



RECONSTRUCTION OF WHARFS 104, 105 AND 106 PORT OF QUEBEC – ANSE AU FOULON SECTOR

Project notice

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NOTICE TO READERS

This project notice is produced and published as part of the Port of Québec's Impact Assessment and Mitigation Process (IAMP). This process is intended as a tool to enable the Port to meet the legal obligations of port authorities under the Canadian *Impact Assessment Act* (IAA, 2019), but also as a means of communicating information to the public. For Level 2 projects (see Framework Procedure¹), mechanisms for consulting the public and affected Indigenous peoples are provided for. In addition, an environmental impact assessment is required. This will make it possible to determine whether the project's impacts are consistent with the provisions of the IAA and whether additional mitigation measures should be considered.

This document is therefore a first opportunity to present the project to rebuild wharfs 104, 105, and 106 in the context of the IAMP. It is the first step in a structured impact assessment process, providing the information currently available based on the technical progress of the project design. In this regard, as explained in the project notice, the Port of Québec has chosen to work in a progressive design-build mode. The project will therefore be able to evolve as stakeholders make decisions related to the proposed concept.

¹ <https://www.portquebec.ca/environnement/processus-devaluation-et-dattenuation-des-impacts/>



TABLE OF CONTENTS

1. CONTEXT	1
2. CURRENT SITUATION AND SCENARIOS ANALYZED	2
3. PROPOSED RECONSTRUCTION OPTIONS	2
4. LOCATION OF THE WORK SITE	5
5. FEDERAL AUTHORITIES INVOLVED.....	5
6. METHOD OF IMPLEMENTATION	6
7. PROPOSED WORKS	7
7.1 Site preparation	9
7.2 Construction.....	9
7.3 Decommissioning of the construction site	10
7.4 Commissioning of the wharfs.....	10
8. TIMELINES.....	10
9. POTENTIAL ENVIRONMENTAL EFFECTS.....	11
9.1 Envision™ Silver Certification.....	12
10. NAVIGATION INFORMATION	12
11. CONTACT.....	13
APPENDIX A - Photographic Directory.....	14

LIST OF FIGURES

Figure 1. Location of wharfs 104, 105, and 106.....	5
Figure 2. Plan view of sheet pile cells	7
Figure 3. Typical cross-section of sheet pile cells	8



1. CONTEXT

Almost a century old, wharfs 104, 105, and 106, located in the Anse au Foulon sector, were built between 1925 and 1931. They have historically been used for loading and unloading ships carrying a variety of products, mainly grain and wood pellets at present. These infrastructures are of fundamental importance to the Port of Québec in maintaining the organization's economic mission and ensuring the sustainability of the supply chain, which is crucial for the region, Québec, and Canada. These wharfs play a key role in the journey that takes goods from the producer to the end customer. Ports are key points in this chain, as they ensure the passage, storage, sorting, and smooth flow of global consumer goods transportation.

With a total length of approximately 623 m, these wharfs are made up of wooden caissons topped with a concrete coping wall. The minimum water depth is 10.3 m at wharf 104 and 11.3 m at wharfs 105 and 106, which allows them to accommodate ships carrying bulk cargo such as grain and wood pellets.

Although these wharfs have undergone multiple repairs over time, they have now reached the end of their useful life, as evidenced by expert assessments and numerous follow-ups carried out in recent years. The project to rebuild wharfs 104, 105, and 106 (the Project) aims to replace century-old port infrastructure that has reached the end of its useful life and, in doing so, ensure the continuity of operations at the Port of Québec, preserve the supply chain, and support the regional and national economy. It is part of a vision of sustainability, climate resilience, and long-term asset performance, while reducing the risk of service disruptions and strengthening the competitiveness of Canadian foreign trade. Without this work, even greater operational limitations than those already observed are to be expected and, ultimately, wharfs could be closed due to the end of their life cycle.

