5.8. The Baie de Beauport Recreational Park is on the boundary of the current port facilities. This sector offers public access to the St. Lawrence River and a beach. Pointe-à-Carcy and Bassin Louise are places of recreational and tourist interest located within the boundary of the port facilities (Englobe, 2018c).

To address the Project's impact on the quality of life, the proponent looked at the nuisance generated by land traffic related to current operations of the harbour, as well as the acoustic, atmospheric, visual and lighting (nighttime luminosity) elements in the study area.

For the analysis of the nuisances generated by traffic, the proponent carried out a traffic study of the routes most commonly used by trucks.

Based on noise surveys conducted in the field in 2014 and 2017, current noise levels include noise from the existing port area, the White Birch Paper mill, rail and road traffic. For all sectors analyzed, noise is higher during the day than at night (Englobe 2018b). The highest value during the day was recorded in the Beauport sector, while during the night, the Old Québec City sector was the noisiest. Overall, the ambient noise index complies with current regulations (Englobe, 2020y).

With respect to nighttime light intensity, the proponent mentions that the current lighting fixtures in the harbour, particularly along wharves 52 and 53, contribute to the lighting environment in the construction zone, but also in the expanded study area (Lévis area, Île d'Orléans and Beauport area) (Englobe 2018b). The luminosity of the Port of Quebec (halo light or glare) slightly modifies the visual aspect of the Beauport sector from certain locations visited (Englobe, 2020y).

Three drinking water supply intakes are located within or near the administrative boundary of the Quebec Port Authority: two in Lévis and one 18 kilometres upstream from the construction zone. The proponent carried out plume dispersion modeling of the overflow effluent from the Québec City and considers that the water intakes in Lévis are currently not significantly affected by the effluent.

The baseline air quality condition is summarized in section 5.1. The proponent reports information from two studies conducted by the Direction régionale de la santé publique de la Capitale-Nationale du Québec (DRSP) on exposure to airborne particles (DRSP, 2013 and 2015). According to the DRSP, the health effects of a given substance can be numerous and can manifest themselves in different ways depending on the individual. Also according to the DRSP, the borough of La Cité-Limoilou presents a combination of environmental and public health risk factors that merits a global and concerted approach to air quality. With this in mind, the DRSP created the *Comité intersectoriel sur la contamination environnementale dans l'arrondissement La Cité-Limoilou* (CICEL), which brings together public and private organizations, authorities or bodies concerned with air quality in the area and whose mandate is to implement measures to reduce the concentrations of certain fine particles in the ambient air. The proponent is one of the members of this committee (Englobe, 2020y).

Additional information on the project's implementation environment

Since the project takes place in an environment that, according to the DRSP, presents a combination of environmental risk and nuisance factors for population health, and where air quality is recognized as a problem, the Agency considers it important to provide a more detailed description of the population likely to be affected by the project.

In 2016, the borough of La Cité-Limoilou had 107,885 inhabitants, or 20.3 % of the city's population (Ville de Québec, 2020). The median household income is much lower than that of all households in the Capitale-Nationale region⁵⁷, i.e. 35 % lower in Basse-Ville and 34 % lower in Limoilou-Vanier (CIUSS-CN, 2018). When compared to the overall Quebec population, these same neighbourhoods show significant disparities in several indicators of social inequality and health determinants, including the proportion of families living on low income, social assistance recipients, vulnerable children and school dropouts.

Among the sensitive receptors within the expanded study area, the proponent has identified 1,737 residences and buildings close to the project site, including 19 early childhood centres (*Centres de la petite enfance CPE*) and daycare centers, 86 schools, seven community and recreation centers, 19 places of worship, 4 libraries, 87 parks and public squares, 13 public accesses to the river, a beach and other sites of interest. Several health care institutions that receive a significant number of users and employees are also present, including the Hôtel Dieu Hospital, the Enfant-Jésus Hospital, a local community service center (*Centre local de services communautaires CLSC de Limoilou*), a residential and long-term care center (*Centre d'hébergement et de soins de longue durée CHSLD de Limoilou*) and a university institute in mental health (*Institut universitaire en santé mentale de Québec*, formerly *Centre hospitalier Robert-Giffard*) (Englobe 2020y).

⁵⁷ The Quebec Nationale-Capitale region refers to Administrative Region 03 of the Province of Québec, which includes the Québec city, as well as the Regional County Municipalities of Portneuf, La Jacques-Cartier, Île d'Orléans, La Côte-de-Beaupré, Charlevoix and Charlevoix-Est.

5.7.2 Analysis of potential effects and proposed mitigation measures

The potential adverse effects identified by the proponent on human health, both physical and psychological, are the risk of accidents resulting from increased truck and train traffic in the vicinity of the project site⁵⁸, damage to physical and psychological health resulting from nighttime luminosity, air quality and noise resulting from project construction activities, and increased traffic in the lanes near the project site. Also, the proponent mentions the risks of contamination of drinking water sources and swimming water as potential health effects of the project.

Physical and psychological health impacts resulting from changes in air quality

In order to assess the health effects of changes in air quality, the proponent conducted a Human Health Risk Assessment (HHRA). To do so, it relied on the air emission modelling study mentioned in section 5.1. The objective of the HHRA was to quantify the potential health risks associated with air emissions of contaminants of potential concern (COPCs) associated with project activities. The HHRA sought to determine whether these risks would exceed the acceptable thresholds set out in Canadian and Quebec standards (Englobe, 2020y). The proponent considered the sources of air emissions associated with the Project during the construction and operational phases, as identified in the modeling (section 5.1). The proponent examined the following exposure pathways: inhalation of gas- and particle-phase pollutants, ingestion and dermal contact with contaminants deposited as dust, and ingestion of food from a local vegetable garden. As for contaminants of potential concern, the proponent selected those whose maximum concentrations would potentially be emitted during the construction and operational phases and which are strongly correlated with adverse health effects when concentrations exceed guide values. These contaminants are fine particulate matter ($PM_{2.5}$) and respirable particulate matter (PM_{10}), nitrogen dioxide (NO_2), total particulate matter (TPM), 1,3-butadiene, acetaldehyde, formaldehyde, polychlorinated biphenyls (PCBs), arsenic and nickel. The effects of these contaminants would primarily impact the cardiorespiratory and cardiovascular systems of vulnerable populations (children, elderly, and people with fragile health). Contaminants that exceed these levels are associated with increased short-term mortality, cardiopulmonary mortality, hospitalizations for cardiac or respiratory disorders (asthma, bronchitis, emphysema, respiratory tract infections, etc.), absenteeism, complications for people with chronic diseases and other health effects (Englobe 2020y).

Diesel Particulate Matter (DPM) was not identified as a contaminant of potential concern because, according to the proponent, its maximum concentrations (baseline plus project) would not exceed 10 % of the standard. The contaminants of potential concern selected were those with maximum concentrations exceeding the standard by 75 %. Nevertheless, the proponent calculated the incremental cancer risk of chronic exposure to diesel particulate matter (Englobe 2020y).

Three scenarios were considered to assess exposure to contaminants of potential concern: the baseline conditions, construction phase and operational phase. The proponent also assessed the risks to human health associated with exposure to concentrations of fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2) that would result from the project using data from epidemiological studies on the relationships between different pollutant concentrations and different health effects. Risks were calculated

⁵⁸ Accident risks arising from the increased traffic generated by the project are discussed in the "Other Considerations" section.

for sensitive receptors such as residents of nearby areas (Limoilou neighbourhood), users and workers in the recreational area of the Baie de Beauport, and workers in the industrial sector adjacent to the project. For example, with respect to NO₂, the proponent used studies reported in the Human Health Risk Assessment of Ambient Nitrogen Dioxide (Health Canada, 2016) that show an increased risk of 1 to 13 % of hospital visits/hospitalizations for various respiratory problems (e.g. asthma, bronchitis, emphysema, respiratory tract infection) associated with an average daily increase of 20 part per billion (ppb) or hourly increase of 30 ppb of NO₂. Based on these studies, the proponent calculated the health risks that would occur when, for example, a concentration of 230 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) would be reached (which represents the maximum value modelled for NO₂ over an hourly period); an increased risk of hospital visits/hospitalizations of between 2 and 30 % for different respiratory causes (e.g. asthma, bronchitis, emphysema, respiratory tract infection, etc.) would result. For PM_{2.5}, an annual concentration of 10 $\mu\text{g}/\text{m}^3$ would theoretically result in 0.35 to 0.77 additional annual cardiopulmonary deaths, 0.66-1.0% increase in mortality after two years in individuals with certain chronic diseases, and 0.3 % increase in the risk of premature death from non-accidental causes (Englobe, 2020y).

For fine particulate matter (PM_{2.5}), the proponent assesses that there would be no exceedance affecting sensitive residential and recreational receptors or workers, other than workers in the area who may be exposed by inhalation to PM_{2.5} (within a period of 24 hours). According to the Proponent, fine particulate matter emissions would have little effect on health during the operational phase.

With respect to exposure to nitrogen dioxide (NO₂), an increase in bronchial responsiveness may occur in asthmatic individuals if hourly or daily maximum concentrations are reached. In the worst-case scenario simulated by the proponent, if hourly maximum concentrations were reached, individuals could experience acute health effects. During the operational phase, exceedances could occur in total NO₂ concentrations and these could contribute to an increased risk for individuals with pre-existing heart or lung conditions, as well as for seniors and children, particularly during the warm season.

The proponent also assessed the human health risks of other contaminants of potential concern during the construction phase. According to the proponent, the human health risks associated with exposure to nickel, arsenic, 3-butadiene and polychlorobiphényles (PCBs) would be entirely, or largely, attributable to the baseline condition in the area. During the operational phase, there would also be exceedances of the 1.0 threshold (TPM) for annual workers, as well as exceedances (1 to 4 additional cases of cancer per 100,000 inhabitants) of the acceptable incremental cancer risk threshold established in Quebec.

According to Health Canada, the human health risk assessment submitted by the proponent complies with the methodological framework for risk assessments recommended by competent organizations in the field (e.g. Health Canada, INSPQ). However, the analysis submitted is closer to a preliminary quantitative risk assessment (PQRA). Health Canada explains that a PQRA is usually conducted using limited site information and is intended to provide a rough but conservative estimate of potential risks to human health. PQRAs are generally viewed as tools to validate the absence of unacceptable risks to human health rather than to adequately quantify the risks associated with a project. As such, the results of the air quality risk assessment in the context of the project must be interpreted in the context of the specifics of a PQRA.

Health Canada has identified several sources of uncertainty related to the proponent's human health risk assessment (HHRA), the main ones being:

- Exposure to soil or sediment on Beauport beach and to water has not been considered, despite the fact that project-related dust could be deposited there. The proponent judged that these environments would retain only a negligible quantity of particles.
- Only the risks associated with the construction phase have been calculated.
- Concentrations calculated at the point of maximum impact (often just outside the property limits of the Port of Quebec) were used to estimate risk, rather than concentrations representative of the city borough. This choice has the effect of overestimating the risk.

According to Health Canada, the proponent's HHRA shows that the construction phase would not contribute significantly to the risks for air contaminants other than particulate matter and NO₂, with the exception of acute exposure to formaldehyde, for workers in the Baie de Beauport recreational area and in the industrial area. The calculated risks for arsenic, nickel and PCBs are almost entirely attributable to the risks associated with the baseline conditions.

Health Canada points out, however, that the notion of population vulnerability was not integrated into the proponent's analysis. From a human health protection perspective, two similar projects producing the same air emissions (and having the same effect on air quality) may have different health effects depending on their location and the characteristics of nearby populations. In this case, the project would be located near residential areas inhabited by a vulnerable population and marked by social inequalities in health.

Health Canada wishes to reiterate that the *Canadian Ambient Air Quality Standards* (CAAQS) of the Canadian Council of Ministers of the Environment for PM_{2.5} and NO₂ do not establish a discernable threshold for the protection of human health and therefore any increase in exposure would result in a further increase in risk in the population, particularly in vulnerable populations including children and the elderly.

Finally, the cancer risk generated by the Project was calculated by the proponent for particulate matter from diesel engines (without considering the initial or existing concentrations). The results presented in appendix E of Englobe (2020y) show that using the unit factor of the California Environmental Protection Agency (CalEPA), the calculated risks for a lifetime in the Limoilou area (using the maximum concentration in the area) amount to 1.35 cases per 100,000 inhabitants and exceed the risk deemed acceptable by the Institut national de la santé publique du Québec of 1 case per million inhabitants (Institut national de la santé publique du Québec, 2012). Risks to recreational receptors, Baie de Beauport's seasonal workers, as well as workers in the nearby industrial sector would also exceed this threshold generally considered acceptable.

The proponent believes that, during the construction phase, the application of the planned air quality measures (section 5.1) would reduce the Project's effects on the quality of life and human health. In addition, the existing air quality-monitoring program would validate the application and effectiveness of mitigation measures. For the operational phase, the measures applied would also be those proposed for air quality (section 5.1), including the maintenance of air quality monitoring in collaboration with the *Ministère de l'Environnement et de la Lutte contre les changements climatiques* (MELCC) and the proponent's participation in the *Comité intersectoriel sur la contamination environnementale dans l'arrondissement La Cité-Limoilou* (CICEL).

Health Canada reports that exceedances due to elevated baseline concentrations would remain even after the application of mitigation measures incorporated into dispersion modeling scenarios. In this sense, the

project would result in air quality and human health effects that cannot be mitigated for both the construction and operational phases.

Health Canada recommends that the proponent implement, in addition to standard mitigation measures, the best available means to avoid air emissions during all phases of the project. In particular, additional mitigation measures would be required to reduce emissions of fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), nickel, formaldehyde and particulate matter (PM) from diesel engines.

The public expressed concerns about human health risks related to population vulnerability, potential exceedances of fine particulate matter ($PM_{2.5}$), nitrogen dioxide and additional risks of different types of cancer, and other potential human health effects related to air quality changes generated by the Project.

Damage to physical and psychological health resulting from noise nuisance caused by project activities

The use of machinery during the construction phase would be the main source of noise⁵⁹. During the operational phase, noise would come from port operations, land and marine traffic, maintenance dredging and land-based sediment management (Englobe 2020v).

The Proponent points out that various health effects can result from continuous, short-term or occasional exposure to high noise levels at night. Depending on the intensity of the exposure, the effects may include insomnia, drowsiness or fatigue during the day, leading to deficits in concentration, depressed mood, irritability, but also cardiovascular disease, changes in certain metabolic functions and a decrease in neurocognitive performance. In addition, noise can create stress responses in some people, which can lead to other health problems such as cardiovascular disease, ulcers and diabetes (Englobe 2020y). In addition, noise can generate subjective effects or nuisances leading to negative emotions influenced by factors such as fear, sense of trust in the community, media treatment, the usefulness or importance of the noise emitter in social or economic terms, and population expectations (Englobe 2020y).

The results of noise modeling indicate that, for the construction phase, the Project's effects on the environment would be low, since the noise levels obtained would be below federal criteria and provincial and municipal guide values. However receiving points P1 and P2 in Levis would experience exceedances at fall of year one and fall of year two due to daytime pile driving. Nevertheless, the installation of an acoustic enclosure around the pile during pile driving would limit, according to the proponent, noise level increases. During the operational phase, the modelled noise levels would also meet federal criteria. According to the proponent, the construction and operational scenarios demonstrate that the noise impact on health would be very low, or even nil for certain situations. The difference between the percentage of the population severely annoyed (% HA) in baseline conditions (ambient noise) and in the presence of future construction and operations is between 0.0 and +1.9%, which is well below the significant threshold of +6.5⁶⁰ (Englobe, 2020v). In that respect, Health Canada emphasizes that this federal criteria and provincial or municipal limits should

⁵⁹ See Table 5 in Chapter 2 for a description of the project's construction work.

⁶⁰ The percentage of the highly annoyed population (% HA) is used to calculate how a typical community responds to a given level of noise (dose-response relationship between noise levels and annoyance generated according to ISO-1996-1). Health Canada recommends that noise impact be assessed based on changes in %HA for populations exposed to noise over the long term (more than one year). According to Health Canada, several studies establish a 6.5% increase in HA as a criterion for determining the existence of a serious noise-related impact on a project (Health Canada, 2017).

not be considered acceptable levels of noise pollution or thresholds below which no health effects occur. Noise levels should be kept as low as reasonably achievable.

The proponent proposes other mitigation measures during the construction phase, in addition to the sound enclosure mentioned, such as using manufacturer's mufflers for equipment, prohibiting the use of engine brakes, minimizing the slamming of truck rear panels, carrying out certain construction activities such as sinking during the day, limiting the speed limit to 15 kilometres per hour and communicating the work schedule to all committees acting as stakeholders. For the operational phase, measures include, among others, the acquisition of gantry cranes equipped with electric motors rather than hybrid electric/diesel motors, the installation of reactive gas exhaust silencers for the new generators, white noise back-up alarms and the reduction of unnecessary equipment movements.

Health Canada asserts that the methods used by the proponent to assess potential noise impacts are appropriate for this type of Project. However, certain methodological aspects could have introduced uncertainties in the modelling results for the operational phase and lead to an underestimation of the total noise attributable to the project. For example, impact noise from railcar switching (during yard operations on-site and in the nearby marshalling yard), noise from ships moving to and from the port, and idling of trains and transport trucks during loading do not appear to have been considered in the modelling.

With respect to the effects of noise nuisance, Health Canada considers that the proponent adequately and sufficiently describes and documents the baseline environmental noise. Similarly, the methodology used to assess the potential noise impacts and the increase in the percentage of people highly disturbed by noise (%HA) is appropriate for this type of Project, despite the uncertainties mentioned above. As for the modeling carried out by the proponent, Health Canada reminds us that water can sometimes act as a reflective surface and produce higher sound levels than those that would occur on hard ground. Thus, the projected sound levels in Lévis could be underestimated since the municipality is located opposite the Project, on the other side of the St. Lawrence River.

Furthermore, Health Canada considers that the proponent's assertion that noise sources near the population would be masked by noise from the Project's operations does not appear to be supported by calculations presented in its noise environment documents. On the contrary, the calculations show that project-related noise levels may exceed ambient noise levels at some locations. Depending on the characteristics of the noise (tonal, impulsive, very impulsive, continuous, intermittent, frequency, etc.), there could be an increase in noise nuisance. According to Health Canada, one should avoid asserting that the existing industrial-urban fabric will mask the dominant sources of noise emissions. Indeed, the human response to specific sound events, to reduced quiet times, and to different sound spectra can be highly variable and may lead to increased nuisance or sleep disturbance, without changing average sound pressure levels.

The public has expressed concerns about the potential nuisance caused by noise to nearby neighbourhoods and users of the Baie de Beauport. Noise sources of concern to the public include, for example, construction site activities, container-handling equipment, and other port operations in general including train and ship traffic and manoeuvres as well as trucking.



Risks and health effects of contamination of drinking and bathing water sources

According to the proponent, the dredging work and the presence of numerous trucks transiting through the construction zone could be sources of suspended solids emissions affecting the quality of drinking and swimming water during the construction phase. The mitigation measures related to surface water quality (section 5.4) should, according to the proponent, reduce the risk of potential contamination of these waters, particularly in the swimming areas of Baie de Beauport. These measures are also intended to protect drinking water intakes located in the study area. For the operational phase, the proponent states that its Project would result in a decrease in the concentration of the plume from the overflow effluent to the Lévis and Québec City (Sainte-Foy sector) water intakes. No effect would then be experienced on the health of people consuming water from these intakes (Englobe 2020y). In addition, maintenance dredging could cause an increase in suspended solids and alter water quality in the St. Charles River estuary and Baie de Beauport beach areas. According to the proponent, mitigation measures to reduce suspended solids would limit the effects of the Project on swimming water.

The public has expressed concerns about the risk of contamination and the quality of water for swimming at Baie de Beauport, as well as the contamination of drinking water sources in the area. The main potential sources of contamination identified by the public are the increase in container ships, construction activities, filling of caissons on the wharf line, dredging and sediment management, among others.

5.7.3 Agency analysis and conclusions on residual effects

Analysis of the effects

Air quality is a major determinant of health (Direction de santé publique, 2019). The Agency notes that the Project is implemented in a residential area inhabited by a vulnerable population and marked by social inequalities in health related, in particular, to air quality. This conclusion is shared and emphasized by experts from federal and provincial departments, the proponent and the public. Based on advice from Environment and Climate Change Canada, the Agency notes that the project would increase particulate matter emissions into the air as well as the presence of contaminants resulting from the use of fossil fuels during both phases of the project, in a sector already saturated for certain air contaminants. The Agency also agrees with Health Canada on the Project's effects on human health and concludes that, due to the proximity of neighbouring populations, their vulnerability and potential health risks, including an increased risk of cancer for particulate matter from diesel engines, the project would have significant residual human health effects related to air quality.

With respect to the health effects related to the risk of contamination of drinking and swimming water, the Agency is satisfied with the mitigation measures that would be applied, particularly during dredging, and considers that there would be little effect on drinking or swimming water.

The Agency considers that if noise levels measured in the field during construction and operation are similar to those modelled, project-related noise is not expected to have a significant effect on the health of neighbouring populations. However, the implementation of the mitigation measures presented in the impact statement is essential to limit the significance of the effects. Based on Health Canada's advice, the Agency considers that a monitoring and follow-up program is necessary to verify the accuracy of the models used and the actual effectiveness of the noise mitigation measures, both during the construction and the

operational phases. Complementary mitigation measures should be put in place in the event that noise proves to be problematic.

Agency findings

At the end of its analysis and according to the assessment criteria and analysis grid presented in appendix A, the Agency concludes that the significant adverse environmental effects on air quality related to the project could cause significant risks to human health. The Agency's conclusion is based on the following elements:

- Existing exceedances observed in the receiving environment for some contaminants, including particulate matter, NO₂ and nickel;
- The location of the Project near a residential area and a vulnerable population presenting social inequalities in health;
- The potential health risks, including those related to air quality and more specifically the additional cancer risk generated by the Project for particulate matter from diesel engines;
- Uncertainties inherent in air contaminant dispersion modeling and human health risk assessment;
- Emissions of contaminants of potential concern or particulate matter generated by the project that would approach or exceed the CAAQS standards or MELCC (CAR) criteria.

These effects could occur despite project optimizations and the application of the key mitigation measures detailed below, as well as the measures specified in sections 5.1 and 5.4. The Agency concludes that the significance of the effects would be high for the following reasons:

- The intensity of the risks to human health would be high, as exceedances of levels of contaminants of potential concern could result in potential human health effects due to exposure to contaminant levels that exceed applicable physical health protection standards and criteria in a vulnerable populations that is already experiencing significant air quality pressures;
- The Project would result in long-term local modification since the risks to human health would extend beyond the project site and the effects would be felt over a period of more than five years;
- Risks to human health would be continuous during the operational phase and partially reversible to irreversible depending on the type of risk.

Identification of key mitigation measures

The Agency has identified the main mitigation measures that are likely to mitigate some of the Project's potential effects on human health. However, in the case of the potential effects of air quality on human health, these measures taken together would not sufficiently mitigate the potential effects of the Project to render the residual effects insignificant. To identify the key mitigation measures, the Agency took into account the mitigation measures proposed by the proponent, the advice of government authorities, as well as comments received from the public.

Specific measures for noise

Phases of construction and operation

- Develop and implement an information and consultation plan to involve the community of potentially affected receptors, prior to any particularly noisy activity, to better understand when noise sensitivity

could increase and plan the work in consideration of the findings of this consultation and implement mitigation measures if necessary;

- Develop a pre-construction protocol, in consultation with potentially affected parties, for receiving complaints related to noise exposure from the Project. Implement the protocol in all phases of the project. The protocol shall be submitted to the Agency prior to construction. The proponent must:
 - Respond to noise complaints related to any component of the Project within 48 hours of receipt of the complaint and implement corrective measures, if necessary, to reduce noise exposure in a timely manner.
 - Train workers and contractors on the importance of noise mitigation;
 - Equip equipment with silencers when possible;
 - Turn off unused electrical or mechanical equipment and trucks waiting for a load for more than the normal waiting time.

Construction phase

- Prohibit the use of engine brakes on the job site unless safety is an issue;
- Minimize slamming of the rear panels of trucks when unloading materials;
- Equip equipment (e.g. shovel and loader) with a white noise back-up alarm adjusted to obtain a maximum sound level of 10 decibels (dBA) above the surrounding noise of the work site, while respecting health and safety standards;
- Drive the piles by vibratory driving. If pile-driving is required, use loudspeakers around the piles. These sound enclosures should reduce the sound power (Lw) generated by pile driving by at least 10 dBA;
- Limit pile-driving activities to the daytime period only between 7:00 a.m. and 7:00 p.m.;
- Pay particular attention to the attenuation of tonal, impulsive and very impulsive noises (such as pile driving) and avoid these types of noise at night, on weekends and holidays.

Operational phase

- Acquire gantry cranes equipped only with electric motors instead of hybrid motors (electric/diesel);
- Equip new generators with reactive exhaust mufflers;
- Locate, when possible, mechanical equipment (pumps, motors, etc.) in buildings;
- Optimize the sequence of operations by reducing unnecessary equipment movements;
- Turn off unused electrical or mechanical equipment and rail convoys awaiting loading whenever possible;
- Equip as much equipment as possible (e.g., yard trucks, stacker trucks) with a white noise back-up alarm, while keeping the terminal in compliance with occupational health and safety requirements;
- In order to protect the quality of sleep of the population, avoid transportation in residential areas and train shunting or assembly during the night.

Need for follow-up and follow-up requirements

Uncertainties were raised regarding the accuracy of the models used to determine the significance of noise during the construction and operational phase and the effectiveness of mitigation measures. In order to verify the predictions of the effects of the project on the noise environment as well as the effectiveness of the proposed mitigation measures, the Agency recommends that the follow-up program, which includes the following requirements, be developed and implemented:

- Develop, prior to construction and in consultation with Health Canada and other jurisdictions, a follow-up program to verify the accuracy of the environmental assessment and to assess the effectiveness of the mitigation measures with respect to the noise environment. The proponent shall submit the follow-up program to the Agency prior to the commencement of construction. This follow-up program must take into account:
 - Each season;
 - Day and night;
 - Sources emitting low-frequency noise.
- Implement the monitoring program at all phases of the Project;
- Develops and implements modified or additional mitigation measures if monitoring results demonstrate that modified or additional mitigation measures are required to address changes to the noise environment attributable to the project. The objective of this monitoring should be to minimize the number of noise-related public complaints. The proponent submits these measures to the Agency prior to implementation.

5.8 Socio-Economic Conditions

The Project could have adverse residual effects on socio-economic conditions related to commercial and recreational fishing and recreation and tourism activities, notably due to the presence of infrastructure, through project-related activities such as dredging and navigation, and beach erosion.

The Agency is of the opinion that the Project is likely to cause significant adverse residual environmental effects on socio-economic conditions for the population, given the effects on the recreational and commercial fisheries, even with the implementation of mitigation, monitoring and follow-up measures.

The following subsections present the information the Agency considered in its analysis in order to reach conclusions on the significance of the Project's effects on socio-economic conditions, including the advices and comments of expert departments, First Nations consulted and the public.

5.8.1 Description of the component "socio-economic conditions component"

The analysis of the socio-economic effects on Indigenous peoples and the general population focuses on recreation and tourism activities, recreational and commercial fishing, and commercial navigation in Baie de Beauport. The effects of the project on the socio-economic conditions of First Nations, as well as the effects on indigenous fisheries are discussed in section 5.9. Furthermore, the Agency has no information

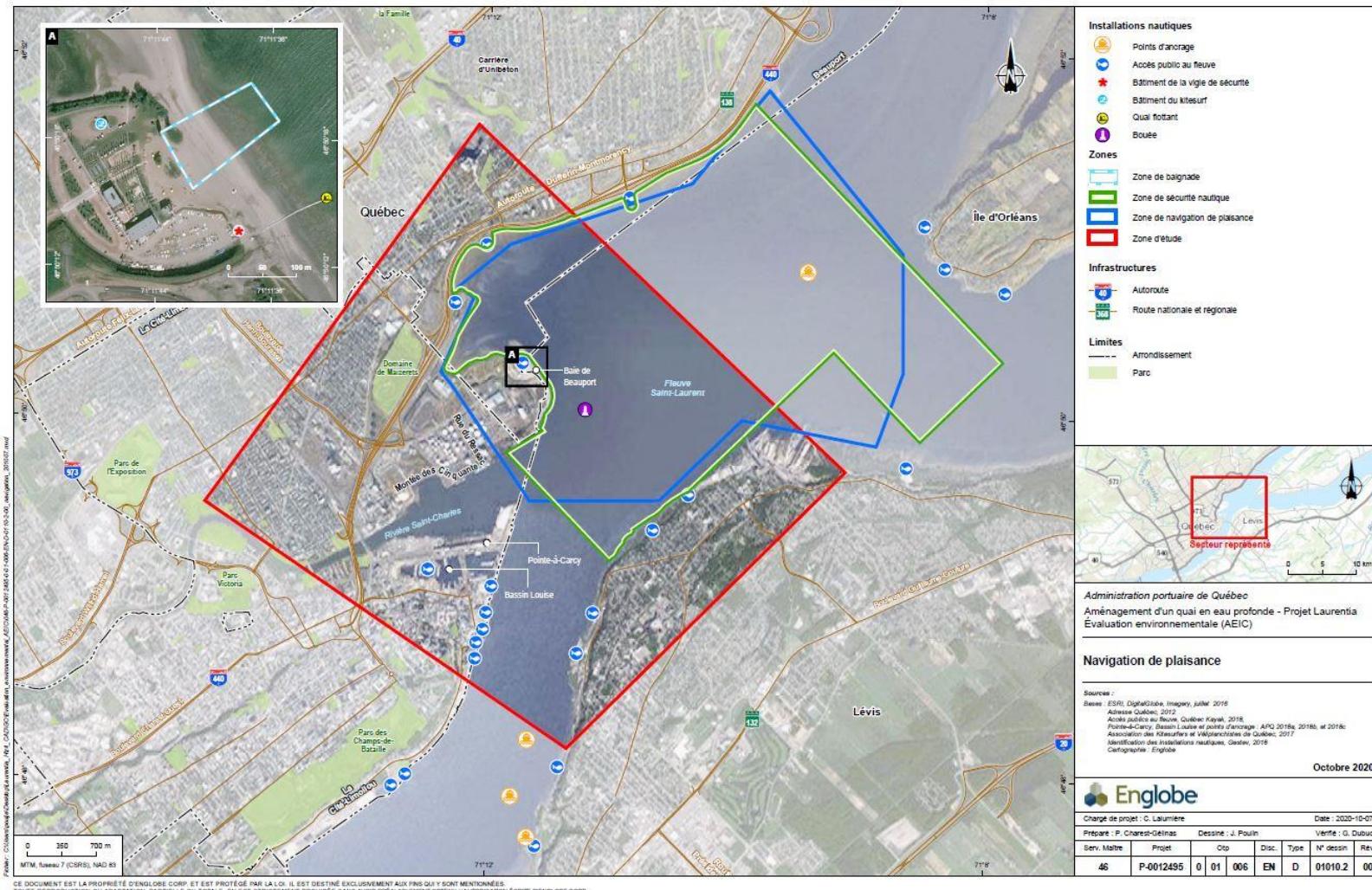
indicating that the project could affect the practice of indigenous commercial fisheries in the proponent's area of jurisdiction or about species that would be affected by the Project.

The project is located on Crown land, i.e. on federal land managed by the Quebec Port Authority. The area selected by the proponent to assess the Project's effects on socio-economic conditions is the extended study area (figure 3, chapter 1). The proponent has identified two major sectors that correspond to the two types of economic activities that characterize the Beauport sector of the Port of Quebec: first, to the north, a recreation and tourism sector including, in particular, the Baie de Beauport Park with its public access to the river and the beach (figure 10); and to the south, a sector dedicated to port activities with the existing bulk solid and liquid terminals (Englobe 2020p; 2018d).



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Figure 10: Location of swimming, boating safety areas.



Source: Englobe, 2020p

Recreational activities and access to the St. Lawrence River in the study area

A number of recreation and tourism businesses coexist with the port facilities in the Baie de Beauport sector. The recreation and tourism uses of the beach, which include several water-based activities and swimming, contribute to the economy of the expanded study area. Kayaking, kitesurfing, canoeing, paddle boarding, water-powered surfing and sailing activities are carried out in the Baie de Beauport. The St. Charles River estuary sector offers a variety of services such as boat tours, museums, outdoor shows and the Québec City sailing school. To the southwest of the sector is the Old Québec recreation and tourism zone and the Anse au Foulon sector of the Port of Quebec. Other public access areas to the river are located within the expanded study area, in addition to a bicycle path and the Domaine Maizerets with its year-round recreation and tourism activities, as well as the Lévis sector, with the Paquet wharf site, which has seen an increase in visits since 2016. The project sector is also the centre of summer shows and the docking site for international cruises on the Québec City side. There are several boat launches for recreational boating in the area. The beach at Anse Gilmour Park, Anse-Tibbits in Parc Saint-Laurent, the Parc de la Grève-Joliet, and the Parcours des Anses bicycle path are popular places for water sports, cycling and walking. The same is true for the sector on the western tip of Île d'Orléans, where there is public access points to the river for kayaking and other recreation and tourism services with shops and walking areas at Anse aux Canots and Anse du Fort in Sainte-Pétronille, as well as the boat launch on Horatio-Walker Street (Englobe, 2018d).

Port activities, including commercial navigation

The proponent has identified two types of commercial navigation activities in the study area, namely the activities of the Port of Quebec in the Beauport sector and the activities of the Ross-Gaudreault Cruise Terminal. The existing port facilities accommodate ships that link Québec City with the Great Lakes and the rest of the world. In 2019, 11 million tonnes of solid and liquid bulk cargo were transhipped in the Port of Quebec's Beauport sector terminals (Englobe 2020i). For its part, the cruise terminal, which welcomes more than 30 large ships and 168,000 visitors each year, is provides visibility and major economic spin-offs for the region.

Recreational and commercial fishing

According to the proponent, recreational fishing in the expanded study area is concentrated at both ends of the St. Charles River estuary. This spring and summer activity is not very popular in the area. On the other hand, intensive sport fishing for walleye and sauger is carried out in the fall. With regard to commercial fishing, five licences were issued in 2016. Other fishers located downstream from the project site may hold commercial fishing licences and may carry out this activity off the eastern tip of Île d'Orléans and on the south side of the channel. Lake sturgeon, Atlantic sturgeon, channel catfish, walleye, sauger and carp are the species that are fished commercially between the limits of Saint-Augustin-de-Desmaures and the eastern tip of Île d'Orléans. The proponent notes that for the administrative region of the Capitale-Nationale du Québec, according to 2015 data from the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques, the harvest quota for lake sturgeon in this region is 5.5 metric tons compared to 60 metric tons for the St. Lawrence Upper Estuary. The proponent has indicated that the locations where fishing is carried out for this species in the study area are not near the project area.



As described in section 5.4 of this report, the Laurentia Project is located in rare and complex habitats that are particularly important for the reproduction, feeding and movements of several fish species including striped bass, lake sturgeon, Atlantic sturgeon, rainbow smelt and American shad. These species make considerable migrations on both sides of the Beauport sector. Indeed, the St. Lawrence River has been described as a "crossroads of connectivity" for fish diversity along an approximately 350 kilometres stretch of the river between Beauharnois and the eastern tip of Île d'Orléans, a stretch that is essential for spawning and for the development of young life stages of a number of fish species (Mingelbier *et al.*, 2016).

Lake sturgeon, Atlantic sturgeon, walleye and smelt are species that are valued and prized in the recreational, commercial and Indigenous fisheries along the St. Lawrence River (fishing zones 7, 8 and 21 of the Ministère des Forêt, de la Faune et des Parcs (MFFP)). In Québec, as in the rest of Canada, recreational fishing has a significant economic footprint. In Québec, in 2016, 5,077 jobs were created or maintained by fishing-related activities. In the year 2015, current spending (packages, transportation costs, food and lodging, fishing services, etc.) plus spending on durable goods (boats, special vehicles, fishing equipment, etc.) by recreational fishers generated an increase of \$473 millions in the province's gross domestic product (B.E.S.T.E., 2018). According to Mingelbier *et al.* (2016), approximately 10 percent of sport fishers in Québec fish on the St. Lawrence River. Moreover, considering the diversity of fish species present and the proximity of major urban centres, sport fishing on the St. Lawrence River has a strong potential for further development (Mingelbier *et al.*, 2016).

Sturgeon have supported a commercial fishery in the river for more than a century and are of great historical importance to Indigenous peoples. In the case of lake sturgeon, after more than three decades of decline (Mingelbier *et al.* 2016), an increase in the abundance of the species has been observed over the last decade throughout the St. Lawrence River as a result of the implementation of several management measures and the improvement of spawning habitats (Paradis *et al.*, 2020).

In 2020, a total of 51 active licences and a total catch of 10,000 sturgeon were authorized by provincial authorities for the commercial fishery targeting this species. Although the St. Lawrence remains one of the few rivers in North America with a sufficiently healthy lake sturgeon population to support a commercial fishery, the species remains vulnerable owing to the specific characteristics of its life cycle, notably its delayed reproduction, with males reaching reproductive maturity between 8 and 20 years of age and females between 15 and 32 years of age⁶¹.

With regard to the Atlantic sturgeon, which almost disappeared in 1970, the management programs put in place for the species currently allow for the issuance of 16 licences as part of a commercial fishery concentrated between the eastern tip of Île d'Orléans and Kamouraska. In 2019, 5,137 Atlantic sturgeon were caught, representing 85.6% of the allocated quota of 6,000 fish (MFFP, 2020). A recent review of the Atlantic sturgeon fishery in the St. Lawrence Estuary nevertheless concluded that the population is currently overexploited due to two factors: the increase in the authorized quota (number of fish) since 2002 and the shift in the fishery towards smaller Atlantic sturgeon compared to the average size recorded during 2005-2018. Signs of overexploitation thus include the change in the size structure of the stock and the presence of a greater proportion of small individuals in the population. Thus, although the fishers do not

⁶¹ <https://mffp.gouv.qc.ca/faune/peche/poissons/esturgeon-jaune.jsp>



catch the entire allocated quota, these two factors would mean that the exploitation rate is slightly above a sustainable level (MFFP 2020).

Recreational and commercial fishing for striped bass, a species that disappeared from the St. Lawrence River in the 1960s and was reintroduced in 2002, is not authorized because of its endangered status under the *Species at Risk Act*. At the initiative of the MFFP, in collaboration with partners such as the Fédération québécoise des chasseurs et pêcheurs, the Fondation de la faune du Québec and the Fondation Hydro-Québec pour l'environnement⁶², major investments have been made by the governments of Québec and Canada since 2002 to reintroduce striped bass into the St. Lawrence River and eventually allow the resumption of sport fishing. The recovery strategy and the proposed action plan for striped bass (DFO, 2019) recall that a survey on the recreational striped bass fishery in the Gaspé Peninsula conducted in 2015 evaluated that, from the second year of existence of this new fishery, more than 7,300 fishing days were devoted to this species, representing economic benefits of at least \$1 million. If the recovery of striped bass were to allow the return of a sport fishery in the St. Lawrence Estuary, certain regions could benefit from significant socio-economic benefits.

American shad is a species that is designated as vulnerable under the Québec *Act respecting threatened or vulnerable species*. However, encouraging signs observed further to the implementation of recovery plans could lead to a review of its status in the coming years (Gagnon-Poiré *et al.*, 2020).

With regard to other activities related to the area and its resources, since the project site is located in an urban industrial port sector, no hunting, trapping or gathering activities, and no seasonal camps or outfitting operations are authorized for non-Indigenous people within the Quebec Port Authority's port territory (Englobe, 2018d).

5.8.2 Analysis of potential effects and proposed mitigation measures

The effects on socio-economic conditions identified by the proponent can be divided into two types: restricted access to waterways and the water body, and an increase in marine traffic which could cause disruptions to recreation and tourism activities, access to the St. Lawrence, and recreational and commercial fishing.

Effects of the project on recreation and tourism, river access, and commercial and recreational fisheries

During the construction phase, the proponent has predicted a loss of 0.5 hectare of the land currently used to store small boats in the Baie de Beauport recreation and tourism sector. In addition, access to the southeastern part of the Baie de Beauport beach would be blocked by the temporary fencing installed on the site, by the site preparation work, by the construction and installation of the containment dyke and the visual and acoustic barrier, and by the relocation of the floating dock to the northwestern sector (Englobe 2018d). Other effects could result from the construction of the reinforced concrete caissons, as well as from the dredging and management of contaminated and non-contaminated sediments, the access road and

⁶² <https://mffp.gouv.qc.ca/faune/habitats-fauniques/etudes-recherches/bar-raye.jsp>



railroad extension work, machinery and the presence of the wharf and rear wharf. This work could affect recreational and tourism activities (swimming, boating and bird watching) and the safety of Baie de Beauport users.

With respect to the restriction of access to waterways and the water body, the proponent states that as a result of the construction work access to waterways and the water body would be limited to recreational boaters who use the sector. Thus, relocation of the floating dock in the beach sector would be necessary to allow boats to dock at a safe distance from the containment dyke. Bird watching, which is done year-round in the Baie de Beauport sector, could be disrupted by the work. According to the proponent, the presence of the concrete plant would not affect tourism activities in the St. Charles River estuary sector. In addition, the construction site area would impose navigation restrictions which could disrupt commercial and recreational fishing activities.

In terms of measures to mitigate the effects of restricted access to waterways and the water body, the proponent is mainly planning to establish a security perimeter around the construction site and traffic zones to ensure the safety of boaters and other users of Baie de Beauport. Also, a boat storage area would be set up near the Baie de Beauport parking lots. The proponent also affirmed its intention to establish effective and ongoing communication with Baie de Beauport users to inform them about the operations and the safety measures adopted. Thus, taking into account the mitigation measures to be implemented by the proponent, public access to the river would remain open during construction. In this regard, the proponent would add an overpass over the railway tracks to ensure continuous and safe access to the boat launch ramps and sites used for recreational activities. In addition, the visual and acoustic barrier proposed by the proponent and the Baie de Beauport Users' Forum would increase the area of land used for recreation by 0.4 hectare.

According to the proponent, recreation and tourism activities, access to the river and recreational and commercial fishing would not be affected during the operational phase. Only sailing activities in the Baie de Beauport would be affected due to the change in the wind conditions caused by the presence of the new terminal (Englobe, 2020u). Environment and Climate Change Canada generally agrees with the proponent's conclusions regarding changes in the wind conditions, but it points out that it would be useful to further document the changes in turbulence conditions that could be associated with the new infrastructure. However, Environment and Climate Change Canada points out that it cannot corroborate the proponent's conclusions on the impact of these changes on carrying out these activities in the Baie de Beauport since it does not have the necessary expertise.

The proponent plans to reduce the boating zone around the new structures to ensure the safety of users. Thus, the navigation routes used by experienced boaters would be adjusted in order to bypass the containment dyke and the new wharf (Englobe, 2020p). As for bird watching, these activities would not be affected during the operations phase.

In terms of the disruption of recreational and commercial fishing, the proponent is proposing to improve the quality and quantity of the areas dedicated to fishing within the territory under its jurisdiction. To this end, it will continue its discussions with the Fédération québécoise des chasseurs et des pêcheurs. First Nations have expressed concerns regarding fishing for migratory species (see section 5.4).

For the public, recreation and tourism uses in the area are among the most important concerns related to the socio-economic aspects of the project. It should be kept in mind that the Baie de Beauport has the only



beach in the sector with safe access and facilities for swimming. Citizens who submitted briefs and participated in the consultation activities expressed concerns about swimming and recreational boating activities that could be disrupted, particularly due to dredging and sediment management as well as changes to the wind conditions, river currents or water quality.

Use of the swimming area could be affected by increased erosion which could affect the sustainability of the beach. This erosion is already occurring and the eroded material is currently transported towards the southwest embayment. The proponent's modelling of the effects of the project on the hydro-sedimentary regime shows that current velocity near the swimming area would be slightly slower than under current conditions (Englobe 2020j). The proponent thus concludes that beach erosion could increase. It plans to work with the Department of Geography at Université Laval which is carrying out a broader research project in which the beach could be included. This research would involve morpho-sedimentological monitoring aimed at describing possible modifications to the beach and the southwest embayment during the operational phase. As a result, recommendations could be provided on the measures to be implemented in the event that impacts to the beach or the habitats in the southwest embayment are observed. Environment and Climate Change Canada recommends that this monitoring be included in the project's follow-up program.

The project also includes the extension of the City of Québec's emergency outfall, in respect of which citizens have raised concerns about potential effects on the bacteriological quality of water in the swimming area. The proponent has modelled the behaviour of effluent leaving the outfall to assess the extent of the plume in relation to the new location of the point of discharge and the new infrastructure associated with the project. Environment and Climate Change Canada is satisfied with the proponent's demonstration that the proposed development should not cause any perceptible degradation at the water intakes. The proponent also confirms that no effects on the bacteriological quality of the water in the swimming area are anticipated and it has undertaken to revise its predictive model of water quality for swimming and to provide the City of Québec with any information that is required to monitor this water quality (Englobe, 2020q).

Effects of increased vessel traffic on commercial and recreational boating

The transit of commercial ships to the Port of Quebec and the Ross-Gaudreault Cruise Terminal, as well as recreational boating in the area, could be disrupted due to temporary restrictions caused by construction work. The proponent used data (2012-2015) from the Canadian Coast Guard's Vessel Traffic Management Information System (VTMIS-INNAV) to assess the increase in marine traffic resulting from its project in the study area. However, unlike the VTMIS data, which tracks round trips of vessels on the St. Lawrence, the traffic predictions provided by the proponent reflect only the number of vessels expected to put in to the port. Thus, according to these estimates, the project would result in a maximum addition of 156 vessels (Englobe, 2020a) to the current amount of vessel traffic, which varies between 5,000 and 6,000 vessels annually.

The presence and increase in traffic consisting of large ships is a concern that was raised by the public in relation to the safety of beach users and boaters in the Baie de Beauport sector. First Nations consulted also identified this increase as a concern in relation to potential effects on socio-economic conditions.

These effects are beyond the scope of this environmental assessment which is limited to the effects of the project in the proponent's area of jurisdiction. However, the Agency highlights the concerns raised by the Innu First Nation of Essipit, which maintains that, if the increase in navigation generates significant impacts on the ecosystem of the St. Lawrence River, their economy which is dependent on recreation and tourism



activities, as well as their traditional practices, could be severely impacted. Also, the Innu First Nation of Pessamit is of the opinion that an increase in vessel traffic could have adverse effects on their economic activities related to harvesting of crab, sea urchin, salmon and groundfish in the St. Lawrence Estuary. The Abenaki of Wôlinak and Odanak expressed concerns about the increase in marine traffic in the Lake St. Pierre sector. Similarly, the Mohawks consider that the project could have impacts on the territory of Kahnawà:ke, due to the potential increase in Seaway traffic in the caused by the Laurentia project and changes to the ecosystem. The effects of the project on the use of Indigenous lands and resources and the impact on Indigenous and treaty rights are discussed in section 5.9 and in chapter 7.

As mitigation measures for the increase in marine traffic, the proponent has proposed the use of available navigational aid programs, such as radars and visual and audible signals, in order to increase navigational safety, in consultation with Baie de Beauport users. According to the proponent, aids to navigation must be used to ensure safe navigation and manoeuvrability for commercial ships, both around the containment dyke and in the waterway, as well as for users in recreational boating zones.

5.8.3 Agency analysis and conclusions on residual effects

Effects analysis

Recreational activities and access to the St. Lawrence River

The Agency agrees with the proponent that the encroachments associated with the project will result in a loss in the total area of the recreation and tourism zone for Baie de Beauport users. However, recreation and tourism activities would not be compromised by the mitigation measures and improvements proposed by the proponent. Sailing activities could, however, be affected by the change in the wind conditions caused by the presence of equipment and containers stored at the terminal. Also, as recommended by Transport Canada, restrictions on non-commercial marine traffic might be necessary near the port to avoid accidents, especially during the loading and unloading of ships. Recreational boaters who navigate near the port would have to modify their routes during these operations. However, the Agency considers that these activities would not be compromised since users would be able to adjust their routes while remaining in the Baie de Beauport sector. Furthermore, the Agency considers that the measures identified in section 6.1 on Accidents and Malfunctions would reduce the safety risks for Baie de Beauport users.

With respect to the use and sustainability of the recreational beach, the Agency is satisfied with the morpho-sedimentological monitoring proposed by the proponent and with its commitment to revise its predictive model of water quality for swimming and to provide the necessary information to the City of Québec to monitor water quality in the swimming area.

Recreational and commercial fisheries

The Agency relies on the advice from Fisheries and Oceans Canada to concludes that adverse effects and uncertainties related to fish and fish habitat could have significant impacts on recreational and commercial fishing for species such as lake sturgeon and Atlantic sturgeon, as well as on the potential resumption of fishing for striped bass and other species at risk that are monitored in the St. Lawrence River. However, the effects on the fishing activities targeting other valued species such as sauger and walleye would not be significant and could be offset.

Fisheries and Oceans Canada considers that the project would have significant effects on habitat used for reproduction, rearing, feeding and migration by a number of fish species including striped bass, lake sturgeons, Atlantic sturgeon, American shad and rainbow smelt. Based on current knowledge, Fisheries and Oceans Canada is of the opinion that the effects on certain habitats cannot be offset (see chapter 5.4). The Agency thus considers that the adverse effects on the distribution and abundance of these migratory species could be felt in the recreational and commercial fisheries in the St. Lawrence River.

Taking into account these potential effects, that it is impossible to offset for certain habitats and very difficult to offset for other, particularly sturgeon, the Agency considers that the project could lead to changes in recreational and commercial fishing activities. For example, the overall performance of the recreational fisheries in the river, which can be considered highly lucrative recreational activities in Québec (Mingelbier *et al.* 2016), could be affected by a decrease or changes in stocks of certain fish species. These changes would force fishermen to switch to fishing for other species or to move to other locations to continue fishing for valued species.

Fisheries and Oceans Canada has highlighted the socio-economic importance of fish and fish habitat in the project area. As well, the investments made by governments in reintroduction, recovery and monitoring programs for migratory species could potentially allow the reopening of recreational and commercial fisheries for species such as striped bass and the conservation and expansion of one of the only remaining Atlantic sturgeon fisheries in the world.

Intensification of marine traffic

The Agency notes that the project sector is characterized by port infrastructure and that Baie de Beauport users already coexist with the ships that transit in the area. According to the data presented above for marine traffic, between 2012 and 2015, more than 5,000 ship movements took place annually, on average, on the St. Lawrence River near Québec City. Bulk carriers, which are ships carrying bulk solids, accounted for half of the movements on the St. Lawrence River during the period concerned. Container ships, for their part, represent approximately 16% of the movements on the river. The project would add approximately 156 additional ships, a figure that would be less than the average variation in annual marine traffic in the sector.

The Agency considers that this increase is small and that, taking into account the mitigation measures proposed by the proponent, it would not significantly disrupt recreation and tourism activities in the sector. However, according to the Agency, the mitigation measures described below would have to be implemented to avoid disruptions to commercial navigation and recreation and tourism activities in the sector, as well as to avoid the safety risks associated with the coexistence of large vessels with swimming and boating activities.

Agency findings

Following its analysis and based on the assessment criteria presented in appendix A, the Agency concludes that the project is likely to cause significant adverse environmental effects on recreational and commercial fishing for lake sturgeon and Atlantic sturgeon as well as on the potential resumption of fishing for striped bass and other species at risk in the St. Lawrence River that are covered by protection and monitoring plans (appendix B). The project-related impacts on these species and their habitat could have adverse effects on the distribution and abundance of these migratory species and thus affect the

recreational and commercial fisheries in the St. Lawrence River. The Agency concludes that the significance of these effects would be high for the following reasons:

- The intensity of the effects on commercial and recreational fisheries would be high since, due to the adverse effects resulting from the destruction of habits used by certain species for spawning, rearing, feeding and movements, the project could cause changes in the distribution and abundance of valued fish species;
- The project would result in effects that are regional in extent and long term in duration since many of the fish species that would be affected by the project are part of migratory populations that have a regional geographic distribution and that travel great distances, thus affecting recreational and commercial fisheries throughout the St. Lawrence River (350 kilometres approximatively). The effects would be felt over the long term since many habitats would be permanently lost and no measures (avoidance, mitigation or offset) could be put in place to significantly reduce these effects;
- Changes to the environment that could result in effects on the commercial and recreational fisheries would be continuous during the operations phase, and the modification and destruction of habitats would be irreversible.

Identification of key mitigation measures

The Agency has identified the main mitigation measures likely to mitigate several potential effects of the project on economic conditions related to recreation and tourism activities and commercial navigation. However, all of these measures, including those intended for fish and fish habitat (section 5.4), would not sufficiently mitigate the potential effects of the project to the point that the residual effects on recreational and commercial fishing would be non-significant. The Agency took into account the mitigation measures proposed by the proponent, the advices of government authorities, and the comments received from First Nations consulted and the general public. These measures are as follows:

- Delineate the public areas that would be accessible during construction to ensure the safety of users of the recreation and tourism areas and users of the project site. This will include signage that clearly identifies the safe access routes to the Baie de Beauport recreation and tourism zone in the work site area;
- Delineation of a security perimeter around the work site to ensure safe navigation;
- In consultation with potentially affected parties and First Nations consulted within the framework of the project, develop a communications plan for the construction phase in order to provide information for recreation and tourism businesses in the project area, users of the Baie de Beauport beach, and users carrying out water-based activities, fishing and any other recreation and tourism activities, as well as commercial navigation stakeholders;

Permanent and temporary works related to dredging, including aquatic or terrestrial disposal sites or dewatering basins, as applicable (indicating the size, location, type and volume of sediment to be stored and the level of contamination). For mariners, this information will take the form of notices to mariners;

A calendar detailing the dates and schedules of work for the installation of the containment dyke, the backfilling of the rear wharf and the installation of the visual and acoustic barrier;

A scheduled detailing the periods of restriction for in-water works in the spring and summer (which correspond to the sensitive periods for fish), to allow users to adjust their recreational activities in the area;



Accessible public areas and closures during the work, as well as access roads to the Baie de Beauport and the river;

Frequent updates to inform boaters about water quality for swimming;

Any other relevant information for boaters and Baie de Beauport users, First Nations concerned and any other stakeholders or individuals affected by the project.

- Maintain an accessible boat storage area during the construction phase;
- In consultation with the potentially affected parties and First Nations consulted, develop a communications plan, for the operational phase, in order to inform the recreational tourism businesses in the project area, the users of the beach of the Baie de Beauport, the users practicing nautical, fishing and other recreational tourism activities, as well as the stakeholders in commercial navigation, about:

The schedule of presence vessels at the quay;

Schedules of loading and unloading operations;

Frequent updates to inform boaters of water quality for swimming;

Navigation measures to be respected by recreational boaters and commercial ships docking at the Port of Quebec and the Ross-Gaudreault Cruise Terminal;

Available navigational support programs.

- In order to prevent accidents, restrict non-commercial marine traffic in the vicinity of the new facility, especially during loading and unloading operations;
- The implementation of available navigational aid programs and tools (visual aids, radar, ship movement planning software, etc.);
- In consultation with users, develop a project to improve the available facilities in the Baie de Beauport sector. As announced by the proponent (Englobe 2020q), the project will have to make 0.9 ha of land available for recreational activities through the implementation and development of the following elements:

A launching ramp;

Long floating docks to ensure user safety at high and low tide;

Relocation of the watch tower;

A storage area for boats and personal watercraft (kayaks) and a recreational area;

Improve and ensure permanent access to Baie de Beauport for recreational activities through the construction of an overpass over the railway tracks.

- In consultation with the Fédération québécoise des chasseurs et des pêcheurs (FédéCP), establish areas under the proponent's jurisdiction that would serve to improve the quality and quantity of the areas dedicated to fishing in the Port of Quebec sector;
- Revise the predictive model of water quality for swimming and provide all relevant information to the City of Québec to ensure monitoring of water quality for this activity.

Need for follow-up and follow-up requirements

In order to verify the accuracy of the environmental assessment and assess the effectiveness of the mitigation measures for evaluating the evolution of beach erosion and of the sand spit in the southwest embayment, the Agency is of the opinion that a morpho-sedimentological follow-up is necessary.

Monitoring programs relevant to the socio-economic context were identified for other valued components analyzed in this report. In particular, see the sections on fish (5.4) and human health (5.7).

5.9 Indigenous Peoples – Current Use of Lands and Resources for Traditional Purposes

The Agency is of the view that the Project would cause significant adverse residual environmental effects on the current use of lands and resources for traditional purposes, and, more specifically on the fishing activities practiced by the Huron-Wendat Nation, the W8banaki Nation, the Essipit, Pekuakamiulnuatsh and Pessamit First Nations, the Kahnawà:ke, Kanesatake and Akwesasne Mohawk First Nations, and the Wolastoqiyik (Maliseet) Wahsipekuk First Nation. Considering that the Project could affect the populations of several fish species already at risk (see section 5.4) and of interest to these First Nations, the Agency considers that the fishing of Lake sturgeon, Atlantic sturgeon, Striped bass and American shad could be compromised by the Project.

The following subsections present the information that the Agency considered in its analysis to conclude on the significance of the effects of the Project on the traditional uses of lands and resources. These sections also include the advice of expert departments, First Nations consulted and the general public.

5.9.1 Description of the component “current use of land and resources for traditional purposes”

For the purpose of federal environmental assessments, “current use of land and resources for traditional purposes” refers to any practice or activity that is part of the distinctive culture of an Indigenous group and that has been commonly carried out by the Indigenous group over a period extending from the recent past to the present, depending on the specific practice or activity. This may include activities such as hunting, fishing, trapping, and cultural or traditional uses of the land such as gathering medicinal plants or using sacred sites. The Agency also considers uses that may have ceased due to external factors if they can be reasonably expected to resume once conditions are restored. The criteria used by the Agency to assess environmental effects and the grid for determining their significance are presented in appendix A.

In order to be able to determine the adverse effects on the current use of lands and resources for traditional purposes, the Agency examines, among other things, whether the Project could result in changes to the resources used for traditional purposes as well as changes in the conditions under which Indigenous peoples practice these activities and use the territory.

As part of its analysis, the Agency assessed the adverse residual environmental effects of the Project on the current use of lands and resources for traditional purposes by the Huron-Wendat Nation, the W8banaki Nation, the Essipit, Pekuakamiulnuatsh and Pessamit First Nations, the Kahnawà:ke, Kanesatake and Akwesasne Mohawk First Nations, and the Wolastoqiyik (Maliseet) Wahsipekuk Nation.



The study area selected by the proponent to assess the effects on the current use of lands and resources for traditional purposes is the extended study area (figure 3, chapter 1). However, the Agency indicates that many of the resources hunted or fished by these First Nations travel long distances. Thus, the adverse effects on these resources may also be felt by First Nations who are located far from the expanded study area and who practice hunting or fishing.

Description of uses practiced by the Huron-Wendat Nation

To describe the Huron-Wendat Nation's uses, the proponent referred to documents, studies and surveys provided, as well as to discussions with representatives from the Nionwentsio Office⁶³. The Project is located on the community's traditional territory and, according to a contemporary land use survey conducted in 2016 by the Huron-Wendat Nation, 11 sites were identified as being used for traditional activities, including fishing, migratory bird hunting and other recreational activities (boating, hiking, etc.) (Englobe, 2018b). Of these 11 sites, six fishing sites, which could be affected by the decline in fish populations, are located between the Pierre-Laporte Bridge and the mouth of the Montmorency River, two of which are located within the extended study area. According to the proponent, the main species of fish caught by the Huron-Wendat Nation are bass, striped bass, brown bullhead, channel catfish, pike, walleye, sturgeon, brook trout and Atlantic salmon. The proponent reports that, according to representatives from the Nionwentsio Office, the Huron-Wendat depend, in part, on fishing in the extended study area for their traditional food, particularly walleye, sturgeon and pike (Englobe, 2018b).

According to the proponent, members of the Huron-Wendat Nation also hunt migratory birds in and near the extended study area. Those interviewed by the Huron-Wendat Nation Council as part of its 2016 complementary impact statement (HWNC, 2016) reported hunting snow geese, Canada geese and various duck species. The complementary study also identified five migratory bird hunting sites in the vicinity of the Project, including one located in Baie de Beauport.

According to the Huron-Wendat Nation survey, other documented uses in the extended study area fall under the general category of recreational activities (Englobe, 2018b). The survey revealed that some members regularly engage in motorized boating on the St. Lawrence River. One member mentioned making regular trips from the Lévis marina on different routes between Québec City and Montréal. Some members reported the occasional use of small boats, particularly in Baie de Beauport. Navigation is practiced from May to October (Englobe, 2018b). In addition, recreational and family activities in Baie de Beauport were reported by several Wendake residents.

The Huron-Wendat Nation also reported the importance of its relationship with nature, its territory and the resources found there, which perpetuated as a result of the practice of traditional activity. The Nation's customs are an integral part of every aspect of Huron-Wendat life⁶⁴.

Description of uses practiced by the W8banaki Nation

The proponent's description of contemporary uses of the W8banakiak (Abenaki) territory is based on existing data that remains partial since the Ndakina Office⁶⁵ has only been in place since 2013 (Englobe,

⁶³ "Nionwentsio" means "our magnificent territory" in the Huron-Wendat language. The Nionwentsio Office is a sector of the Huron-Wendat Nation Council, which is also in charge of protecting the territory.

⁶⁴ Consultation on the Environmental Impact Assessment Study of the Deep Water Wharf Development Project in the Port of Quebec City – Beauport 2020, Huron-Wendat Nation Council, March 3, 2017 (Brief).

⁶⁵ "Ndakina" means "Our land" in Aln8ba8dwaw8gan (W8banaki language). The Ndakina Office is a sector of the Grand Conseil de la Nation Waban-Aki, which is in charge of responding to territorial consultations.

2018b). According to the proponent, W8banakiak practice hunting, fishing, trapping and plant gathering activities that are concentrated in the southern half of the First Nation's traditional territory, located mainly on the south shore of the St. Lawrence, approximately between Sorel and Montmagny to the U.S. border. According to the proponent and following consultations with the Ndakina Office, members of the W8banaki Nation do not make any particular use of the Project's extended study area for the practice of traditional activities (Englobe, 2018b). However, some members of the W8banaki Nation do navigate the extended study area for recreational purposes and as a traditional activity (Englobe, 2018b). The W8banaki Nation reported that in order to access fishery resources and sites of knowledge transfer, they use boats, canoes and motorized rowboats, and access rivers through public and private ramps (Englobe, 2020f).

Fishing in the St. Lawrence River takes place mainly between Montréal and Sorel Islands, but extends to the Québec City area (Englobe, 2020f). The species fished by the Nation include, but are not limited to, yellow perch, eel, channel catfish and various species of walleye, sturgeon and catfish. The lake sturgeon is a species of cultural importance to the W8banakiak of Odanak. It is their emblem. The striped bass is also a valued species whose historic fishing was interrupted due to the species' extinction. Recovery of this species in the St. Lawrence River, in which the W8banakiak participate through research projects, would allow them to catch this species again. Migratory fish species, such as lake and Atlantic sturgeon, are caught year-round in open water or on the ice (Englobe, 2018b). With regard to sturgeon, W8banakiak informed the Agency that they have established a daily limit of catching one per day to protect the species.

The proponent reports that the First Nation considers fishing to be central to the establishment of the individual and collective identity of its members. It is an integral part of their way of life and their diet, and is essential to the intergenerational transfer of W8banaki values and knowledge (Englobe, 2019f). It is also considered important for the physical, mental and spiritual well-being of W8banakiak (Englobe, 2020f). The Ndakina office also mentioned that W8banakiak women fish a lot, in equal proportion to men. This is because fishing is an activity that is easier to practice with children near communities. Women therefore play an important role in knowledge transfer. According to the Ndakina office, this implies that the effects on fishing would have a greater effect on women for whom it would be more difficult to travel to remote territories or to leave for longer stays to access the resource if it becomes necessary.

According to the proponent, W8banakiak do not hunt migratory birds in the Project's extended study area. This type of hunting is mainly practiced in the vicinity of Lake Saint-Pierre. It is also practiced on the southern tip of Île d'Orléans and in the intertidal zone and tidalands of the south shore of the river near Montmagny. The species hunted are Canada geese, snow geese and several duck species (Englobe, 2018b).

Description of uses practiced by the Kahnawà:ke, Kanesatake and Akwesasne Mohawk First Nations

The information used by the proponent to describe the uses of the Kahnawà:ke, Kanesatake and Akwesasne Mohawk First Nations comes mostly from publicly available resources. The proponent claims to have had few opportunities to meet with these First Nations. A meeting held in 2015 with representatives from the Kahnawà:ke Mohawk First Nation provided additional information for this community (Englobe, 2018b). However, both the proponent and the Agency were unable to obtain information regarding traditional uses by members of the Kanesatake and Akwesasne First Nations.

According to the proponent, members of the Kahnawà:ke, Kanesatake and Akwesasne Mohawk First Nations do not practice any traditional, recreational or commercial activities in the extended study area. Members of the Kahnawà:ke First Nation in the Montréal area catch certain species of migratory fish such

as lake sturgeon and American shad, whose distribution range includes the fluvial and estuarine portion of the river. The Agency has also received additional information from the Mohawk Council of Kahnawà:ke⁶⁶ that the Project could affect the availability of lake sturgeon, a species of cultural importance to the Mohawks, and of American shad at the members' practice sites, and thus have an effect on the Nation's food security. The Mohawk Council of Kahnawà:ke also highlighted the link between fishing and the experience surrounding this practice both in terms of community sharing and intergenerational knowledge transfer. The Mohawk Council of Kahnawà:ke established that there is a direct link between the usage effects of the Project and the repercussions it could have on the First Nation's culture and language.

Description of uses practiced by the Essipit, Pessamit and Pekuakamiulnuatsh Innu First Nations

According to the 2004 Agreement-in-Principle of General Nature⁶⁷, the respective traditional territories (Nitassinan) of the Essipit, Pessamit and Pekuakamiulnuatsh First Nations are not included in the Project's extended study area, but a customary territory used by the three communities called "Southwestern Part" corresponds approximately to the Québec National Capital Region.

According to the proponent, some members of the Innu practice fishing in the Québec National Capital Region, including in the extended study area and the surrounding area. Members of the Essipit Innu First Nation fish walleye at the Saint-André wharf in Québec City for four to five days a year. This information was collected by the Essipit Innu First Nation as part of the monitoring of its members' traditional practices (Innu-Aitum monitoring). However, since not all members have been met with yet, the data is not exhaustive. Contemporary use of the traditional territory of the Pekuakamiulnuatsh does not affect the extended study area or the St. Lawrence River. The traditional activities practiced near the study area are fishing on the Montmorency River, upstream from the falls (Pekuakamiulnatsh Takuhikan and CPNIE, 2016). The members of the Pessamit First Nation practice their traditional activities mainly in the St. Lawrence River, downstream from the Project's extended study area.

Members of the three communities downstream from the extended study area fish for species such as Atlantic sturgeon and smelt whose population distribution includes the Québec City region. No other resource harvesting activities (including migratory bird hunting), hunting camps, or drinking water sources have been identified in the Project's extended study area(Englobe, 2018b).

The proponent specified that certain members of the Essipit community supplement their diet with fish products. About 20 community members also practice subsistence fishing for redistribution to families (Englobe, 2020f).

Description of uses practised by the Wolastoqiyik (Maliseet) Wahsipekuk First Nation

The proponent relied on public information available at the time of the environmental assessment to describe the uses of the Wolastoqiyik (Maliseet) Wahsipekuk First Nation. The Wolastoqiyik Wahsipekuk First Nation territory overlaps the southern portion of the Project's extended study area, on the south shore of the St. Lawrence River between the Chaudière River near Lévis and the Mitis River near Mont-Joli

⁶⁶ Mohawk Council of Kahnawà:ke Briefs, 2017 and 2019

⁶⁷ https://www.rcaanc-cirnac.gc.ca/DAM/DAM-INTER-HQ/STAGING/texte-text/mamu_1100100031952_eng.pdf



(Englobe, 2018b). According to the proponent, there is little documentation about this nation's land use. However, during a meeting with the Agency⁶⁸, the Wolastoqiyik Wahsipekuk First Nation indicated that the Etchemin and Chaudière rivers, whose watersheds flow into the St. Lawrence River, are important for the practice of ancestral fishing, including catching lake sturgeon. The First Nation also informed the Agency⁶⁹ that they were in the process of documenting its members' uses and that they suspect they use the extended study area since several members live in and visit that area, and that its historical use by the Maliseet is documented. According to the proponent, fishing and hunting for food purposes are still an integral part of the lives of many Maliseet families. The community also practices community hunting and fishing (Englobe, 2018b).

5.9.2 Analysis of potential effects and proposed mitigation measures

According to the proponent, the disturbance and noise caused by the construction work could impact fishing, hunting and other activities practiced near the construction zone. Access to the territory through entry points located in the extended study area could also be modified by the construction work.

The proponent considers that terminal and port operations could also disrupt or alter activities related to the day-to-day use of land and resources. The effects would not be the same for all First Nations affected by the Project. The level of impact would depend on the type of activities carried out and their location (Englobe, 2020f).

Fishing and hunting activities

During the construction phase, fishing and hunting activities practiced in the extended study area by First Nations members, including members of the Huron-Wendat Nation and Innu First Nations, could be disrupted by the construction work (disturbance and noise). According to the proponent, fishing would be affected in an intermittent manner on both shores of the St. Lawrence, while hunting would be affected during the hours when construction work would take place because birds could leave the construction site area. However, bird distribution and abundance would not be altered (Englobe, 2020f).

For the Huron-Wendat First Nation, the proponent anticipates that both fishing sites located within Baie de Beauport as well as the migratory bird hunting site on the shores of Baie de Beauport to be disturbed, particularly by noise from the construction work. For safety reasons, Huron-Wendat fishermen would not be able to access the fishing area partially located within the construction zone (Englobe, 2020f).

During the operational phase, the terminal's presence and related activities could disrupt the hunting and fishing activities of First Nations. Noise from activities and increased marine traffic could diminish the quality of these practices. However, access to the sites will not be modified. The Project would encroach on only a small portion of one of the fishing sites used by the Huron-Wendat First Nation.

The proponent does not anticipate any significant effects on fish distribution and abundance in the river, including widely distributed migratory species such as striped bass, lake sturgeon, Atlantic sturgeon and

⁶⁸ Meeting between the Agency and the Wolastoqiyik Wahsipekuk Nation on the project update and presentation of the Agency's new rights impact assessment methodology (January 15, 2019).

⁶⁹ Meeting between the Agency and the Wolastoqiyik Wahsipekuk Nation on the rights impact assessment (September 23, 2020).



American shad. The proponent concluded that there would not be measurable effects on American shad fishery, that effects for the fishery of the two sturgeon species would be unnoticeable or marginal, and that the Project would not affect the growth of the striped bass population and the eventual opening of a subsistence fishing (Englobe, 2020f).

However, as noted in section 5.4: “Fish and Fish Habitat, Including Invertebrates”, the Agency concluded that there would be significant effects on fish and fish habitat, including migratory species such as striped bass, lake sturgeon, Atlantic sturgeon and American shad. Considering that these species migrate considerably on either side of the Beauport sector, that it is not possible to offset for certain habitats affected by the Project and very difficult to offset for others, effects on traditional or contemporary indigenous fishing activities could be observed. All the above-mentioned species are fished or involved in traditional activities by one of the First Nations targeted by the Project’s environmental analysis. Members of the Huron-Wendat, W8banaki, Innu, Kahnawà:ke Mohawk and Wolastoqiyik Wahsipekuk Nations could be affected by a decline in the numbers of any of the species affected by the Project. Concerning the Kanesatake and Akwesasne Mohawks First Nations, as previously mentioned, it was not possible to obtain information concerning their uses and the exercise of their rights. However, it is reasonable to believe that these two First Nations fish migratory species and that, consequently, the repercussions on fishing rights would be the same for these two communities as for the Kahnawà:ke First Nation.

To reduce the concerns and worries of the First Nations, the proponent suggested that each hold follow-up meetings, one of which would address the fish offset plan. These meetings would make it possible to keep the First Nations informed of the design, implementation and evolution of the offset program. Other subjects of interest would also be discussed, including the state of Indigenous fisheries (Englobe, 2020f).

Changes in land access and land use

During the construction phase, navigation, recreational and family activities practised near the work site by the Huron-Wendat Nation and the W8banaki Nation will be disrupted by noise and construction activities (Englobe, 2020f). The proponent indicated that public access to the river on the Quebec Port Authority territory would remain open during the construction and operational phase. The proponent also indicated that the Saint-André wharf would remain accessible during the construction work and that signage would be put in place to delineate the worksite, whose access would be temporarily unavailable.

The proponent also considers that periods of work restrictions in the aquatic environment for fish during the summer could benefit members who wish to take advantage of the Beauport River and Bay for their activities (Englobe, 2020f).

During the operational phase, the proponent believes some adaptation would be necessary for Huron-Wendat users because of the presence of new infrastructure that would encroach on a portion of one of their fishing sites. Increased marine traffic could also affect the quality of the experience (Englobe, 2018b). The proponent indicated that the new infrastructure should not impede the usual navigation corridors of the W8banaki-Aki Nation and that the Project would not cause increased marine traffic between Québec City and Montréal, a sector used by W8banakiak and Mohawk fishermen and users (Englobe, 2020f).

To reduce the effects of the Project, the proponent has proposed to First Nations who wish to do so, to participate in a periodic follow-up in connection with the environmental follow-up and offset program during the construction and operational phases. This follow-up would consist of meetings adapted and planned according to the interests and concerns of each of the First Nations. For the Huron-Wendat Nation, the proponent proposed to continue the follow-up meetings held within the framework of the Permanent Working Table to maintain exchanges and communication on the Laurentia Project (Englobe, 2020f).

As with fishing and migratory bird hunting activities, the proponent would provide First Nations representatives with the construction schedule for distribution to the communities so members can plan their activities accordingly.

5.9.3 Agency analysis and conclusions on residual effects

Effects analysis

With respect to the construction phase, the Agency believes that the proponent has provided an adequate analysis and drawn appropriate conclusions regarding the effects of the construction site and noise on activities carried out near the construction zone, including First Nations fishing and hunting activities. The Agency considers that the implementation of follow-up meetings and the continuation of meetings within the framework of the Permanent Working Table for the Huron-Wendat Nation would allow the proponent and First Nations to discuss the Project's progress and the concerns of the various communities in a cooperative manner.

With respect to the operational phase, the Agency also believes that the proponent's analysis and conclusions are adequate with respect to the effects caused by disturbance and noise on First Nations activities, particularly hunting and fishing activities. The increase in marine traffic generated by the Project could cause additional disturbances to members in the extended study area. Since vessels would use the same waterways they currently use, it is likely that the increase in traffic, whose annual variation would be 52 to 156 vessels, would be barely noticeable in an environment where the average annual vessel movement is 5,000 to 6,000 (Englobe, 2020f).

However, the Agency believes the Project could impact fishing in the St. Lawrence River and its estuary, and the resulting use for First Nations in relation to habitat loss and modifications caused by the encroachment of the Project and dredging on migratory species such as striped bass, lake sturgeon, Atlantic sturgeon and American shad. Thus, the Agency is of the opinion that the Project could modify fishing-related activities and customs such as food for subsistence, community sharing and intergenerational knowledge transfer in the following ways, for each of the nations:

- Huron-Wendat Nation: Fishing activities and customs involving lake sturgeon and Atlantic sturgeon;
- W8banaki Nation: Fishing activities and customs involving lake sturgeon and Atlantic sturgeon;
- Essipit, Pessamit and Pekuakamiulnuatsh First Nations, and more specifically the Essipit First Nation: Fishing activities and customs involving lake sturgeon;
- Wolastoqiyik (Maliseet) Wahsipekuk First Nation: Fishing activities and customs involving lake sturgeon;
- Mohawk First Nations, and more specifically the Kahnawà:ke First Nation: Fishing activities and customs involving lake sturgeon and American shad.

As mentioned by the Grand Conseil de la Nation Waban-Aki, fishing may be particularly affected by the effects of the Project on fish and fish habitat for certain sub-groups of the population, such as women or Elders.

It is also important to note that First Nations representatives promote the release of striped bass and sturgeon among their members to help these populations recover. It should also be noted that traditional striped bass fishing is important for all communities that wish to see it become an important activity for their members again. The Agency therefore considers that the striped bass fishery, which could resume once



the conditions necessary for its practice are restored, could be compromised by the effects of the Project on the species.

First Nations expressed concerns about the Project's effects on fishing migratory species of interest. The Grand Conseil de la Nation Waban-Aki, for example, stated that striped bass is a species valued by the Nation and that its recovery could make it possible to support a fishery in the portion of the St. Lawrence River included in their traditional territory. They are also concerned about the effects that the decrease in fish populations could have on uses. More specifically, members could be encouraged to fish other species of fish. Finally, the Mohawk Council of Kahnawà:ke is concerned about the reduction of migratory species at traditional sites following the construction and operation of the terminal. The Project's effects on sturgeon, striped bass and American shad populations are of particular concern to this First Nation.

The Agency is aware that additional information on the current use of land and resources for traditional purposes and possible residual effects could be presented to the Agency. Comments from First Nations on the draft environmental assessment report and potential conditions will be considered and will assist the Agency in finalizing its conclusions regarding the Project's potential effects on the current use of lands and resources for traditional purposes.

Agency conclusion

Based on its analysis and the assessment criteria presented in appendix A, the Agency has concluded that the Project is likely to cause significant adverse environmental effects on the current use of lands and resources for traditional purposes. The Project's effects on fish and fish habitat, particularly on striped bass, lake sturgeon, Atlantic sturgeon and American shad, could reduce these fish populations that are prized, valued and fished by First Nations and, consequently, have repercussions on the practice of fishing and fishing-related activities and customs. The Agency concludes that the effects would be significant for the following reasons:

- The magnitude of the Project's effects would be high because the Project would modify the conditions of traditional practices in a way that would compromise current use by Indigenous people and, more specifically, striped bass, lake sturgeon, Atlantic sturgeon and American shad fishery.
- The Project would have regional and long-term effects since they would be felt by several Indigenous communities that fish along the St. Lawrence River, from Montréal to the Estuary. In fact, the Project would affect migratory fish species that travel long distances. The effects would also be felt in the long term since fishing practices would be affected by the decrease in fish populations impacted by the Project. The population decrease would be caused by the loss of habitats necessary and important to the life cycle of the fish.
- Adverse effects would be continuous because they would be felt throughout the Project's operational phase and would be irreversible in time since current use will not likely return to its initial state considering that the affected fish stocks are already in a precarious state.

Identification of key mitigation measures

The Agency has identified below the main mitigation measures likely to decrease the Project's potential effects. However, these measures will not be sufficient enough to render the residual effects on current uses insignificant. Also, key mitigation measures, particularly for navigation, have been identified in section 5.8 (Socio-economic conditions). To identify the key mitigation measures, the Agency took into account the measures proposed by the proponent, the advice of government authorities, as well as comments received from the First Nations consulted and the public. However, these measures would not sufficiently mitigate the project's potential effects on current uses to render the residual effects insignificant. Should the project be allowed to proceed, the government will consult with First Nations to determine what additional mitigation or accommodation measures would be required to mitigate the impacts on current uses of resources for traditional purposes:

- Transmit the construction work schedule to representatives of various First Nations to inform users who practice traditional activities near the Project site;
- Have regular follow-ups with First Nations who wish to do so regarding the design, implementation and evolution of the environmental follow-up program for damages caused to fish and fish habitat. These meetings would be adapted and planned according to the interests and concerns of the interested First Nations in order to exchange and discuss the potential effects that could be linked to the Project;
- Implement the fish and fish habitat mitigation measures identified in section 5.4.2 to limit effects on fish and fish habitat;
- Implement the mitigation measures for accidents and malfunctions under the responsibility of the proponent presented in Section 6.1 to avoid adverse effects on resources.

Need for follow-up and follow-up requirements

According to the *Canadian Environmental Assessment Act* (CEAA, 2012), a follow-up program is used to verify the accuracy of a Project's environmental assessment and to judge the effectiveness of measures to mitigate adverse environmental effects. However, the Agency believes that no follow-up program would sufficiently reduce the uncertainties associated with the significant adverse effects of the Project on the current use of lands and resources for traditional purposes. However, the Agency recommends the following follow-up program to assess the effectiveness of the mitigation measures:

- The proponent shall develop, prior to construction and in consultation with First Nations and competent authorities, a follow-up program to verify the accuracy of the environmental assessment and to judge the effectiveness of the mitigation measures with respect to the adverse environmental effects on Indigenous fisheries of the following fish species: striped bass, lake sturgeon, Atlantic sturgeon and American shad.

5.10 Natural and Cultural Heritage

The Project could have residual effects on the natural and cultural heritage, particularly through the backfilling in the river and the presence of tall structures. However, the Agency is of the opinion that the Project is not likely to cause significant adverse residual environmental effects, taking into account the application of the mitigation and follow-up measures recommended below.

The following subsections present the information considered by the Agency in its analysis to conclude on the significance of the Project's effects on natural and cultural heritage, including the advice and comments of expert departments, First Nations consulted and the public.

5.10.1 Description of the component "natural and cultural heritage"

The Agency considers that natural and cultural heritage can include such things as land or a resource (e.g., an artifact, object, or place), as well as a structure, site, or thing of historical, archaeological, paleontological, or architectural significance that is distinguished from other things by virtue of the value attributed to it (Agency, 2015). Québec City's heritage ensemble, recognized for its natural and humanized landscapes, the historical and cultural heritage of First Nations and archaeological resources meet this definition.

The proponent selected the expanded study area for the analysis of landscape and First Nations historical and cultural heritage, while the work site area was used for archaeological resources (figure 3, chapter 1).

Landscape

The Laurentia Project fits into the visual environment of the industrial-port site in the Beauport sector of the Port of Quebec. This sector includes components of various heights and widths typical of industrial zones, which isolate the area. It also includes sites dedicated to recreational activities on the Baie de Beauport beach and the bicycle path of the Corridor du Littoral.

Because of its location near the St. Lawrence River, the Project would be visible to users of the Seaway (St. Lawrence River landscape), particularly during the practice of tourist and recreational activities, as well as the western tip of Île d'Orléans (rural landscape) and the north and south shores of the river (alternating urban, industrial and recreational-tourism landscapes). The urban landscapes of Québec City and Lévis have many heritage features, including the Fortifications of Québec, the Forts-et-Châteaux-Saint-Louis National Historic Sites, which include the Dufferin Terrace, and the Lévis Forts. In addition, the Historic District of Old Québec is a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site, which is co-managed by Parks Canada, Québec City and the Government of Québec through the Ministère de la Culture et des Communications du Québec.

The proponent has defined ten landscape units within the expanded study area (table 15). A detailed baseline condition for each was used to assess the Project effects presented in Englobe (2020o).

Table 15 Landscape units defined in the expanded study area and viewpoints used in the proponent's visual simulations.

| Landscape unit | Point of view |
|---|--|
| Limoilou Urban Landscape (U1) | None |
| Beauport Urban Landscape (U2) | None |
| Downtown Québec City Urban Landscape (U3) | Remparts Street (PT3) |
| Lévis Urban Landscape (U4) | Duplessis Street (PT13) Jolliet Strike (PT14) Paquet Wharf - Québec-Lévis Traverse (PT18) |
| St. Charles River Recreational Landscape (RT1) | Mouth of the St. Charles River (PT2) |
| Cap-Blanc Recreational Landscape (RT2) | Pier 22 - Cruise Terminal (PT4) Marine Marchande Square (PT5) Dufferin Terrace (PT19) |
| Port of Quebec Industrial Landscape (I1) | Baie de Beauport (PT1) Pier 24 - Bunge Site (PT6) |
| Lévis Industrial Landscape (I2) | |
| St. Lawrence River Landscape (F1) | CN Rail Yard (PT7) Mouth of the Beauport River (PT8) Des Chutes Boulevard's Wharf (PT9) View of Baie de Beauport from the St. Lawrence River (PT10) Offshore of Davie Canada Inc. (PT12) Near the Davie Canada Inc. construction site. (PT15) View north from the St. Lawrence River (PT16) Île d'Orléans Bridge (PT20) View towards the west from the middle of the St. Lawrence River (PT21) |
| Île d'Orléans Rural Landscape (R1) | Anse aux Canots (PT11) Parking La Goéliche (PT17) |

First Nations Historical and Cultural Heritage

According to the proponent, four sites of historical and cultural interest are located near the Project, namely the sites of Stadaconé, the former Huron-Wendat village near Sainte-Pétronille at the western tip of Île d'Orléans, the former Sillery mission and Pointe à Puiseaux. The Stadacona site, located on the site of present-day Québec City, and the former Huron-Wendat village on Île d'Orléans at Sainte-Pétronille, occupied between 1651 and 1657, are within the expanded study area. The other two sites are both outside the expanded study area. The exact location of the Stadacona site has not been identified. This site is of historical importance for the Huron-Wendat Nation since it is the meeting place between the explorer Jacques Cartier and the Iroquoians in 1535-1536 (Englobe, 2018d).

According to the information sources and documents consulted by the proponent, the location of Québec City, the St. Charles River, Sillery Cove and Île d'Orléans are important heritage sites because of the events that took place there in the past in the presence of the Innu and other First Nations (Englobe, 2020d).

Terrestrial and underwater archaeology

Parks Canada Agency is of the opinion that the Project site does not have terrestrial archaeological potential since studies of the site's history and previous occupations show that the area was never built in the past. However, the sector does have strong archaeological potential associated with marine navigation due to its long port history. The study carried out by the proponent showed that several shipwrecks are located in the expanded study area. However, no wreck sites protruding from the river bed are located in the construction zone. However, it would still be possible to find small to medium sized archaeological resources, such as ship ⁷⁰deck fittings (e.g., lost anchors or chains) (Englobe, 2020w).

In addition to the archaeological potential study, an underwater geophysical survey and a sediment profiler survey were carried out in the work area by the proponent. However, these activities were not carried out in collaboration with an underwater archaeologist. Thus, according to Parks Canada, these activities did not accurately identify the nature of the archaeological targets since they did not allow for the identification of potential archaeological targets. To remedy these shortcomings, the proponent proposed an archaeological intervention plan that it would implement before work began and continue throughout all phases of the Project (Englobe, 2020w).