2. CURRENT SITUATION AND SCENARIOS ANALYZED

Over the years, multiple interventions have been carried out to stabilize wharfs 104 to 106 and extend their life cycle. These interventions were completed in 2015 with the addition of tie rods to stabilize the crown walls. These temporary works were intended solely to delay the need for reconstruction.

Since then, the structures have continued to deteriorate, leading to increasingly restrictive load restrictions that directly affect port operations and weaken the supply chain.

In this context, the Port of Québec asked CIMA+ to conduct a study to analyze various stabilization solutions. For wharfs 104 and 105, it recommended underpinning or the construction of a load-bearing floor, combined with the addition of anchor rods. For wharf 106, it proposed the installation of a combined pile-sheet pile wall to confine the wooden caissons. Although these measures would extend the life of the wharfs by 10 to 20 years, the fact remains that the basic structures are aging and that these solutions, all of which are very costly, have a fairly limited lifespan.

In light of these findings, the Port of Québec conducted a risk analysis to evaluate three scenarios: the status quo, the implementation of the stabilization work mentioned above (extending the useful life by 10 to 20 years), and the complete reconstruction of wharfs 104, 105, and 106. The results of the analysis show that the latter option is the most advantageous scenario, particularly because of the significantly higher costs associated with implementing the other options in relation to their expected lifespan.

The stabilization options are excessively costly and do not allow the infrastructure to be used to its full capacity. These are temporary solutions compared to the reconstruction options, which do not guarantee that the entire infrastructure will be preserved, particularly given the presence of a layer of loose soil. This characteristic suggests that significant related work may also need to be considered to consolidate the soil under the wooden caissons. In any case, stabilization options would not be able to sufficiently secure aging structures such as the crown walls.

As for the option of maintaining the status quo, it is impossible for the Port of Québec to assume such a risk, given the considerations outlined in the background section. The deterioration of the wharfs is too advanced for this option to be considered, as it would pose a significant risk to the supply chain and force the adoption of restrictive measures to ensure the safety of workers.

For these reasons, the Port of Québec proposes rebuilding the three wharfs. The reconstruction options were analyzed in a feasibility study and are summarized in the following section.

3. PROPOSED RECONSTRUCTION OPTIONS

Following the risk analysis, which highlighted that the status quo and stabilization were very unsustainable solutions, the Port of Québec commissioned CIMA+ to conduct a feasibility study on the reconstruction of wharfs 104, 105, and 106. Three options proved to be the most



promising: the construction of a combined pile-sheet pile wall, concrete caissons, and sheet pile cells.

The combined pile-sheet pile wall consists of sheet piles driven into the ground and interspersed with more rigid structural elements, such as tubular piles or H-type piles. For this option, the wall could either be built as a continuous extension of Wharf 103 or directly in front of the existing facade of Wharfs 104, 105, and 106. The option of aligning with platform 103 presented several challenges, particularly in terms of maintaining operations and providing lateral support for the embankment between the existing wall sections. It also posed significant challenges during the construction phase, particularly in terms of environmental impact.

The other option, which involves installing a combined pile-sheet pile wall in front of the existing line of wharfs 104, 105, and 106, is the only solution that minimizes encroachment on the seabed. However, installing the tie rods needed to hold the sheet piles in place would have required extensive excavation of the embankment if it had been built directly along the existing wharf line. This excavation would have greatly disrupted port operations during the approximately 33 months needed to rebuild the wharfs. This solution, with anchor rods distributed very evenly in the ground, would also have compromised the possibility of installing surface structures and limited storage capacity. In addition, maintaining the enclosed configuration of the wharfs, aggravated by their undermining, increases the risks of approach, which limits the use of tugs and bow thrusters.

The construction of concrete caissons in front of the existing wharf line would offer a longer service life than the other solutions studied. However, it is the most time-consuming construction solution (work lasting approximately 49 months), in addition to generating direct costs that could be up to twice as high as those of the other options. This configuration would involve aligning the facades of wharfs 104, 105, and 106 with that of wharf 103, which would increase the area of the current storage zone. For the caisson foundation, it would be necessary to dredge approximately 73,000 m³ of sediment (more than double that of the selected solution), in addition to carrying out stabilization work on the existing soil. However, the volumes of soil to be excavated would remain negligible compared to those required for the implementation of the combined pile-sheet pile wall.

The solution of constructing sheet pile cells in front of the existing wharf facade would require less excavation work behind the wharf than the combined pile-sheet pile wall, as well as a smaller volume of dredged sediment than that required for the construction of concrete caissons (estimated at approximately 30,000 m³). It is also the solution with the lowest direct cost estimate, although it has the shortest service life. Like the concrete caisson option, rebuilding the wharfs using sheet pile cells would force alignment with Wharf 103, thereby increasing the existing storage area for Wharfs 104, 105, and 106. According to estimates, this solution could be implemented in as little as 30 months.

An important factor in analyzing the possible reconstruction options is the current shape of the line of wharfs 101 to 106. The enclosed configuration of the wharfs creates a break in alignment that increases approach risks. These risks are exacerbated by the undermining of the berths, which limits the use of tugs and bow thrusters. The protrusion of berth 103 also generates a backwash that pushes ships. The proposed alignment, with concrete caissons or sheet pile cells, will eliminate these constraints and significantly improve maneuvering safety and, by extension, the operational flexibility of this line of wharfs.



An analysis based on environmental, operational, technical, and economic criteria was carried out to compare the various solutions for the complete reconstruction of the wharfs that could be considered. At the end of this analysis, the solution consisting of continuously extending the line of wharf 103 with sheet pile cells was selected.



4. LOCATION OF THE WORK SITE

The project is located in Quebec City, at the Port of Quebec, in the Anse au Foulon sector, along Champlain Boulevard (Figure 1). Wharfs 104, 105, and 106, which are the focus of the reconstruction project, are located on the north shore of the St. Lawrence River. The terminals served by these wharfs are used by Sollio Agriculture, Parrish and Heimbecker, and QSL, which handle bulk cargo (grain, wood pellets, salt, and sugar) and general merchandise.