5.10.2 Potential Effects and Mitigation Measures

Landscape

The promontory of Cap Diamant, the river, the profile of the Laurentians, the bridges and the Montmorency Falls are emblematic landscapes that make Québec City famous in terms of tourism (Ville de Québec, 2005). In addition, the memoirs of the members of the Association des kitesurfers et véliplanlistes de Québec (AKVQ), attest that the St. Lawrence River, in the Project area, offers a breathtaking view of the Baie de Beauport that could be affected by the Project.

⁷⁰ All the superstructures of a ship

In order to visualize the potential effects of the Project on the landscape, simulations were prepared by the proponent (Englobe, 2020o). These simulations were carried out at different times of the year from 21 points of view (see figure 11 and table 15). These viewpoints were selected to respond to the concerns expressed by citizens and environmental groups about the visual impact on the Project's landscape of the presence of numerous historic sites, heritage sites and landscape observation points in the region. They take into account nearby residential areas, sites of heritage significance, emblematic landscapes and locations dedicated to recreational and tourism activities.

Few visual breakthroughs on the Port of Quebec would be possible from the urban landscapes of Limoilou (U1), Beauport (U2) and downtown Québec City (U3) as well as the recreational landscape of the St. Charles River (RT1). There would be a few partial viewpoints at or near the Project area, for example at the mouth of the St. Charles River. The effect felt on the industrial landscapes of the Port of Quebec (I1), with the exception of the Baie de Beauport sector, and Lévis (I2), would be slight due to the Project's insertion in an already industrialized environment and the nature of the activities taking place there.

The proposed infrastructure would be visible to residents, tourists and users of the Île d'Orléans Rural Landscape (R1). However, the angle of these viewpoints in relation to the Project means that the existing harbour landscape would partially absorb the new infrastructure that would be put in place. In the urban landscape of Lévis (U4), residents near certain viewpoints and recreational and tourist users who frequent the shoreline would be able to see distinctly the new structures that would extend above the skyline, just as they do for the existing facilities of the Port of Quebec. This would limit the integration of the overhead structures into the landscape and would significantly alter the landscape for these observers.

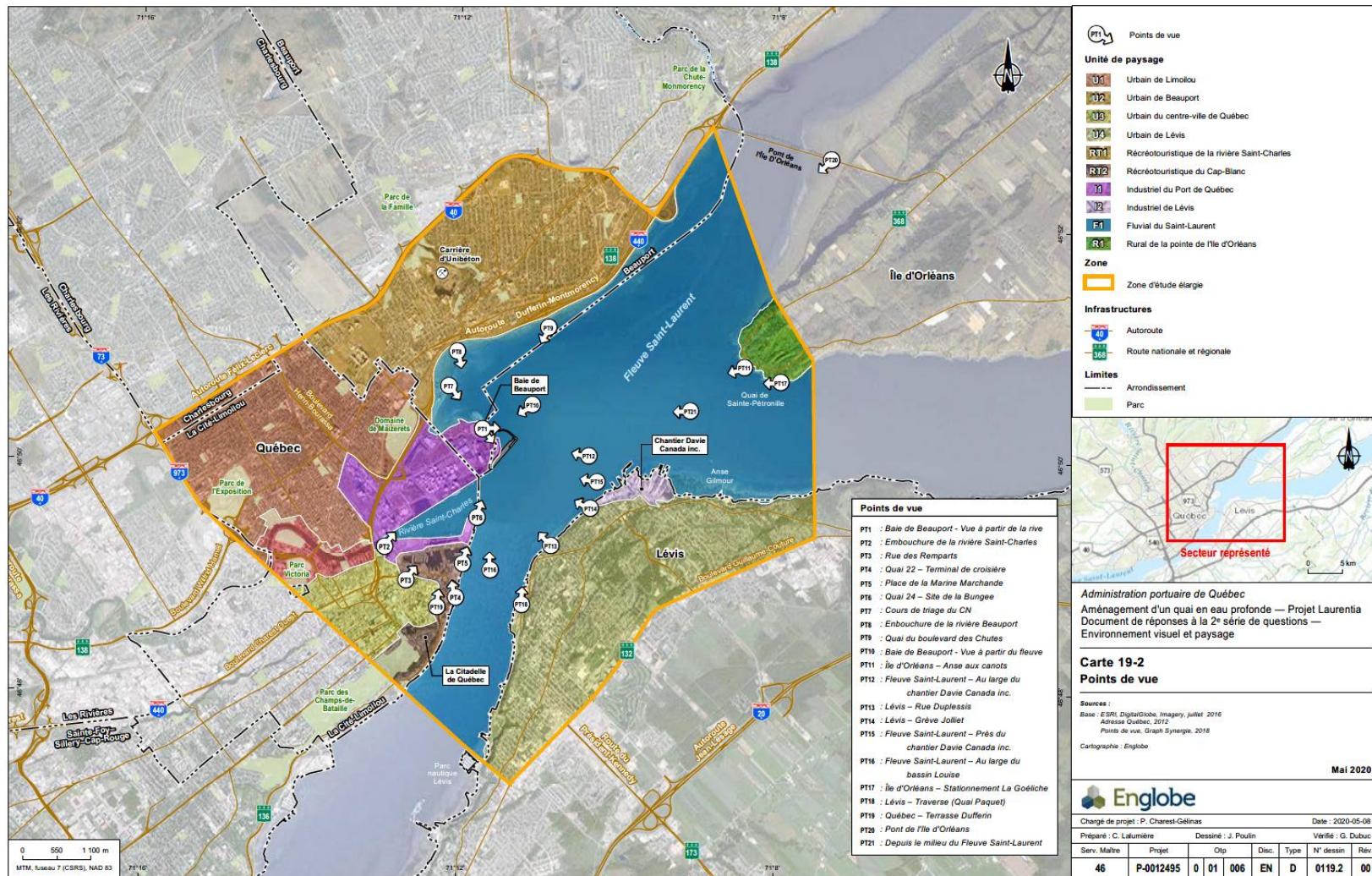
In the Cap-Blanc Recreational Landscape Unit (RT2), the Project would generally have no visual effect on the many historical and heritage sites in the Historic District of Old Québec since most viewpoints are closed due to the narrowness of the streets and the topography of the sector. However, the Project would be visible from certain viewpoints that offer an open view of the St. Lawrence River and the Port of Quebec. The view would be modified by extending the existing infrastructure into the industrial landscape of the Port of Quebec, such as the Dufferin Terrace, which is a visual point of interest for observers. From this point of view, observers would have an open view of the Project, but the observer's gaze could be directed more towards the St. Lawrence River, Île d'Orléans or the city of Lévis than towards the industrial sector of the Port of Quebec.

The views of the Baie de Beauport sector of the Port of Quebec Industrial Landscape Unit (I1) and from the St. Lawrence River Unit (F1) are those that would be most affected by the Project, since it is in these landscape units that the Project would be implemented (figure 12). These sectors are highly valued by users of the Baie de Beauport since the practice of their activities is linked to the degree of appreciation of the river landscape. Depending on the location of the observer, overhead structures would partially or even completely obstruct (from certain angles) the view of downtown and the Château Frontenac by observers during navigation in the sector. In the Baie de Beauport beach sector, the view of the river would be partially obstructed by the new installations, but also by a visual and acoustic screen. These facilities would be added to the existing port facilities.



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Figure 11 Presentation of landscape units and viewpoints used for visual simulations

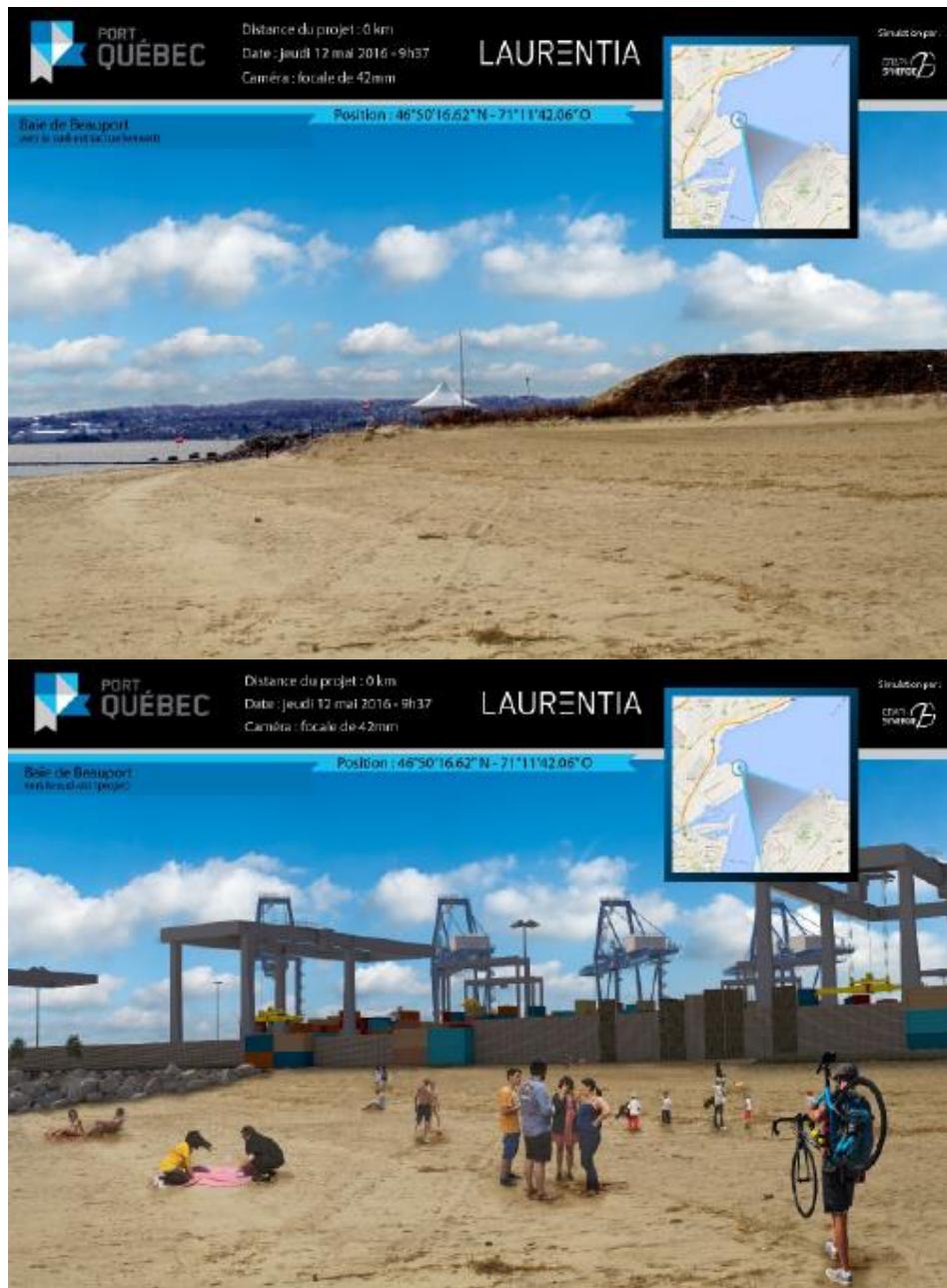


Englobe, 2020



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Figure 12 View of the projected infrastructure from the Baie de Beauport (PT1) without (top) and with the Project (bottom)



Englobe, 2020o



In order to mitigate the effect of the Project on the landscape, the proponent has undertaken to plan its choice of materials and colours in such a way as to visually harmonize the structures with the landscape, particularly with regard to the cranes, within the limits of the relevant safety rules. The proponent also proposes to maintain its buildings and infrastructure to avoid degradation and the decline of their appearance for their entire life.

In addition, the proponent proposes to install a visual and acoustic screen in the Baie de Beauport beach sector to reduce the visual aspect of container storage (see figure 13). The visual aspect of this screen is a concern raised by environmental groups and citizens, who would like to see measures aimed at better landscaping integration of the wall initially proposed. To address this concern, the proponent proposes to design the screen in collaboration with the community of the Baie de Beauport Users' Forum. The wall would be made of attractive materials and colours and would also include an area dedicated to the practice of rock climbing to ensure its integration into the activities of Baie de Beauport users. It would also include containers that would allow for the addition of service areas near the use and storage areas. Finally, native plants would complete the integration of the screen into the Baie de Beauport landscape. The public expressed concern that the model proposed by the proponent provides for the plants to adequately cover the visual and acoustic screen only after 15 years. Some citizens recommended that a measure be implemented as soon as the screen is built, such as the installation of an artistic wall. In response to this request, the proponent mentioned that the concept for the visual and acoustic screen was based on simplicity and the use of natural materials, such as rock wool and wood, to ensure optimal integration of the screen into the existing landscape.

Environmental groups and citizens have also raised concerns about the durability of the screen, the maintenance work required for long-term plant life, the list of plant species chosen to cover the containers, and the detailed structure of the screen wall. The proponent proposed a preliminary 10 to 15 year maintenance program, including a plant care and maintenance program, which outlines key milestones and measures to be put in place in the event of plant degradation.

Figure 13 Concept of the visual and acoustic screen in the Baie de Beauport beach sector.



Englobe 2020o

Monitoring and follow-up activities related to the landscape would be integrated into the proponent's planned community relations management. These activities would include, in particular, the steps taken with interest groups, including the Baie de Beauport Users' Forum, meetings of the Port-Community Cohabitation Committee (which would be in operation throughout the construction phase and for the first two years of operation of the Project) and the Port Operations Awareness Committee, as well as the consideration of comments and concerns gathered during meetings with the various stakeholders.

In addition, the proponent plans to manage any complaints and questions that may arise. Citizens and interest groups could ask questions or make comments and suggestions during the construction and operational phases of the Project. The proponent would publish a "Questions-Answers" section on the Internet page dedicated to the Laurentia Project, in order to disclose information in response to certain questions or concerns. In addition, the proponent would send out targeted surveys in years 1 and 3 following the start of operations. These surveys would gather general concerns and comments from interest groups and citizens about the Laurentia Project. The results of the surveys would also be posted on the proponent's website within approximately 30 days of the completion of the survey.

First Nations historical and cultural heritage

According to the proponent, construction and operation activities do not threaten the integrity of First Nations heritage and cultural sites since these are located outside the construction zone (Englobe, 2020f).

Terrestrial and underwater archaeology

The main potential effect on underwater archaeological resources would be associated with the risk of damaging or destroying archaeological resources, both during the construction phase and during the operational phase. For the construction phase, this risk is related to site preparation, the construction and placement of the reinforced concrete caissons, the construction of the retaining dyke, the dredging of sediments and the presence of the new port infrastructure (wharf and back wharf). As for the operational phase, potential effects are associated with maintenance dredging and marine navigation.

Data provided by the proponent suggests that anticipated effects on large archaeological resources, such as shipwrecks, are unlikely in the work area.

For medium and small resources, Parks Canada believes that there are significant gaps in baseline condition. To address this lack of information and in response to the Parks Canada Agency's recommendations, the proponent submitted an archaeological intervention plan (Englobe, 2020o) in which it details the field work to be carried out to acquire the missing scientific data, the actions to be implemented in the event of archaeological artifact discoveries, and the mitigation and monitoring measures to be put in place to limit the risks associated with the Project. Following the review of the archaeological intervention plan, Parks Canada is of the opinion that this plan is adequate and would reduce the risks to the artifacts if the planned archaeological interventions are carried out in accordance with the standards and principles of underwater archaeology and the recommendations of a marine archaeologist. The results of the work planned in the archaeological plan would be presented to the Agency and Parks Canada as soon as they are available, as well as to First Nations who have expressed the wish to do so (Englobe, 2020f). Finally, the proposed mitigation measures were deemed adequate

and sufficient by Parks Canada. The complementary inventories provided for in the archaeological intervention plan would be carried out prior to the start of the work.

Parks Canada notes that the presentation of archaeological resources through a public, virtual or physical exhibit could be considered by the proponent for any documented archaeological resource of significant heritage value, based on the recommendations of the marine archaeologist.

Monitoring and follow-up activities related to archaeological resources would be established by the proponent based on the results of the inventories provided for in the archaeological intervention plan. The proponent indicates that monitoring by an archaeologist during dredging may be recommended (Englobe, 2020o), particularly in high-potential areas that could not be verified by diving or using an unmanned underwater vehicle. In the case of an incidental discovery of an archaeological site, the proponent has planned monitoring measures based on Parks Canada's *Guidelines for the Conservation of Archaeological Sources* (2005). These measures stipulate that in the event of an incidental archaeological discovery on land or underwater, workers must notify the person in charge of the work site and immediately suspend work that is likely to affect the discovery. In all cases, the proponent would collaborate with the competent authorities to determine the significance of the discovery and the level of protection required. Finally, as part of its monitoring and follow-up program, the proponent would produce an annual report that would incorporate the results of the archaeological monitoring, which would be produced by the marine archaeologist. Parks Canada considers this monitoring program during the construction phase to be adequate.

For the operational phase, the proponent has not planned any mitigation measures during the activities, since it considers that the volumes of sediments to be dredged during maintenance would be low and that dredging activities would be located in the areas included in the capitalization dredging (dredging carried out during the work). No monitoring or follow-up program is planned by the proponent for this phase. Parks Canada is of the opinion that it would not be necessary to implement a monitoring or follow-up program during the operational phase, if the planned archaeological intervention plan is applied in accordance with the standards and principles of underwater archaeology and with the recommendations of a marine archaeologist.

For the proponent, the long-term effects of the Laurentia Project do not represent a major potential risk. However, Parks Canada considers that the Project could affect the wrecks (confirmed and potential) identified in the administrative zone of the Port of Quebec. Parks Canada remains concerned about the effect of future dredging, increased tonnage and marine traffic, which could jointly generate underwater erosion affecting wrecks (confirmed and potential). It therefore encourages the proponent to proactively manage archaeological resources, including known shipwrecks within its property boundaries, in order to limit uncertainties for the future. The acquisition of historical and archaeological data on the archaeological remains located on its properties would represent a great opportunity for the development of cultural heritage that could be integrated into other public initiatives already planned by the proponent.

5.10.3 Agency analysis and conclusions on residual effects

Residual effects analysis

With regard to landscapes, the Agency notes that the sector targeted by the Project is already characterized by port and industrial infrastructure, with a certain capacity to absorb new infrastructure. The quality of the landscapes of the Québec City heritage complex is highly valued by the region's population as well as by Québec City, which has integrated landscape protection into its land-use planning and development documents. The Historic District of Old Québec is a UNESCO protected site, and the urban landscapes of Québec City and Lévis contain many heritage elements protected by the Government of Canada and the Government of Québec. The visual influence of the infrastructure on these sectors would generally be weak since few visual openings are possible towards the Project site from most of the surrounding viewpoints. However, despite the mitigation measures proposed by the proponent to reduce the Project's effects on the landscape (Englobe, 2020r), they do not completely mitigate the visual effects for observers located in the landscape units of the Port of Quebec (I1), Cap-Blanc (RT2), Lévis (U4) and the St. Lawrence River (F1), particularly for users of the Baie de Beauport, visitors to the Dufferin Terrace, residents along St. Lawrence River in Lévis and users navigating on the St. Lawrence River in the Project sector.

As for First Nations heritage and cultural sites, construction and operation activities would not threaten their integrity since they are located outside of the work site area.

Finally, for underwater archaeological resources, the Agency relies on the advice of Parks Canada and notes that, despite the uncertainties related to the baseline condition, the application of the contingency plan would limit the risks of damaging or destroying potential archaeological resources by providing for the acquisition of missing data and defining the methods for managing underwater archaeological resources in the event of a discovery. However, this plan must be carried out in accordance with the standards and principles of underwater archaeology and the recommendations of a marine archaeologist.

Agency findings

Based on its analysis and using the environmental effects assessment criteria presented in appendix A, the Agency concludes that the Project is not likely to cause significant adverse environmental effects on natural and cultural heritage (appendix B), taking into account the application of the key mitigation measures identified below. The Agency concludes that the significance of the effect would be moderate, not significant for the following reasons:

- The magnitude of the Project effects would be moderate in that the effects would result in the modification of certain characteristics of the particular character of the landscape, but the effect would not compromise the integrity of the natural and cultural heritage for the landscape units assessed. As well, the effect would not compromise the integrity of anything of archaeological significance and the effects would not interfere with the maintenance or management of designated heritage features.
- The Project would result in a long-term, local-scale alteration to the landscape through the introduction of embankments and elevated structures on the north shore of the St. Lawrence River. This modification to the landscape would be irreversible and continuous over time.

Determination of key mitigation measures

The Agency has identified the key mitigation measures required to ensure that the proposed Project does not cause significant adverse residual environmental effects on natural and cultural heritage. It took into account the mitigation measures proposed by the proponent, the advices of government authorities, as well as the comments received from First Nations consulted and the public. These measures are as follows:

- Use materials and colours for structures, such as cranes, that harmonize with the landscape;
- Design, prior to construction and in consultation with potentially affected parties, a visual screen and native plant species to the area to reduce the visual appearance of container storage;
- Vegetate landscaped slopes and bare surfaces as construction work is completed. To do so, use species native to the region;
- Fully implement the Archaeological Response Plan filed as an appendix⁷¹ to the CEA Agency's *Response Document to the Second Request for Additional Information of August 2019 - Natural, Cultural and Archaeological Heritage* (Englobe, 2020w) in accordance with the standards and principles of underwater archaeology and with the recommendations or supervision of a marine archaeologist. These include, but are not limited to
 - Carry out additional studies and provide the results and recommendations to the Agency before work begins (point 5.2 of the intervention plan).
 - Put measures in place to ensure the conservation of archaeological sources in the case of chance discoveries (point 5.3 of the intervention plan).
 - For anomalies with high archaeological potential that could not be verified prior to dredging activities, carry out monitoring during dredging under the supervision of a marine archaeologist.
 - Present to the Agency, Parks Canada and First Nations who have expressed the wish to do so, as indicated in the document in Englobe (2020w), the results of the work planned in the archaeological plan and the annual review of the results of the archaeological monitoring.

Need for follow-up and follow-up requirements

The effectiveness of the mitigation measures aimed at the harmonization of the structures and the installation of the visual and acoustic screen is uncertain. In order to verify the predictions of effects on natural and cultural heritage and the effectiveness of the proposed mitigation measures, the Agency recommends that the follow-up program include the following requirements:

- Develop and implement a follow-up program to validate the accuracy of the environmental assessment and judge the effectiveness of mitigation measures on the visual environment. The proponent will have to compare photographs taken from points of view comparable to those used in the visual simulations carried out as part of the impact statement. Photographs must be taken every two years for the first 10 years following the end of construction and every 5 years thereafter, until 25

⁷¹ AECOM. 2020. Plan d'intervention archéologique subaquatique - Projet d'aménagement d'un terminal en eau profonde au port de Québec-Projet Laurentia. 37 pages and appendices



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years following the end of construction. Corrections will be made as required if mitigation measures need to be modified or added to reduce the effects on the visual environment.

- The monitoring should make it possible to concretely evaluate the effect felt by residents and vacationers, for example by means of a survey that will be carried out after the Project is up and running.
- Monitor the growth, composition and abundance of vegetation and make the necessary corrections in case of plant degradation, including replacement of plants.
- Develop a pre-construction feedback protocol for effects on the visual environment. The proponent will be required to implement the protocol during construction and operation.

6 Other Effects Considered

6.1 Effects of Accidents or Malfunctions

Accidents and malfunctions are likely to occur during all phases of the Project, which could result in adverse effects on the Project and the surrounding environment.

However, the Agency is of the opinion that the Project is unlikely to cause significant adverse residual environmental effects due to accidents or malfunctions. The proponent has properly identified the Project's inherent risks and would implement preventive measures that include the proper design of the infrastructure, its inspection and its maintenance. The proponent plans to develop a detailed emergency response plan that would allow a quick and effective response in the event of accidents or malfunctions.

The following subsections present the information considered by the Agency, including the opinions and comments of the expert departments, First Nations consulted and the public.

6.1.1 Analysis of potential effects and proposed mitigation measures

For the purposes of the environmental assessment, an accident is described as a sudden and unexpected event involving Project components or activities that results in damage to valued components. A malfunction, on the other hand, is described as the inability of equipment or a system to function as intended, resulting in damage to valued components. Accidents and malfunctions are likely to occur at all stages of the Project.

The environmental assessment takes into consideration the environmental effects of the Project, including those caused by accidents or malfunctions, which could affect all of the valued components assessed and described in chapter 1. Environmental factors may also cause damage to the Project's land and marine infrastructure and increase the likelihood of an accident or malfunction occurring. The environmental effects on the Project, such as flooding and earthquakes, are discussed in section 6.2.

Potential effects

The proponent described the potential effects of accidents and malfunctions related to the Project, as well as the associated prevention and response measures. The assessment focuses only on the effects of accidents or malfunctions at a terminal dedicated to container handling, since the proponent considers no other use for this terminal.

Description of the sensitive elements

The Project would be located in close proximity to sensitive elements of the human, physical or biological environment likely to be affected by accidents or malfunctions in the terrestrial or marine environment. These include residents and visitors, as well as employees of other nearby industries and businesses, public infrastructure, parks and environmental features (figure 14). The closest residence to the Project

site is located 1.3 km along Montmorency Boulevard (Englobe, 2018d). Environment and Climate Change Canada and Health Canada indicate that sensitive elements that could be affected by potential accidents or malfunctions, including drinking water intakes, are well identified. Environment and Climate Change Canada recommends including the mapping of sensitive elements in the area (both terrestrial and river environments) in the proponent's emergency response plan in order to guide, as quickly as possible, responses to accidents or malfunctions. In addition, a periodic update of the mapping, if necessary, should be provided to take into account any changes to the environment and to the status of species.

Risk analysis

The proponent has conducted a Technology Risk Assessment to identify and quantify the risks of the activities and facilities associated with the operation of the new terminal, as well as a HAZID ("hazard identification") study (Englobe, 2018d). Environment and Climate Change Canada is of the opinion that the risk analysis of accidents and malfunctions was adequately presented and that the proponent used an internationally recognized standard method. It recommends, as mentioned by the proponent, that the future operator of the container terminal, Hutchison Port Holdings Limited, produces a risk analysis specific to the handling and storage of dangerous goods in classes 2.1 (flammable gases), 2.3 (toxic gases) and 3 (flammable liquids). For the analysis of risks related to marine transportation, the proponent used the TERMPOL Review Process under the previous version of the Project (Beauport 2020), which provided for the transhipment of liquid bulk (oil), among other things. Environment and Climate Change Canada is of the view that the information remains relevant with respect to shipping accidents, as TERMPOL allows for the assessment of risks that could arise, the identification of potential problems and the identification of opportunities for improvement to enhance marine safety. The proponent assessed several potential accident scenarios, including dyke failure in the terrestrial environment of the contaminated sediment basin, spills or leaks of petroleum products, spills or leaks of other hazardous materials, fires, explosions, major breakdowns or failures of structures, and spills of contaminated sediment into the water (Englobe, 2020s; Englobe, 2018d). These risks, detailed below, are likely to occur during both construction and operational phases and may affect both the terrestrial (road and rail) and marine environments. Risks from anthropogenic sources external to the Project were also considered by the proponent.

The Agency, based on advice from Transport Canada and Environment and Climate Change Canada, is of the opinion that the information presented by the proponent is sufficient and does not present specific issues related to rail and marine safety. All activities carried out by the proponent in relation to the transportation of dangerous goods by rail, i.e., the application for transport, handling or transportation, will have to be carried out in compliance with the requirements of the *Transportation of Dangerous Goods Act, 1992* and the *Transportation of Dangerous Goods Regulations*.

Contaminated sediment pond land dyke failure

The failure of the dyke in the terrestrial environment of the contaminated sediment basin could be caused by natural phenomena, such as an earthquake or storm, by a defect in the design of the structure, by a deficiency in its inspection, or by sabotage (Englobe, 2018d).

Spills or leaks of petroleum products

Petroleum product spills or leaks during the construction phase could be caused by a leak during refuelling, a leaking valve or connection, a punctured pipe or tank, an overflow, a traffic accident or machinery breakdown (Englobe, 2018d). Several vehicles would be operating on the construction site, near the St. Lawrence River, the mouth of the St. Charles River and the southwest inlet. During the operational phase, these same situations are likely to occur due to the presence of motorized equipment and the receiving, storage, loading and unloading activities. The worst-case scenarios identified during the operational phase are related to the risks associated with the presence of a container ship at the wharf (vessel refueling), the risks associated with maritime traffic of container ships within the administrative boundaries of the proponent and road or rail accidents on the Project site. The risks of spills and collisions related to marine transportation and cargo are major concerns raised by the W8banaki Nation, the Essipit and Pessamit Innu First Nations and Kahnawà:ke Mohawk First Nation. The risk of petroleum product spills and spot leaks from machinery and the risk of accidents related to the handling of containers by heavy machinery are concerns raised by the public.

Spills or leaks of other hazardous materials

Spills or leaks of other hazardous materials during the construction phase could occur as a result of their use, handling or storage (Englobe, 2018d). A break in machinery, a perforation of a pipe or tank, or human error are causes that could lead to a spill of hazardous materials. This type of accident is most likely to occur during handling. In the operational phase, the worst case scenario of a spill or leak of hazardous materials would be related to the presence and temporary storage of containers containing dangerous goods. It is anticipated that a maximum of three % of the goods transported in containers under the Project would be classified as dangerous goods. Dangerous goods include various products, substances and organisms, flammable liquids, corrosive substances, oxidizing substances and organic peroxides, toxic substances, flammable solids, gases, radioactive materials and explosives. When rail or truck transportation involves dangerous goods, it is subject to Transport Canada's *Transportation of Dangerous Goods Regulations*. This type of health and safety accident or malfunction is a concern raised by the public, particularly with respect to the transportation of dangerous goods and the risk of spills. section 5.7 describes the effects of the Project on human health (physical and psychological).

Fires

Fires could occur as a result of the improper use or handling of petroleum products and certain chemicals, such as certain compressed gases (Englobe, 2018d), or in the event of a spill of petroleum products in enclosed or poorly ventilated areas. Fires can also occur as a result of electrical failure or negligence.

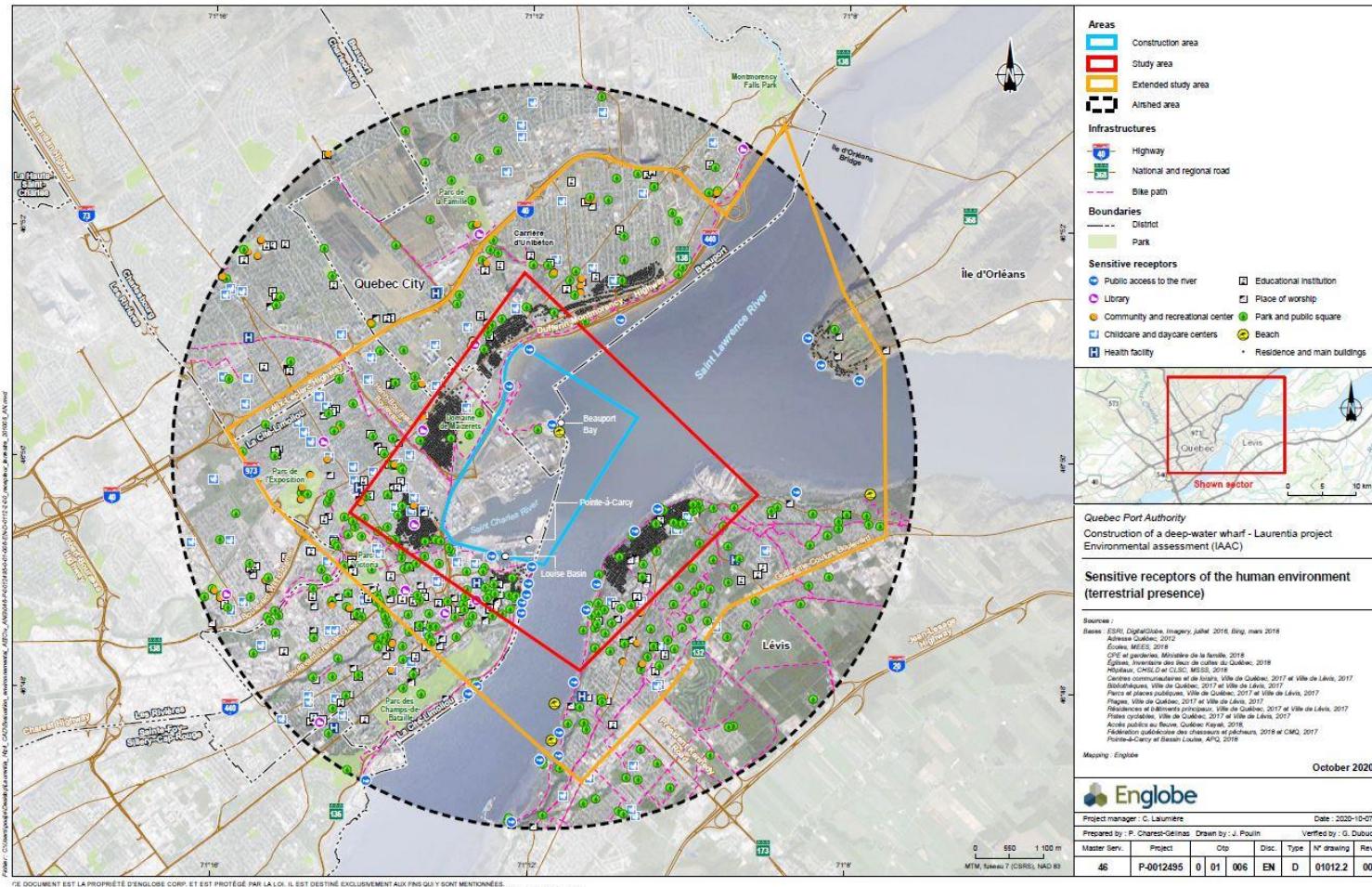
Explosions

Explosions are more likely to occur during transportation or storage of certain equipment or hazardous materials (Englobe, 2018d). The main risks would be an error or negligence related to the handling, use or storage of hazardous materials, an error or negligence related to an attempt to smother a fire involving oxidizing products or an accident at the Project site involving a truck or train carrying hazardous materials.



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Figure 14 Identification of sensitive receptors in the human environment in the vicinity of the Project site (terrestrial environment)



Englobe, 2020s

Major breakdowns or failures of the works

The stability of the new wharf and the effectiveness of the structures and related facilities could be jeopardized by a defect in the design of the structure, an oversight in the inspection of the structure or in the study of the initial characteristics of the infrastructure, natural phenomena (for example, a major flood, ice jam, marine storm or exceptional earthquake), structure failures (for example, a defect in the water control and management system) and sabotage (Englobe, 2018d).

Discharge of contaminated sediment into water

A spill of contaminated sediment into the water could occur during dredging, particularly due to adverse weather conditions (Englobe, 2018d). The main risks would be the accidental opening of the barge's bottom valves, the overturning of the barge filled with contaminated sediment, damage to the dredge, a malfunction or failure of the barge's sediment transfer pump, and the breaching of the contaminated sediment basin dyke.

Risks related to road transport

The main risks associated with road transportation during the construction and operational phases are truck and tanker accidents involving tipping of the contents, spills of petroleum products or falling containers containing hazardous or non-hazardous materials (Englobe, 2018d). A truck accident on a road leading to a fire or explosion involving petroleum products or dangerous goods and the spread of a toxic cloud could also occur. According to the proponent, the environmental effects related to road transportation would be negligible due to the number of dangerous goods that would be transported by truck within the Project site (approximately 0.2%) as well as the size of the containers (20 feet instead of 40 feet). Despite the low risk of road accidents, the proponent conducted an environmental effects analysis by identifying potential effects on valued environmental components, such as fish mortality or other health effects on fish, ingestion of chemicals by animals and loss of biodiversity due to the presence of contaminants in a terrestrial ecosystem or wetland.

Environment and Climate Change Canada is of the opinion that the proponent does not provide sufficient justification to support its conclusions on the potential effects of a fire and the spread of a toxic cloud. The proponent concludes that an explosion or fire that could occur during a truck accident could affect the fauna or flora within the radius of influence over a short period of time because of the rapidity with which gaseous contaminants are diluted and attenuate with distance or when the fire is extinguished. No studies or illustrations were presented to demonstrate or validate this information. Environment and Climate Change Canada recommends that the proponent complete its review, at the time of the specific risk analysis, using cloud dispersion modeling (modeling software) to confirm its conclusions.

For risks related to road transport, the proponent proposes to put measures in place to encourage truckers to use routes that avoid more sensitive sectors such as Henri-Bourassa Boulevard and residential areas. In this regard, Environment and Climate Change Canada recommends installing signs on the proponent's property to warn truckers to drive at low speeds, especially in the most sensitive areas.

Risks related to rail transport

The main risks associated with rail transportation are the derailment of low-speed railcars on or near the terminal involving one or more containers of hazardous materials and the derailment of a low-speed locomotive involving a punctured fuel tank. According to the proponent, the environmental effects following a derailment of a train containing dangerous goods or a punctured locomotive fuel tank are significantly reduced due to the reduced speed of trains, the small quantity of dangerous goods transported and Canadian National Railway's recognized good practices. Therefore, the potential effects would be limited to the railway right-of-way and in the worst cases, to contamination of soil, a watercourse or water body depending on the location of the accident. With respect to railway activities associated with the Project, Health Canada is of the opinion that sensitive environments adjacent to the Project site, notably the neighbourhoods of La Cité-Limoilou and Maizerets, should receive special attention in the event of accidents or malfunctions.

Risks related to maritime transport

According to Environment and Climate Change Canada, the proponent has adequately explained the potential consequences of navigation-related accidents. Using modelling, it demonstrated that the effects on receiving environments would vary depending on the size of the spill, the product spilled and the response time of clean-up operations.

External risks of anthropic origin

External risks of anthropogenic origin are mainly related to industrial facilities in the vicinity of the proposed Project (Englobe, 2018d). The territory adjacent to the Project site is dedicated to industrial uses, with the exception of Baie de Beauport sector, which is used for recreation and tourism. Ongoing activities at the Port of Quebec include, among others, the reception and storage of liquid bulk. The proposed biomethanization plant, IMTT Québec Inc, VOPAK, Glencore, QSL and Arrimage Saint-Laurent are industrial facilities presenting external risks of anthropogenic origin. The biomethanization plant Project will be used to stabilize domestic waste. According to the proponent, the potential risks of these companies are mainly related to air quality, safety, health and spills. Because of the potential interactions with the Project site, the presence of these activities is considered in its risk analysis of accidents and malfunctions.

Other considerations

Various initiatives have been proposed by the proponent to prevent the accidents and malfunctions listed above and to reduce their environmental risks (Englobe, 2020r). Among other things, the proponent has an emergency reponse plan for its current port operations that serves as a tool for managing emergency situations that could arise within the administrative boundaries of the Port of Quebec (Englobe, 2018d).

The proponent has initiated an update of its emergency response plan to include the following:

- Risks specific to container handling and storage operations and their potential consequences;
- Information and mapping on sensitive elements (areas) and receptors in the environment and surroundings that may be affected;

- The identification, development or updating of intervention strategies according to the potential risks to sensitive elements (sectors) and receptors in the environment and surroundings;
- The identification of external emergency response plan resources (federal, provincial, municipal actors and harbour users) as well as the mechanisms for coordinating the response.

The proponent's emergency response plan includes response strategy in case of: fire or explosion on land, fire or explosion on board a ship, ground pollution, air pollution, water pollution, shipboard accidents, acts of terrorism and bomb threats, severe weather conditions or any other major incident in the Beauport sector. In the event of incidents in Beauport Bay, specific emergency measures are in place. If necessary, specific response plans could be developed in collaboration with the users of future facilities to take into account their operations and the resources available to them (Englobe, 2018d). Health Canada is of the opinion that the proponent's alert system and the frequent updating of its emergency response plan, including an exercise program with key stakeholders, would prove to be very important to protect users of the Baie de Beauport recreational tourism site in the event of accidents or malfunctions.

With respect to the emergency communications plan, Health Canada emphasizes that rapid and effective communication between responders and land users in the event of an environmental emergency is essential to mitigate potential health effects. In the event of a project-related spill that could affect the quality of drinking water sources, close collaboration with the municipal authorities concerned would be necessary to ensure that measures to protect public health are implemented quickly, such as a drinking water advisory. It is very important that the proponent's emergency response plan specifically address such a scenario.

The proponent proposes to have emergency response kits on-site to respond quickly to recover potential contaminants. In the event of a spill, the proponent would immediately report the situation to the responders identified in the emergency response plan and would also immediately inform Environment and Climate Change Canada's emergency services or the Canadian Coast Guard (in the event of marine pollution). Transport Canada also recommends that employees be familiar with the emergency response plan and be trained in its use.

With respect to road and rail transportation, when there is an accident involving a container, fuel, granular material, machinery or other construction inputs outside the limits of the Port of Quebec, it is the responsibility of the carrier and the Ministère des Transports du Québec to have an emergency response plan. This plan ensures the coordination of actions with the local and regional authorities responsible for emergency measures on the territory affected by the Project.

Environment and Climate Change Canada is of the opinion that the protective measures, response protocols and preliminary contingency plans proposed by the proponent are adequate. They address the types of emergencies that could reasonably be expected to occur, including on site and off-site consequences, related prevention, alerting and preparedness issues, and corrective and recovery measures. However, it is recommended that the following be considered:

- Ensure that the intervention plan contains an intervention scheme and an alert structure;
- Place the plan in an easily accessible location and in view of all employees;
- Inform contractors or any other mandated person of their role and responsibility in the preparation and implementation of contingency plans in the event of a spill of fuel or other hazardous materials on



the site. They should also be informed of the legislative and regulatory provisions relating to pollution prevention, including the *Canadian Environmental Protection Act* (CEPA 1999), the provisions of the *Fisheries Act* and the *Migratory Birds Convention Act*, 1994;

- Ensures that dock personnel are prepared to respond to a minor spill that may occur between a vessel and the dock and can activate the emergency response plan;
- Detail the measures to be taken to respond to emergencies for each of the main accident risks considered, including measures to protect the environment;
- Identify the equipment needed to respond to these emergencies and locate them to ensure their availability;
- Provide staff training in the maintenance and use of intervention equipment;
- Provide a detailed spill notification procedure, and an emergency communications plan for external parties;
- Describe what is planned in the event of a hazardous material spill to protect sensitive components of the environment, including surface water, groundwater and wetlands, fish, migratory birds or other sensitive species.

6.1.2 Agency analysis and conclusions on residual effects

Effects analysis

The proponent has clearly identified the Project's inherent risks and plans to implement preventive measures, including the proper design of the infrastructure, their inspection and their maintenance (chapter 2). The proponent has also presented a preliminary emergency response plan that would enable it to respond quickly and effectively in the event of accidents or malfunctions. Taking into account the mitigation measures (Englobe, 2020r), response measures and contingency plan that the proponent has committed to put into place, the Agency considers that accidents and malfunctions are unlikely to occur in such a way as to cause significant adverse residual environmental effects on the Project's valued components.