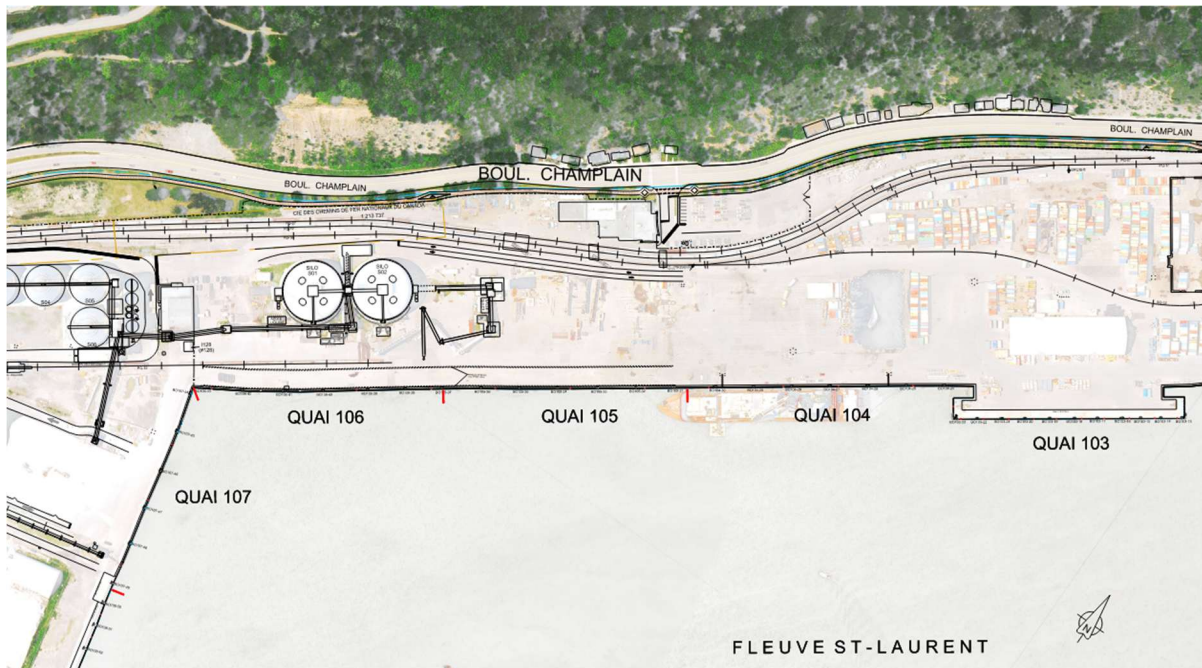


Figure1 . Location of wharfs 104, 105, and 106

5. FEDERAL AUTHORITIES INVOLVED

The Project is located within the administrative boundaries of the Port of Québec, and therefore on Crown land. Consequently, and in accordance with the Port's Impact Assessment and Mitigation Process (IAMP), the Project will require an environmental impact assessment under section 82 of the Impact Assessment Act (IAA). Otherwise, a request for review to determine the nature of the permits required must be submitted to Fisheries and Oceans Canada (DFO). It is agreed that, at a minimum, a permit under the Fisheries Act (R.S.C. [1985], c. F-14) will be required.

6. METHOD OF IMPLEMENTATION

The implementation method selected for the Project is progressive design-build (PDB). The Project will be carried out through a collaborative approach between the Port of Québec, designers, builders, and port partners. The Port wants the overall success of the Project (taking into account technical, operational, environmental, and operational maintenance constraints and issues) to be at the heart of all decisions and discussions, and for all stakeholders to be fully focused on this objective.

This collaboration will take the form of co-design workshops, shared governance mechanisms, and transparency in technical and financial decisions. The goal is to foster lasting synergy among stakeholders, support decisions that are aligned with the best interests of the Project, and optimize the solutions selected. This will ensure the effective, consistent, and safe implementation of activities throughout the Project's life cycle.



7. PROPOSED WORK

The main part of the planned work involves driving sheet piles until a competent soil layer is reached. These sheet piles will form cells approximately 22 m in diameter. These cells will then be connected by circular arcs of sheet piles on both the river and land sides. The junction between the new cells and one of the two ends (wharf 103 or wharf 107) will be constructed using a combined pile-sheet pile wall.

The sheet pile cells will be positioned in front of the existing facade of wharfs 104, 105, and 106 and will be aligned so as to extend the line of wharf 103 until it intersects with wharf 107. Advancing the facade of wharfs 104, 105, and 106 by approximately 25 m from their current alignment will increase the wharf area by approximately 16,000 m². A platform will also be built to allow for the continuity of port operations.