The Agency notes that the proponent took into account the risks of accidents and malfunctions in the design of the Project in order to prevent risks. Furthermore, the Agency is satisfied with the proponent's characterization and assessment of potential accidents and malfunctions related to the Project. The proponent has responded to comments, questions and concerns from government authorities, First Nations and the public.

Determination of key mitigation measures

The Agency considered the mitigation measures proposed by the proponent and the advice of expert government authorities to identify the key mitigation measures required to ensure that the Project does not cause significant adverse environmental effects in the event of accidents or malfunctions:

General measures

- Take all reasonable steps to prevent accidents and malfunctions that may cause adverse environmental effects;
- Consult, prior to construction, the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations and the competent authorities on the measures to be implemented to prevent accidents and malfunctions;
- Update, prior to construction and in consultation with the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations and the competent authorities, an emergency response plan in the event of an accident or malfunction related for each phase of the Project. The accident and malfunction response plan should specify, among other things, the types of accidents and malfunctions that could lead to adverse environmental effects;
- Implement the appropriate measures described in the emergency response plan in the event of an accident or malfunction that could result in adverse environmental effects:
 - Implement the communications plan in relation to accidents and malfunctions;
 - Notify the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations as soon as possible, as well as the potentially affected parties and the competent authorities of the accident or malfunction and notify the Agency in writing no later than 24 hours following the accident or malfunction. For the notice to First Nations and the Agency, the proponent shall specify:
 - The date on which the accident or malfunction occurred;
 - A description of the accident or malfunction;
 - A list of any substances potentially released to the environment as a result of the accident or malfunction.
 - Notify appropriate authorities with responsibilities related to emergency response, including environmental emergencies, in accordance with applicable regulatory and legislative requirements.
- Submit a written report to the Agency no later than 30 days after the accident or malfunction. The written report shall include:
 - A description of the accident or malfunction and its adverse environmental effects;
 - The measures that have been taken by the proponent to mitigate the adverse environmental effects caused by the accident or malfunction;
 - All views of First Nations and advice from the competent authorities received with respect to the accident or malfunction, its adverse environmental effects and the measures taken by the proponent to mitigate those adverse environmental effects;
 - A description of any residual adverse environmental effects and any additional or modified measures required to be taken by the proponent to mitigate the residual adverse environmental effects;
 - Details regarding the implementation of the emergency response plan in the event of an accident or malfunction.
- Submit, no later than 90 days after the accident or malfunction, and taking into account the information previously submitted, a written report to the Agency on the changes made to prevent the recurrence of such an accident or malfunction and on the implementation of any modified or

additional measures to mitigate and monitor the residual adverse environmental effects and to undertake any required progressive claims. The report includes the views of the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations and potentially affected parties, as well as the views of additional competent authorities received by the proponent.

- Develop, prior to construction, a communications plan in consultation with the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations and potentially affected parties. Implement and maintain the communications plan during all phases of the Project. The communications plan includes in particular:
 - The types of accidents and malfunctions requiring the proponent to notify each First Nation and potentially affected parties;
 - The manner in which each First Nation and potentially affected party shall be notified by the proponent of an accident or malfunction and the opportunities for First Nations and potentially affected parties to assist as a result of the accident or malfunction;
 - The contact information of the proponent's representatives with whom First Nations and potentially affected parties may communicate and the contact information of the representatives of each of the First Nations and potentially affected parties that the proponent notifies.

Measures specific to rail transport

- Establish a speed limit for trains at no more than 15 kilometres per hour within the administrative limits of the Quebec Port Authority and require that any person respect this speed limit.

Measures specific to maritime transport

- Establish, in consultation with the Laurentian Pilotage Authority, an approach and berthing manoeuvring zone so that any vessel associated with the project may approach the wharf at reduced speed, subject to navigational safety;
- Indicate, before dredging, the beginning of the dredged area with buoy K168 and keep the buoy in place during all dredging;
- Maintain, during construction and operation, equipment for responding to accidental spills of contaminants in the area of the construction site, including a rapidly deployable floating phase collection device;
- Install, prior to construction, and maintain during construction and operation, a pumping station equipped with two pumps capable of providing a total flow rate of approximately 8,000 US GPM (gallons per minute) to provide a fire protection system;
- Maintain approximately 1.3 kilometer of underground piping from the pumping station to the entrance of the existing liquid bulk terminals to provide a fire protection system;
- Maintain at least seven fire hydrants distributed throughout the site to respond to dock fires;
- Determine, in consultation with the Laurentian Pilotage Authority, a maximum wind speed for berths and departures that takes into account the sails of vessels associated with the project, subject to the safety of navigation, and establish a corresponding maximum wind speed at which loading and unloading activities of containers associated with the project stop.

Measures specific to container management

- Designate the dangerous goods container storage area associated with the project to allow for the segregation of this area and taking into account the risks associated with existing port operations in the project area, including the operation of International-Matex Tank Terminals facilities;
- Perform preventive inspection of containers to verify that they comply with safe rail shipping practices;
- Make an inventory, for each containerized dangerous cargo, of the containerized dangerous goods that are stored and transshipped, indicating the maximum quantity authorized to be stored on the premises and the class of dangerous goods according to the *International Maritime Dangerous Goods Code*.

6.2 Effects of the Environment on the Project

Pursuant to paragraph 19(1)h) of the CEAA 2012, the environmental assessment must consider the effects that the environment may have on the Project, including the effects of local conditions, earthquakes and extreme weather events, whether or not related to climate change.

6.2.1 Analysis of potential effects and proposed mitigation measures

The proponent assessed several environmental factors that could have an effect on the Project, including geological conditions, hydrodynamic conditions, extreme weather events and climate change. According to the proponent, the Project's technical design considers all identified risks and safety factors through the choice of equipment types and materials and the implementation of best practices.

Potential effects of geological conditions

The potential effects of geological conditions assessed by the proponent include risks associated with seismic activity, potential soil liquefaction associated with earthquakes, ground movements, subsidence, settlement and landslides.

The seismic risk in the Québec City area is low to medium. The proponent used the design standard of the Canadian Highway Bridge Design Code (CAN/CSA-S6-14) to account for seismic risk in the design of port and marine structures (Englobe, 2020b). Future installation of structures in the area behind the wharf must also use and respect the current design standard.

During the environmental analysis, Natural Resources Canada raised concerns about the potential for liquefaction and lateral spread landslides due to earthquakes. In response to the Agency's questions (Englobe, 2020b), the proponent provided the required information and demonstrated that these risks were taken into account in the analysis, site preparation (soil compaction in the area behind the wharf and soil excavation) and infrastructure design. Natural Resources Canada is satisfied with the information provided by the proponent.

Thus, for lateral spread landslides to occur, granular soils would have to liquefy completely or partially. For this Project, geotechnical tests reveal liquefaction potential only at great depths of 30 metres



(Englobe, 2020b). The impacts of liquefaction would be negligible at the surface and would not pose a threat to Project installations (Englobe, 2018d). For the development of the area behind the wharf, existing design standards would be used and the foundations of these structures would be designed to counter any risk of liquefaction in the upper part of the backfill. The proponent points out that only the riverbed would be affected locally as a result of a major earthquake-induced landslide. In the case of spread issues following soil liquefaction, dredging would allow the necessary adjustments to be made. The proponent does not propose any mitigation measures to reduce these risks since they would be taken into account in the site preparation and design of marine and land-based infrastructures, which would take into account the most recent versions of construction standards related to the Project, including the Canadian Building Code.

As for ground movement, subsidence and settlement, the proponent has considered the settlement that would occur in the short term due to the caissons' weight and has factored this into their design. This settlement would nevertheless be negligible. No further ground movement or settlement is expected due to soil stability (Englobe, 2018d). The proponent expects that ground movement or subsidence will have limited effects on the new wharf. Resistance to landslides has been incorporated into the design of the caissons, based on the applicable parameters and safety factors, to withstand the various loads to which they will be subjected. To protect against scour and to maximize the lifespan of wharf 54, slabs would be installed at the foot of its facade. Other measures to control the effects of settlement would be validated during the detailed engineering phase.

In general, Natural Resources Canada believes that the proponent has adequately identified and documented the changes and risks related to seismic activity. It recommends that appropriate measures (dynamic compaction or the installation of vibro stone columns) be implemented in areas backfilled with materials that are sandy or likely to liquefy in the event of an earthquake. The impact of earthquakes on the caissons should also be assessed during the detailed engineering phase. The Agency has forwarded these recommendations to the proponent.

Potential effects of hydrodynamic conditions

To address the effects of hydrodynamic conditions on the Project, the proponent examined hydraulic conditions, high tides, storm surges and ice cover.

The hydraulic conditions of the Saint-Charles River are regulated by the Joseph-Samson Dam, which is located at its mouth. The City of Québec has been studying this dam for several years as part of the *Project Gestion des sédiments et contrôle des niveaux d'eau en amont du barrage Joseph-Samson sur la rivière Saint-Charles* [Sediment management and water level control upstream of the Joseph-Samson Dam on the Saint-Charles River]. According to the proponent, the City of Québec is in contact with the Quebec Port Authority to ensure that the potential effects of the hydrodynamic conditions on the Laurentia Project area are assessed and that the Joseph-Samson Dam Project is adjusted accordingly (Englobe, 2018d).

High tides and storm surges could combine to create turbulent water conditions that could pose a risk during the construction and operational phases (Englobe, 2018d). During the operational phase, waves from high tides and storms could also endanger the berthing and loading of vessels. The proponent maintains that these are existing conditions that are taken into account in their current operations. According to the proponent, these risks are also taken into account in the design of the structures,

particularly through the selection of the concrete to be used, which would have a high compressive strength and would contain additives to increase its durability (Englobe, 2018d).

During the construction phase, no work is planned during the winter season. Thus, the presence or movement of the ice cover would not affect the Project's completion (Englobe, 2018d). However, during the operational phase, ice could be hazardous for berthing and ship loading and may slow down operations. Because of its design and construction materials, the wharf would be able to withstand the structural load caused by ice accumulation and movement. The orientation of the new wharf, which is 17 degrees north of the range line of wharf 53, was chosen to facilitate the flow of water and ice floes (Englobe, 2020a).

Potential effects of extreme weather events and climate change

The proponent's assessment of the potential effects of extreme weather events includes cold waves, winter storms, floods, droughts, heavy precipitation, severe thunderstorms and tornadoes. During the construction and operational phase, extreme weather events could affect port operations and result in a temporary cessation of activities (Englobe, 2018d). The proponent is aware of these conditions and has taken them into account in its current operations and in the design of the proposed installations, including that of the storm drainage system.

The proponent has taken climate change into account in its projections of heat waves, maximum temperatures, drought periods and ice movement. Climate change would not have an impact on the Project since it was taken into consideration in the Project's design and ongoing operations, particularly by ensuring the wharf's resistance to ice and by conducting mooring simulations according to water levels during periods of drought (Englobe, 2018d). During the lowering of the river level due to severe drought, the proponent has projected a water depth of 16 metres at low tide in the manoeuvring and mooring area, and does not expect the Project to be affected. Rising sea levels, recurrence of extreme events, wave heights and high tides are concerns raised by the public.

6.2.2 Agency analysis and conclusions on residual effects

Analysis of the effects

The Agency agrees that the proponent has taken into account the environmental factors that could have an impact on the Project's design of land-based and marine infrastructures and on the terminal's day-to-day operations.

6.3 Cumulative Environmental Effects

Cumulative environmental effects are defined as the effects of a project that are likely to occur when a residual effect acts in combination with the effects of other projects or activities that will be or have been carried out. The Agency's Operational Policy Statement guided the cumulative effects assessment⁷². To determine the components to be subject to a cumulative effects analysis, the Agency based its assessment on the significance of the residual adverse effects, the likelihood of their occurrence, the degree of concern expressed by the public, the First Nations consulted and the government authorities, and the state or condition of the valued component. A cumulative effects analysis was carried out for the following components:

- Fish and fish habitat;
- The current use of lands and resources for traditional purposes by Indigenous Peoples;
- Socio-economic conditions;
- Air quality;
- Human health.

Based on its analysis, the Agency concludes that the project, in combination with past, present and reasonably foreseeable future projects, is likely to cause significant cumulative effects on all of the above components, despite the implementation of additional mitigation or follow-up measures. In reaching this conclusion, the Agency considered the project's effects, the effects of other projects or physical activities, the views expressed by federal and provincial departments, Indigenous communities and the public, and proposed mitigation measures.

6.3.1 Proponent's approach and scope

The proponent conducted a cumulative effects assessment based on the guidelines described in the Agency's Operational Policy Statement¹. The proponent also relied on the methodology described in the Practitioners Guide prepared by Hegmann et al. (1999) to analyze the cumulative effects of its project. The proponent's approach to cumulative effects assessment is based on five steps (Englobe, 2018d):

- Determining the scope of the cumulative effects analysis, including:
 - The determination of spatial and temporal boundaries;
 - The determination of the valued components;
 - A review of concrete activities carried out in the past;
 - A review of the concrete activities that will be carried out.
- Analysis of cumulative effects;
- Assessing the significance of cumulative effects;
- Identification of mitigation measures;

⁷² Cumulative Environmental Effects Assessment under the *Canadian Environmental Assessment Act* (2012).

- Cumulative effects monitoring.

The proponent established spatial boundaries for the cumulative effects assessment based on the components analyzed (table 16). The proponent did not assess cumulative effects on socio-economic conditions.

Table 16 Spatial and Temporal Boundaries Used by the Proponent for the Assessment of Cumulative Effects on Selected Components

| Valued Component - Cumulative Effects | Spatial Boundaries | Time limits |
|--|--|---------------------------------|
| Fish and its habitat | St. Lawrence River Corridor between Montréal and Île d'Orléans | 1927 à 2026* |
| Indigenous Peoples - Current and Traditional Uses of Land and Resources | Addressed in a global way, without specific spatial or temporal limits | |
| Air Quality | Airshed area | Urban development of the region |
| Human Health | Airshed area | Urban development of the region |

The past time limit (1927) established by the proponent corresponds to the construction of the Anglo Canadian Pulp and Paper (White Birch) mill. This period marks the beginning of the industrial revolution and the beginning of the development of industrial-type port infrastructures at the Port of Quebec. The future limit (2026) corresponds to the last year of the St. Lawrence Centre follow-up program (2026).

The proponent chooses several past works and events for the analysis of cumulative effects, including the construction of wharves 50 and 51 and the development of a cruise terminal; the dredging of sediments at the mouth of the Saint-Charles River in 1960; the construction of Champlain Boulevard; the construction of the Joseph-Samson Dam at the mouth of the Saint-Charles River (1963); the construction of the Dufferin-Montmorency Highway; the development of the Samuel-de-Champlain Parkway and other developments by public authorities (federal, provincial and municipal) that have had an impact on aquatic habitats.

6.3.2 Fish and their habitat including invertebrates

The Agency focused the analysis of cumulative effects on fish and fish habitat on the migratory fish species most severely affected by the project, namely striped bass, lake sturgeon, Atlantic sturgeon and American shad, as well as mussels species at risk, including the olive hickorynut.

Proponent's assessment of cumulative environmental effects, proposed mitigation and monitoring measures

Analysis of cumulative effects on habitat

According to the proponent, the St. Lawrence River ecosystem has undergone several disruptions and modifications over time, notably due to urban development on its shores. Among these, the channelization of the St. Lawrence River as well as the dredging of the Seaway and its maintenance have significantly modified the St. Lawrence River ecosystem. Artificialization of the banks by man-made developments (wharves, walls, backfilling, rock placement) have also contributed to the fragmentation of the natural riparian environment (Englobe, 2020h).

According to the proponent's estimate, the area covered by aquatic habitat in the port sector was estimated at 614 hectares in the 1960s. Since that time, the loss of aquatic habitats (wetlands and permanent aquatic areas) due to dredging, backfilling and the installation of port and road infrastructures is estimated at 239 hectares. The current area covered by the aquatic environment in the construction zone is estimated at 375 hectares. Thus, nearly 39% of the aquatic habitats in this sector would have been lost in the Beauport Bay area in nearly 60 years. The project will add the destruction of 12.8 hectares and the permanent modification of 8.6 hectares of aquatic habitats, representing an additional 5.6 and 19.1% respectively (Englobe, 2020h).

The proponent considers that the quality of the habitats lost at the end of the harbour tip in the context of this project is different from that of the original shoreline habitats of the Beauport Bay. A wide, shallow tidal flat with significant riparian and submerged aquatic grass beds characterizes the latter. The proponent believes that the project's footprint and dredging area consist of medium-quality feeding habitat for fish. According to the proponent, the most significant effects on fish habitat were caused by the backfilling of the riparian portion of the Beauport Bay, which included a tidal flat of emergent and submerged aquatic grass beds. He concluded that this loss had a much greater effect on fish productivity than his project could have. He therefore considers that the project's residual cumulative effect on fish habitat are not significant (Englobe, 2020h).

Cumulative effects on fish

The proponent's analysis focuses particularly on species at risk (American shad, striped bass, lake sturgeon, and Atlantic sturgeon) since these species, as well as their habitats, located in the project area are currently weakened by human activities. The construction of new port infrastructure, as well as the increase in port activities and the realization of future projects, are likely to increase the current pressure on these species (Englobe, 2020h).

American shad

The proponent reports that the decline of the American shad population in the river is linked to the various dams impeding access to spawning sites for spawners. Since the proponent considers that there are no spawning grounds at the Beauport site, it concludes that the cumulative effects of successive fillings in Beauport Bay probably had no impact on the reproduction of this species. However, since Beauport Bay is now a rearing and nursery habitat for the year's young, he believes that the reduction of the bay's natural riparian habitats following successive fillings probably had a significant effect on the productivity of the



year's young. New habitat destruction would add to historical losses and could, according to the proponent, constitute a significant cumulative effect. However, it notes that riparian habitats for young shad are relatively abundant along the shores of the St. Lawrence River, particularly around Île d'Orléans, and that the project would only incidentally affect the American shad population.

The Proponent does not propose any additional measures to mitigate cumulative effects on American shad, and considers that some of the proposed developments under the Fish Habitat Compensation Project would increase the amount of rearing habitat for young-of-the-year fish.

Striped bass

The proponent reports that the species' historical decline was probably due to disturbance generated by the deposition of dredged material within important habitats, which would have forced the bass to take refuge in areas of the river where intensive fishing activities were taking place.

Today, the abundant and regular presence of striped bass in Beauport Bay and in front of the port peninsula demonstrates, according to the proponent, that the species easily adapts to heavily modified environments. Thus, it does not anticipate that the project's effects on striped bass reproduction would add up to historical and future cumulative effects.

According to the proponent, it is likely that the successive fillings that have reduced riparian habitats in Beauport Bay have had a significant effect on the availability of feeding habitat for the year's young. The proponent considers that the habitat loss induced by the project would add to the loss of historical habitats in Beauport Bay and could constitute a significant cumulative effect. However, he points out that riparian habitats for young striped bass are relatively abundant along the shores of the St. Lawrence River and that the project's effects would only incidentally affect the striped bass population.

The proponent is not proposing any additional mitigation measures for the striped bass, but considers that some of the developments proposed as part of the fish habitat offsetting project would increase rearing habitat area for juvenile striped bass in the year.

Lake Sturgeon

The proponent reports that human activity is the main threat to lake sturgeon. Historically, commercial fishing has caused massive declines in many lake sturgeon populations. More recently, direct and indirect effects of dams has been identified as a threat for this species.

Sturgeon using the study area are also likely to use the habitats of the St. Lawrence River between Île d'Orléans and the upstream part of the Montréal archipelago. The proponent hypothesizes that lake sturgeon used Beauport Bay and the St. Charles River estuary as feeding habitat in the past. It considers that the project's cumulative effect on this species would not be significant since the project would have no noticeable impact on its feeding habitat.

The proponent does not propose any additional mitigation measures for lake sturgeon.

Atlantic sturgeon

The proponent reports that the main threats to Atlantic sturgeon are commercial fishing and habitat degradation and loss. The modification of benthic environments related to dredging activities would constitute

a significant threat, mainly in the feeding area for juveniles. The proponent states that water quality near spawning grounds contains high levels of phosphorus and suspended solids due to increased flow and the resulting erosion (Comité de concertation Suivi de l'état du Saint-Laurent, 2008). Such an increase in bank erosion could lead to the deposition of suspended solids on spawning grounds and the asphyxiation of incubating eggs.

According to the proponent, juvenile Atlantic sturgeon feed in relatively deep zones (between 10 and 40 metres) in the study area and the cumulative effects of the loss of riparian habitat in the Beauport Bay are probably not significant for this species. From the proponent perspective, the project's footprint is located in an area that is barely used by Atlantic sturgeon and the dredging area is located near an area where juvenile sturgeon are concentrated. For the proponent, the effects of dredging on this species would not be significant as long as future depth and substrate conditions are adequate. The Atlantic sturgeon using the study area are likely to use the river habitats located between Trois-Rivières and the Gulf of St. Lawrence. The proponent concludes that the cumulative effects of the project are not significant.

The proponent does not propose any additional mitigation measures for Atlantic sturgeon.

Cumulative effects on mussels (freshwater mussels)

According to the documentation consulted by the proponent, the mussels population fell dramatically between 1995 and 2005. Several species are currently in a precarious situation. The main causes associated with this decline are the construction of dams and dykes that modify the chemical and physical properties of the water upstream and downstream, water pollution and the introduction of invasive alien species, such as the zebra mussel. Moreover, the proponent indicates that this species' density in Beauport Bay far exceeds that of native species. It should be noted that the 205 hectares of encroachment and dredging carried out since the early 1960s constitute a habitat loss for this community of organisms.

The proponent considers that the construction and operation of the new port infrastructures constitute disruptive elements whose effects on the mussels will add to those generated by past and current activities. It also indicates that the risk of contamination of the mussels population by ships' ballast water (the main vector for invasive alien species) will be accentuated by changes to ships' transit and by ships' greater capacity, involving larger ballast water volumes. Thus, the proponent concludes that there are significant cumulative effects, notably because current information tends to show that the mussels population is in sharp decline.

As additional mitigation measures to reduce the project's cumulative effects on mussels, the proponent proposes to inspect dredges and other watercraft used in the aquatic environment prior to their arrival at the construction site to ensure that they are free of invasive alien species.

Agency analysis

For fish and fish habitat, the spatial boundaries considered by the Agency in its analysis include the range of fish species affected by the project in the St. Lawrence River. The Agency relies on the advice of Fisheries and Oceans Canada, which considers that the cumulative effects analysis carried out by the proponent did not sufficiently take into account the habitat needs of sensitive species and did not demonstrate that the residual habitats were sufficient to continue to support the targeted fish populations.

However, the Agency is satisfied with the proponent's analysis of cumulative effects on precarious status mussels.

The Agency notes that approximately 39% of the aquatic habitats in Beauport Bay have been lost in nearly 60 years. Although the residual habitats that would be lost because of the project are of small scale, Fisheries and Oceans Canada considers that they still support important fish habitat functions and that they are used intensively by sensitive and highly prized fish species.

The environment in which the project is located is particularly sensitive, complex and rare in this sector of the St. Lawrence River and provides a full set of fish habitat functions. Thus, the project's habitat losses may have cumulative consequences on the numbers of species by eliminating important habitats. These species have already experienced several pressures and their populations are fragile. In addition to the threats identified by the proponent, the *Species at Risk Public Registry* targets dredging activities as an additional danger to striped bass. According to the Registry, infrastructure development, disturbance of riparian habitats, contamination, the installation of obstacles and invasive alien species could also hinder the survival and recovery of the species in the St. Lawrence River. Finally, according to the *ministère des Forêts, de la Faune et des Parcs*⁷³, the main threat to this species is the loss of spawning habitat.

The Agency believes that the preservation of these habitats is important, even essential, for the conservation and recovery of some of these species. In this context, the Agency concludes that carrying out the project would expose the residual habitats to additional and cumulative pressures on fish populations (many of which are sensitive) that depend on the Beauport site to carry out certain key stages of their life cycle.

Agency conclusion

The Agency considers that the project, in combination with past, present and reasonably foreseeable projects, is likely to cause significant cumulative effects on fish and fish habitat, specifically on striped bass, lake sturgeon, Atlantic sturgeon, and American shad in the St. Lawrence River.

The Agency considers that the following additional mitigation measure would reduce cumulative effects on mussels:

- Inspect dredges and other watercraft used in the aquatic environment prior to their arrival at the work site to ensure that they are free of invasive alien species.

However, as with the project's direct effects on fish and fish habitat, the Agency considers that the key measures identified in section 5.4 would not sufficiently mitigate the project's potential effects to ensure that the cumulative effects are not significant.

⁷³https://www3.mffp.gouv.qc.ca/faune/especies/menacees/fiche.asp?noEsp=10&_ga=2.250467718.1076914452.1602119724-1333823922.1599741986

6.3.3 Current uses of lands and resources for traditional purposes

Considering the project's potential effects on fish species prized by First Nations, the Agency focused its analysis on the cumulative effects on the current use of lands and resources for traditional purposes on fishing activities carried out by First Nations. The First Nations likely to be affected are the Huron-Wendat and W8banaki Nations, the Essipit, Pekuakamiulnuatsh and Pessamit Innu First Nations, the Kahnawà:ke, Kanesatake and Akwesasne Mohawk First Nations and the Wolastoqiyik (Maliseet) Wahsipekuk First Nation.

Proponent's assessment of cumulative environmental effects, proposed mitigation and monitoring measures

The proponent conducted an analysis of the cumulative effects of port activities and marine transportation on the Indigenous human environment with respect to the availability of resources, access to territory and resources, and the quality of the experience. The proponent concluded that the project would have no cumulative effects on fishing since it considers that the cumulative effects on fish would be minor and that the effects on Indigenous fishing would not be perceptible to First Nations members (Englobe, 2020f). However, he indicates that it is undeniable that past activities and events have limited the use of the territory and resources by Indigenous people. Urban, agricultural and industrial development, as well as activities related to maritime transportation, the privatization of riverbanks and the discharge of wastewater into the river are among the main factors responsible for this situation (Englobe, 2020h). These past activities and projects would also have significantly restricted First Nations member's access to the St. Lawrence River for many decades (Englobe, 2020h).

All of the communities that participated in the environmental assessment indicated that they have concerns about the increase in navigation on the St. Lawrence River due to the various port expansion projects currently underway or under assessment. The proponent mentioned that this increase could have consequences on fishing practices and more specifically on the experience of the members. It could also imply a loss of peaceful enjoyment of the territory for users of the water body and induce a perception of increased disturbance of the territory (Englobe, 2020h). Therefore, this factor could diminish the quality of the fishing experience by First Nations members. This quality of experience could continue to deteriorate if the number of vessels were to increase in connection with other harbour projects. For the Mohawk Council of Kahnawà:ke, each additional passage of a vessel near the community represents a significant disruption in the activities of First Nation members (Englobe, 2020h).

The proponent does no plan any specific mitigation measures in relation to cumulative effects on current uses of lands and resources for traditional purposes. The proponent suggested that he could organize discussions on cumulative effects with First Nations, if they wish so. In the event that specific issues or problems are raised in relation to cumulative effects, mitigation or compensation measures could, if necessary, be identified and implemented.

Agency analysis

The proponent did not define a clear spatial and temporal limit in the analysis for the cumulative effects of port activities and marine transportation on the Indigenous human environment. For the purposes of the

analysis, the Agency determined that the limits would be the same as those used for the analysis of the cumulative effects of the project on fish and fish habitat, particularly because fishing practices are fundamentally linked to the state of the resource. The Agency considers that the cumulative effects described in section 6.3.2 on the fish species caught by First Nations also have effects on the fishing carried out by these communities.

The First Nations who participated in the environmental assessment testify to the impacts of the modifications to the St. Lawrence River ecosystem on the practice of their fishery. Several mentioned that the decline in the numbers of prized populations such as striped bass, lake sturgeon, Atlantic sturgeon and American shad have had consequences on the fishing carried out by their members, but also on the customs surrounding these fisheries. These changes have forced fishermen to turn to other available species or to move to continue fishing for species usually prized. The striped bass fishery is a good example. This fishery, once practiced and prized by most First Nations using the St. Lawrence River, is now no longer carried out by the majority of community members in order to allow the species to recover.

For the Grand Council of the W8banaki Nation, fish populations in the river have been under significant pressure in the past and are now in decline. According to the Grand Council, human activity, including ecosystem modification related to channel (seaway) dredging, bank anthropization, dam and lock construction, the introduction of alien species and water pollution from municipal, industrial and agricultural sources are factors responsible for this decline. The Grand Council of the W8banaki Nation gives the example of four important fish species whose stocks have experienced significant declines related to the cumulative effects of different projects or activities: lake sturgeon, Atlantic sturgeon, striped bass and yellow perch. It also pointed out that the Nation is faced with a decline in the populations of the species it has fallen back on, notably yellow perch in Lake Saint-Pierre. This species is now subject to a moratorium until 2022⁷⁴ in Lake Saint-Pierre. The lake's capacity to support a yellow perch population has decreased considerably due to the loss and deterioration of habitats caused by human use of the shoreline.

With respect to the quality of the fishing experience and the availability of the resource, the Grand Council of the W8banaki Nation also points out that its members must fish in increasingly difficult and stressful contexts.

According to the Mohawk Council of Kahnawà:ke, the project will affect migratory species in the river and, consequently, traditional fishing activities. It insists that the community cannot accept a further decline in fish populations.

The Agency believes that, for all communities, the sense of tranquility and escape, the transfer of knowledge and the collective and individual health supported by the food, ritual and social practices related to fishing are affected by the cumulative effects of past activities and projects.

As for future projects, the redevelopment and expansion of the cruise terminal, the redevelopment of the Bassin Louise, sediment management at the Jacques-Samson Dam, the construction of the Île d'Orléans Bridge and the redevelopment, expansion and use of the Ross-Gaudreault cruise terminal could have significant cumulative effects on fish populations already threatened by the project and thus have consequences on First Nations fisheries throughout the river corridor. Furthermore, since the affected fish

⁷⁴ <https://mffp.gouv.qc.ca/la-faune/peche/prolongation-moratoire-perchaude/>

populations are migratory, other development projects along their migration corridor on the St. Lawrence River could add cumulative effects on these populations, notably the expansion projects of the ports of Montréal and Trois-Rivières.

Agency conclusion

The Agency considers that the project, in combination with past, present and reasonably foreseeable projects, is likely to cause significant adverse cumulative environmental effects on the striped bass, lake sturgeon, Atlantic Sturgeon and American shad fishing carried out by First Nations, as well as on the traditions or customs surrounding these activities. The project's effects on species of interest fished by First Nations would be significant as the stocks are already low. Thus, any additional effects of future projects would exacerbate the threats to these species, which could lead to significant cumulative effects on the already diminished Indigenous fisheries.

Based on the analysis of the effects on fish and fish habitat (section 5.4), the Agency considers that no mitigation, monitoring or follow-up measures would sufficiently reduce the cumulative effects of the project on the practice of fishing and the activities and customs surrounding this practice to ensure that the cumulative effects are not significant.

6.3.4 Socio-economic conditions

The Agency focused its analysis of cumulative effects on socio-economic conditions on issues related to recreational and commercial fishing because of the project's potential effects on the distribution and abundance of popular migratory fish species, including lake sturgeon, Atlantic sturgeon and American shad. The possible return of the striped bass fishery is also being considered, since this species is the subject of a recovery strategy in the St. Lawrence River.

Proponent's assessment of cumulative environmental effects, proposed mitigation and monitoring measures

Socio-economic conditions, including recreational and commercial fishing, were not included in the proponent's cumulative effects assessment. The proponent justifies its choice by explaining that the project was designed in such a way as to avoid conflicts of use and changes to the zoning of the targeted sites. He also indicated that 0.4 hectares of recreational land would be available as a result of the project's realization and with the development of the Baie de Beauport, which would benefit recreational activities.

Agency analysis

The Agency determined that the spatio-temporal limits would be the same as those used for the analysis of the cumulative effects of the project on fish and fish habitat, in particular because fishing practices are fundamentally linked to the state of the resource. The Agency considers that the cumulative effects described in section 6.3.2 on migratory fish species also imply cumulative effects on recreational and commercial fishing. In addition, the analysis of cumulative effects on Indigenous fisheries described in section 6.3.3 also applies to recreational and commercial fishing by the general population, since the effects are related to the same fish species.

As indicated in section 5.8, recreational fishing is an important activity for the economy of Quebec and Canada. In 2016, 5,077 jobs were created or maintained in Quebec by activities related to fishing. For the year 2015, current expenditures (packages, transportation costs, food and lodging, fishing services, etc.) and expenditures on durable goods (boats, special vehicles, fishing equipment, etc.) by recreational fishers contributed \$473 millions to the province's gross domestic product (B.E.S.T.E., 2020). According to Mingelbier (2016), approximately 10% of recreational fishers in Quebec fish on the St. Lawrence River. Due to the diversity of fish species present and the proximity of major urban centers, recreational fishing on the St. Lawrence River has a strong potential for development (Mingelbier et al., 2016).

Sturgeons have been fished commercially in the St. Lawrence River for over a century. Although the St. Lawrence River remains one of the few rivers in North America with a population healthy enough to support a commercial fishery, the lake sturgeon remains vulnerable because of the particularities of its life cycle. As for the Atlantic sturgeon, which almost disappeared in 1970, the effectiveness of the management programs that have been implemented for the species now allows for the issuance of commercial fishing licences. A recent review of the use of Atlantic sturgeon in the St. Lawrence Estuary nevertheless concludes that the population is currently overexploited. American shad is a species in a precarious situation designated as vulnerable under the *Act respecting threatened or vulnerable species*. In the 19th century, this species was one of the three most exploited fish species on the Atlantic coast. However, commercial landings of American shad in the St. Lawrence River have been significantly reduced since the mid-20th century (Gagnon-Poiré et al., 2020). The declines are believed to be due to overfishing and habitat loss, including loss of connectivity due to dam construction and pollution that has reduced dissolved oxygen concentrations. This species is the subject of a recovery action plan involving many agencies and departments. In recent years, there has been a significant interest in the recreational fishery for this species (Gagnon-Poiré et al., 2020).

Recreational and commercial fishing for striped bass, a species that disappeared from the river in the 1960s and was reintroduced in 2002, is not authorized because of its endangered status under the *Species at Risk Act*. Significant investments have been put in place by the governments of Quebec and Canada since 2002 to reintroduce the species and eventually allow the resumption of sport fishing. According to the proposed recovery strategy and action plan for striped bass (DFO, 2019), a survey of the sport fishery in the Gaspé Peninsula conducted in 2015 estimated the economic benefits of this new fishery to be at least \$1 million in its second year of existence. If the striped bass recovery were to allow the return of a sport fishery in the St. Lawrence Estuary, certain regions could benefit from significant socio-economic benefits.

The Agency concluded that there would be significant adverse residual effects on socio-economic conditions related to recreational and commercial fishing since the project would alter the distribution and abundance of fish species. As well, any adverse effects on these fisheries resulting from present or future activities would be cumulative with and exacerbate the residual effects of the project. The main threats to prized and migratory fish species come notably from dams that prevent them from migrating to habitats essential to their life cycle and from the loss of habitat, particularly breeding habitats. Any project having such effects would necessarily have consequences on commercial and recreational fisheries that would add to the significant effect generated by the project on fish and fishing.

Thus, given these potential effects, the impossibility of compensating for certain habitats and the great difficulty of compensating for others, particularly for the two species of sturgeon, striped bass and American shad, the Agency considers that the project could cause changes in the practice of recreational



and commercial fishing. For example, the overall performance of recreational fishing in the river, which can be considered a lucrative recreational activity in Quebec (Mingelbier et al., 2016), could be affected by a decrease or changes in the stock of certain fish species. Fishermen would turn to other species or move to continue fishing the usually prized species. Cumulative impacts on recreational and commercial fisheries would occur throughout the river corridor due to the migratory nature of the prized species. Significant investments in the recovery of these species could also be lost.

Agency conclusion

The Agency considers that the project, in combination with past, present and reasonably foreseeable projects, is likely to cause significant adverse cumulative environmental effects on recreational and commercial fishing, particularly for prized species such as lake sturgeon, Atlantic sturgeon and American shad, as well as the potential return of striped bass fishing to the St. Lawrence River.

Based on the analysis conducted on fish and fish habitat (section 5.4) as well as socio-economic conditions (section 5.8), the Agency considers that no mitigation, monitoring or follow-up measures would sufficiently reduce the project's cumulative effects on recreational and commercial fishing to ensure that they are not significant.

6.3.5 Air quality

Proponent's assessment of cumulative environmental effects, proposed mitigation and monitoring measures

According to the proponent, the implementation of past projects has generated cumulative effects on air quality within the spatial boundaries selected for the analysis of this component. Other current and future projects, including those related to the construction and maintenance of roads and highways, infrastructure rehabilitation, bridge and incinerator construction, are also likely to modify the overall air quality situation. The Agency considers that other sources contribute to the current air quality situation, including residential wood burning.

For all projects, air quality is affected by gaseous emissions, such as exhaust and fuel combustion from road, rail and marine vehicles, dust generation and air emissions from factory or industrial stacks. The operation of White Birch Paper's Stadacona mill, the Québec City incinerator and the Port of Quebec current operations are examples of activities described by the proponent that affect current air quality (Englobe, 2020c).

Future projects include the construction and operation of a biomethanization center, the construction of a new bridge for Île d'Orléans, a third road link between Québec City and Lévis, a structuring transportation network and various road projects, as well as the redevelopment of the Bassin Louise, the Promenade portuaire du Foulon and the Promenade Samuel de Champlain (Phases III and IV). According to the proponent, these projects would emit atmospheric contaminants from similar sources. In fact, they consist mainly of excavation and grading work requiring machinery and trucking for the supply of materials and resulting in the emission of dust and greenhouse gases. The duration of the construction phase for these projects is variable, but would be limited to a few years. As for their operational phase, some would result in an increase in traffic on the roadways (e.g. various road projects, third road link), while others would



reduce the pressure on the road network (e.g. tramway). The main air emissions associated with the operational phase of these projects would therefore be dust generation, fuel combustion and exhaust emissions (Englobe, 2020c).

Finally, the proponent considers that the cumulative effects due to marine activities would not be significant and that carrying out the project would help avoid a significant increase in contaminant emissions from larger scale trucking in the future. The proponent justifies this hypothesis by suggesting that, without the Laurentia project, containers from the local market would necessarily have to pass through another port in Quebec or elsewhere in Canada or the United States and that their transportation to Québec City (particularly trucking) would generate emissions that could be avoided or reduced by the Laurentia project (Englobe, 2020c). Environment and Climate Change Canada considers this assertion hypothetical, and it would be valid only if the future conditions described by the proponent were to materialize. Rather, it asserts that the project would result in an increase in marine and rail traffic in absolute terms in the airshed area. A decrease in the air quality effects in this area would therefore not be felt by this likely change in freight traffic.

With respect to rail transportation in the operational phase, no significant cumulative effect on air quality is anticipated. According to the proponent, the number of locomotives on the network is not expected to increase despite the project's completion.

The proponent puts into perspective the magnitude of the project's effects in relation to other activities currently underway that influence air quality in the airshed area. The proponent identifies current ambient air quality as the main aggravating factor in the cumulative effects assessment. On this point, Health Canada points out that contaminant exceedances include, in part, emissions from current and adjacent activities at the harbour and considers that the proponent should develop and implement an air emissions management plan that includes its current facilities. Environment and Climate Change Canada recommends that the proponent pursue the current initiative to improve its practices to reduce the air quality footprint of its current operations through the involvement of "specialized firms, research and development firms, and Laval University.".

Given the current situation, which is already worrying, any additional emissions are likely to be problematic, mainly in the borough of La Cité-Limoilou. The effects of future projects will add to those of current activities and result in greater cumulative effects. However, the proponent considers that the project's effects will be relatively marginal once it will be operating and the construction of future projects will be completed. In its view, the bulk of the anticipated effects are linked to the construction phase of the various projects, particularly the road projects. The proponent concludes that the project's completion would not be a significant aggravating factor for the receiving environment, and emphasizes that his project should encourage the continued stakeholders' collaboration in the community so that they continue to find, in a concerted manner, practices or initiatives that support the improvement of ambient air quality.

With respect to the mitigation measures proposed by the proponent to reduce cumulative effects, they are the same as those currently applied at the port site for its ongoing operations since 2011 and those planned for the construction and operational phases. The proponent considers that such measures will be sufficient to mitigate the effects generated by current and future activities.

Agency analysis

The project would take place in an atmospheric environment where air quality standards and criteria are already being exceeded. The Agency concludes that the direct effects of the project on air quality would be significant. Since residential, industrial, road, and commercial development in this sector will continue in the future and several major projects are pending, the Agency considers that the project, in combination with other projects and future activities, could exacerbate current air quality problems. As a result, air quality in the airshed area is likely to continue to deteriorate and there is no indication at this time that it could improve significantly.

Agency conclusion

The Agency considers that the project, combined with past, present and reasonably foreseeable projects, is likely to cause significant cumulative effects on air quality in the airshed area and more specifically in the borough of La Cité-Limoilou.

Since air quality in the airshed area is already affected by a variety of industries and activities, any mitigation measures related to cumulative effects should be developed in consultation with other users of the environment. For this reason, the Agency considers that, in addition to the measures already planned and in place at the Port of Quebec and those identified in section 5.1, the following measures are necessary to help mitigate potential cumulative environmental effects on air quality:

- Pursue efforts to improve air quality with local stakeholders through the *Comité intersectoriel sur la contamination environnementale dans l'arrondissement de La Cité-Limoilou* (CICEL) (or any other committee aimed at improving air quality in the borough of La Cité-Limoilou), of which the Quebec Port Authority is a member (established in 2013, the CIECEL brings together several players from the industrial sector, as well as representatives of Québec City, the ministère de l'Environnement et de la Lutte contre les changements climatiques and citizens);
- Develop, in consultation with Environment and Climate Change Canada, a plan to manage atmospheric emissions from all Port of Quebec activities, including those generated by the project;
- Continue to develop initiatives to improve the proponent's activities to reduce its air quality footprint.

6.3.6 Human health

The Agency assessed the cumulative effects on human health taking into account that the project would contribute to the degradation of air quality in a living environment where several environmental and socio-economic risk factors for health are already present and known.

Proponent's assessment of cumulative environmental effects, proposed mitigation and monitoring measures

The proponent conducted a cumulative human health effects assessment due to concerns about ambient air quality and potential health risks.

According to the proponent, the main effects likely to add to those of the project during the construction phase would result from future linear transportation infrastructure projects. The air contaminants emitted

by these projects would be similar to those emitted by its project, namely dust and greenhouse gases. The duration of the construction phase for these projects would vary, but would be limited to a few years.

As for the operational phase of these projects, it would lead to an increase in traffic on the roadways in some cases (e.g., various road projects and the 3rd road link between Québec City and Lévis), but would lead to a reduction in pressure on the road network in others (e.g., structuring transportation network). The main air emissions associated with the operational phase of these projects would be related to dust, fuel combustion and exhaust gases.

The proponent based its analysis of cumulative effects on human health on the analysis of cumulative effects on air quality. In its view, taking into account the project's effects on air quality, baseline conditions and other potential contributors, the contaminants that deserve particular attention in the context of the assessment of cumulative effects on human health are as follows:

- Particles (TPM, PM₁₀ and PM_{2.5});
- NO₂ and NOx;
- Volatile organic compounds (VOCs).

According to the proponent, sulphur dioxide (SO₂) is not an issue in the airshed area, although the project would slightly increase the presence of this contaminant. Consequently, it concludes that there are no significant cumulative effects in the context of the project for this contaminant in relation to human health.

With respect to fine particulate matter, it would be more likely to be observed at the boundaries of the proponent's facilities during the construction phase. However, the proponent considers that the application of the planned mitigation measures would reduce cumulative effects. According to the proponent, the health effects most likely to occur include increased daily respiratory symptoms and absenteeism from work or school. The likelihood of these effects occurring during the operational phase would be almost nil for the surrounding population. Therefore, the proponent concludes that the cumulative effects associated with the emission of fine particulate matter would not be significant in the context of its project.

According to the proponent, nitrogen dioxide (NO₂) is more likely to cause cumulative health effects, particularly during the construction phase and at the limits of the Port of Quebec facilities. The proponent believes that the maximum concentrations modelled during the construction phase are likely to lead to more visits or hospitalizations for respiratory causes (asthma in children). However, these health risks would decrease significantly during the operational phase. The proponent points out that attention would be paid to this contaminant and that, given the measures that would be put in place, one can conclude that cumulative effects on human health would not be significant.

The probability of ground-level ozone causing health effects would also be higher during the construction phase, according to the proponent. This increased presence of ground-level ozone could result in a very small increase in the risk of mortality and hospitalization and a very low probability of pulmonary effects in predisposed individuals.

Finally, the proponent concludes that the cumulative effects on human health in relation to the residual effects on air quality are not significant. To support this conclusion, the proponent relies on the fact that air contaminant emissions associated with the project would be low and that the project would bring no

significant change to ambient air quality compared to the current situation. It believes that the frequency of population health effects will remain similar to that currently observed. Consequently, the proponent does not propose any additional mitigation measures, although the proposed monitoring and follow-up program would also apply to the anticipated cumulative effects.

Health Canada suggests that an air emissions management plan applicable to the project and the existing Port of Quebec facilities be developed and implemented (see subsection 6.3.5). This plan should include mechanisms and procedures for communicating monitoring and follow-up results to the community, as well as procedures for managing complaints, if applicable.

Agency analysis

In conducting its analysis, the Agency relies on the analysis and conclusions presented in the sections on the project's effects on air quality (section 5.1) and human health (section 5.7) as well as in the subsection on the project's cumulative effects on air quality (subsection 6.3.5). The Agency also takes into account the living environment in which the project would take place and the characteristics of the population likely to be affected by the project.

According to the *Direction de la santé publique de la Capitale-Nationale* du Québec, there are significant differences between the health status of the populations in the territories of the Limoilou-Vanier and Basse-Ville Local Community Service Centres (CLSCs) and that of the rest of the population in the Quebec Capitale-Nationale region (CIUSS-CN, 2018). These territories have been the subject of a number of interventions by the *Direction régionale de santé publique de la Capitale-Nationale* (DRSP-CN) in relation to outdoor air quality, healthy housing, gas leaks and, contaminated land. The Public Health Branch is concerned about the simultaneous exposure of the population to several environmental health risk factors and the presence of significant health inequalities that may be related to the environment (CIUSS-CN, 2018).

Social inequalities in health are observed in the lifestyle of the population in these territories, for example in cigarette smoking, in the prevalence of obstructive lung diseases (chronic bronchitis and emphysema), and in hospitalizations for respiratory and cardiovascular diseases (CIUSS-CN, 2018). Compared to the entire Quebec Capitale-Nationale region, the hospitalization rate for respiratory diseases is 1.3 times higher in Lower Town and 1.5 times higher in Limoilou-Vanier (CIUSS-CN, 2018). In addition, in these boroughs, life expectancy at birth is significantly shorter. When compared to other sectors of the Quebec Nationale-Capitale region, life expectancy at birth is 6 years less in Lower Town and 2.8 years less in Limoilou-Vanier (CIUSS-CN, 2018).

The premature mortality rate, as well as death rates from respiratory diseases, cardiovascular diseases and cancer (trachea, bronchus and lung) remain significantly higher than those of other territories in the Quebec Capitale-Nationale region and even in the province of Quebec as a whole. For example, the mortality rate from respiratory diseases is twice as high in Basse-Ville and 1.4 times higher in Limoilou-Vanier (CIUSS-CN 2018).

The DRSP-CN recommends prioritizing the following issues related to outdoor air quality and human health:

- The annual average concentrations of PM_{2.5};
- Exceedances of short-term (hourly, 8-hour, 24-hour) reference values for particulate matter and ozone;
- Air quality at the Vieux-Limoilou station, in a context of health inequalities and cumulative risks;
- The detection of carcinogenic substances, highly toxic contaminants and non-threshold substances deemed safe for health.

For the Agency, the project's effects on air quality, when combined with the effects of current and future projects, will exacerbate the effects on human health, in particular because they will contribute to degrading the current state of ambient air. The effects of these projects, including the Laurentia project, could reduce the chances of mitigating the problems identified and prioritized by the *Centre intégré de santé et de services sociaux de la Capitale-Nationale* (CIUSS) and improve the health of the population on its territories.

Health problems related to air quality will also add to those already present in the community and thus increase existing social inequalities.

Agency conclusion

The Agency considers that the project, in combination with past, present and reasonably foreseeable future projects, is likely to cause significant cumulative effects on human health in the expanded study area and more specifically in the borough of La Cité-Limoilou.

Since human health in the borough of La Cité-Limoilou is already affected by social and health inequalities, the Agency considers that no mitigation or follow-up measures can sufficiently mitigate cumulative effects to make sure that they do not become significant. However, the Agency considers that the measures provided for in sections 5.1 and 5.7 and subsection 6.3.5 can reduce cumulative effects on human health to some extent.

7 Impacts on Aboriginal and Treaty Rights

The Agency assessed the potential impacts on rights of Indigenous peoples and their degree of severity by examining the relationship between Project activities and the conditions necessary for the exercise of rights, such as the availability and quality of resources, access to territory, or the experience related to the exercise of rights and cultural transmission.

This analysis is not a rights determination process. In this document, the Agency reports on the First Nations' proposed visions for the occupation of the territory, and this, in full respect of the positions shared by other First Nations.

Following its analysis, the Agency concluded that the Project is likely to have a high level of impact on Aboriginal and treaty rights.

This section summarizes how the Project is likely to affect the rights of the First Nations selected for consultation. Appendix D summarizes the main concerns identified by the Indigenous communities during the environmental assessment up to the publication of this report and indicates how the proponent and the Agency have responded to them.

Impacts on current uses of lands and resources for traditional purposes are considered and assessed in section 5.9 of this report. The cumulative effects of the Project on current land and resource uses are assessed in section 6.3.

7.1 Aboriginal and Treaty Rights

The study area selected by the proponent to assess the effects of the Project on Indigenous peoples is the extended study area (introduction, figure 3). However, the Agency points out that the Project's adverse effects could also be felt by First Nations outside the expanded study area. The Agency also took into account the concerns of First Nations regarding the potential impacts of Project activities outside the scope of the environmental assessment, including the cumulative effects of navigation.

In the course of its assessment, the Agency found overlaps between the claims and land assertions of certain First Nations in the expanded study area of the Project. In this chapter, the Agency reports on the information shared by First Nations in full respect of their respective positions.

7.1.1 The Huron-Wendat Nation

The Huron-Wendat Nation was established at the end of the 17th century in the Wendake reserve. It is the only Huron-Wendat reserve in Canada. Wendake is located on the shores of the Saint-Charles River called *Akiawenrahk* in the Huron-Wendat language, which means "trout river". Wendake is located in the administrative Québec National Capital Region and is landlocked by Québec City, approximately 18 kilometres from the proposed Project site. The Project area is located in the heart of the 'Nionwentsio', which means "our magnificent territory" in the Huron-Wendat language, the traditional territory of the

Huron-Wendat Nation. According to information transmitted by the Council of the Huron-Wendat Nation, this territory covers 66,056 square kilometres and extends, from north to south, from the Saguenay River to the U.S. border. From east to west, it runs from New Brunswick to the Saint-Maurice River. The southeastern fringe of this territory also includes a small part of the State of Maine, between the Saint John River and the Canada-U.S. border.

The Huron-Wendat Nation indicated in its submission to the Agency in March 2017 that the rights and freedoms protected by the Huron-British Treaty of 1760 include, but are not limited to, freedom of trade and religion, the right to practice customs such as hunting, fishing, trapping, gathering, traditional rites, the peaceful enjoyment of Nionwentsino and, more generally, the right to self-government. According to the Huron-Wendat Nation, this Peace and Alliance Treaty seals the nation-to-nation and treaty partner relationship between the Crown and the Huron-Wendat Nation. The rights protected by this treaty are entrenched in the Canadian Constitution through section 35. This treaty, whose validity was recognized by the Supreme Court of Canada in 1990 in the *Sioui*⁷⁵ decision, protects the customary and religious activities of the Huron-Wendat Nation that take place on the Nionwentsio.

The Huron-Wendat Nation explains in its brief (2017) that members of the Huron-Wendat Nation have continued to frequent the Project study area since the 16th century. As part of the Project, the Huron-Wendat Nation also conducted a complementary study in 2016⁷⁶ on the occupation and use of the expanded study area by members. The results of this study were used by the proponent in its Impact Statement.

7.1.2 The Innu First Nations

The First Nations of Essipit, Pessamit and Pekuakamiulnuatsh (Mashteuiatsh) are among the nine Innu First Nations in Québec. The Project's expanded study area does not overlap with the traditional territories ("Nitassinan" which means "Our territory" in Innu-aimun) specific to each of the three communities. However, the expanded study area is partly included in Nitassinan common to the three First Nations (the "Southwestern part"), whose boundaries are linked, according to the Innu First Nations, to their thousand-year-old occupation. This territory covers an area of 14,794 square kilometres and corresponds approximately to the Québec National Capital Region.

The Innu community of Pessamit is located on the Upper North Shore of the St. Lawrence River, west of the municipality of Baie-Comeau, approximately 140 kilometres east of Tadoussac and about 360 kilometres from the proposed Laurentia Project site. "Pessamit" means "where there are lampreys" in the Innu language. The Nitassinan of Pessamit, as described in the Agreement of General Principles (EPOG⁷⁷), covers a total area of approximately 137,800 square kilometres. Its western boundary borders the Nitassinan of the Pekuakamiulnuatsh, to the southwest, that of Essipit and to the east, that of the Innu of Uashat mak Mani-Utenam (Sept-Îles).

⁷⁵ Sioui Judgment: <https://scc-csc.lexum.com/scc-csc/scc-csc/fr/item/608/index.do>

⁷⁶ Study included in the Aboriginal Communities Companion Study, WSP, 2016: <https://www.ceaa.gc.ca/050/documents/p80107/116785F.pdf>

⁷⁷ Agreement signed between the Petapan Regroupement and the federal and provincial governments in 2004 laying the groundwork for the negotiation of a future treaty: <https://www.rcaanc-cirnac.gc.ca/fra/1100100031951/1539797054964>

The Essipiunnuat (or Innu of Essipit) were formerly called Montagnais of Les Escoumins. The Innu reserve of Essipit (which means "shellfish river") is located on the Upper North Shore of the St. Lawrence, near the municipality of Les Escoumins, about 40 kilometres east of Tadoussac and 254 kilometres from the proposed Project site. The Essipit Nitassinan, as described in the General Agreement of Principles (GAP), covers a total area of approximately 8,400 square kilometres including the maritime portion (estuary and Fjord). This traditional territory includes the Tadoussac region and part of the Saguenay River and the Vallin Mountains. To the east, it is bordered by the Portneuf River.

The Pekuakamiulnuatsh (or Ilnuatsh of the Pekuakami) were formerly called Montagnais of Lac-Saint-Jean. The Mashteuatiatsh reserve is located near the municipality of Roberval, approximately 210 kilometres north of the Project site. Mashteuatiatsh means "where there is a point" in the Innu language. The Nitassinan of the Pekuakamiulnuatsh covers nearly 79,000 square kilometres. This territory corresponds to most of the administrative region of Saguenay-Lac-Saint-Jean, as well as part of the Québec National Capital Region and the Mauricie region.

In the briefs submitted to the Agency in June and July 2019, the First Nations of Essipit, Pessamit and Pekuakamiulnuatsh affirm that they jointly hold Aboriginal rights and title to the Project site located in the "southwest" part. According to the report provided by the First Nations of Essipit and Pekuakamiulnuatsh to the proponent in May 2016 (Pekuakamiulnuatsh Takuhikan and CPNIE, 2016), at the beginning of the 17th century, the Québec City region was considered part of Innu territory. Under the pressure of colonization, epidemics, and the reduction of wildlife resources, the Innu then progressively retreated northeastward on the north shore of the St. Lawrence (Pekuakamiulnuatsh Takuhikan and CPNIE, 2016).

7.1.3 The W8banaki Nation

The W8banaki Nation includes the communities of Odanak and Wôlinak, both located on the south shore of the St. Lawrence between Sorel and Bécancour. The community of Wôlinak is located 152 kilometres from the Project area, and the community of Odanak, 178 kilometres away. Of Algonkian origin, the name of the W8banaki Nation comes from the terms "W8ban" (white light) and "Aki" (land) meaning "people of the dawn".

According to the proponent, the W8banakiak claim to be among the "mission Indians" in the St. Lawrence Valley allied with the King of France who made a treaty at Oswegatchie in 1760 with the British Crown. In addition, the Québec Court of Appeal ruled⁷⁸ that the Oswegatchie Treaty of 1760 is a treaty that recognizes the right of "mission" Indigenous peoples in the St. Lawrence Valley to remain on settled lands and, for a nomadic people, a right of access to traditional hunting and fishing territories (Englobe, 2018).

According to the map provided by the Ndakina Office to the proponent, the boundaries of the territory (Ndakina⁷⁹), over which W8banakiak have Aboriginal and treaty rights, extend from west to east, from the Richelieu River to east of Montmagny. For the north-south boundaries, in addition to the north shore of Lake St. Pierre and the islands of Sorel, the boundary extends from the south shore of the St. Lawrence River to the United States.

⁷⁸ Côté Judgement, 1993 : <https://www.canlii.org/fr/qc/qcca/doc/1993/1993canlii3913/1993canlii3913.pdf>

⁷⁹ "Ndakina" means "Our land" in aln8ba8dwaw8gan (w8banaki language)

Thus, the portion of the ancestral territory, which includes the city of Lévis, is intersected by the Project's expanded study area. The boundaries listed are subject to change by the Ndakina Office. The zone for the practice of hunting, fishing and trapping activities for food, ritual or social purposes, whose limits were established following an agreement between the Wôlinak and Odanak Councils and the Government of Québec in 2001, covers the southern half of the ancestral territory. This zone is located at a distance of more than 70 kilometres south of the extended study area. A code of practice governs traditional activities and their management (Englobe 2018 and GCNWA, 2015).

7.1.4 Wolastoqiyik (Maliseet) Wahsipekuk First Nation

The Wolastoqiyik (Maliseet) Wahsipekuk First Nation is the only Maliseet First Nation in Québec. It has a territory located in Whitworth Township, near Rivière-du-Loup, and a small lot in Cacouna. These two territories are not inhabited. The Maliseet in Québec are not grouped into communities, but live scattered over the territory.

The Cacouna reserve is adjacent to the municipality of the same name and is located approximately 222 kilometres from the Project site. The Whitworth reserve is located on the south shore of the St. Lawrence River and is approximately 230 kilometres from the Project site.

Called *Etchemins* by Samuel de Champlain, the Maliseet belong to the Algonquin linguistic family. They called each other "Wulust'agooga'wiks", meaning "People of the Beautiful River". According to the proponent, the Wolastoqiyik (Maliseet) Wahsipekuk First Nation has occupied and used, since time immemorial, a territory in Québec located on the south shore of the St. Lawrence River, between the Chaudière River, near Lévis, and the Mitis River, near Mont-Joli. According to the Wolastoqiyik (Maliseet) Wahsipekuk First Nation, the ancestral territory known as Wolastokuk joins the northern shores of the St. Lawrence and part of the banks of the Saguenay River. The Project's extended study area is located at the southwestern extremity of this territory and thus intersects the Wolastokuk (Englobe, 2018).

According to public information gathered by the proponent, the Maliseet have been pursuing exploratory discussions with the federal government since 2003 on comprehensive land claims. These negotiations have the dual objective of clarifying Aboriginal rights and implementing the various historic treaties of peace and friendship. In Marshall (R. v. Marshall, [1999] 3 S.C.R. 456), the Supreme Court of Canada ruled that these Peace and Friendship Treaties confirmed the right of certain Indigenous groups to hunt, fish and gather, and to trade in the products of these activities as a means of "moderate livelihood".

According to the proponent, the contemporary use of the territory by members of the Wolastoqiyik (Maliseet) Wahsipekuk First Nation remains relatively undocumented. However, the First Nation has indicated to the Agency⁸⁰ that it is in the process of documenting the various usages of its members and has indicated a use of the expanded study area by its members since many members live in and frequent this area and its historical use by the Maliseet is documented.

⁸⁰ Meeting between the Agency and the Wolastoqiyik Wahsipekuk Nation on Rights Impact Assessment (September 23, 2020)

7.1.5 Kahnawà:ke, Kanesatake and Akwesasne Mohawk First Nations

The Kahnawà:ke Mohawk Reserve is located on the south shore of the St. Lawrence River, 10 kilometres southwest of Montréal, at the elevation of Lake Saint-Louis, approximately 280 kilometres upstream from the Project study area. According to the documentation consulted by the proponent, Kahnawà:ke means "near the rapids" or "on the rapids" in *Kanienke*, the Mohawk language. This term refers more specifically to the Lachine Rapids, which are located near the eastern boundary of the reserve. The Mohawks of Kahnawà:ke traditional territory of does not overlap with the Project study area. However, they assert that they have rights, titles and interests in the area affected by the Project since, according to oral tradition, the St. Lawrence Iroquoians, their ancestors, would have already occupied this area. In its shared submission to the Agency in August 2019, the Mohawk Council of Kahnawà:ke also claims other rights, including, but not limited to, Aboriginal title, governance rights (including environmental management based on the Two Row Wampum treaty and "Ochen:ton Karihwatehkwen", the basis for decision making centered on respect for the environment as a whole) and the rights to collect and trade in the St. Lawrence River as inherent rights and section 35(1) of the *Constitution Act, 1982*.

The community of Kanesatake is located on the north shore of the Deux-Montagnes Lake, at the junction of the Ottawa River, 53 kilometres west of Montréal and approximately 300 kilometres from the Project site. The Kanesatake First Nation traditional territory does not overlap the Project study area.

The Akwesasne First Nation is located approximately 383 kilometres from the Project site. The Akwesasne traditional territory does not affect the Project study area. According to information gathered by the proponent, this territory includes part of the St. Lawrence River, at the mouth of the Raquette and St. Regis rivers, as well as several islands located on these bodies of water. The Akwesasne territory straddles Ontario, Québec and the state of New York in the United States. (Englobe, 2018)

The Supreme Court of Canada's 1996 Adams⁸¹ decision recognized the Mohawks' right to fish for food in Lake St. Francis and the St. Lawrence River, based on the Nation's practices before contact with Europeans. The decision does not specify on which portion of the river the right to fish applies. The decision simply cites the historical analysis presented to the Court. This analysis concluded that at the time of European contact, when Aboriginal rights crystallized, the Mohawks had military control of the St. Lawrence River between Montréal and Lake Ontario. The Côté decision (1993) of the Court of Appeal of Québec, based on the Oswegatchie Treaty of 1760, recognized the signatory Indigenous Nations' rights to their lands, as well as their right to hunt and fish as they traditionally did. The Oswegatchie Treaty was signed between the British and some indigenous nations, including the Iroquois of Kahnawà:ke and Kanesatake.

Despite communications sent to Kanesatake and Awesasne First Nations, it was not possible for either the proponent or the Agency to obtain information concerning the uses and rights exercised by the members of these First Nations that could be affected by the Project.

⁸¹ <https://scc-csc.lexum.com/scc-csc/scc-csc/fr/item/1420/index.do>

7.2 Potential Negative Effects of the Project on Aboriginal and Treaty Rights

7.2.1 Potential impact pathways on the exercise of rights

Since 2015, the Agency has received several briefs from First Nations and has had several exchanges with them regarding the assessment of the Project's potential impact on their rights. The main concerns that have been raised are related to the following elements:

- The impact of the Project on certain migratory species of fish of interest, including lake and Atlantic sturgeon and American shad;
- The impact of the Project on fish and fish habitat, particularly on the striped bass, an endangered species;
- The potential impacts of the Project on the exercise of rights (including fishing and hunting of migratory birds) and customary laws;
- The cumulative effects of increased navigation and other activities resulting from the various port Projects on the St. Lawrence River;
- The importance of consulting First Nations on mitigation or offset measures that may affect their Aboriginal rights;
- Access to the territory and the transfer of knowledge.

The Huron-Wendat Nation also expressed certain concerns to the Agency regarding the Project's effects on terrestrial wildlife environments and habitats, including questions on the mitigation and offset measures planned by the proponent (see appendix D).

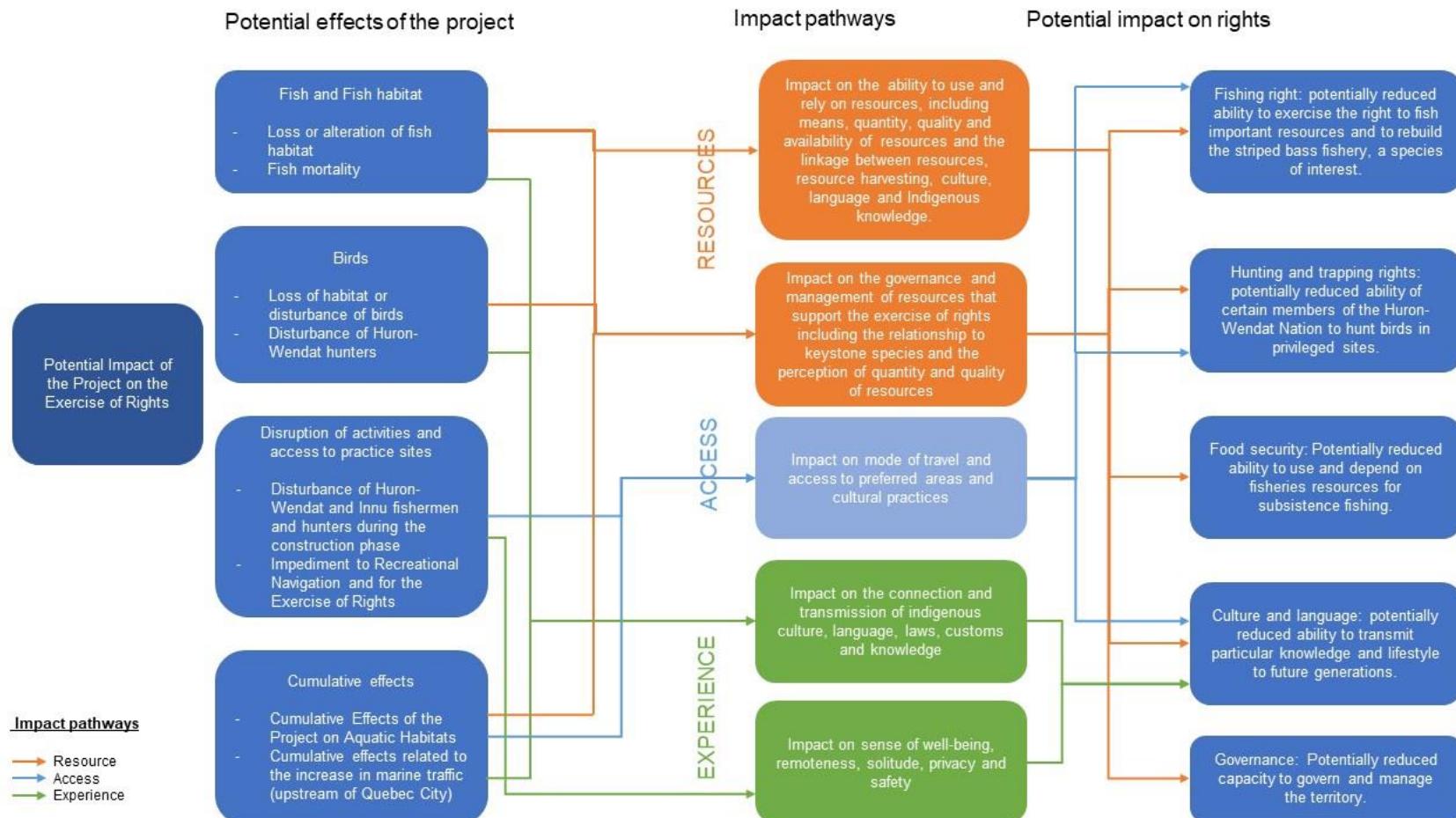
As for historical and cultural heritage, it was not the subject of major concerns although the Huron-Wendat Nation and the Innu First Nations raised the historical importance of the Project site and of adequate archaeological digs (see chapter 5.10).

The diagram below (figure 15) and the elements that follow reflect the main advice and concerns expressed by the First Nations regarding the Project's potential impacts on their rights and the ways in which the Project could affect the exercise of these rights. Impact pathways describe how the project may affect First Nations rights. The rights impact assessment methodology used by the Agency classifies these impact pathways into three categories: Resources, Access, and Experience.



IMPACT ASSESSMENT AGENCY OF CANADA

Figure 15 Visual presentation of pathways of potential impact of the Project (resource, access, experience) on the rights of the First Nations who participated to the environmental assessment



First Nations' vision

Fishing Right

As shown in figure 15, First Nations fishing rights would be affected primarily by the project's direct and cumulative effects on fish and fish habitat, by affecting the possibility for First Nations to use and manage the resource and to pursue their cultural practices related to the harvesting of the resource (Resource Impact Pathway - arrows and boxes in orange - figure 15). To a lesser extent, and for certain First Nations only, the right to fish could also be affected by the project's potential effects on access to the practice sites in connection with project-related shipping (Access Impact pathway - blue arrows and boxes in the figure).

The Huron-Wendat Nation emphasized to the proponent and the Agency the importance of the Project's expanded study area, including the construction zone, where several fishing sites used by its members are located. In its shared submission to the Agency in 2017, the Huron-Wendat Nation expressed its disagreement with the proponent's analysis qualifying the residual effects of the Project on the current use of land and resources as minor and insignificant. According to the Huron-Wendat Nation, the disturbance of fishermen during the construction phase, as well as the need for fishermen to adapt during the operational phase, are significant.

The Essipit First Nation indicated that the monitoring of the traditional practices of its members (*Innu-aitun Monitoring*) made it possible to identify that some of them practiced walleye fishing within the Project study area.

The W8banaki Nation, the First Nations of Essipit, Pessamit and Pekuakamiulnuatsh, and the Kahnawà:ke First Nation emphasized the importance of the Project's study area for fish and fish habitat, particularly for migratory fish species fished downstream and upstream of the expanded study area by these First Nations.

Information on First Nations' uses and fished resources as well as information on the location of certain practice sites can be found in chapter 5.9.

First Nations who participated in the environmental assessment raised concerns about the Project's direct and cumulative effects on fish and fish habitat, particularly on migratory species such as lake and Atlantic sturgeon, American shad and striped bass, some of which are at risk, which could affect their fishing rights. Beyond the right to fish, these First Nations are also concerned more globally for the health of fish and aquatic ecosystems. Regarding striped bass, First Nations who participated in the environmental assessment have mentioned an interest in this species and are concerned about its status and the threat that the Project would represent for its recovery. First Nations also mentioned that among their members, they favour the release of striped bass in order to help its population recover and favour, when the conditions will be met, the resumption of fishing for this species. Fishing limits for sturgeon are also applied by W8banakiak.

The Huron-Wendat Nation and the Innu First Nations also indicated, in their discussions with the proponent, that the fishing of certain species constituted as food and subsistence fishing for some of their members (Englobe, 2018b). The Mohawk Council of Kahnawà:ke, in its shared submission to the Agency (2019), also indicated that it was concerned about its food sovereignty and the food security of its members should the Project affect the availability, quality and access to resources.

First Nations also mentioned the impact that the effects on fish and fish habitat could have on cultural transmission and territorial experience. The Mohawk Council of Kahnawà:ke, in particular, indicated to the Agency (August 2019) that the effects of the Project on Mohawk fishing rights could have an adverse

impact on Mohawk culture and language by affecting, for example, their ability to use terms related to this practice. The Grand Conseil de la Nation Waban-Aki also explained that any effect on fish species of interest that could lead to a decrease in fishing success could ultimately affect the ability of the W8banakiak to transfer their knowledge and all the experience and benefits related to fishing and use of the territory such as a sense of healing, introspection, benefits to the family unit and a sense of individual and cultural continuity. According to the Grand Conseil de la Nation Waban-Aki, women would be more affected by the effects on fish since it would be more difficult for them to rely on other species in practice sites that are more distant from the communities. Some First Nations also noted the unique cultural importance of particular species, such as the two sturgeon species for W8banakiak or sturgeon and American shad for the Mohawks of Kahnawà:ke.

Hunting and Trapping

As shown in figure 15, and according to the information available to the Agency, the right to hunt migratory birds could be affected, to a lesser extent than the right to fish, in two ways: by the effects on the resource due to the potential disturbance of the birds and by the effects on the experience on the territory due to the disturbance of hunters, particularly during the construction phase (Resource and Access impact pathways - arrows and boxes in blue and orange in figure 15).

Information on First Nations' uses and the practice of hunting and trapping, particularly migratory bird hunting, can be found in chapter 5.9.

According to the proponent, members of the Huron-Wendat Nation hunt migratory birds in and near the extended study area. The complementary study conducted by the Huron-Wendat Nation in 2016 identifies five migratory bird hunting sites used by its members in the vicinity of the Project, including one located in Baie de Beauport. Members hunt snow geese, Canada geese and various species of ducks.

The Wolastoqiyik (Maliseet) Wahsipekuk First Nation did not share any information regarding the practice of migratory bird hunting with the proponent. However, the First Nation has indicated to the Agency⁸² that it is in the process of documenting the uses of its members and has indicated a use of the extended study area by its members, since many members live in and use this area and its historical use by the Maliseet is documented.

The W8banaki Nation, the Essipit, Pessamit and Pekuakamiulnuatsh Innu First Nations, and the Kahnawà:ke First Nation did not share any concerns, either with the proponent or the Agency, regarding hunting and the potential effects of the Project on this practice. However, the Essipit Innu First Nation mentioned to the Agency that the documentation of its members' activities in the southwestern part (*Innu-aitun Follow-up*) had not been completed and that information on potential uses, particularly migratory bird hunting in the extended study area and nearby, could emerge.

Other Uses: Navigation and Recreational Activities

According to the Huron-Wendat Nation's 2016 supplementary study, other documented uses in the expanded study area fall under the general category of recreational activities (Englobe, 2018b). According to this survey, some members regularly engage in small and motorized boating on the St. Lawrence River,

⁸² Meeting between the Agency and the Wolastoqiyik Wahsipekuk First Nation on Rights Impact Assessment (September 23, 2020)

including Baie de Beauport. Recreational and family activities in the Baie de Beauport were also reported by several people living in Wendake.

According to the proponent and following consultations with the Ndakina Office, although members of the W8banaki Nation do not make specific use of the expanded study area for activities such as fishing or hunting, some members of the Nation navigate in the expanded study area for recreational purposes and as a traditional activity (Englobe, 2018b).

The Essipit, Pessamit and Pekuakamiulnuatsh Innu First Nations did not mention, either to the proponent or to the Agency, the practice of other uses such as navigation in the extended study area or in its vicinity. The same applies to the Wolastoqiyik Wahsipekuk First Nation. However, as previously mentioned, the documentation of the use of the expanded study area by these First Nations has not been completed.

According to the proponent, no traditional, recreational or commercial activities would be carried out by members of the Kahnawà:ke, Kanesatake and Akwesasne Mohawk First Nations in the expanded study area and these First Nations have not mentioned this in their dealings with the Agency.

First Nations' concerns related to recreational uses and navigation in particular, within and outside the expanded study area are mainly related to marine traffic and the increase of marine traffic (Access Impact Pathway - blue arrows and boxes in figure 15). Several First Nations mentioned the lack of certainty regarding the increase in marine traffic generated by the Project and the possible changes to the Project's vessel carrying capacity in the future. The Innu First Nations, for their part, mentioned the potential impacts of the increase in marine traffic due to the Project, downstream of the expanded study area, particularly on beluga whales and on their commercial fishing activities (see chapter 5.8).

Culture and Language

First Nations who participated in the environmental assessment mentioned the direct link between the exercise of rights and the practice of their culture and way of life and shared their concerns regarding the direct and cumulative effects of the Project on them. The intergenerational transfer of knowledge was particularly cited by First Nations as being dependent on the members' capacity to perform their practices under adequate conditions. As shown in figure 15, any effect of the project on resource, access and experience are likely to result in impacts on indigenous language and culture. For Mohawks, food and harvesting practices are at the core of cultural continuity, linking past, present and future. The revitalization of language, cultural practices and knowledge system depends on their connection to the land and water, and on their continued harvesting, processing and consumption of traditional foods such as fish. Harvesting fish allows families to spend time on the water and to connect with culturally and spiritually important places along the River. Teaching about environmental terminology, harvesting and processing techniques, and ways of relating to the environment go hand in hand with these activities.

Regional, Historical and Cumulative Context

The Grand Conseil de la Nation Waban-Aki, the First Nations of Kahnawà:ké, Wolastoqiyik Wahsipekuk, Huron-Wendat and Innu First Nations shared their concerns with the Agency and the proponent regarding the cumulative effects of the Project, particularly those related to the increase in marine traffic generated by the Project. In summary, these concerns are related to:

- effects on aquatic ecosystems, fish and fish habitat;
- the risk of introducing invasive species;

- limiting access to fishing grounds, which are valued sites for the intergenerational transfer Indigenous knowledge;
- increased risk of accidents and spills, putting at risk the safety and health of Indigenous communities;
- adverse impacts on crab, groundfish, green sea urchin and Atlantic salmon fishing activities, as well as clam harvesting and migratory bird hunting;
- adverse effects of marine transportation on beluga whales upstream from the study area.

The First Nations also raised the following issues related to the increase in marine traffic generated by the Project and, more generally, the cumulative effects of present and future port projects:

- Limited access to the river that restricts the ability of Indigenous peoples to practice their traditional, spiritual and recreational activities (fishing, swimming, community gathering, canoeing, etc.);
- Increased shoreline erosion and associated environmental impacts (e.g. increased water turbidity, loss of riparian areas, deterioration of boat launch ramps, etc.).

The cumulative effects of the project therefore generate concerns in terms of resources, access and experience, which are illustrated respectively by the orange, blue and green boxes and arrows in figure 15.

The Huron-Wendat Nation, the Grand Conseil de la Nation Waban-Aki and the Mohawk Council of Kahnawà:ke explained their understanding of the cumulative effects resulting from the Crown's approval of the Project in the event that the Crown would also approve the realization of other port projects currently under study, including those proposed by the Montréal Port Authority (MPA) in Contrecoeur and the Trois-Rivières Port Authority (TRPA) in Trois-Rivières. Considering the various port projects currently under study, the Grand Conseil de la Nation Waban-Aki and the Mohawk Council of Kahnawà:ke believe that a comprehensive study of the St. Lawrence River is necessary.

The three Innu Nations, for their part, raised the same concerns regarding cumulative effect by evoking the projects mentioned above as well as projects in the Saguenay region.

Territory Governance

First Nations, including the Huron-Wendat Nation and the Kahnawà:ké First Nation reminded the proponent and the Agency of their stewardship and responsibility for the land. The Kahnawà:ke First Nation indicated (MCK, 2019) that the Project could directly affect their governance, fishing and general stewardship rights and that the threshold for their ability to exercise their rights has been crossed with the construction of the Seaway and the expansion of marine transportation since the 1950s.

The Huron-Wendat Nation was in favour of the Project, but stressed the importance that the effects of the Project on the environment and resources must be accurately assessed.

As shown in figure 15, the concerns expressed by First Nations in relation to the direct impacts of the project on their governance are mainly related to the effects of the project on the resource. Regarding the cumulative effects of the project related to the increase in navigation, they also generate concerns related to resource governance (orange boxes and arrows - figure 15).

Agency analysis on rights impact pathways

As described in section 5.9, the Agency is of the opinion that the Project would cause significant adverse residual environmental effects on the current use of lands and resources for traditional purposes and more specifically on the fishing activities practiced by the Huron-Wendat Nation, the W8banaki Nation, the Essipit, Pekuakamiulnuatsh and Pessamit Innu First Nations, Kahnawà:ke First Nation, and the Wolastoqiyik (Maliseet) Wahsipekuk (Maliseet) First Nation. Concerning the Kanesatake and Akwesasne Mohwaks First Nations, as previously mentioned, it was not possible to obtain information concerning their uses and the exercise of their rights. However, it is reasonable to believe that these two First Nations fish migratory species and that, consequently, the repercussions on fishing rights would be the same for these two communities as for the Kahnawà:ke First Nation. Considering that the Project could have effects on the populations of several fish populations already at risk (see section 5.4) and of interest to these First Nations, the Agency considers that the fishing rights of these First Nations could be compromised by the Project. The Fishing right could also be modified by the removal or modification of access to certain practice sites for the Huron-Wendat Nation.

- The Agency is of the opinion that the loss and modification of habitats caused by Project encroachment and dredging on migratory species such as striped bass, lake sturgeon, Atlantic sturgeon and American shad could compromise the First Nations right to fish for these resources. The effects of the Project could also have repercussions on cultural practices and the overall experience surrounding the exercise of fishing rights, such as community sharing or the intergenerational transfer of knowledge. Chapter 5.9 describes the potential impacts on the uses of each First Nation according to the species they value more particularly;
- Because of the cumulative effects on the fish species mentioned above, the Project is also likely to have cumulative effects on the right to fish;
- The presence of the construction site and noise during the construction phase could have an impact on the access and experience in the practice sites and the practice of fishing and hunting rights for migratory birds by members of the Huron-Wendat Nation and fishing for certain members of the Essipit First Nation. Navigation, recreational and family activities practised near the work site by the Huron-Wendat Nation and the W8banaki Nation would be disturbed by noise and construction activities (Englobe, 2020f);
- With respect to access to the territory, the proponent indicates that public access to the river located on the territory of the Quebec Port Authority would remain open during the construction and operational phase. The Agency is of the opinion that the effects on access to First Nations practice sites, both within and outside the expanded study area, during the construction and operational phase of the Project, would be limited;
- The increase in marine traffic generated by the Project could cause additional disruption for members of the Huron-Wendat, Essipit, Pekuakamiulnuatsh, Pessamit, Wolastoqiyik (Maliseet) Wahsipekuk First Nations and members of the W8banaki Nation frequenting and navigating in the expanded study area or downstream from it. However, according to the Agency, since the vessels would use the same waterways as at present, it is likely that the increase in traffic, with an annual variation of 52 to 156 vessels, would be hardly noticeable in an environment where the average annual vessel movement is 5,000 to 6,000 (Englobe, 2020f). Concerning the Mohawks and W8banaki First Nations located upstream of the Project, the information shared by the proponent is to the effect that no increase in maritime traffic would be generated between Québec City and Montréal. The Agency is

therefore of the opinion that the recreational and navigational activities practiced by the members of these First Nations would not be affected by the Project, either in terms of access or experience.

7.3 Proposed Mitigation and Accommodation Measures

Certain mitigation and accommodation measures proposed by the Agency in the environmental assessment report would mitigate the effects of the Project that may affect rights and the practice of traditional activities. These measures relate to fish and fish habitat (section 5.4), migratory birds (section 5.5), the current use of land and resources for traditional purposes (section 5.9) and accidents and malfunctions (section 6.1). However, these measures would not prevent high severity impacts on the right to fish related to significant effects on fish and fish habitat. Should the project be allowed to proceed, the government will consult with First Nations to determine what additional mitigation or accommodation measures would be required to mitigate the impact on rights.

7.4 Other Measures

With respect to cumulative effects, the Agency highlights the existence of Transport Canada's initiative to assess the cumulative effects of marine transportation, developed under the Oceans Protection Plan (OPP) and the St. Lawrence Action Plan. Several First Nations concerned by the Project are participating in this initiative. The Agency recognizes that this study only partially addresses the concerns raised by the First Nations in relation to the cumulative effects of the port projects currently under study. Nevertheless, it is of the opinion that this initiative could provide answers to the shared issues and that its results could be used in future impact assessments, particularly in terms of improving the assessment of the cumulative effects of marine transportation.

On July 2020, the Mohawk Council of Kahnawà:ke filed a request⁸³ for a Regional Assessment of the St. Lawrence River Area under subsection 97(1) of the Impact Assessment Act. The Grand Conseil de la Nation Waban-Aki and the Council of the Huron-Wendat Nation supported this request. After careful consideration, the Minister of the Environment (the Minister) has determined that such a regional assessment has potential benefits at various levels. In order to deepen the analysis and to help define the nature, scope, objectives and results of such an assessment, the Agency will, in the coming months, launch an engagement process with federal and provincial authorities, the Mohawk Council of Kahnawà:ke, other interested First Nations, and other non-governmental organizations. The results of this process, which will be provided the Minister no later than the spring of 2021, will enable him to make a final decision on the conduct of a Regional Assessment.

⁸³ <https://www.ceaa.gc.ca/050/evaluations/proj/80913?&culture=en-CA>

7.5 Issues to be Addressed in the Regulatory Approvals Phase

The regulatory approvals phase, during which federal authorizations or permits are considered, would take place after the completion of the environmental assessment. In the event that the Project is authorized under CEAA 2012, Fisheries and Oceans Canada would continue to consult with Indigenous communities in the pursuit of regulatory processes under the *Fisheries Act* and the *Species at Risk Act*. The Agency forwarded comments it received from Indigenous communities during the environmental assessment to Fisheries and Oceans Canada so that the department could consider them before making its decisions under the Acts it administers. Where appropriate, Fisheries and Oceans Canada's decisions will take into account the results of ongoing consultations with Indigenous communities as well as the record of consultations resulting from the environmental assessment.

7.6 Agency's Conclusion on Impacts on Aboriginal Rights

The Agency concludes that the Project is likely to have a high impact on the Aboriginal and treaty rights of the Huron-Wendat Nation, the W8banaki Nation and the Kahnawà:ke, Kanesatake, Akwesasne Mohawks First Nations, Essipit Innu First Nation, Pekuakamiulnuatsh (Mashteuatiash) First Nation, Pessamit Innu First Nation and Wolastoqiyik (Maliseet) Wahsipekuk First Nation.

The Project's effects on fish and fish habitat, particularly on striped bass, lake sturgeon, Atlantic sturgeon and American shad, could reduce the numbers of these populations that are prized, valued and fished by First Nations and, consequently, have repercussions on the exercise of fishing rights as well as on the activities and customs surrounding this right. The impacts of the project on the right to fish could interfere with or prevent the transfer of knowledge, culture and language related to this practice or the affected fish species. The project could also lead to a loss of confidence in the quality of traditional resources. The Agency has identified the main mitigation measures likely to reduce the potential effects of the Project on the Aboriginal right to fish. However, these measures would not sufficiently mitigate the potential effects of the Project to consider the severity of the impact on rights as not significant.