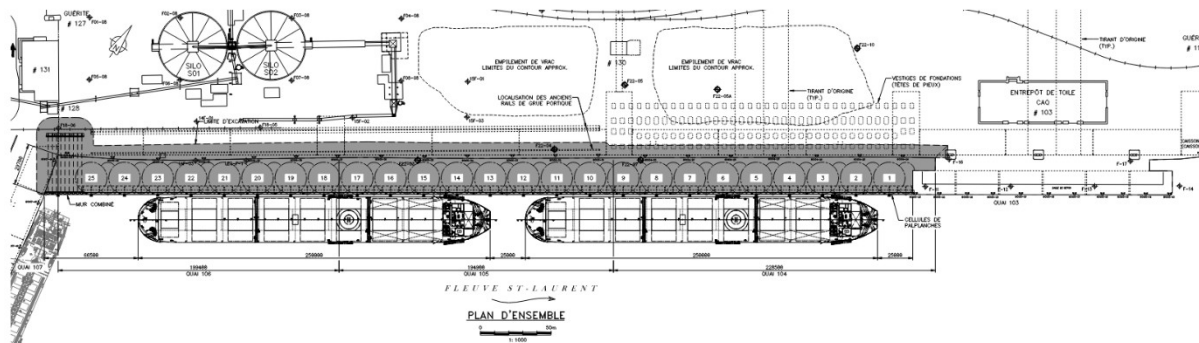


Figure 2. Plan view of sheet pile cells

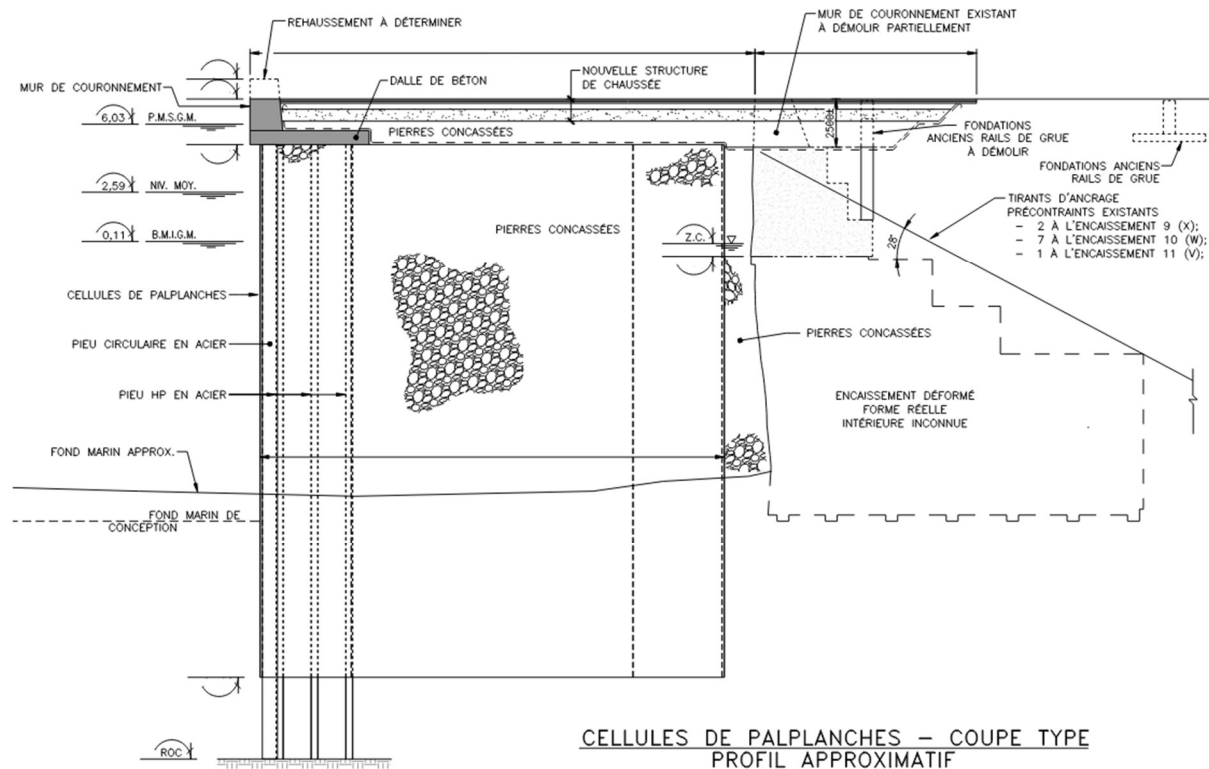


Figure 3. Typical cross-section of sheet pile cells

The existing coping wall will be demolished to a height of approximately 2.5 m, which will mitigate the differential behavior between the new structure and the existing surface of the wharf. The demolished concrete can then be reintroduced into the backfill of the new structures.

Dredging will be required to ensure that the water depth available in front of the new wharf structures is equivalent to the depth of the current maneuvering area of -12.2 m ZC (chart datum). This dredging will aim to deepen a portion of the new maneuvering area by allowing for the maximum removal of approximately one meter of sediment.