The Agency also recognizes the potential changes in the exercise of the Huron-Wendat Nation's right to hunt migratory birds.

The Agency is of the opinion that the Project is part of a history of anthropogenic development in the region where the seriousness of the repercussions on the rights of First Nations in relation to cumulative effects is high and that, as a result, the exercise of their rights, including their capacity for land stewardship, is diminished.

Based on the analysis of the environmental effects of the Project on Indigenous communities, including the analysis of cumulative effects on current traditional uses (section 6.3), the related mitigation measures described in sections 5.4, 5.5, 5.9 and 6.1, the potential impacts and the key mitigation, monitoring and follow-up measures described in the appendix C, the Agency concludes that the severity of the impacts would be high for the following reasons:

- The likelihood of impacts on rights, particularly the right to fish, would be high since the impacts would alter the conditions of traditional practices in a way that would result in changes that would compromise current Indigenous use;
- The Project would result in long-term regional effects since the effects would be felt by several Indigenous communities that fish along the St. Lawrence River from Montréal to the estuary. The Project would affect migratory fish species that travel great distances. The decline in numbers would be caused by the loss of habitat that is necessary and important to the fish cycle;
- Adverse effects would be continuous because they would be felt throughout the operational phase of the Project and irreversible since the changes in uses could not return to an initial state considering that the affected fish stocks are already in a precarious state;
- The level of impact on the cultural well-being of some First Nations would be high as it would result in a loss of availability of culturally significant species, namely sturgeon for the Wabanaki Nation and Sturgeon and American shad for the Kahnawà:ke First Nation;
- Cumulative effects on First Nations' rights would be high since the Project would have adverse residual effects on lake sturgeon, Atlantic sturgeon, striped bass and American shad, which are culturally significant species that are also found to be species at risk. The Agency also takes into account the many historical, ongoing and projected projects in the region and the existing level of disturbance;
- In terms of governance impacts, the effects of the Project could vary from one First Nation to another. Potential changes, perceived by members, regarding the quality and quantity of resources would affect the relationship to species and more generally the governance of resources by First Nations in a context where many of them have already put in place quotas for the harvesting of targeted species, participate to the recovery of these species or feel that the thresholds allowing them to exercise their rights have already been exceeded. The Mohawk Council of Kahnawà:ke has indicated to the Agency that the implementation of the Project would not be consistent with the application of its traditional laws and that no mitigation or adaptation measures could compensate for the impacts. The Mohawk Council of Kahnawà:ke raised the point that in the context of the cumulative effects of several port projects, the exercise of its rights and its culture would be seriously threatened. The Huron-Wendat Nation, for its part, expressed its support for the Project and the Agency notes that the level of cooperation between the proponent and Huron-Wendat Nation is high.

The Agency is aware that the consultation is not complete and that further information on the possible residual effects of the Project on Aboriginal and treaty rights may be forthcoming. Comments from Indigenous communities on the draft environmental assessment report and potential conditions will be considered and will assist the Agency in finalizing its conclusions regarding the potential effects of the Project on Aboriginal and treaty rights.

7.7 Perspectives on Rights Impact Assessment

Several First Nations have expressed to the Agency and the proponent their concerns regarding the proper assessment of the Project's impacts on their Aboriginal and treaty rights. The Grand Conseil de la Nation Waban-Aki thus raised its inability to proceed exhaustively with the application of the methodology proposed by the Agency.

Moreover, according to the representatives of the Essipit Innu First Nation, the assessment of the impacts of a Project on rights and interests requires an assessment of the cumulative impacts of past development on the ancestral territory, which is lacking in current assessments.

For its part, the Mohawk Council of Kahnawà:ke has mentioned to the Agency several times that the absence of a regional study of the St. Lawrence River did not allow it to conduct an adequate analysis of the impacts of the Project on their rights.

The new rights impact assessment methodology developed under the *Impact Assessment Act* and applied in the context of this environmental assessment under CEAA 2012 will, according to the Agency, contribute to improving the analysis of impacts on Aboriginal and treaty rights in collaboration with First Nations. The Agency wishes to reiterate its willingness to strengthen its collaboration with Indigenous peoples in the continuous improvement of its processes and its determination to contribute to the Government of Canada's commitments regarding the recognition, protection and respect of the rights of Indigenous peoples.

Concerning the request for a Regional Assessment of the St. Lawrence River Area filed in July 2020 by the Mohawk Council of Kahnawà:ke, as mentioned above, the Agency will initiate an engagement process with First Nations and other interested parties over the coming months. This process aims to conduct a more in-depth analysis of the file and to define the nature, scope, objectives and results of an eventual Regional Assessment. The results of the discussions will be provided to the Minister of the Environment in the spring of 2021 so that a final decision on the conduct of a Regional Assessment will be made.

8 Other considerations

The scope of the project's environmental assessment under the CEAA 2012 is limited to the activities that take place on land owned and controlled by the proponent. However, during the environmental assessment process, the public, First Nations and experts from federal and provincial governments raised concerns regarding activities associated with the project that would take place off-port property. This section summarizes concerns to be considered in the Minister's decision.

Concerns relate to the effects of off-site road and rail transportation on air quality and human health in relation to contaminant emissions, noise disturbance, and the potential for accidents and malfunctions.

8.1 Effects of Road and Rail Transportation on Air Quality

The Port of Quebec's activities have been the subject of sustained attention by citizens of the borough of La Cité-Limoilou over the past few years regarding air quality. As part of the environmental assessment, the proponent modelled the effects on air quality of road and rail transportation in the borough of La Cité-Limoilou (section 5.1). The results show that emissions from these activities would essentially consist of gaseous contaminants from equipment and engines, including land and rail transport, and fugitive dust emissions from paved and unpaved roads. The sources of effects would come, among others, from road transport within the borough of La Cité-Limoilou and from rail transport outside the site and in the Beauport marshalling yard.

8.2 Effects of the increase in road traffic and train length on the population of the borough of La Cité-Limoilou and the greater Québec City area, including Lévis

Level Crossings

The public has raised concerns about the effects of train length on waiting time at crossings. Transport Canada noted that although the proponent's study identifies three crossings, a total of 13 level crossings on the Bridge Subdivision and two on the Drummondville Subdivision are likely to experience increased use. The impacts would mainly be related to nuisances due to the prolonged activation of warning systems and the occupation of crossings by trains. As for the multifunctional track in Limoilou, a significant impact is anticipated due to prolonged occupation by trains, which could block access to the track and affect emergency services, among other things. There would be a significant impact if the level crossing remains in its current condition due to prolonged occupation by long trains entering or leaving Beauport Bay. Among other things, this situation could affect emergency services because of the prolonged blockage. On the regulatory side, the warning systems would not have to be modified for the additional trains since they

already meet the required basic criteria. Once on Canadian National's major tracks (Montmagny Subdivision, Drummondville (after mile 8.6), Saint-Hyacinthe, Montréal and Kingston), the additional trains would have no impact. The volume of rail traffic varies regularly on these subdivisions, with no impact on safety.

Security

In terms of safety, the public indicates that the risk of collisions with cyclists or pedestrians must be taken into account since several accidents have occurred along the trucking routes proposed by the proponent. Pedestrians and cyclists are present at intersections and their safety may be put at risk by an increased number of heavy vehicles, with vehicle weight and longer braking distances increasing the risk and severity of collisions. The public is also concerned about the safety of young people attending schools located near transportation activities. For example, the Saint-Paul-Apôtre Elementary School playground is directly adjacent to the Canadian National right-of-way. Other schools, such as Jean-de-Brebeuf, are also in this situation, as are Limoilou CEGEP and several Early Childhood Centres. Furthermore, since the Lac-Mégantic rail disaster, there is a public perception of an increased risk of accidents and malfunctions, particularly related to rail transportation.

Disturbance

The public is concerned about the proposed traffic route as they pass through residential and highly sensitive areas. Some are concerned about the possibility of a deterioration in noise levels related to road activities, which could lead to sleep disturbances and a reduced sense of well-being. In addition, the increase in trucking on the roads could amplify the congestion problems already observed in the sector and contribute to nuisances in the living environments located near the roads used. With regard to rail transportation, the project's impact on noise levels and on the quality of life in residential areas was noted. The public also pointed out that the increase in train length and the number of crossings would create traffic congestion. An increase in waiting time at crossings would result in queues on the road network, while increased noise levels and vibrations could affect the nearby population, causing sleep disturbance and disruption.

9 Agency Conclusions and Recommendations

In preparing this report, the Agency took into consideration the proponent's environmental impact study, its responses to requests for information and the comments and opinions of the public, government agencies and First Nations.

The environmental effects of the project and their consequences have been determined using assessment methods and analytical tools that reflect accepted practices among environmental and socio-economic assessment practitioners, including consideration of accidents and malfunctions and cumulative environmental effects.

The Agency concludes that the project is likely to cause significant adverse environmental effects, as defined in CEAA 2012. The Agency is of the opinion that the project would cause significant direct and cumulative residual adverse environmental effects on:

- Fish and fish habitat;
- Air quality;
- Human health;
- The current use of land and resources for traditional purposes, more specifically related to fishing;
- Socio-economic conditions related to recreational and commercial fisheries.

Also, taking into account the implementation of mitigation measures, the Agency concludes that the project is not likely to cause significant adverse environmental effects on other components of the environment under federal jurisdiction.

The Agency has identified mitigation measures and follow-up programs for consideration by the Minister of the Environment and Climate Change to support his decision regarding the significance of any adverse environmental effects that may result from the project. If the Minister determines that the project is likely to cause significant adverse environmental effects, the Minister will refer to the Governor in Council the question of whether these effects are justified in the circumstances. If the Governor in Council determines that these effects are justified in the circumstances, the Minister of the Environment and Climate Change will set the conditions for carrying out the project in his decision statement under the CEAA 2012. The conditions set out by the Minister of the Environment and Climate Change would be legally binding on the proponent.

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Appendices



Appendix A Environmental Effects Rating Criteria

The Agency has developed the following assessment criteria for the analysis of the significance of environmental effects for the Laurentia Project environmental assessment. Appendix A presents the general definitions of the criteria, the definitions of levels for extent, duration, frequency and reversibility (table 1), the definitions of levels of magnitude for each of the valued components (table 2), and the grid for determining the significance of environmental effects (table 3).

General definitions of criteria used to assess residual effects on each of the valued components (VCs)

Magnitude: Indicates the level of disturbance (change) that the studied valued component (VC) would experience. The magnitude assessment takes into account the component's ecological context. The magnitude can incorporate the concept of the time when the effect would occur, which can refer to a phase of the component's life cycle (migration, reproduction, feeding, etc.) or a period during which a cultural, spiritual or recreational practice by a First Nation or population would occur (e.g., hunting season).

Extent: Geographical extent of the adverse effects.

Duration: Period of time during which the adverse effects will occur.

Frequency: Pace at which the adverse effects would occur in a given period.

Reversibility: Likelihood of a VC recovering from the adverse effects caused by the Project.

Significance: The significance of the adverse effects is determined by the combination of levels assigned to each of the criteria (magnitude, extent, duration, frequency and reversibility) for each component. A grid for determining the significance of the residual effects on the components is used for this purpose (table 3).

**Table 1: Definition of levels for each criteria⁸⁴**

| Assessment criteria | Definition of levels |
|---------------------|---|
| Extent | Site-specific: Effects limited to the Project site. Local: Effects extend beyond the Project site but are in the local study area. Regional: The effects extend beyond the local study area. |
| Duration | Short term or temporary: The effects will occur over a period of less than one or two years. Medium term: The effects would occur over a period of one or two to five years. Long term: The effects would occur over a period of more than five years. |
| Frequency | Once: Occurs once in any phase of the Project. Intermittent: Occurs occasionally or intermittently during one or more phases of the Project. Ongoing: Occurs continually during one or more phases of the Project. |
| Reversibility | Reversible: The VC will recover completely from the Project's effects (e.g., return to the baseline or another target). Partially reversible: The VC will partly recover from the Project's effects. Irreversible: The VC will not recover from the Project's effects. |

⁸⁴ These levels apply to all valued components.

Table 2: Definition of magnitude levels for each of the VCs

| Levels | Definition of levels for the magnitude criterion |
|--------------------|---|
| Air quality | |
| LOW | <p>Anticipated concentrations of contaminants of potential concern (CPC) and/or of particulate matter (PM) (baseline state and Project contribution) would remain far below Canadian Ambient Air Quality Standards (CAAQS) and/or any other national or provincial standards and/or other applicable air quality criteria or recommendations;</p> <p>AND</p> <p>The likelihood that these concentrations would have harmful effects on human health and/or on wildlife or wildlife habitat is low.</p> |
| MEDIUM | <p>Anticipated CPC and PM levels (baseline state and Project contribution) would be below the CAAQS and/or any other national or provincial standards and/or other applicable air quality criteria and/or recommendations;</p> <p>AND</p> <p>these concentrations could have harmful effects on human health and/or on wildlife and wildlife habitat.</p> |
| HIGH | <p>Anticipated CPC and/or particulate matter concentrations (baseline state and Project contribution) would exceed the CAAQS and/or other applicable national and/or provincial and/or other criteria and/or recommendations on air quality;</p> <p>AND/OR</p> <p>these concentrations could have harmful effects on human health and/or on wildlife and wildlife habitat.</p> |
| Wetlands | |
| LOW | <p>In the case of wetlands in “areas where wetland losses or functional values require that special measures be applied”⁸⁵ and/or in an area where wetlands have been designated as having ecological or socio-economic importance:⁸⁶</p> <p>The effects would not limit or reduce the ecological or socio-economic functions of wetlands.</p> <p>In the case of wetlands outside of such areas:</p> |

⁸⁵ Taken from: Environment Canada, 1996. Federal Policy on Wetland Conservation Implementation Guide for Federal Land Managers. 23 pages and appendices.

⁸⁶ Taken from: Environment Canada, 1991. Federal Policy on Wetland Conservation. 15 pages.



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| | <p>The effects would affect the wetlands and alterations or loss of ecological or socio-economic function are expected in wetlands of lesser ecological value.⁸⁷</p> |
| MEDIUM | <p>In the case of wetlands in “areas where wetland losses or functional values require that special measures be applied” and/or in an area where wetlands have been designated as having ecological or socio-economic importance:</p> <p>The effects would affect wetlands, BUT without causing any net loss of wetland ecological or socio-economic functions.</p> <p>In the case of wetlands outside of such areas:</p> <p>The effects would affect wetlands and alterations or loss of ecological and socio-economic functions are anticipated in wetlands of moderate ecological value.¹²</p> |
| HIGH | <p>In the case of wetlands in “areas where wetland losses or functional values require that special measures be applied” and/or in an area where wetlands have been designated as having ecological or socio-economic importance:</p> <p>The effects would cause a net loss of wetland ecological or socio-economic functions.</p> <p>In the case of wetlands outside of such areas:</p> <p>The effects would affect wetlands and alterations or loss of ecological or socio-economic function are anticipated in wetlands of high ecological value.</p> |
| Fish and fish habitat, including aquatic species and special-status species | |
| LOW | <p>The effects would cause little to no disruption to one or more sensitive phases in the life cycle of fish.</p> <p>In the case of special-status fish:⁸⁸</p> <p>The effects would not disrupt the sustainability and/or management and/or recovery of one or more of these species.</p> |

⁸⁷ Ecological value: This value must be determined through an analysis of such criteria as surface area, connectivity (natural environments, bodies of water), the diversity of natural communities found there, and disruptions affecting these environments. It tends to illustrate the fragmentation of habitats and ecosystems. Reference: MDDEP (2008), Guide d’élaboration d’un plan de conservation des milieux humides.

⁸⁸ Species with federal or provincial special status or those subject to recommendations from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).


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| MEDIUM | <p>The effects would disrupt one or more sensitive phases of the life cycle of fish, BUT without harming the sustainability of the fish population.</p> <p>In the case of special-status fish:</p> <p>Effects on these species are anticipated, BUT measures (offsetting or protective) could be taken to avoid disrupting the sustainability <u>and/or</u> management <u>and/or</u> recovery of one or more of these species.</p> |
| HIGH | <p>The effects would disrupt the sustainability of the fish population.</p> <p>In the case of special-status fish:</p> <p>Effects on these species are anticipated AND no measures (offsetting or protective) could be taken to reduce the effects.</p> |
| Birds and bird habitat, including special-status species | |
| LOW | <p>The effects would cause little to no disruption to one or more sensitive phases in the life cycle of birds.</p> <p>In the case of special-status birds:</p> <p>The effects would not disrupt the sustainability <u>and/or</u> management <u>and/or</u> recovery of one or more of these species.</p> |
| MEDIUM | <p>The effects would disrupt one or more sensitive phases of the life cycle of birds, BUT without harming the sustainability of the bird population.</p> <p>In the case of special-status fish:</p> <p>Effects on these species are anticipated, BUT measures (offsetting or protective) could be taken to avoid disrupting the sustainability <u>and/or</u> management <u>and/or</u> recovery of one or more of these species.</p> |
| HIGH | <p>The effects would disrupt the sustainability of the bird population.</p> <p>In the case of special-status birds:</p> <p>Effects on these species are anticipated AND no measures (offsetting or protective) could be taken to reduce the effects.</p> |
| Other special-status species | |
| LOW | <p>The effects would not disrupt the maintenance <u>and/or</u> management <u>and/or</u> recovery of one or more of these species.</p> |
| MEDIUM | <p>Effects on these species are anticipated, BUT measures (offsetting or protective) could be taken to avoid disrupting the sustainability <u>and/or</u> management <u>and/or</u> recovery of one or more of these species.</p> |

| | |
|------------------------------|--|
| HIGH | Effects on these species are anticipated AND no measures (offsetting or protective) could be taken to reduce the effects. |
| Risks to human health | |
| LOW | <p>The potential effects on physical health are related to exposure to contaminant levels that are well below the applicable standards and criteria for the protection of physical health.</p> <p>OR</p> <p>Contaminant management and mitigation measures would minimize residual effects on air, water, soil, food or quality of life (including for contaminants for which there are no thresholds).</p> <p>OR</p> <p>Potential effects on physical, psychological or social health are related to exposure to low levels of nuisance (noise, light, vibrations, odors, dust). The effects can be felt by a few individuals.</p> <p>In the case of psychological health :</p> <p>The perception of the risk to health or safety that could be caused by Project-related changes to the environment is manifested by a few individuals but is not a concern for many social groups.</p> |
| MEDIUM | <p>Potential physical health effects are related to exposure to contaminant levels that are below the applicable standards and criteria for the protection of physical health, BUT at moderate levels of nuisance (noise, light, vibration, odour, dust). The effects may be felt by certain social groups.</p> <p>AND</p> <p>Residual effects will persist on air, water, soil, food or quality of life despite contaminant management and mitigation measures (including for contaminants for which there are no thresholds).</p> <p>In the case of psychological health :</p> <p>Certain individuals and social groups who would be affected by the Project perceive a risk to their health or safety that could be caused by Project-related changes to the environment BUT mitigation or compensation measures could be put in place.</p> |
| HIGH | <p>Potential physical health effects are related to exposure to contaminant levels that are above applicable standards and criteria for the protection of physical health OR to high levels of nuisance (noise, light, vibration, odour, dust). The effects may be felt by several social groups or a significant portion of the affected population.</p> <p>AND</p> <p>Residual effects will persist on air, water, soil, food or quality of life despite contaminant management and mitigation measures (including for contaminants for which there are no thresholds).</p> <p>In the case of psychological health :</p> |



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| Socio-economic conditions⁸⁹ | |
| LOW | <p>The area is not commonly used for activities. The effects would cause few changes to behaviours required for carrying out activities and their economic impact.</p> |
| MEDIUM | <p>The effects would lead to changes in the behaviours required for carrying out activities BUT carrying out activities would not be compromised in the most commonly used areas.</p> |
| HIGH | <p>The effects would lead to noticeable changes in the behaviours required for carrying out activities in regularly used areas, such that the activity would be compromised or no longer possible.</p> |
| Natural or cultural heritage | |
| LOW | <p>The effects would slightly alter the characteristics of the unique nature of an element of the natural or cultural heritage and/or of a structure, site or thing of historical, archaeological, paleontological or architectural significance.</p> <p>AND/OR</p> <p>Access to or use of an element of the natural or cultural heritage and/or of a structure, site or thing of importance would not be altered for users.</p> <p>In the case of designated heritage elements:</p> <p>The effects would not disrupt the sustainability and/or management of designated heritage elements.</p> |
| MEDIUM | <p>The effects would alter some characteristics of the unique nature of an element of the natural or cultural heritage and/or of a structure, site or thing of historical, archaeological, paleontological or architectural significance, BUT would not compromise its integrity.</p> <p>AND/OR</p> <p>Access to or use of an element of the natural or cultural heritage and/or of a structure, site or thing would be altered BUT would not be compromised for users.</p> <p>In the case of designated heritage elements:</p> |

⁸⁹ Definition: all social and economic conditions required for the continuation of activities undertaken by the population affected by the environmental changes caused by the project (e.g., jobs, education, facilities, housing, infrastructure, community social services and physical community infrastructure, medical and social services, or recreational services and facilities).



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| | The sustainability or management of designated heritage elements would be altered BUT would not alter their designation. |
| HIGH | <p>The effects would lead to the loss of characteristics of the unique nature of an element of the natural or cultural heritage or of a structure, site or thing of historical, archaeological, paleontological or architectural significance, such that its integrity would be compromised.</p> <p>AND/OR</p> <p>The effect would prevent users from accessing or using an element of the natural or cultural heritage or a structure, site or thing of historical, archaeological, paleontological or architectural significance.</p> <p>In the case of designated heritage elements:</p> <p>The effects would interfere with the sustainability and/or management of designated heritage elements and could compromise their designation.</p> |
| Current use⁹⁰ of lands and resources for traditional purposes⁹¹ by Indigenous peoples | |
| LOW | <p>The effects would alter the conditions of traditional practices⁹² in a manner resulting in few changes to current use.</p> <p>AND/OR</p> <p>The effects involve few changes to behaviour, allowing current Indigenous use to continue, in preferred ways or locations.</p> |
| MEDIUM | <p>The effects would alter the conditions of traditional practices without compromising current use.</p> <p>AND/OR</p> <p>Some behaviours would be modified, but current Indigenous use would not be compromised.</p> |
| HIGH | <p>The effects would alter the conditions of traditional practices in a manner resulting in changes that would compromise current use.</p> <p>AND/OR</p> |

⁹⁰ In the context of an environmental assessment, “current use” refers to the manner in which land and resource use may be affected in the course of the life cycle of a proposed project. “Current use” includes active use by Indigenous peoples at the time of the environmental assessment and uses that are likely to occur in a reasonably foreseeable future provided that they have continuity with traditional practices, traditions or customs. Furthermore, uses that may have ceased due to external factors and should also be considered if they can reasonably be expected to resume once conditions change.

⁹¹ Traditional purposes typically relate to activities that are integral to a community’s way of life and culture and have continuity with historic practices, customs and traditions of the community.

⁹² A “practice” is a way of doing something that is common, habitual or expected, generally related to activities that are integral to a community’s way of life and culture and offer continuity with historic practices.

“Conditions of practice” are baseline conditions for the practice of activities. Examples of these are quantity or quality of available resources and access to the area.



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| | Current Indigenous use would no longer be possible in accordance with preferred ways or would be compromised in the only suitable, available or most preferred locations. |
|--|---|

Table 3: Decision Tree for Determining Overall Significance of a Residual Effect

| High Magnitude | | | | | | | | | | | | | | | | | |
|-------------------------|-------------|--------------|-----------------------------------|--------------------|--------------|-------------------------|-------------|--------------|-----------------------------------|--------------------|-----------------|-------------------------|------------|--------------|-----------------------------------|--------------------|--------------|
| Extent | Duration | Frequency | Reversibility/ Irreversibility | Level of Effect | Significance | Extent | Duration | Frequency | Reversibility/ Irreversibility | Level of Effect | Significance | Extent | Duration | Frequency | Reversibility/ Irreversibility | Level of Effect | Significance |
| Regional | Long term | Continuous | Irreversible | High | Significant | Local | Medium term | Continuous | Irreversible | High | Significant | Site-specific | Long term | Irreversible | High | Significant | |
| | | | Partially reversible | High | Significant | | | | Partially | High | Significant | | | Partially | High | Significant | |
| | | | Reversible | High | Significant | | | | Reversible | High | Significant | | | Reversible | High | Significant | |
| | | Intermittent | Irreversible | High | Significant | | | Intermittent | Irreversible | High | Significant | | | Irreversible | High | Significant | |
| | | | Partially | High | Significant | | | | Partially | High | Significant | | | Partially | High | Significant | |
| | | | Reversible | High | Significant | | | | Reversible | High | Significant | | | Reversible | High | Significant | |
| | | Once | Irreversible | High | Significant | | | Once | Irreversible | High | Significant | | | Irreversible | High | Significant | |
| | | | Partially | High | Significant | | | | Partially | High | Significant | | | Partially | High | Significant | |
| | | | Reversible | High | Significant | | | | Reversible | High | Significant | | | Reversible | High | Significant | |
| | Medium term | Continuous | Irreversible | High | Significant | | | Continuous | Irreversible | High | Significant | | | Irreversible | High | Significant | |
| | | | Partially | High | Significant | | | | Partially | High | Significant | | | Partially | High | Significant | |
| | | | Reversible | High | Significant | | | | Reversible | High | Significant | | | Reversible | High | Significant | |
| | | Intermittent | Irreversible | High | Significant | | | Intermittent | Irreversible | High | Significant | | | Irreversible | High | Significant | |
| | | | Partially | High | Significant | | | | Partially | High | Significant | | | Partially | High | Significant | |
| | | | Reversible | High | Significant | | | | Reversible | High | Significant | | | Reversible | Moderate | Not Significant | |
| | | Once | Irreversible | High | Significant | | | Once | Irreversible | High | Significant | | | Irreversible | High | Significant | |
| | | | Partially | High | Significant | | | | Partially | High | Significant | | | Partially | Moderate | Not Significant | |
| | | | Reversible | High | Significant | | | | Reversible | Moderate | Not Significant | | | Reversible | Moderate | Not Significant | |
| Short term or temporary | Continuous | Continuous | Irreversible | High | Significant | Short term or temporary | Continuous | Continuous | Irreversible | High | Significant | Short term or temporary | Continuous | Irreversible | High | Significant | |
| | | | Partially | High | Significant | | | | Partially | High | Significant | | | Partially | High | Significant | |
| | | | Reversible | High | Significant | | | | Reversible | High | Significant | | | Reversible | Moderate | Not Significant | |
| | | Intermittent | Irreversible | High | Significant | | | Intermittent | Irreversible | High | Significant | | | Irreversible | High | Significant | |
| | | | Partially | High | Significant | | | | Partially | High | Significant | | | Partially | Moderate | Not Significant | |
| | | | Reversible | High | Significant | | | | Reversible | Moderate | Not Significant | | | Reversible | Moderate | Not Significant | |
| | Once | Once | Irreversible | High | Significant | | | Once | Irreversible | High | Significant | | | Irreversible | Moderate | Not Significant | |
| | | | Partially | High | Significant | | | | Partially | Moderate | Not Significant | | | Partially | Moderate | Not Significant | |
| | | | Reversible | High | Significant | | | | Reversible | Moderate | Not Significant | | | Reversible | Moderate | Not Significant | |

*Only residual impacts with a "High" effect level demonstrate a significant effect within the meaning of the Canadian Environmental Assessment Act 2012.

| Medium Magnitude | | | | | | | | | | | | | | | | | |
|------------------|-------------------------|--------------|-------------------------------|-----------------|-----------------|--------|-------------------------|--------------|-------------------------------|-----------------|-----------------|---------------|-----------|-------------------------|-------------------------------|-----------------|-----------------|
| Extent | Duration | Frequency | Reversibility/Irreversibility | Level of Effect | Significance | Extent | Duration | Frequency | Reversibility/Irreversibility | Level of Effect | Significance | Extent | Duration | Frequency | Reversibility/Irreversibility | Level of Effect | Significance |
| Regional | Long term | Continuous | Irreversible | High | Significant | Local | Long term | Continuous | Irreversible | Moderate | Not Significant | Site-specific | Long term | Continuous | Irreversible | Moderate | Not Significant |
| | | | Partially | High | Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant |
| | | Intermittent | Irreversible | High | Significant | | | Intermittent | Irreversible | Moderate | Not Significant | | | Long term | Irreversible | Moderate | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant |
| | | Once | Irreversible | Moderate | Not Significant | | | Once | Irreversible | Moderate | Not Significant | | | Long term | Irreversible | Moderate | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant |
| | Medium term | Continuous | Irreversible | High | Significant | | Medium term | Continuous | Irreversible | Moderate | Not Significant | | | Medium term | Irreversible | Moderate | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant |
| | | Intermittent | Irreversible | Moderate | Not Significant | | | Intermittent | Irreversible | Moderate | Not Significant | | | Medium term | Irreversible | Moderate | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant |
| | | Once | Irreversible | Moderate | Not Significant | | | Once | Irreversible | Moderate | Not Significant | | | Medium term | Irreversible | Moderate | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant | | | | Reversible | Low | Not Significant |
| | Short term or temporary | Continuous | Irreversible | Moderate | Not Significant | | Short term or temporary | Continuous | Irreversible | Moderate | Not Significant | | | Short term or temporary | Irreversible | Moderate | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant |
| | | Intermittent | Irreversible | Moderate | Not Significant | | | Intermittent | Irreversible | Moderate | Not Significant | | | Short term or temporary | Irreversible | Moderate | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Moderate | Not Significant | | | | Reversible | Low | Not Significant |
| | | Once | Irreversible | Moderate | Not Significant | | | Once | Irreversible | Moderate | Not Significant | | | Short term or temporary | Irreversible | Moderate | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Partially | Low | Not Significant |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant |

*Only residual impacts with a "High" effect level demonstrate a significant effect within the meaning of the Canadian Environmental Assessment Act 2012.

Low Magnitude

| Extent | Duration | Frequency | Reversibility/ Irreversibility | Level of Effect | Significance | Extent | Duration | Frequency | Reversibility/ Irreversibility | Level of Effect | Significance | Extent | Duration | Frequency | Reversibility/ Irreversibility | Level of Effect | Significance | |
|----------|-------------------------|--------------|-----------------------------------|--------------------|-----------------|--------|-----------|--------------|-----------------------------------|--------------------|-----------------|---------------|-----------|-------------------------|-----------------------------------|--------------------|-----------------|-----------------|
| Regional | Long term | Continuous | Irreversible | Moderate | Not Significant | Local | Long term | Continuous | Irreversible | Moderate | Not Significant | Site-specific | Long term | Continuous | Irreversible | Moderate | Not Significant | |
| | | | Partially | Moderate | Not Significant | | | | Partially | Moderate | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Moderate | Not Significant | | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | |
| | | Intermittent | Irreversible | Moderate | Not Significant | | | Intermittent | Irreversible | Moderate | Not Significant | | | Long term | Intermittent | Irreversible | Low | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Low | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | | | | Partially | Low | Not Significant | |
| | | Once | Irreversible | Moderate | Not Significant | | | Once | Irreversible | Low | Not Significant | | | | Reversible | Low | Not Significant | |
| | | | Partially | Low | Not Significant | | | | Partially | Low | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | | | | Partially | Low | Not Significant | |
| | Medium term | Continuous | Irreversible | Moderate | Not Significant | | | Continuous | Irreversible | Moderate | Not Significant | | | Medium term | Continuous | Irreversible | Low | Not Significant |
| | | | Partially | Moderate | Not Significant | | | | Partially | Low | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | | | | Partially | Low | Not Significant | |
| | | Intermittent | Irreversible | Moderate | Not Significant | | | Intermittent | Irreversible | Low | Not Significant | | | | Reversible | Low | Not Significant | |
| | | | Partially | Low | Not Significant | | | | Partially | Low | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | | | | Partially | Low | Not Significant | |
| | | Once | Irreversible | Low | Not Significant | | | Once | Irreversible | Low | Not Significant | | | | Reversible | Low | Not Significant | |
| | | | Partially | Low | Not Significant | | | | Partially | Low | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | | | | Partially | Low | Not Significant | |
| | Short term or temporary | Continuous | Irreversible | Moderate | Not Significant | | | Continuous | Irreversible | Low | Not Significant | | | Short term or temporary | Continuous | Irreversible | Low | Not Significant |
| | | | Partially | Low | Not Significant | | | | Partially | Low | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | | | | Partially | Low | Not Significant | |
| | | Intermittent | Irreversible | Low | Not Significant | | | Intermittent | Irreversible | Low | Not Significant | | | | Reversible | Low | Not Significant | |
| | | | Partially | Low | Not Significant | | | | Partially | Low | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | | | | Partially | Low | Not Significant | |
| | | Once | Irreversible | Low | Not Significant | | | Once | Irreversible | Low | Not Significant | | | | Reversible | Low | Not Significant | |
| | | | Partially | Low | Not Significant | | | | Partially | Low | Not Significant | | | | Irreversible | Low | Not Significant | |
| | | | Reversible | Low | Not Significant | | | | Reversible | Low | Not Significant | | | | Partially | Low | Not Significant | |

*Only residual impacts with a "High" effect level demonstrate a significant effect within the meaning of the Canadian Environmental Assessment Act 2012.



Appendix B Assessment of Residual Adverse Environmental Effects – Executive Summary

| Potential residual effects | Characterization of potential residual effects | Significance of Potential Residual Adverse Environmental Effects |
|--|---|---|
| Effects on air quality | | |
| <p>During construction: increase in the concentration of particulate matter (TPM, PM₁₀ and PM_{2.5}), nitrogen dioxide, formaldehyde and nickel in the atmosphere beyond the RAA or CAAQS standards.</p> <p>During operation: increase in the concentration of total particulate matter (TPM), fine particulate matter (PM_{2.5}), nitrogen dioxide, acetaldehyde and nickel above the RAA or CAAQS standards.</p> <p>Exceedances in all areas of interest and at sensitive receptor locations in the study area for fine particulate matter (PM_{2.5}) (construction and operation), the 2025 hourly CAAQS for nitrogen dioxide (NO₂) (construction and operation), and the RAA standard for nickel (construction).</p> <p>Slight infrequent exceedances (generally in the range of 0-2% of the time) in some areas of interest and at some sensitive receptor locations for the daily standards for particulate matter (PM_{2.5}, TPM and PM₁₀) and NO₂, and the 15-minute standard for formaldehyde.</p> <p>Slightly more frequent exceedances (up to 10% of the time) in the Baie de Beauport recreational zone.</p> | <p>Magnitude: High – The atmospheric contribution of the project would increase the concentrations of contaminants of potential concern to exceed the CAAQS⁹³ (2020-2025) or the criteria of the AAR⁹⁴ in an environment where exceedances already exist.</p> <p>Scope: Regional – Effects would extend beyond the local study area (airshed area)</p> <p>Duration: Long-term – Effects would last over the life of the project.</p> <p>Frequency: Continuous</p> <p>Reversibility: Irreversible</p> | <p>Important High residual effect level. The additional contribution of the project in an environment where air quality is already significantly affected, particularly with respect to total particulate matter, fine particulate matter, nitrogen dioxide, nickel and diesel particulate matter, is likely to result in a significant deterioration of air quality in the surrounding residential neighbourhoods and public areas.</p> |

⁹³ CAAQS: Canadian Ambient Air Quality Standards

⁹⁴ RAA: Regulation respecting the purification of the atmosphere of the Government of Quebec



| Potential residual effects | Characterization of potential residual effects | Significance of Potential Residual Adverse Environmental Effects |
|---|---|---|
| Transboundary effects (greenhouse gases) | | |
| Emissions of approximately 20,000 tons of CO ₂ equivalent per year. | Low contributions of the project's direct and indirect emissions to provincial or national emissions. Direct emissions below the threshold of the reporting programs of the governments of Canada and Quebec. | No Important Greenhouse gas emissions would not contribute significantly to provincial or national emissions. |
| Wetlands | | |
| No loss or disruption of wetland functions anticipated. | No loss or disruption of wetland functions. | No Important As the project would avoid all wetlands, a follow-up will be necessary to verify the accuracy of the environmental assessment. |
| Fish and fish habitat, including aquatic invertebrates and special status species ⁹⁵ | | |
| Destruction and Permanent Alteration of Fish and Aquatic Invertebrate Habitat : <ul style="list-style-type: none">• Permanent loss of 21.4 hectares of important and sensitive habitat for striped bass, lake sturgeon, Atlantic sturgeon and American shad.• Loss of striped bass breeding habitat, loss of feeding and movement habitat for both sturgeon species. Loss of rearing and breeding habitats for American shad.• Hydraulic changes significantly affecting certain fish habitat functions. | Intensity: High – The project would adversely affect the sustainability of the population of several fish species and no measures (avoidance, mitigation or offsetting) could be put in place to significantly mitigate the effects on these species. Extent: Regional – The most affected species are migratory populations, which have a regional geographic distribution and travel great distances. Duration: Long term – Many habitats would be permanently lost without the possibility of offsetting. Frequency: Continuous Reversibility: Irreversible | Important High residual effect level. The destruction and permanent modification of important habitats for several species of fish would have consequences on the sustainability of populations of species that are already fragile. The destruction of breeding habitat for striped bass, an endangered species according to the <i>Species at Risk Act</i> (Schedule 1), could not be offset and could hinder the recovery of the species. |

⁹⁵ Species of special status include species listed under federal and provincial legislation. Effects on species at risk are assessed under section 79 of the *Species at Risk Act* and include species for which the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommends that their status be changed or added to the list of species at risk.



| Potential residual effects | Characterization of potential residual effects | Significance of Potential Residual Adverse Environmental Effects |
|--|---|---|
| Changes in water quality related to dredging and sediment management : <ul style="list-style-type: none">Activities during the construction and operational phase could adversely affect water quality and fish habitat by adding suspended solids and contaminants.Sound and light during the night could be harmful to fish.Mitigation measures would be sufficient to ensure that fish are not harmed. | | |
| Birds and their habitat, including special status species1 | | |
| Habitat loss and disturbance : <ul style="list-style-type: none">Permanent loss of 7.5 hectares of terrestrial bird habitat and 13.7 hectares of aquatic encroachment.Loss of habitat used during spring and fall migration for several species of waterfowl, including shorebirds. The shorebird offsetting plan would reduce the effects during migration. | Intensity: Low – Effects would have little effect on one or more important phases of the birds' life cycle. Scope: Local – Effects would extend beyond the project site but would be within the local study area. Duration: Long term – Habitat losses would be permanent. Frequency: Continuous Reversibility: Irreversible | No Important Moderate level of residual effect. The project is not likely to cause significant adverse effects on terrestrial and aquatic bird species, provided that all key mitigation measures are implemented. |
| Disturbance by noise, traffic and night lighting : <ul style="list-style-type: none">Low disturbance by noise and traffic. | | |
| Mortality risks in case of collision with structures : <ul style="list-style-type: none">Low risk of bird mortality in case of collision with structures. | | |
| Species at Risk Act : <ul style="list-style-type: none">The construction and maintenance of artificial bank swallow nesting boxes would | | |



| Potential residual effects | Characterization of potential residual effects | Significance of Potential Residual Adverse Environmental Effects |
|--|--|---|
| <ul style="list-style-type: none">allow the species to breed and continue to use this habitat;• Unlikely to have harmful effects on barn swallows, common Nighthawk, chimney sweeps and peregrine falcons. | | |
| Other special status species (other than fish or birds) | | |
| An industrialized environment that supports mostly marginal, disturbed and small area habitats. The inventories carried out on certain species with special status have not detected their presence. Species at Risk Act : <ul style="list-style-type: none">• Unlikely to have harmful effects on Victorin's water-hemlock, Victorin's gentian, map turtle, snapping turtle and monarch. | Intensity: Low – Effects would not adversely affect the sustainability, management, or recovery of one or more of these species. Scope: Site-specific – Effects would occur at the project site. Duration: Long-term – Effects would occur throughout the life of the project. Frequency: Continuous Reversibility: Partially reversible | No Important Low level of residual effect. The project is not likely to have significant adverse effects on special status species (other than fish or birds). |
| Human health (physical and psychological) | | |
| Existing exceedances observed in the receiving environment for certain contaminants, including particulate matter, NO ² and nickel. Project located near a residential sector and a vulnerable population with social inequalities in health. Potential health risks, including those related to air quality and more specifically the additional cancer risk generated by the project for particulate matter from diesel engines. Uncertainties inherent in air contaminant dispersion modeling and human health risk assessment. | Intensity: High – exceedances of concentrations of contaminants of potential concern could result in potential human health effects on vulnerable populations in the area. Scope: Local – Risks to human health would extend beyond the site area (airshed area). Duration: Long-term – Effects would occur throughout the life of the project. Frequency: Continuous Reversibility: Partially reversible to irreversible, depending on the type of risk. | Important Strong residual effect level. The project would contribute to the degradation of air quality in a living environment where several environmental and socio-economic risk factors for health are already present and known. |



| Potential residual effects | Characterization of potential residual effects | Significance of Potential Residual Adverse Environmental Effects |
|--|--|--|
| Project-generated emissions of contaminants of potential concern or particulate matter that would approach or exceed the NAAQS or MELCCAR criteria ⁹⁶ . | | |
| Socio-economic conditions | | |
| Recreational and tourist activities and access to the St. Lawrence River : <ul style="list-style-type: none">• Loss of area of the Baie de Beauport recreational and tourist use zone;• Practice of recreational tourism activities would not be compromised. Recreational and commercial fishing : <ul style="list-style-type: none">• Change in recreational and commercial fishing practices due to the potential effects on fish and fish habitat, the impossibility of offsetting some habitats (striped bass) and the great difficulty of offsetting others (lake sturgeon and Atlantic sturgeon);• Socio-economic importance of fish and fish habitat, including investments from governments (reintroduction, recovery and monitoring programs). Intensification of maritime traffic : <ul style="list-style-type: none">• Addition of approximately 156 vessels. | Intensity: High – The effects would result in significant changes in the behaviours related to recreational and commercial fishing in areas that are regularly fished, in such way that they are compromised. Scope: Regional – The most affected species are migratory populations. Duration: Long term – Many habitats would be permanently lost and no measures could be put in place to significantly reduce these effects. Frequency: Continuous Reversibility: Irreversible | Important Strong residual effect level. Negative effects and uncertainties affecting fish and fish habitat could have significant effects on recreational and commercial fishing. |
| Indigenous Peoples - Current Uses of Lands and Resources for Traditional Purposes | | |
| Fishing and hunting activities : | Intensity: High – The project would change the conditions of traditional practices in a way that compromise the | Important |

⁹⁶ MELCC: Ministry of the Environment and the Fight against Climate Change.



| Potential residual effects | Characterization of potential residual effects | Significance of Potential Residual Adverse Environmental Effects |
|--|--|--|
| <ul style="list-style-type: none">• Fishing activities could be jeopardized due to potential effects on several prized fish populations already at risk:<ul style="list-style-type: none">○ The Huron-Wendat Nation: the activities and customs surrounding the striped bass, lake sturgeon and Atlantic sturgeon fishery;○ The W8banaki Nation: activities and customs surrounding the lake and Atlantic sturgeon fishery and future striped bass fishing opportunities;○ The First Nations of Essipit, Pessamit and Pekuakamiulnuatsh, more specifically the Essipit Innu: activities and customs surrounding Atlantic sturgeon fishing and future striped bass fishing opportunities;○ The Wolastoqiyik (Maliseet) Wahsipekuk Nation: activities and customs surrounding the Atlantic sturgeon fishery;○ Mohawk First Nations, including Kahnawà:ke First Nation: activities and customs surrounding the lake sturgeon and American shad fishery. <p>Changes in access and land use :</p> <ul style="list-style-type: none">• Disruption of activities by disturbance, noise and increased vessel traffic. | <p>striped bass, lake sturgeon, Atlantic sturgeon and American shad fisheries.</p> <p>Scope: Regional – The effects would be felt by several Indigenous communities fishing migratory species along the St. Lawrence River.</p> <p>Duration: Long term – Fishing practice would be affected by the decrease in affected fish populations.</p> <p>Frequency: Continuous – Effects would occur throughout the operational phase.</p> <p>Reversibility: Irreversible – It is unlikely that current use can return to an initial state considering that the affected fish stocks are already precarious.</p> | <p>High residual effect level.</p> <p>The project's effects on fish and fish habitat could reduce the fish stocks prized and fished by First Nations. Potential impacts on the practice of fishing activities as well as on the activities and customs surrounding this practice are expected.</p> |
| Natural or cultural heritage and effects on sites, structures or locations of historical, archaeological, paleontological or architectural significance | | |



| Potential residual effects | Characterization of potential residual effects | Significance of Potential Residual Adverse Environmental Effects |
|--|---|--|
| <p>Landscape :</p> <ul style="list-style-type: none">• Sector characterized by port and industrial infrastructures, with a capacity to absorb new infrastructures;• The visual influence of the infrastructure would generally be low. <p>First Nations Historical and Cultural Heritage :</p> <ul style="list-style-type: none">• Construction and operation activities would not threaten the integrity of First Nations heritage and cultural sites. <p>Terrestrial and underwater archaeology :</p> <ul style="list-style-type: none">• The application of a contingency plan for underwater archaeological resources would be required. | <p>Intensity: Medium – The effects would result in the modification of certain landscape features without compromising the integrity of the natural and cultural heritage, or something of archaeological significance, and would not interfere with the maintenance or management of heritage features.</p> <p>Scope: Local – Effects would occur in the local study area.</p> <p>Duration: Long-term – The effects would be permanent.</p> <p>Frequency: Continuous</p> <p>Reversibility: Irreversible</p> | <p>Not important</p> <p>Moderate level of residual effect.</p> <p>The project is not likely to cause significant adverse residual environmental effects, taking into account the implementation of key mitigation measures.</p> |

Appendix C Mitigation Measures, Monitoring and Follow-Up Considered by the Agency

| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
|------------------|--|
| Air Quality | Mitigation Measures <p><u>Construction phase</u></p> <ul style="list-style-type: none"> • Use rail transportation (instead of trucking) to import the majority of fill material to the job site; • Reduce wind erosion and airborne particulate emissions: <ul style="list-style-type: none"> ◦ Clean work areas and traffic areas continuously during work hours and at the end of each day using a mechanical broom (broom, water jet and vacuum). Regularly clean and water the train backfill material unloading area and work areas near the rear platform during backfilling to prevent airborne particles from becoming airborne; ◦ Water dried soils as needed to minimize dust generation during stripping or grading, keeping the surface wet; ◦ Stabilize or quickly restore the work area to avoid wind erosion. When soils are excavated, continuously backfill exposed soils or cover them with impermeable covers as soon as the work is completed (daily) to limit wind erosion or rain leaching. Pay particular attention to wind erosion when preparing the site and when laying out the vegetated slope; ◦ Cover with tarpaulins any loads that may release particles into the air; ◦ Cover dykes, settling pond walls, piles of material (gravel and sand) and dredged sediments with waterproof tarps. Ensure that the impermeable covers are effective; ◦ Use a dust suppressant to reduce the emission of particles into the air. The attenuation rate to be achieved should be 80%. The proponent shall develop and implement a procedure to ensure that this mitigation rate is achieved. Take all necessary measures to ensure compliance with this procedure; ◦ Paving the entire site in the shortest possible time; ◦ Do not handle granular materials in high winds or when the wind is blowing towards sensitive receptors; otherwise use dust suppressors to minimize dust generation. The proponent must measure wind speed and, when the wind reaches 19 kilometres per hour or more, measures must be put in place to reduce wind erosion. The proponent must implement concrete measures to enforce these measures; ◦ Use water cannons to reduce the emission of particles into the air. An operating procedure should be developed to specify the activities and conditions that require their use, as well as their frequency and mode of operation. For example, if a water cannon is used during operations, frequently check that it is positioned correctly and that it optimally controls dust; |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none">○ Limit the height at which the material is unloaded and the distance over which it will fall freely to reduce the emission of particles into the air.● Immediately stop construction activities if conditions could result in dust and contaminant emissions to sensitive receptors (activities could then be moved to another area);● Install and regularly maintain dust collectors or devices to reduce particulate emissions in areas where operations may generate dust;● Optimize the logistics of equipment movement to control transportation in order to avoid unnecessary emissions and increase efficiency of use (develop an efficient road routing system on the worksite, schedule vehicle and equipment movements and work methods to minimize time and distances traveled);● Limit vehicle travel speeds to less than 15 kilometres per hour and put in place concrete measures to enforce these measures;● Operate switching locomotives that meet, as a minimum, the Tier 4 emissions standards as set out in the <i>Locomotive Emission Regulations</i>;● Prohibit engine idling and put in place concrete measures to enforce these measures;● Specific mitigation measures for the use of the concrete plant:<ul style="list-style-type: none">○ Install the concrete plant in an area where exposure to prevailing wind is minimal;○ Install and maintain dust collectors on a regular basis;○ Stored all granular materials with a particle size of less than 3 millimetres (bulk cement, bentonite and similar fine dry materials) required for the concrete plant in silos;○ Maintain a high moisture content of the aggregates to reduce particulate emissions to the air through wind erosion;○ Use all effective means to protect aggregate piles or other materials from wind to prevent wind erosion;○ Arrange piles (shape/geometry) to minimize the exposed surface area of aggregate stockpiles and reduce wind erosion. For example, use windproof fences/screens or platforms below ground level;○ Minimize the number of raw material transfer points and close them partially or completely;○ Maximize the height of fall of conveyors or hoppers. |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <p><u>Operation phase</u></p> <ul style="list-style-type: none">• Acquire port equipment equipped only with electric motors rather than hybrid (electric/diesel) motors corresponding to what was used for air emission modeling. This will include, but is not limited to, the following equipment: quay gantry cranes, rail cranes and cantilever rail cranes, if not hybrid (automated tractor trucks, automated horizontal transport vehicles, stacking cranes and empty container carts);• Keep traffic areas clean to minimize dust generation when trucks pass by.• Maintain driveways and running surfaces, and repair surfaces when required.• Use trucks that are in good working order and meet ECCC on-road and off-road emission standards.• Carry out a preliminary and regular inspection of the machinery to ensure its good condition and proper operation, particularly the exhaust and anti-pollution systems.• Limit the speed of vehicles to less than 15 km/h and put in place concrete measures to enforce these measures;• Operate switching locomotives that meet, as a minimum, the Tier 4 emissions standards as set out in the <i>Locomotive Emission Regulations</i>;• Prohibit engine idling and put in place concrete measures to enforce these measures.• Provide incentives for container trucking to use the Félix-Leclerc and Dufferin-Montmorency highways. Truckers should only use Henri-Bourassa Boulevard for local deliveries or when traffic on the above-mentioned highways is diverted.• Provide for the use of locomotives with automatic engine shutdown and restart to reduce contaminant emissions associated with idling on the project site.• Establish monitoring and communication practices to issue warnings to vessels discharging excessive amounts of smoke.• Install the necessary equipment for the electrical connection to the ships' berths as provided for in the design measures of the project.• Develop, prior to operation and in consultation with Environment and Climate Change Canada, and implement life cycle air emission reduction plan for various contaminants, including specific non-threshold contaminants associated with engine exhaust including diesel particulate matter, for the life of the project. This plan should specify reduction measures to be implemented and quantifiable targets. |

| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <p style="text-align: center;">Monitoring and Follow-up</p> <p><u>Construction phase</u></p> <ul style="list-style-type: none"> • Develop and implement a follow-up program in consultation with the relevant authorities, including: <ul style="list-style-type: none"> ◦ Develop the sampling specifications before the beginning of the work and send them to the Agency, Environment and Climate Change Canada and the Ministère de l'Environnement et de la lutte contre les Changements climatiques du Québec for review and recommendations ; ◦ Develop a structured methodological approach to determine whether the source responsible for particulate matter criteria exceedances is construction. Develop a contingency plan in the event that site sources exceed the applicable criteria. Submit relevant documents to the Agency, Environment and Climate Change Canada and the Ministère de l'Environnement et de la lutte contre les Changements climatiques du Québec the methodological approach and the contingency plan for review and recommendations; ◦ Install the new sampling stations required for monitoring before work begins and follow the recommendations of the MELCC's <i>Lignes directrices concernant les stations d'un réseau de surveillance de la qualité de l'air</i>⁹⁷ and the Ambient Air Monitoring Protocol by the CCME⁹⁸; ◦ The following substances should be monitored during the construction phase: fine particles (PM_{2.5}), inhalable particles (PM₁₀), total particles (TPM), formaldehyde, nitrogen dioxide and nickel; ◦ Compare the results of parameter monitoring to the most restrictive standards or criteria between the CAAQS and the RAA; ◦ Dust deposition during periods of maximum dust emission should also be monitored <p><u>Operation phase</u></p> <ul style="list-style-type: none"> • Develop and implement a detailed air quality monitoring program, including air quality sampling specifications (sampling methods and frequency and parameters to be analyzed): |

⁹⁷ http://www.ceaeq.gouv.qc.ca/accreditation/pala/DR12SCA09_lignes_di_stations.pdf

⁹⁸https://www.ccme.ca/files/Resources/air/pm_ozone/pm_oz_cws_monitoring_protocol_pn1456_e.pdf

| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none"> • Include air quality monitoring in the borough of La Cité-Limoilou in the project monitoring program. Submit the detailed follow-up program to the Agency, Environment and Climate Change Canada and the Ministère de l'Environnement et de la lutte contre les Changements climatiques du Québec for review and recommendations; • Compare the results of parameter monitoring to the most restrictive standards or criteria between the CAAQS and the RAA; • Determine the response mechanisms in the event of non-compliance with the criteria; • Track the following substances : Fine particles (PM_{2.5}), inhalable particles (PM¹⁰), total particulate matter (TPM), Acetaldehyde and nitrogen dioxide; • If air degradation is observed in the borough of La Cité-Limoilou, take steps in collaboration with the <i>Comité intersectoriel sur la contamination environnementale dans l'arrondissement La Cité-Limoilou</i> (CICEL) to implement measures that will make it possible to establish an action plan |
| Transboundary Environmental Effects - Greenhouse Gas Emissions | <p style="text-align: center;">Mitigation measures</p> <p><u>Construction phase</u></p> <ul style="list-style-type: none"> • Use machinery of the optimum size for the needs of the work (avoid over-specification); • Use rigorous planning to optimize operating time; • Select sites for storage, recovery and disposal of materials near construction activities. <p><u>Operation phase</u></p> <ul style="list-style-type: none"> • Optimizing loading and unloading operations at the terminal (automation and programming of logistic sequences), allowing in particular a significant reduction in the movement of mobile equipment on-site (reducing the energy consumption of hybrid equipment). • Develop and implement a greenhouse gas emissions reduction plan for the life of the project. This plan should specify reduction measures to be implemented and quantifiable targets. <p style="text-align: center;">Monitoring and Follow-up</p> |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none">• Collect the data and measures implemented in the annual review of the environmental and social monitoring and follow-up program;• Develop the greenhouse gas monitoring program to specify how it intends to monitor greenhouse gases and what additional measures, if any, could be applied;• Plan a monitoring program within the property limits that takes into account the nature of the activities carried out in the port and the periods of representative activities and traffic;• Review the frequency of monitoring in the airshed area for the period of operation based on the activities that will take place at the harbour and the increasing capacity of the harbour. |
| Wetlands | <p style="text-align: center;">Monitoring and Follow-up</p> <p><u>Monitoring changes in the area and composition of wetlands</u></p> <ul style="list-style-type: none">• Develop, prior to operation and in consultation with Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques, and implement a monitoring program for wetlands based on inventories that would make it possible to follow the evolution of their surface area and floristic composition;• Conduct follow up in operating years 1, 3, 5, 7 and 10;• Monitor the evolution of wetlands in the southwest embayment and Beauport Bay, including bulrush marshes (excluding marshes 9 and 10 identified in figure 7), swamps with marsh weir and marshes with broad-leaved Sagittarius;• Conduct inventories according to the principles of the simplified botanical method of the Guide de caractérisation des milieux humides du Québec meridional (Bazoge et al., 2015);• Provide a list of the plant species present as well as the percentage of overlap and validate the boundaries and areas of the environments;• Documenting and locating new plant species and documenting substrate composition;• Make a comparison between each year of monitoring and take into account the morpho-sedimentological monitoring to determine if the evolution of the beach and the sand spit leads to changes in the wetlands; |

| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none"> • In the event that negative effects on wetlands are detected during monitoring, propose adaptive management measures such as compensatory measures in order to meet the Policy's objective of no net loss of wetland functions; <ul style="list-style-type: none"> ○ Following the results of the follow-up determine in consultation with Environment and Climate Change Canada whether the follow-up should continue beyond 10 years. <p><u>The Agency considers that the morpho-sedimentological monitoring program should include the following elements:</u></p> <ul style="list-style-type: none"> • Develop, prior to operations and in consultation with Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques, a morpho-sedimentological monitoring program that will make it possible to track the evolution of erosion processes and quantify coastal sedimentary movements. The morpho-sedimentary monitoring should make it possible to analyze the hydrosedimentary behaviour of the beach following the project and to determine if the sedimentary balance remains the same. The monitoring should also document the effects of the project on the surrounding biological environments, particularly those of Beauport Bay: <ul style="list-style-type: none"> ○ In the event that negative effects on the surrounding environment are detected during the follow-up, propose, in consultation with Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques, adaptive management measures to reduce the effects of the project. • Conduct follow up in operating years 1, 3, 5, 7 and 10; <ul style="list-style-type: none"> ○ In the event that the monitoring results show phenomena (e.g. erosion or sediment displacement) that are more intense than anticipated, determine in consultation with Environment and Climate Change Canada and the Ministère de l'Environnement et de la Lutte contre les changements climatiques whether parameters should be added to the monitoring program or measures should be applied to reduce the intensity of these phenomena; • Following the analysis of the results, determine in consultation with Environment and Climate Change Canada, the Ministère de l'Environnement et de la Lutte contre les changements climatiques, those in charge of the recreation and tourism site and its users, determine the measures or actions necessary to put in place to maintain the beach while making sure not to harm the surrounding biological environment and more specifically the wetlands of the southwestern reentrant; • Following analysis of monitoring results, determine in consultation with Environment and Climate Change Canada and the Ministry of Environment and Climate Change if monitoring should continue beyond 10 years. |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| Fish and fish habitat, including aquatic invertebrates and special status species | <p style="text-align: center;">Mitigation measures</p> <p>Specific measures for fish</p> <ul style="list-style-type: none">• Carry out interventions in water outside sensitive periods for fish, particularly striped bass, Atlantic sturgeon, lake sturgeon, American shad, and American smelt. Determine these sensitive periods in consultation with the competent authorities and limit the duration of the work in the aquatic environment to the minimum;• Carefully recover all the captive fish in the confined or isolated sections of the work site and return them immediately to the aquatic environment, in a sector favouring their survival, to avoid any fish morbidity;• During placement of piles:<ul style="list-style-type: none">◦ Recover the drilling mud and deposit in a terrestrial environment;◦ Use vibration instead of hammering, unless this is not technically feasible;◦ Start the piledriving work to allow the fish to leave the immediate area of the work. Gradual startup should begin with minimum machine power, gradually increasing to optimum power;◦ If a shutdown longer than 20 minutes is anticipated between two piledriving periods, repeat the gradual startup procedure;◦ Drive the piles using a noise enclosure around the pile. This noise enclosure must allow a reduction of the sound power (L_w) generated by piledriving of at least 10 A-weighted decibels (dBA). <p>Measures specific to freshwater mussels</p> <ul style="list-style-type: none">• Gather and relocate the freshwater mussels before construction of the containment dyke. In consultation with the competent authorities and before the work, determine the areas where this collection is necessary, identify the host site favourable to the species, and determine the gathering and relocation methods;• In consultation with Fisheries and Oceans Canada, determine the areas where hickorynuts are likely to be found, develop and conduct an inventory to detect their presence and, as applicable, relocate the individuals in an adequate habitat for the species. <p>Measures specific to work in the aquatic environment and sediment management</p> |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none">• Implement effective measures to surround the work area in the aquatic environment in order to confine suspended sediments (e.g., turbidity curtain). In particular, implement control measures to protect Beauport Bay during work in the aquatic environment;• Prior to the commencement of the dredging required for the construction of the designated project, develop and implement measures to reduce emissions of contaminants and suspended solids to the environment, including:<ul style="list-style-type: none">◦ During the transport and deposition of sediments;◦ For the management of dredged material and dewatering water.• Mechanically dredge contaminated sediments using the dredging cone method or any other equivalent method that targets the contaminated sediments that need to be dredged.<ul style="list-style-type: none">◦ Dredge an additional 30 centimetres around the area of contaminated sediment and manage it as contaminated sediment;◦ Use an impervious bucket when dredging contaminated sediment;◦ Minimize the distance between the dredge bucket and the barge to the lowest technically feasible distance when filling the barge;◦ Once the dredging of the contaminated sediments is completed, carry out an additional dredging passage (clean-up passage) to recover contaminated sediments that may have settled on the bottom of the dredging cone;◦ Complete a visual inspection of the particle size and colour of the dredged material from the dredging cone to verify that all contaminated sediments have been dredged.• Delineate, before dredging begins, the areas in which dredging will be undertaken. The proponent shall not undertake any dredging outside these areas ;• Carry out dredged sediment transhipment work over a watertight basin to recover the water and sediment discharged in order to avoid any release of dredged material or water from dredging into the aquatic environment;• Identify and implement, in consultation with Environment and Climate Change Canada, mitigation measures to limit the risk of concrete or contaminant spills into the aquatic environment during the fabrication of concrete caissons on the submersible barge; |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none">• Install and use a mobile treatment unit to treat the effluent from the contaminated sediment settling pond prior to discharge into the municipal sewer in order to comply with municipal regulatory obligations related to the quantity and quality of water discharged into the sewer systems and waterways on the territory of the agglomeration of Québec City;• Develop, prior to the start of operations and in consultation with Environment and Climate Change Canada, a protocol for the characterization and management of sediments that will be dredged during maintenance dredging. In developing the protocol, the proponent must:<ul style="list-style-type: none">◦ Identify how the proponent will carry out in situ characterization of the sediments to determine their contamination levels;◦ Determine the methods for the management and disposal of sediment, dredged material and dewatering water that the proponent will be able to implement during dredging based on the results of the characterization referred to in the condition;◦ Carry out, before the beginning of each maintenance dredging period, a characterization of the sediments to be dredged. The proponent shall identify and implement methods for the management and disposal of sediment, dredged material and dewatering water, taking into account the results of the characterization, to mitigate environmental effects on the aquatic environment. <p>Measures specific to surface water management</p> <ul style="list-style-type: none">• Apply erosion and sedimentation control measures during all phases of the project in the project work area to limit the input of sediment to the aquatic environment during any activity associated with the project. The proponent shall:<ul style="list-style-type: none">◦ Consider periods of flooding, heavy precipitation and frost when developing these measures;◦ Periodically maintain any measures implemented and repair any damaged measures in a timely manner.• Capture runoff from the project during all phases of the project and treat runoff that does not meet the prevention provisions of the Fisheries Act before releasing it into the environment during all phases of the project.• Promote the percolation of resurgent water into the soil during the excavation of contaminated soils.• Clean equipment and vehicles that are likely to carry contaminated soil or sediment, in a designated washing area where water is collected and treated during all phases of the project.• During the operation of the concrete manufacturing plant: |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none">○ Capture runoff from the concrete batch plant site and direct it to the proponent's storm water system and install sediment traps in all catch basins;○ Set up a watertight basin to recover the washing water from the production equipment of concrete structures for recycling in the process water;○ Transfer the excess washing water to a water treatment basin by tanker truck;○ Empty the sludge by dump truck and manage it off-site by a specialized firm.● During the construction phase, clean the traffic lanes, particularly on the route used by dump trucks transporting contaminated dredged sediments to the dewatering basin (continuous use of a mechanical broom). Install sediment traps in all catch basins located along this route;● Collect snow and dispose of it in an authorized location during all phases of the project;● Install systems capable of recovering suspended solids and surface oils in each of the sumps on the new dock. <p>Specific measures for soil and groundwater management</p> <ul style="list-style-type: none">● Take into account the Canadian Soil Quality Guidelines of the Canadian Council of Ministers of the Environment and the generic criteria for industrial soils set out in appendix 2 of the Intervention Guide - Soil Protection and Rehabilitation of Contaminated Sites of the Ministère de l'Environnement et de la Lutte contre les Changements climatiques du Québec before reusing any soil excavated as part of the designated project in order to respect the principle of non-degradation of soils. The proponent must:<ul style="list-style-type: none">○ Do not reuse any excavated soil that exceeds the "C" criteria for industrial soil as set out in appendix 2 of the Guide d'intervention - Protection des sols et réhabilitation des terrains contaminés of the Ministère de l'Environnement et de la Lutte contre les Changements climatiques du Québec and dispose of such soil in an authorized location;○ Do not reuse any excavated soil to backfill the area of the back wharf and any other area located near the high-water mark.● Respect the principle of non-degradation of soils: |



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| | <ul style="list-style-type: none">○ Do not increase contaminant concentrations in soils, even if current concentrations are below the CCME <i>Canadian Soil Quality Guidelines</i> (CSQG) thresholds;○ Any excavated soils that are reused on site must contain concentrations lower than CCME and MELCC criteria (industrial use), and concentrations lower than those measured in the soils in the backfill areas;○ Manage soils with concentrations of a substance in excess of background levels to avoid disposing of them near an aquatic environment.● Backfill the area of the back wharf or other areas near the high-water mark (recurrence of 2 years of pre-project) with dredged sediments with concentrations below the Occasional Effects Concentration (OEC) and materials of terrestrial origin, including soils, whose quality meets Criterion A;● Do not use on the QPA's property any soil excavated as part of the upgrading work on the used snow disposal site carried out by the City of Québec, even if this soil meets the criteria established by the QPA for reusing soil excavated as part of the Laurentia project;● Continuously backfill exposed soils or cover them with waterproof tarps as soon as the work is completed (daily) to limit the possibility of wind erosion or rain leaching;● Use biodegradable oils in the equipment used for backfilling the backshore;● Design contaminated sediment dewatering and recovery ponds to ensure sufficient capacity for the storage of contaminated sediment during the work, as well as to ensure the watertightness and stability of the structures;● Provide a watertight dumpster for trucks used to transport contaminated sediment from Pier 49 to Parcel 3;● Cover the surface of the back wharf with asphalt or concrete and install a storm sewer system on the back wharf;● Design the stormwater collection system based on-site requirements and applicable best practices. Subdivide the entire terminal watershed into containment zones to isolate a specific area in the event of a hazardous material spill. Provide each containment area with an oil, water and sediment separation device with downstream shutoff valves to prevent discharge to the river. <p>Specific measures during temporary work site closure</p> |



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| | <ul style="list-style-type: none">• Stabilize and temporarily protect the disturbed soils presenting a risk of erosion and sediment transport to the aquatic environment, using methods adapted to the site, the duration of the work site closure and the period of the year;• Ensure that the measures deployed to limit the intake of sediments from the work site to the aquatic environment function adequately and that they are maintained before the work site closure.. <p>Monitoring and Follow-up</p> <ul style="list-style-type: none">• Monitoring of suspended solids in the aquatic environment;<ul style="list-style-type: none">◦ Develop, prior to construction and in consultation with Environment and Climate Change Canada, a plan to monitor suspended solids generated by the project. As part of the implementation of this follow-up:<ul style="list-style-type: none">▪ Establish baseline conditions for the work area in terms of turbidity and ambient levels of suspended solids prior to the start of dredging and backfilling of the backshore area;▪ Calibrate the turbidity-suspended-matter curve established by the proponent on-site, when dredging and backfilling of the backshore begins, to ensure that it is representative of conditions in the work area at the time of the work;▪ Monitor, during dredging and backfilling of the backshore, maximum variations in suspended solids concentrations using turbidimeters positioned according to the progress of the dredging and backfilling work;▪ Position the turbidimeters according to the progress of dredging and backfilling of the backshore in order to capture the maximum variations in suspended solids (SS) concentrations;▪ If the suspended solids requirement in the receiving environment is exceeded, implement additional measures such as reducing the opening speed of the discharge valves on the hydraulic dredge or reducing the discharge speed of the dredge pumps.• Monitoring during hydraulic dredging to ensure continuous monitoring of sediments that are pumped into the settling basin to prevent dredging of contaminated sediments;<ul style="list-style-type: none">◦ Gradually characterize the sediments that would be hydraulically dredged using a bucket, 48 hours prior to dredging, for each parcel or surface unit to be dredged in order to validate that these are non-contaminated sediments. |



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| | <ul style="list-style-type: none">○ Continuously monitor sediments pumped into the settling basin during hydraulic dredging for signs of contamination. If such contamination is discovered and in consultation with the relevant authorities, determine and implement solutions including complete removal by additional dredging or dredging and capping of the residual contaminated area.● Monitoring of effluent from the uncontaminated sediment settling pond:<ul style="list-style-type: none">○ Perform daily monitoring of suspended solids concentrations at the settling pond weir;○ Develops and implements mitigation measures in the event that alert thresholds are exceeded.● Monitoring of contaminated sediment dewatering ponds:<ul style="list-style-type: none">○ Monitor, through dewatering pond sampling and laboratory characterization following sample settling, the quality of water from the dewatering ponds, including water quality parameters related to the minimum requirements for discharge to the City of Québec sanitary sewer;○ Conduct sampling on a daily basis, unless monitoring demonstrates that water quality meets the minimum requirements over a period of at least two weeks, in which case the proponent shall conduct sampling on a weekly basis;○ Develop and implement mitigation measures if monitoring results show any exceedance of the minimum requirements for discharge to the City of Québec sanitary sewer.● Monitoring runoff water to ensure that temporary facilities are in good condition and efficient and that runoff water meets criteria:<ul style="list-style-type: none">○ Monitoring the concentration of suspended solids and petroleum hydrocarbons (C10 to C50) in the storm system outlet of Parcel 4;○ Monitor the concentrations of suspended solids, petroleum hydrocarbons (C10 to C50) and pH at the end of the stormwater system in the block where the concrete plant will be located;○ Develop and implement modified or additional mitigation measures if monitoring results show exceedances of the established criteria.● Soil and groundwater quality monitoring:<ul style="list-style-type: none">○ During the construction and operation phases, develop and implement a groundwater quality monitoring program using the six observation wells installed upstream hydraulically from the new facilities and additional observation wells in the |

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| | <p>newly developed areas. The following parameters will be monitored at least twice a year: petroleum products (HP (C10-C50), F1-BTEX, F2-F4, PAHs and VOCs), pH, sulfide, phenolic compounds, available cyanides, PCBs, ammonia nitrogen, chlorides, total fluoride, phthalates and finally metals and metalloids. Integrate the results into the proponent's annual monitoring program;</p> <ul style="list-style-type: none"> ○ Develop and implement modified or additional mitigation measures if monitoring results show exceedances of established criteria. ● The proponent shall submit to the Agency, the competent authorities and the First Nations, at the end of construction, a report on the management carried out by the proponent during construction of contaminated and non-contaminated soils and dredged sediments. The proponent shall submit the following information: <ul style="list-style-type: none"> ○ A balance sheet of contaminated soils disposed of off-site (including volume, source, location of disposal, environmental quality and carrier used); ○ A balance sheet of non-contaminated soils moved and reused in the work area (particularly in terms of volume and environmental quality); ○ An assessment of the sediments dredged and managed in the construction site area (in particular in terms of volume and environmental quality); ○ A map(s) of the work area showing the location of soils and sediments. |
| Birds and their habitats, including endangered species | <p>Mitigation measures</p> <p>General measures:</p> <ul style="list-style-type: none"> ● Put measures in place to protect birds and to avoid harming, killing or disturbing migratory birds or destroying, disturbing or taking their nests and eggs. In this regard, the proponent shall follow Environment and Climate Change Canada's <i>Avoidance Guidelines</i> in order to reduce the risk to birds. The measures that the proponent implements as part of the designated Project are in compliance with the <i>Migratory Birds Convention Act, 1994</i>, the <i>Migratory Birds Regulations</i> and the <i>Species at Risk Act</i>. These include, but are not limited to the following: <ul style="list-style-type: none"> ○ Determine breeding season dates, for years in which activities that could affect nesting are carried out; |



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| | <ul style="list-style-type: none">○ In the case of a nest discovered by chance, or during an inventory carried out by an ornithologist, to avoid destroying the nest any eggs it may contain (incidental take), define a protective buffer zone appropriate to the species, where no work will be authorized until the chicks have permanently left the vicinity of the nest.● During construction and operation, maintain the nesting boxes in a condition that allows them to be used by shore martins, in particular by keeping the area around the nesting box open. <p>Shorebird resting habitat offset Project:</p> <ul style="list-style-type: none">● The proponent shall develop, in consultation with Environment and Climate Change Canada, and shall implement offset measures for shorebird resting habitat prior to the construction phase. According to Environment and Climate Change Canada's Operational Framework for the Use of Conservation Allowances, if it is not possible to implement the offset measures before adverse effects occur, the best option is to implement offset measures during the construction phase at the same time as the activities that would result in adverse effects. Thus, it is recommended that the principle of no net loss be applied and that specific offset measures for high tide resting areas for shorebirds be developed and implemented. The proponent shall submit the measures to the Agency and appropriate authorities for review and comment prior to implementation; <p style="text-align: center;">Monitoring and Follow-up</p> <p>The Agency considers that the follow-up program should include the following elements:</p> <ul style="list-style-type: none">● Identify activities or operations that may have an effect on birds, including species at risk, and for each of these, determine the measures to be put in place to ensure that the nuisance or disturbance is minimized, particularly during the nesting period. The monitoring program will have to pay particular attention to bird species at risk, including the common nighthawk and the bank swallow, which are likely to use certain areas of the Project site, particularly areas where there is no vegetation;● Develop and implement a management plan in the event of bird mortality or abnormal bird behaviour. Should such events or situations occur, the proponent shall contact the Canadian Wildlife Service of Environment and Climate Change Canada and take appropriate corrective action; |

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| | <ul style="list-style-type: none"> • Follow up on status updates for bird species monitored and identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and listed under the <i>Species at Risk Act</i>; • Put in place additional measures to mitigate the effects of the Project on affected species in the event that the status of a species changes during the implementation of the monitoring program. <p>Tracking for shore swallows:</p> <ul style="list-style-type: none"> • Continue to monitor the bank swallow nesting boxes to ensure the continued success of their use by the species during the construction and operational phases. Monitoring must be done over a sufficiently long period of time to ensure that the colony is maintained over the long term. Monitoring should, at a minimum, be annual during the construction phase and during the three years following construction, and every five years thereafter throughout the life of the Project's operation; • Develop and implement follow-up to determine whether noise generated by the construction work and the new terminal's operations is having an adverse environmental effect on the species and implement corrective measures if required. <p>Monitoring of the shorebird offset Project:</p> <ul style="list-style-type: none"> • Develop, in consultation with Environment and Climate Change Canada, and implement follow-up of the offset project for shorebirds to ensure its success and implement corrective measures if required. |
| Other species with special status | <p style="text-align: center;">Mitigation measures</p> <ul style="list-style-type: none"> • Delineate in the field, before deforestation begins, the areas where deforestation would be necessary. Deforestation outside these areas should not occur unless required for safety reasons; • Carry out, before the beginning of the work, a delimitation of the environments colonized by invasive alien floristic species in order to properly identify them; • Specify in the contractors' technical specifications that the granular materials used must come from a source free of invasive alien species; • Clean machinery that will be used in areas colonized by invasive alien species before using it elsewhere on the site. Provide washing stations in areas not conducive to seed germination and away from streams, water bodies and wetlands; |



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| | <ul style="list-style-type: none">• If invasive alien species are visible in work areas, eliminate them by burying them on-site where excavation will take place, in a 2-metre-deep pit, then covering them with at least 1 metre of unaffected material, or by disposing of them in an authorized engineered landfill;• Revegetate disturbed areas immediately after the end of the construction work to ensure a quick recovery. Follow seeding rates prescribed by the manufacturer. |
| Human health (physical and psychological) | <p>Mitigation measures</p> <p><u>Specific measures for noise</u></p> <p><i>Construction and operation phase</i></p> <ul style="list-style-type: none">• Develop and implement an information and consultation plan to involve the community of potentially affected receptors, prior to any particularly noisy activity, to better understand when noise sensitivity could increase and plan the work in consideration of the findings of this consultation and implement mitigation measures if necessary;• Develop a pre-construction protocol, in consultation with potentially affected parties, for receiving complaints related to noise exposure from the Project. Implement the protocol in all phases of the project. The protocol shall be submitted to the Agency prior to construction. The proponent must:<ul style="list-style-type: none">◦ Respond to noise complaints related to any component of the Project within 48 hours of receipt of the complaint and implement corrective measures, if necessary, to reduce noise exposure in a timely manner.• Train workers and contractors on the importance of noise mitigation;• Equip equipment with silencers when possible;<ul style="list-style-type: none">◦ Turn off unused electrical or mechanical equipment and trucks waiting for a load for more than the normal waiting time <p><i>Construction phase</i></p> <ul style="list-style-type: none">• Prohibit the use of engine brakes on the job site unless safety is an issue;• Minimize slamming of the rear panels of trucks when unloading materials;• Arrange non-noise making equipment or materials in such a way as to create a screen between the noisiest work and the residential and tourist sectors; |



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| | <ul style="list-style-type: none">• Equip equipment (e.g. shovel and loader) with a white noise back-up alarm adjusted to obtain a maximum sound level of 10 decibels (dBA) above the surrounding noise of the work site, while respecting health and safety standards;• Drive the piles by vibratory driving and use loudspeakers around the piles. These sound enclosures should reduce the sound power (L_w) generated by pile driving by at least 10 dBA;• Limit pile-driving activities to the daytime period only between 7:00 a.m. and 7:00 p.m.;• Pay particular attention to the attenuation of tonal, impulsive and very impulsive noises (such as pile driving) and avoid these types of noise at night, on weekends and holidays. <p><i>Operation phase</i></p> <ul style="list-style-type: none">• Acquire gantry cranes equipped only with electric motors instead of hybrid motors (electric/diesel);• Equip new generators with reactive exhaust mufflers;• Locate, when possible, mechanical equipment (pumps, motors, etc.) in buildings;• Optimize the sequence of operations by reducing unnecessary equipment movements;• Turn off unused electrical or mechanical equipment and rail convoys awaiting loading whenever possible;• Equip as much equipment as possible (e.g., yard trucks, stacker trucks) with a white noise back-up alarm, while keeping the terminal in compliance with occupational health and safety requirements;• In order to protect the quality of sleep of the population, avoid transportation in residential areas and train shunting or assembly during the night. <p>Monitoring and Follow-up</p> <ul style="list-style-type: none">• Develop, prior to construction and in consultation with Health Canada and other jurisdictions, a follow-up program to verify the accuracy of the environmental assessment and to assess the effectiveness of the mitigation measures with respect to the noise environment. The proponent shall submit the follow-up program to the Agency prior to the commencement of construction. This follow-up program must take into account; |

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| | <ul style="list-style-type: none"> ○ Each season; ○ Day and night; ○ Sources emitting low-frequency noise. <ul style="list-style-type: none"> ● Implement the monitoring program at all phases of the Project; ● Develops and implements modified or additional mitigation measures if monitoring results demonstrate that modified or additional mitigation measures are required to address changes to the noise environment attributable to the project. The objective of this monitoring should be to minimize the number of noise-related public complaints. The proponent submits these measures to the Agency prior to implementation |
| Socio-economic conditions | <p style="text-align: center;">Mitigation measures</p> <ul style="list-style-type: none"> ● Delineate the public areas that would be accessible during construction to ensure the safety of users of the recreation and tourism areas and users of the project site. This will include signage that clearly identifies the safe access routes to the Baie de Beauport recreation and tourism zone in the work site area; ● Delineation of a security perimeter around the work site to ensure safe navigation; ● In consultation with potentially affected parties and First Nations consulted within the framework of the project, develop a communications plan for the construction phase in order to provide information for recreation and tourism businesses in the project area, users of the Baie de Beauport beach, and users carrying out water-based activities, fishing and any other recreation and tourism activities, as well as commercial navigation stakeholders: <ul style="list-style-type: none"> ○ Permanent and temporary works related to dredging, including aquatic or terrestrial disposal sites or dewatering basins, as applicable (indicating the size, location, type and volume of sediment to be stored and the level of contamination). For mariners, this information will take the form of notices to mariners; ○ A calendar detailing the dates and schedules of work for the installation of the containment dyke, the backfilling of the rear wharf and the installation of the visual and acoustic barrier; ○ A schedule detailing the periods of restriction for in-water works in the spring and summer (which correspond to the sensitive periods for fish), to allow users to adjust their recreational activities in the area; ○ Accessible public areas and closures during the work, as well as access roads to the Baie de Beauport and the river; |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none">○ Frequent updates to inform boaters about water quality for swimming;○ Any other relevant information for boaters and Baie de Beauport users, First Nations concerned and any other stakeholders or individuals affected by the project.● Maintain an accessible boat storage area during the construction phase;● In consultation with the potentially affected parties and First Nations consulted, develop a communications plan, for the operational phase, in order to inform the recreational tourism businesses in the project area, the users of the beach of the Baie de Beauport, the users practicing nautical, fishing and other recreational tourism activities, as well as the stakeholders in commercial navigation, about:<ul style="list-style-type: none">○ The schedule of presence vessels at the quay;○ Schedules of loading and unloading operations;○ Frequent updates to inform boaters of water quality for swimming;○ Navigation measures to be respected by recreational boaters and commercial ships docking at the Port of Quebec and the Ross-Gaudreault Cruise Terminal;○ Available navigational support programs.● In order to prevent accidents, restrict non-commercial marine traffic in the vicinity of the new facility, especially during loading and unloading operations;● The implementation of available navigational aid programs and tools (visual aids, radar, ship movement planning software, etc.);● In consultation with users, develop a project to improve the available facilities in the Baie de Beauport sector. As announced by the proponent (Englobe 2020q), the project will have to make 0.9 ha of land available for recreational activities through the implementation and development of the following elements:<ul style="list-style-type: none">○ A launching ramp;○ Long floating docks to ensure user safety at high and low tide;○ Relocation of the watch tower; |

| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none"> ○ A storage area for boats and personal watercraft (kayaks) and a recreational area; ○ Improve and ensure permanent access to Baie de Beauport for recreational activities through the construction of an overpass over the railway tracks. ● In consultation with the Fédération québécoise des chasseurs et des pêcheurs (FédéCP), establish areas under the proponent's jurisdiction that would serve to improve the quality and quantity of the areas dedicated to fishing in the Port of Quebec sector; ● Revise the predictive model of water quality for swimming and provide all relevant information to the City of Québec to ensure monitoring of water quality for this activity. <p>Revise the predictive model of water quality for swimming and provide all relevant information to the City of Québec to ensure monitoring of water quality for this activity.</p> |
| Indigenous peoples - Current Use of Lands and Resources for Traditional Purposes | <p style="text-align: center;">Mitigation measures</p> <ul style="list-style-type: none"> ● Transmit the construction work schedule to representatives of various First Nations to inform users who practice traditional activities near the Project site; ● Have regular follow-ups with First Nations who wish to do so regarding the design, implementation and evolution of the environmental follow-up program for damages caused to fish and fish habitat. These meetings would be adapted and planned according to the interests and concerns of the interested First Nations in order to exchange and discuss the potential effects that could be linked to the Project; ● Implement the fish and fish habitat mitigation measures identified in section 5.4.2 to limit effects on fish and fish habitat; ● Implement the mitigation measures for accidents and malfunctions under the responsibility of the proponent presented in section 6.1 to avoid adverse effects on resources. <p style="text-align: center;">Monitoring and Follow-up</p> <ul style="list-style-type: none"> ● The proponent shall develop, prior to construction and in consultation with First Nations and competent authorities, a follow-up program to verify the accuracy of the environmental assessment and to judge the effectiveness of the mitigation |

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| | <p>measures with respect to the adverse environmental effects on Indigenous fisheries of the following fish species: striped bass, lake sturgeon, Atlantic sturgeon and American shad</p> |
| Natural and cultural heritage | <p style="text-align: center;">Mitigation measures</p> <ul style="list-style-type: none"> • Use materials and colours for structures, such as cranes, that harmonize with the landscape; • Design, prior to construction and in consultation with potentially affected parties, a visual screen and native plant species to the area to reduce the visual appearance of container storage; • Vegetate landscaped slopes and bare surfaces as construction work is completed. To do so, use species native to the region; • Fully implement the Archaeological Response Plan filed as an appendix⁹⁹ to the <i>CEA Agency's Response Document to the Second Request for Additional Information of August 2019 - Natural, Cultural and Archaeological Heritage</i> (Englobe, 2020w) in accordance with the standards and principles of underwater archaeology and with the recommendations or supervision of a marine archaeologist. These include, but are not limited to <ul style="list-style-type: none"> ◦ Carry out additional studies and provide the results and recommendations to the Agency before work begins (point 5.2 of the intervention plan). ◦ Put measures in place to ensure the conservation of archaeological sources in the case of chance discoveries (point 5.3 of the intervention plan). ◦ For anomalies with high archaeological potential that could not be verified prior to dredging activities, carry out monitoring during dredging under the supervision of a marine archaeologist. ◦ Present to the Agency, Parks Canada and First Nations who have expressed the wish to do so, as indicated in the document in Englobe (2020w), the results of the work planned in the archaeological plan and the annual review of the results of the archaeological monitoring. <p style="text-align: center;">Monitoring and Follow-up</p> |

⁹⁹ AECOM. 2020. Plan d'intervention archéologique subaquatique - Projet d'aménagement d'un terminal en eau profonde au port de Québec-Projet Laurentia. 37 pages and appendices

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| | <ul style="list-style-type: none"> • Develop and implement a follow-up program to validate the accuracy of the environmental assessment and judge the effectiveness of mitigation measures on the visual environment. The proponent will have to compare photographs taken from points of view comparable to those used in the visual simulations carried out as part of the impact statement. Photographs must be taken every two years for the first 10 years following the end of construction and every 5 years thereafter, until 25 years following the end of construction. Corrections will be made as required if mitigation measures need to be modified or added to reduce the effects on the visual environment. • The monitoring should make it possible to concretely evaluate the effect felt by residents and vacationers, for example by means of a survey that will be carried out after the Project is up and running. • Monitor the growth, composition and abundance of vegetation and make the necessary corrections in case of plant degradation, including replacement of plants. • Develop a pre-construction feedback protocol for effects on the visual environment. The proponent will be required to implement the protocol during construction and operation. |
| Effects of Accidents or Malfunctions | <p style="text-align: center;">Mitigation measures</p> <p><u>General measures</u></p> <ul style="list-style-type: none"> • Take all reasonable steps to prevent accidents and malfunctions that may cause adverse environmental effects; • Consult, prior to construction, the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations and the competent authorities on the measures to be implemented to prevent accidents and malfunctions; • Update, prior to construction and in consultation with the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations and the competent authorities, an emergency response plan in the event of an accident or malfunction related for each phase of the Project. The accident and malfunction response plan should specify, among other things, the types of accidents and malfunctions that could lead to adverse environmental effects; • Implement the appropriate measures described in the emergency response plan in the event of an accident or malfunction that could result in adverse environmental effects: <ul style="list-style-type: none"> ○ Implement the communications plan in relation to accidents and malfunctions; |



IMPACT ASSESSMENT AGENCY OF CANADA

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| | <ul style="list-style-type: none"> ○ Notify the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations as soon as possible, as well as the potentially affected parties and the competent authorities of the accident or malfunction and notify the Agency in writing no later than 24 hours following the accident or malfunction. For the notice to First Nations and the Agency, the proponent shall specify: <ul style="list-style-type: none"> The date on which the accident or malfunction occurred; A description of the accident or malfunction; A list of any substances potentially released to the environment as a result of the accident or malfunction. ○ Notify appropriate authorities with responsibilities related to emergency response, including environmental emergencies, in accordance with applicable regulatory and legislative requirements. ● Submit a written report to the Agency no later than 30 days after the accident or malfunction. The written report shall include: <ul style="list-style-type: none"> ○ A description of the accident or malfunction and its adverse environmental effects; ○ The measures that have been taken by the proponent to mitigate the adverse environmental effects caused by the accident or malfunction; ○ All views of First Nations and advice from the competent authorities received with respect to the accident or malfunction, its adverse environmental effects and the measures taken by the proponent to mitigate those adverse environmental effects; ○ A description of any residual adverse environmental effects and any additional or modified measures required to be taken by the proponent to mitigate the residual adverse environmental effects; ○ Details regarding the implementation of the emergency response plan in the event of an accident or malfunction. ● Submit, no later than 90 days after the accident or malfunction, and taking into account the information previously submitted, a written report to the Agency on the changes made to prevent the recurrence of such an accident or malfunction and on the implementation of any modified or additional measures to mitigate and monitor the residual adverse environmental effects and to undertake any required progressive claims. The report includes the views of the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations and potentially affected parties, as well as the views of additional competent authorities received by the proponent. |

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| | <ul style="list-style-type: none"> • Develop, prior to construction, a communications plan in consultation with the Huron-Wendat, Wabanaki, Innu, Mohawk and Maliseet First Nations and potentially affected parties. Implement and maintain the communications plan during all phases of the Project. The communications plan includes in particular: <ul style="list-style-type: none"> ◦ The types of accidents and malfunctions requiring the proponent to notify each First Nation and potentially affected parties; ◦ The manner in which each First Nation and potentially affected party shall be notified by the proponent of an accident or malfunction and the opportunities for First Nations and potentially affected parties to assist as a result of the accident or malfunction; ◦ The contact information of the proponent's representatives with whom First Nations and potentially affected parties may communicate and the contact information of the representatives of each of the First Nations and potentially affected parties that the proponent notifies <p><u>Measures specific to rail transport</u></p> <ul style="list-style-type: none"> • Establish a speed limit for trains at no more than 15 kilometres per hour within the administrative limits of the Quebec Port Authority and require that any person respect this speed limit <p><u>Measures specific to maritime transport</u></p> <ul style="list-style-type: none"> • Establish, in consultation with the Laurentian Pilotage Authority, an approach and berthing manoeuvring zone so that any vessel associated with the project may approach the wharf at reduced speed, subject to navigational safety; • Indicate, before dredging, the beginning of the dredged area with buoy K168 and keep the buoy in place during all dredging; • Maintain, during construction and operation, equipment for responding to accidental spills of contaminants in the area of the construction site, including a rapidly deployable floating phase collection device; • Install, prior to construction, and maintain during construction and operation, a pumping station equipped with two pumps capable of providing a total flow rate of approximately 8,000 US GPM (gallons per minute) to provide a fire protection system; • Maintain approximately 1.3 kilometer of underground piping from the pumping station to the entrance of the existing liquid bulk terminals to provide a fire protection system; |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <ul style="list-style-type: none">• Maintain at least seven fire hydrants distributed throughout the site to respond to dock fires;• Determine, in consultation with the Laurentian Pilotage Authority, a maximum wind speed for berths and departures that takes into account the sails of vessels associated with the project, subject to the safety of navigation, and establish a corresponding maximum wind speed at which loading and unloading activities of containers associated with the project stop <p><u>Measures specific to container management</u></p> <ul style="list-style-type: none">• Designate the dangerous goods container storage area associated with the project to allow for the segregation of this area and taking into account the risks associated with existing port operations in the project area, including the operation of International-Matex Tank Terminals facilities;• Perform preventive inspection of containers to verify that they comply with safe rail shipping practices;• Make an inventory, for each containerized dangerous cargo, of the containerized dangerous goods that are stored and transshipped, indicating the maximum quantity authorized to be stored on the premises and the class of dangerous goods according to the <i>International Maritime Dangerous Goods Code</i>. |
| Cumulative Environmental Effects | <p>Mitigation Measures</p> <p><u>Fish and their habitat including invertebrates</u></p> <p>The Agency considers that the following additional mitigation measure would reduce cumulative effects on mussels:</p> <ul style="list-style-type: none">• Inspect dredges and other watercraft used in the aquatic environment prior to their arrival at the work site to ensure that they are free of invasive alien species.<ul style="list-style-type: none">○ However, as with the project's direct effects on fish and fish habitat, the Agency considers that the key measures identified in section 5.4 would not sufficiently mitigate the project's potential effects to ensure that the cumulative effects are not significant. <p><u>Current Uses of Lands and Resources for Traditional Purposes</u></p> <p>Based on the analysis of the effects on fish and fish habitat (section 5.4), the Agency considers that no mitigation, monitoring or follow-up measures would sufficiently reduce the cumulative effects of the project on the practice of fishing and the activities and customs surrounding this practice to ensure that the cumulative effects are not significant.</p> |



| Valued Component | Mitigation Measures, Monitoring and Follow-Up |
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| | <p>Socio-economic conditions</p> <p>Based on the analysis conducted on fish and fish habitat (section 5.4) as well as socio-economic conditions (section 5.8), the Agency considers that no mitigation, monitoring or follow-up measures would sufficiently reduce the project's cumulative effects on recreational and commercial fishing to ensure that they are not significant.</p> <p>Air Quality</p> <p>Since air quality in the airshed area is already affected by a variety of industries and activities, any mitigation measures related to cumulative effects should be developed in consultation with other users of the environment. For this reason, the Agency considers that, in addition to the measures already planned and in place at the Port of Quebec and those identified in section 5.1, the following measures are necessary to help mitigate potential cumulative environmental effects on air quality:</p> <ul style="list-style-type: none">• Pursue efforts to improve air quality with local stakeholders through the <i>Comité intersectoriel sur la contamination environnementale dans l'arrondissement de La Cité-Limoilou</i> (CICEL) (or any other committee aimed at improving air quality in the borough of La Cité-Limoilou), of which the Quebec Port Authority is a member (established in 2013, the CIECEL brings together several players from the industrial sector, as well as representatives of Québec City, the ministère de l'Environnement et de la Lutte contre les changements climatiques and citizens);• Develop, in consultation with Environment and Climate Change Canada, a plan to manage atmospheric emissions from all Port of Quebec activities, including those generated by the project;• Continue to develop initiatives to improve the proponent's practices to reduce its air quality footprint. <p>Human Health</p> <p>Since human health in the borough of La Cité-Limoilou is already affected by social and health inequalities, the Agency considers that no mitigation or follow-up measures can sufficiently mitigate cumulative effects to make sure that they do not become significant. However, the Agency considers that the measures provided for in sections 5.1 and 5.7 and subsection 6.3.5 can reduce cumulative effects on human health to some extent.</p> |

Appendix D Summary of Indigenous Consultations

This appendix includes the comments received from First Nations as part of the environmental assessment, as well as the responses provided by the Quebec Port Authority (the proponent) and the Agency up to the publication of the draft environmental assessment report on November 16, 2020. The concerns presented have been synthesized by the Agency from the issues raised during the various meetings with First Nations and comments submitted during the environmental assessment process. The First Nations' comments are available on the Canadian Impact Assessment Registry. The comments are presented in order of chapters of the environmental assessment report.

| Theme | Summary of the comment or concern | Summary of the proponent's response | Agency's Response |
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| Huron-Wendat Nation (NHW) | | | |
| Terrestrial and wetlands environments | NHW has requested a compensation plan for the loss of wetlands and the protection or restoration of 7 hectares of destroyed terrestrial areas. | The proponent is proposing a project outside the Laurentia project for the development of a <i>Trame verte</i> (green grid) on the periphery of the port sector. This project, would make it possible to compensate for the 3.2 hectares of terrestrial vegetation that will be lost due to the project, is underway. The proponent does not foresee any permanent loss of wetlands. The proponent propose a monitoring of the evolution of the surface area of wetlands. | The Agency is of the opinion that the project is unlikely to cause significant adverse residual environmental effects on wetlands and their ecological and socio-economic functions since the proponent would avoid all wetlands. The Agency has identified key mitigation measures and the follow-up program to avoid effects on wetlands in section 5.3. In particular, a program to monitor the evolution of the wetlands will have to be set up in order to verify the accuracy of the conclusions of the environmental assessment. |
| Fish and their habitats | The First Nation shared several concerns about the potential effects of the project on striped bass. The NHW has made proposals for mitigation measures related to the striped bass (e.g. work restriction period). | According to the proponent, the project would affect striped bass rearing habitats in the St. Charles River estuary and Baie de Beauport, as well as striped bass spawners whose spawning area includes the footprint of the wharf and the back wharf and the dredging area. The proponent undertakes to apply a restriction period during dredging work. | The Agency is of the opinion that the project would result in significant adverse residual environmental effects on fish and fish habitat, including aquatic invertebrates and special status species due to the destruction and permanent alteration of habitat. The Agency has identified the key mitigation measures and follow-up program for fish and fish habitat in section 5.4, including carrying out the in-water works outside of sensitive periods for fish. |


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| | The NHW wonders about the effects of the project on the American eel and Atlantic salmon. | According to the proponent, the majority of migrating eels in the project area would use the south channel of Île d'Orléans. The estuary of the St. Charles River would be unfavourable in terms of habitat for the species. He does not anticipate any effect of the project on eels or Atlantic salmon. | The Agency is satisfied with the proponent's responses and, based on Fisheries and Oceans Canada's advice, does not anticipate any effect of the project on these species. |
| | Requests that all species of fish with precarious status be subject to a compensation plan (including American shad). | The proponent submitted a compensation program to offset the effects of the destruction and modification of fish habitats, which is intended to provide similar or higher quality feeding habitats for species it considers affected by the project. | <p>The Agency is of the opinion that the project would result in significant adverse residual environmental effects on fish and fish habitat, including aquatic invertebrates and special status species due to the destruction and permanent alteration of habitat. The Agency relies on the advice of Fisheries and Oceans Canada that compensation for lost spawning habitat would not be possible given the nature and complexity of the features that are attractive to striped bass. The adverse effects of the project could not be mitigated, avoided or controlled by measures consistent with the recovery plan for the species.</p> <p>The Agency has identified the main measures likely to mitigate several potential effects of the project in section 5.4. However, these measures taken together would not sufficiently mitigate the potential effects of the project to render the residual effects insignificant.</p> |
| Special status species | Concerns regarding monitoring and the implementation of mitigation and compensation measures for species at risk such as | The proponent does not anticipate any effect on special status species of birds. It proposes a monitoring program for these species, including monitoring of the artificial nesting box for shore swallows. | The monitoring of birds and their habitats, including special status species, proposed by the proponent is included in the Agency's monitoring requirements in section 5.5. |


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| | the Chimney Swift or the Common Nighthawk. | | |
| Socio-economic conditions | The NHW wishes to be a partner in the project and the continuation of the work of the Working Table set up with the proponent. | The proponent has committed to continue the work of the Permanent Working Table with NHW. | The Agency forwarded the comment to the proponent and considers that the continuation of the Permanent Table would promote collaboration between the proponent and the First Nation (chapter 5.9). |
| Common Uses for Traditional Purposes | Shared concerns regarding the American Eel fishery at the Pointe à Puisaux site and under the Quebec Bridge. | According to the proponent, the construction and operation activities of the Laurentia project do not threaten the integrity of these sites, since they are located outside the construction zone. One of the options in the proponent's compensation plan aims to improve the crossing of obstacles to the free movement of American eel in four watersheds in the Québec City area. | These sites are located outside the expanded study area. The Agency is satisfied with the responses provided by the proponent regarding the link between its compensation plan and the species fished by Indigenous people. Information concerning American eel can be found in section 5.4. |
| | The NHW shared information regarding the use of Beauport Bay and nearby areas for fishing and migratory bird hunting and concerns regarding members' access to the territory and resources. | The proponent has integrated in its analysis the results of the complementary study conducted by NHW concerning the use by its members of the project study area. It indicates that construction activities could disrupt access to fishing and hunting practice sites, but that these accesses would not be modified during operational phase. The project would encroach on only a small portion of one of the fishing sites used by NHW. | The Agency is of the opinion that the proponent has provided an analysis and drawn adequate conclusions regarding the effects of the presence of the construction site and the operation of the terminal on access to territories and resources for the practice of hunting and fishing activities near the project site. The Agency considers that the implementation of follow-up meetings and the continuation of meetings within the framework of the Permanent Table for the Huron-Wendat Nation would allow the proponent and the NHW to discuss the progress of the project and their concerns in a spirit of cooperation. On the other hand, the Agency is of the opinion that the project could have consequences on the practice of fishing in the St. Lawrence River |


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| | | | and its estuary and the resulting uses for First Nations in relation to the loss and modification of habitats caused by the encroachment of the project and by dredging on migratory species such as striped bass, lake sturgeon, Atlantic sturgeon and American shad. |
| Cultural Heritage | NHW wishes to participate in the evaluation of the archaeological heritage | In addition to the archaeological potential study, an underwater geophysical survey and a sediment profiler survey were carried out in the construction area by the proponent. The proponent proposed an archaeological intervention plan that it would implement prior to the start of work and continue throughout all phases of the project. | The Agency has identified the main mitigation measures likely to reduce the potential effects on cultural heritage in section 5.10, including the presentation to First Nations who have expressed the wish to do so, of the results of the work planned in the archaeological plan and the annual report on the results of the archaeological monitoring. |
| Aboriginal and Treaty Rights | The NHW recalls the rights exercised by the Nation over Nionwentsio and confirmed by the Treaty of 1760. | This information is included in the proponent's documents. | The Agency has taken these comments into account in preparing its report and the rights impact assessment presented in Chapter 7. |
| | Requests for modifications to the reference condition presented by the proponent in relation to the occupation of the territory and the southwestern part of the Innu First Nations. | The proponent has made certain adjustments in its reference state and integrated the NHW's comments in relation to the Innu territorial assertions. | In section 7, the Agency indicated the possible overlaps between First Nations' territorial assertions. The Agency has indicated to NHW that this issue, however, goes beyond the scope of environmental assessment. |
| Grand Council of the Waban-Aki Nation (GCNWA) | | | |
| Fish and their habitats | Concerns about the effects of the project on migratory fish species moving to Wabanakiak | According to the proponent's analysis, the potential effects during the exploitation phase on special status fish species would affect juvenile and adult striped bass, juvenile Atlantic sturgeon | The Agency is of the opinion that the project would result in significant adverse residual environmental effects on fish and fish habitat, including aquatic invertebrates and special |



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| | <p>practice sites: lake sturgeon, Atlantic sturgeon, striped bass.</p> <p>The GCNWA also indicated that it would like to be kept informed of expert advice on these species and any related information.</p> | <p>and adult and juvenile lake sturgeon, which mainly use the St. Charles River estuary as feeding habitat. The proponent undertakes to keep Wabanaki representatives consulted and informed about the proposed compensation plan to offset the effects of the destruction and alteration of fish habitat, which aims to provide similar or higher quality feeding habitat for the affected species.</p> | <p>status species due to the destruction and permanent alteration of habitat. The project would cause significant habitat loss and negatively affect several species, including striped bass, lake sturgeon, Atlantic sturgeon and American shad. In particular, Fisheries and Oceans Canada considers that the losses of fish habitat that would result from the project have not been sufficiently avoided, mitigated and compensated and that the project would result in negative effects on fish and fish habitat. The Agency has identified measures that could mitigate several potential effects of the project in section 5.4. However, these measures taken together would not sufficiently mitigate the potential effects of the project to render the residual effects insignificant.</p> <p>The Agency forwarded DFO's final advice regarding the effects of the project on fish and fish habitat, including effects on migratory species, to the First Nation. A meeting was also organized by the Agency between DFO and GCNWA representatives regarding this advice.</p> |
| | <p>Concerns about the impact of impacts on migratory fish species on community fisheries, lived experience and intergenerational transmission.</p> | <p>According to the proponent, the fish habitat modifications related to the Laurentia project will not have a significant negative effect on the Waban-Aki Nation's fisheries, neither during the construction phase nor during the operational phase. The proponent is of the opinion that the project will not have a significant negative effect on the experience of the territory, on the governance capacity of Wabanakiak on fisheries resources and on the intergenerational transmission of their knowledge. This opinion is</p> | <p>Sections 5.9 and 7 on current traditional uses and rights incorporate an analysis of the effects of the project on these components (Impact pathways - Resource - Access - Experience).</p> <p>The Agency is of the opinion that the project would result in significant adverse residual environmental effects on the current use of</p> |



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| | | <p>based primarily on the proponent's arguments that the project will not have a significant adverse effect on fish habitat.</p> | <p>lands and resources for traditional purposes and, in particular, on the fishing activities practised by the W8banaki Nation due to the effects of the project on fish and fish habitat. According to the Agency, the effects of the project on migratory fish species fished by W8banakiak could have repercussions on cultural practices, such as the transmission of knowledge, surrounding fishing.</p> |
| | <p>Importance of consulting W8banakiak on the compensation plan to ensure that the measures put in place will be sufficient for the Nation's members.</p> | <p>The Proponent has committed to keeping the Nation up to date on its proposed compensation plan.</p> | <p>As part of the consultation on this report, discussions will continue with the W8banaki Nation regarding compensation measures related to the impacted uses and rights. Considering that no compensation project would be able to offset the loss of fish habitat, the Agency considers that the mitigation measures related to fish and fish habitat would not sufficiently mitigate the potential effects of the project to render the residual effects, including those on traditional uses and rights, insignificant.</p> |
| Maritime transport | <p>Concern regarding the project's impact on the increase in maritime traffic in the Lake Saint-Pierre sector and more generally on the cumulative effects of maritime transport: erosion caused by bailing, effects on uses, erosion and disappearance of important sites, access to</p> | <p>The proponent states that no increase in marine traffic is expected between Québec City and Montréal and that the assessment of the cumulative effects of marine transportation is outside the scope of the environmental assessment of the project.</p> <p>The proponent indicates that the risk of contamination of the mule mussel (freshwater mussel) population by ships' ballast water will be accentuated by the modification of ships' transit and by the greater capacity of these ships involving larger ballast volumes.</p> | <p>The Agency shared information regarding the anticipated increase in marine traffic to the First Nation.</p> <p>Although the increase in marine traffic outside the project study area is outside the scope of the environmental assessment, the Agency has incorporated the MCK's concerns into section 7 on Aboriginal and Treaty Rights.</p> <p>The Agency has detailed the main measures likely to reduce the risk of accidents and malfunctions in section 6.1. The Agency is</p> |



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| | <p>the river, invasive alien species.</p> | <p>For the construction phase, the proponent proposes to inspect dredges and other watercraft used in the aquatic environment before they arrive on the construction site to ensure that they are free of invasive alien species.</p> | <p>satisfied with the information provided by the proponent confirming that the vessels targeted by the Laurentia project would not be able to travel to Montréal due to insufficient water depth and that no increase in traffic generated by the project is expected between Québec City and Montréal. Consequently, no effect related to the maritime transport generated by the project is expected on the access and experience in the territory by W8banakiak.</p> <p>The Agency has identified measures proposed by the proponent that could mitigate the effects of invasive species on mules in section 5.4.</p> |
| Cumulative effects | <p>Concerns about the cumulative effects of the project and the various port projects on the ecosystems and the uses and rights of W8banakiak.</p> <p>The Grand Council of the Waban-Aki Nation and the Council of the Huron-Wendat Nation supported the request for a regional assessment submitted by the Mohawk Council of Kahnawà:ke to the Minister of the</p> | <p>The proponent mentions that the increase in navigation on the St. Lawrence River due to the various port expansion projects underway or under evaluation could have consequences on fishing practices and on the experience of First Nations. It could also imply a loss of peaceful enjoyment of the territory for users of the water body and induce a perception of increased disturbance of the territory.</p> | <p>The Nation's concerns have been incorporated into section 7 on Rights Impact Assessment. Cumulative effects are among the criteria used to assess the extent of the project's impacts on rights. According to the Agency, in relation to cumulative effects on fishing rights, the impacts on rights would be of high severity.</p> <p>Section 6.3 presents an assessment of the cumulative effects of the project on current traditional uses.</p> <p>The GCNWA supported the request for a regional assessment on the St. Lawrence River submitted to the Minister of the Environment by the Mohawk Council of Kahnawà:ke. Over the coming months, the Agency will launch an engagement process</p> |


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| | Environment and Climate Change in July 2020. | | with federal and provincial authorities, other interested First Nations and non-governmental organizations. The results of this process must be shared with the Minister no later than the spring of 2021, so that he can make a final decision on the conduct of a regional assessment. |
| Consultation and Rights Impact Assessment | Late integration of the rights impact assessment methodology: the application of the proposed methodology requires that information needs be planned in collaboration with the communities concerned before the impact assessment guidelines are published. | Not applicable | The Agency presented the new fee impact assessment methodology to the GCNWA in March and October 2019. The Agency has incorporated GCNWA's reservations regarding the use of the methodology in chapter 7 of this report. |
| Wolastoqiyik (Maliseet) Wahsipekuk First Nation (WWFN) | | | |
| Maritime transport | Concerns about the impacts of an increase in maritime traffic on the St. Lawrence River and particularly on the beluga whale nursery located in Cacouna. | According to the proponent, the increase would be 3 boats per week, or about 156 more boats per year. Beluga whales are not included in the environmental assessment of the project because they are not found in the study area. | Information regarding the expected increase in marine traffic was shared with the First Nation. Although the increase in vessel traffic outside of the Project study area is outside the scope of the environmental assessment, the Agency has incorporated WWFN's concerns into section 7 on Aboriginal and Treaty Rights. |
| Cumulative effects | Concern about the cumulative effects of the various port projects, especially on fishing | The proponent mentions that the increase in navigation on the St. Lawrence River due to the various port expansion projects underway or under evaluation could have consequences on fishing practices and on the experience of First Nations. It could also imply a loss of peaceful | The Nation's concerns have been incorporated into section 7 on Rights Impact Assessment. Cumulative effects are among the criteria used to assess the extent of the project's impacts on rights. According to the Agency, in relation to cumulative effects on |



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| | | enjoyment of the territory for users of the water body and induce a perception of increased disturbance of the territory. | fishing rights, the impacts on rights would be of high severity. Section 6.3 presents an assessment of the cumulative effects of the project on current uses for purposes. |
| Essipit Innu First Nation (EIFN) | | | |
| Fish and its habitat | The First Nation would have liked the proponent to talk about potential negative effects on all fish species, not just migratory species. Resources harvested by the Innu: cod, redfish, capelin, American pout, sea trout, smelt and herring. | The proponent provided information confirming that the fish species cited by the First Nation do not frequent the project area, with the exception of smelt. The project would affect rearing areas particularly used by rainbow smelt. The proponent is proposing a compensation plan to offset the effects of the destruction and modification of fish habitats, which aims to develop feeding habitats of similar or higher quality for the affected species. | The Agency is satisfied with the proponent's responses, which specify that apart from smelt, none of the other fish species cited by the First Nation are found in the project area. The Agency relies on the advice of Fisheries and Oceans Canada, which considers some of the proponent's compensation proposals to be relevant to offset losses to certain habitats and valued species, such as yellow walleye or rainbow smelt. |
| Special status species | Questioning on the authorization of the project and the <i>Species at Risk Act</i> (striped bass). | Not applicable | The Agency provided preliminary and final advice from DFO on the effects of the project on fish and fish habitat. In its final opinion, DFO indicated that under the current state of affairs and the current status of striped bass, the project would not be authorized under the <i>Species at Risk Act</i> . |
| Maritime transport | Concerns related to the increase in marine traffic and the risk of accidents and the effects on traditional practices, rights, beluga whales, species of interest and the related economy, | According to the proponent, the increase would be 3 boats per week, or about 156 more boats per year. Beluga whales are not included in the environmental assessment of the project because they are not found in the study area. The proponent shared information with the First Nation regarding marine safety regulations. The | The Agency shared information regarding the anticipated increase in marine traffic to the First Nation. Although the increase in marine traffic outside the project study area is outside the scope of the environmental assessment, the Agency has integrated the concerns of the Innu First |


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| | <p>user safety and invasive alien species.</p> | <p>proponent used the TERMPOL review to analyze the risks associated with marine transportation.</p> | <p>Nations in section 7 on Aboriginal and treaty rights.</p> <p>The Agency has identified the main measures that could reduce the risk of accidents and malfunctions in section 6.1.</p> |
| Cumulative effects | <p>Request that Federal Government conduct a regional assessment to assess the cumulative effects of navigation on a regional scale.</p> <p>Questioning the Agency's ability to assess cumulative effects in a comprehensive manner</p> | Not applicable | <p>No regional assessment has been initiated under CEAA 2012. A request for a regional assessment on a portion of the St. Lawrence River under the <i>Impact Assessment Act</i> was filed with the Minister of the Environment and Climate Change in July 2020. The Minister of the Environment (the Minister) determined on October 27, 2020, that such regional assessment has potential benefits at various levels. In order to deepen the analysis and to help define the nature, scope, objectives and results of such a assessment, the Agency will, in the coming months, launch an engagement process with federal and provincial authorities, other interested First Nations and non-governmental organizations. The results of this process must be shared with the Minister no later than the spring of 2021, so that he can make a final decision on the conduct of a regional assessment.</p> |
| Aboriginal and Treaty Rights | <p>The First Nation questions the credibility of the proponent's source that gives the opinion of Mr. René Boudreault on the southwestern part of</p> | <p>Changes were made to the baseline for Indigenous peoples by the proponent.</p> | <p>The information provided by the First Nation regarding the southwestern portion was incorporated by the Agency in its Rights Impact Assessment and Section 7 on Aboriginal and Treaty Rights.</p> |


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| | Nitassinan. The First Nation would like to point out that the southwestern part appeared in the negotiations following the Delgamuuk decision and was a complex subject of discussion. | | |
| Consultation and Rights Impact Assessment | Inherent limitations of the process regarding the assessment of fees by proponents and the Agency. Complexity of finding one's way through the many documents transmitted since the project began in 2015. | Not applicable | In July 2019, the Agency presented the new rights impact assessment methodology to the Innu First Nations. The Agency has incorporated the NCBI's reservations regarding the use of the methodology in section 7 of this report. |
| Pekuakamiulnuatsh First Nation (PFN) | | | |
| Birds and their habitats | The PFN raises an issue regarding nest boxes for the Shore Swallow, a species designated as threatened under the <i>Species at Risk Act</i> that may be impacted by this project. | The proponent conducted an inventory of the presence of shore swallows and built a nesting box in 2015, moved in 2018 and then 2019. Monitoring of the new nesting box (2018) has shown that it is used intensively by the swallows. | The Agency is satisfied with the information provided by the proponent on the monitoring of the use of the nesting boxes installed in 2018 (moved to 2019). The Agency relies on the advice of the Canadian Wildlife Service of Environment and Climate Change Canada, which was satisfied with the results indicating that the nesting box is being used by the species. Thus, according to the Agency, the 11 pairs of barn swallows would not be affected by the project. The Agency has identified the main mitigation and follow-up measures to mitigate the effects on the shore swallow, including continued monitoring of the use of the artificial nesting box. |



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| Fish and its habitat | <p>Concern about the impacts of dredging. PFN calls for a long-term monitoring program in collaboration with the responsible authorities. During monitoring, if negative residual effects are identified on nearby habitats, the proponent should take corrective or compensatory measures.</p> <p>The loss of 12.9 ha of habitat due to dredging must be minimally compensated by an ecologically equivalent area. A compensation program must include an additional area to offset the residual effects on surrounding habitats resulting from the operation of the wharf. Also, an additional area should compensate for the response time (effectiveness) when compensation measures are put in place.</p> | <p>In order to reduce the effects of the project and ensure a certain efficiency during dredging, the proponent favours hydraulic dredging for non-contaminated sediments and mechanical dredging for the surface layer, contaminated sediments and sediments surrounding contaminated sediments.</p> <p>The proponent submitted a compensation program to offset the effects of the destruction and alteration of fish habitat, which is intended to provide similar or higher quality feeding habitat.</p> | <p>The Agency notes that dredging would result in the loss of feeding and relocation habitat for both sturgeon species.</p> <p>The Agency is relying on advice from Environment and Climate Change Canada to determine that the rigorous implementation of mitigation, monitoring and follow-up measures during the various phases of the project would reduce the effects of sediment management and dredging activities on the aquatic environment.</p> <p>The Agency has identified key measures that could mitigate several potential effects of the project on fish in section 5.4, including the effects of dredging.</p> |
| Maritime transport | Concerns about the impacts of maritime | According to the proponent, the increase would be 3 boats per week, or about 156 more boats per year. | Information regarding the expected increase in marine traffic was shared with the First Nation. |


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| | transport on beluga whales. | Beluga whales are not included in the environmental assessment of the project because they are not found in the study area. | Although the increase in marine traffic outside the project study area is outside the scope of the environmental assessment, the Agency has integrated the concerns of the Innu First Nations in section 7 on Aboriginal and treaty rights. |
| Cumulative effects | Concerns about the cumulative effects of port and plant projects along the St. Lawrence Seaway. | A concern outside the scope of the environmental assessment for the proponent. | <p>PFN's concerns have been incorporated into section 7 on Rights Impact Assessment. Cumulative effects are one of the criteria used to assess the extent of the project's impacts on rights. According to the Agency, in relation to cumulative effects on fishing rights, the impacts on rights would be of high severity.</p> <p>The Agency assesses the cumulative effects of the project in combination with the effects of other past, present and reasonably foreseeable projects on the current use of lands and resources for traditional purposes within appropriate geographic and temporal boundaries (section 6.3).</p> |
| | Requests that the Federal Government conduct a regional assessment to assess the cumulative effects of navigation on a regional scale. | Not applicable | <p>No regional assessment has been initiated under CEAA 2012. A request for a regional assessment on a portion of the St. Lawrence River under the <i>Impact Assessment Act</i> was submitted to the Minister of the Environment and Climate Change in July 2020. Over the coming months, the Agency will launch an engagement process with federal and provincial authorities, other interested First Nations and non-governmental organizations. The results of this process must be shared with the Minister no later than the spring of</p> |


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| | | | 2021, so that he can make a final decision on the conduct of a regional assessment. |
| Aboriginal and Treaty Rights | The First Nation questions the credibility of the proponent's source that gives the opinion of Mr. René Boudreault on the southwestern part of Nitassinan. The First Nation would like to point out that the southwestern part appeared in the negotiations following the Delgamuuk decision and was subject to complex discussions. | The reference in question has been removed and an adjustment is made to the presentation of indigenous peoples by the proponent. | The information provided by the First Nation regarding the southwestern portion was incorporated by the Agency in its Rights Impact Assessment and section 7 on Aboriginal and Treaty Rights. |
| Consultation and Rights Impact Assessment | According to the First Nation, there is no real tool to enable the proponent to get a fair picture of the impacts of its project and the cumulative effects on the rights of First Nations. As a result, the proponent's assessment of the impacts on rights is unsatisfactory. | Not applicable | <p>The cumulative effects of the project on rights are assessed by the Agency in section 7 and based on the new Rights Impact Assessment methodology was presented to the First Nation in July 2019.</p> <p>Cumulative effects on uses are assessed in chapter 6.3.</p> |
| Pessamit Innu First Nation (PIFN) | | | |
| Fish and its habitat | The Innu Council of Pessamit would like more information on fish habitat compensation plans. | The proponent submitted a compensation program to offset the effects of the destruction and alteration of fish habitats, including the development of feeding habitats of similar or higher quality. | Section 5.4 of this report presents the baseline conditions as well as the potential effects of the project on fish and fish habitat. |



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| | | | <p>The Agency is of the opinion that the project would result in significant adverse residual environmental effects on fish and fish habitat, including aquatic invertebrates and special status species due to the destruction and permanent alteration of habitat. The project would cause significant habitat loss and negatively affect several species, including striped bass, lake sturgeon, Atlantic sturgeon and American shad.</p> <p>The Agency forwarded DFO's final advice regarding the effects of the project on fish and fish habitat, including effects on migratory species, to the First Nation.</p> <p>The Agency has identified the main measures likely to mitigate several potential effects of the project in section 5.4. However, these measures taken together would not sufficiently mitigate the potential effects of the project to render the residual effects insignificant.</p> |
| Socio-economic conditions | The proponent must include in the mitigation measures actions aimed at taking into account the particularities of the workforce, socio-economic catch-up initiatives and strategies encouraging the integration, development | The proponent has indicated that it will put in place a mechanism to inform First Nations representatives of employment opportunities and potential calls for tenders, in the form of email messages, when they arise. However, the proponent has indicated that it cannot guarantee or reserve a number of jobs for First Nations members. | <p>The Agency asked the proponent questions about how the proponent plans to promote the integration and development of the Indigenous workforce.</p> <p>In its environmental assessment, the Agency considers the effects of changes to the environment on economic issues. The Agency does not assess direct effects on job creation under CEAA 2012.</p> |


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| | and valorization of the Indigenous workforce. | | |
| Maritime transport | Concerns about the impacts of an increase in maritime traffic on the river (accident risks and environmental effects for coastal communities, traditional activities, economic). | The proponent has indicated that the increase would be from 1 to 3 vessels per week and will share information with the First Nation regarding regulations related to marine safety. | Information regarding the expected increase in marine traffic was shared with the First Nation. Although the increase in marine traffic outside the project study area is outside the scope of the environmental assessment, the Agency has integrated the concerns of the Innu First Nations in section 7 on Aboriginal and treaty rights. Section 6.1 identifies the risks inherent to the project as well as the key mitigation measures related to the risks of accidents and malfunctions. |
| Cumulative effects | Concerns about the cumulative effects of different projects on Nitassinan. Questions about the possibility for the Agency to assess cumulative effects in a comprehensive manner. | A concern outside the scope of the environmental assessment for the proponent. | The Agency assessed the project's impact on rights, section 7, including the cumulative effects criterion. Section 6.3 presents the assessment of the cumulative effects of the project on current uses for traditional purposes. |
| Mohawk Council of Kahnawà:ke (MCK) | | | |
| Project Rationale | Requires a demonstration of the need for and viability of the project. Questions regarding the economic justification of the project. | The proponent presented information on the rationale for the project, based in part on the current shortage of space and congestion at the terminals. According to the proponent, the expansion of the Port of Québec will help take full advantage of the assets of the St. Lawrence trade corridor and the opportunities for Canada in | Several questions related to the project's rationale were forwarded to the proponent, and the proponent's responses to these questions are available on the Canadian Environmental Assessment Registry. The Agency may request clarification on the economic issue that justifies the project, but |



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| | | <p>international trade (Englobe, 2020a). The proponent presented the project's rationale and location at a meeting held in November 2018 and indicated its willingness to meet again with MCK representatives to discuss the project further, if necessary.</p> | <p>does not comment on the accuracy of the information provided. Elements concerning the project justification are found in section 4 of this report.</p> |
| Fish and its habitat | <p>Concern about the implementation of a compensation plan for the 20 ha lost. Concerns about effects on fish and fish habitat, specifically: striped bass, lake sturgeon and American shad. The MCK requires complete information regarding fish and fish habitat and planned compensation plans.</p> | <p>The potential effects of the project on aquatic fauna and its habitats were assessed by the proponent in its impact statement. Additional information was shared in its responses to the Agency's requests for information.</p> <p>The proponent submitted a compensation program to offset the effects of the destruction and alteration of fish habitats, including the development of feeding habitats of similar or higher quality.</p> | <p>Section 5.4 of this report presents the baseline conditions as well as the potential effects of the project on fish and fish habitat.</p> <p>The Agency is of the opinion that the project would result in significant adverse residual environmental effects on fish and fish habitat, including aquatic invertebrates and special status species due to the destruction and permanent alteration of habitat. The project would cause significant habitat loss and negatively affect several species, including striped bass, lake sturgeon, Atlantic sturgeon and American shad. The Agency is relying on the advice of Fisheries and Oceans Canada, which considers that compensation for lost spawning habitat would not be possible given the nature and complexity of the features that are attractive to striped bass. The harmful effects of the project could not be mitigated, avoided or controlled by measures consistent with the recovery plan for the species.</p> <p>The Agency forwarded DFO's final advice regarding the effects of the project on fish and fish habitat, including effects on migratory species, to the First Nation. Two meetings were also organized by the Agency between</p> |



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| | | | <p>DFO and MCK representatives regarding this advice.</p> <p>The Agency has identified the main measures likely to mitigate several potential effects of the project in section 5.4. However, these measures taken together would not sufficiently mitigate the potential effects of the project to render the residual effects insignificant.</p> |
| | <p>Aboriginal and stewardship rights related to striped bass, sturgeon and American shad.</p> | <p>Not applicable</p> | <p>The Agency has assessed the impacts of the project on Aboriginal and treaty rights in section 7 of this report. The Agency concludes that the project will have a high degree of impact on rights, particularly due to impacts on the right to fish. The stewardship component was also included in the Agency's assessment.</p> |
| <p>Maritime transport</p> | <p>Concerns about the increase in maritime traffic and its effects on access to the river and the practice of rights by members.</p> <p>Concerns regarding mitigation measures related to transportation.</p> | <p>The proponent states that no increase in marine traffic is expected between Québec City and Montréal and that the assessment of the cumulative effects of marine transportation is outside the scope of the environmental assessment of the project.</p> | <p>The Agency shared information regarding the anticipated increase in marine traffic to the First Nation.</p> <p>Although the increase in marine traffic outside the project study area is outside the scope of the environmental assessment, the Agency has incorporated the MCK's concerns into section 7 on Aboriginal and Treaty Rights.</p> <p>The Agency identified the main measures likely to reduce the risk of accidents and malfunctions in section 6.1. According to the Agency, no increase in traffic generated by the project is expected between Québec City and Montréal. Consequently, no effect related to marine transportation generated by the project</p> |



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| | | | <p>is expected on access and experience in the territory by the Mohawks of Kahnawà:ke.</p> <p>A meeting dealing specifically with marine transportation was organized by the Agency with the MCK and Transport Canada.</p> |
| | <p>Concerns about the introduction of invasive species from ships.</p> | <p>The proponent indicates that the risk of contamination of the mule mussel (freshwater mussel) population by ships' ballast water will be accentuated by the modification of ships' transit and by the greater capacity of these ships involving larger ballast volumes.</p> <p>For the construction phase, the proponent proposes to inspect dredges and other watercraft used in the aquatic environment before they arrive on the construction site to ensure that they are free of invasive alien species.</p> | <p>The Agency held a meeting with MCK during which Transport Canada responded to this concern by presenting federal regulations in terms of ballast water management.</p> |
| Cultural Heritage | <p>An archaeological survey should be conducted prior to the start of work and not only if artifacts are discovered during the construction period.</p> | <p>In addition to the archaeological potential study, an underwater geophysical survey and a sediment profiler survey were carried out in the construction site by the proponent. The proponent proposed an archaeological intervention plan that it would implement prior to the start of work and continue throughout all phases of the project.</p> | <p>The Agency has identified the main measures likely to reduce the potential effects on cultural heritage in section 5.10, including the presentation to First Nations who have expressed the wish to do so, of the results of the work planned in the archaeological plan and the annual report on the results of the archaeological monitoring.</p> |
| Cumulative effects | <p>Numerous concerns related to the cumulative effects of various projects along the St. Lawrence, particularly port projects and the resulting increase in maritime traffic (effects</p> | <p>A concern outside the scope of the environmental assessment for the proponent.</p> | <p>MCK's concerns have been incorporated into section 7 on Rights Impact Assessment. Cumulative effects are among the criteria used to assess the extent of the project's impacts on rights. According to the Agency, in relation to cumulative effects on fishing rights,</p> |



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| | <p>on fishing rights, cultural practices, language, transmission of knowledge).</p> | | <p>the impacts on rights would be of high severity.</p> <p>The Agency assesses the cumulative effects of the project in combination with the effects of other past, present and reasonably foreseeable projects on the current use of lands and resources for traditional purposes within appropriate geographic and temporal boundaries (section 6.3).</p> |
| | <p>Request from MCK to conduct a regional assessment forwarded to the Minister of Environment and Climate Change in July 2020 under subsection 97(1) of the <i>Impact Assessment Act</i>. According to the MCK, this assessment is necessary for the Crown to fulfill its duty to consult.</p> | <p>Not applicable</p> | <p>A meeting was held between the Agency and the MCK regarding this request.</p> <p>The Minister of the Environment (the Minister) has determined that such regional assessment has potential benefits at various levels. In order to deepen the analysis and help define the nature, scope, objectives and results of such assessment, the Agency will, over the coming months, launch an engagement process with federal and provincial authorities, the MCK, other interested First Nations and non-governmental organizations. The results of this process, to be shared with the Minister no later than the spring of 2021, will enable him to make a final decision on the conduct of a regional assessment.</p> <p>However, the regional assessment cannot be completed before the completion of the environmental assessment of the Laurentia project.</p> |


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| | The MCK has requested further discussions with the Agency on the issue of cumulative effects. | Not applicable | Consultation with the Agency is ongoing. Consultation on the Agency's draft report may, at the request of the MCK, include a meeting on the issue of assessing the cumulative effects of the project. |
| Aboriginal and Treaty Rights | Iroquoian presence in the Beauport area. The MCK requested modifications to the reference conditions presented by the proponent concerning Indigenous peoples and the presence of Mohawks in the study area. The MCK asserts that it holds rights in the study Area. | The proponent has made changes related to the presence of Iroquoian groups in the study area. | The Agency has incorporated information shared by the MCK regarding their rights and historical presence in the study area into the rights impact analysis and section 7. |