Several maritime facilities will need to be installed, including bollards of at least 100 tons, fenders, and ladders along the wharfs. This new equipment, which is necessary for the safety of maritime operations and ship maneuvers, will ensure the safe use of the infrastructure.

The work includes the installation of a storm sewer system for surface water collection and management. This system will be complemented by the installation of a hydrodynamic separator, to partially treat suspended solids before the water is discharged into the St. Lawrence River, in accordance with the project's environmental performance objectives.

The project also includes the maintenance and adaptation of the water supply network, ensuring water supply for fire protection. In addition, the option of creating a raw water network fed by a pumping well in the river will be evaluated. This solution could meet certain operational needs, such as dust management, by reducing the use of drinking water from the municipal network.

In terms of electricity, the existing network will be extended to the wharf frontage. This will enable the new infrastructure to be connected. Other infrastructure will also be developed to allow for the installation of potential shore-side power supply networks for ships. Finally, the installation of new lighting towers will ensure compliant, safe lighting that is suitable for port operations.

To support the transition to a smart port, the project will integrate data collection systems and digital structural and operational monitoring tools, including instrumentation, sensors, and cameras. These technologies will improve asset management, operational efficiency, and the development of smart infrastructure.

All structures will be designed to allow for the adaptation of the wharf's height throughout its lifetime and to strengthen its resilience to climate change, including rising water levels and storm surges.

7.1 SITE PREPARATION

Throughout the duration of the work, access to the site will be limited to workers and controlled by the gatehouse at the entrance to this secure area of the Port of Québec. The construction site will be fenced off and temporary signage will be put in place.

The contractor will begin mobilizing on site in the spring of 2027. As the supply of sheet piles could take approximately 16 weeks, the months following the contractor's mobilization will be devoted to the production of the required temporary structures, including the driving jigs for the sheet pile cells, and to the demolition work. The current schedule is based on final financing in December 2026 and the obtaining of all necessary permits.

The site is located in an industrial port area and is entirely artificial with no vegetation. No deforestation is therefore planned for the work.

7.2 CONSTRUCTION

Construction of the cells will begin as soon as the sheet piles are received and within the periods of work in water authorized by the DFO. The implementation sequence requires that only two cells be built at a time and that the circular arches between them be installed before they are filled. The first cells will be built from a barge and the subsequent ones from a granular work platform built on the surface of the completed cells. The sheet piles forming the cells will be vibratory driven until the desired elevation is reached.

The combined pile-sheet pile wall connecting the existing structures and the new cells will require the construction of an anchor wall and tie rods.

The backfilling of the top of the cells to the surface and the construction of the civil and electrical infrastructure will follow the progress of the crown wall.

Dredging work in front of the wharfs will be carried out in phases in parallel with the construction work, but outside the periods of limited seabed disturbance indicated by the DFO. The equipment used will be equipped with a positioning system (GPS) offering good accuracy to limit dredging to the necessary maneuvering area only. During the work, the conformity of the depths to be reached will be validated by bathymetric surveys. The dredged sediments will be

managed in accordance with standard best practices and current regulations, in particular based on contamination levels that will be validated in advance and the Port of Québec's soil management policy.

The total duration of the work is estimated at approximately 30 months. It will be strategically distributed according to the seasons, operational constraints at the wharfs, and periods of restriction for work in the water. In addition, the site's operating hours must comply with the mitigation measures systematically required by the Port of Québec in order to reduce nuisances (e.g., noise) in the evening and at night.

The equipment expected at each stage of the work is summarized as follows:

- Excavation and backfilling on the wharfs: hydraulic excavators, loaders, bulldozers, graders, road rollers, and trucks;
- Material handling: forklifts and cranes;
- Demolition work: hydraulic excavators equipped with rock breakers, loaders, and trucks;
- Sheet pile cells: barges, hydraulic excavators equipped with a vibratory hammer;
- Dredging: barges, tugboats, and hydraulic excavators equipped with clamshell buckets;
- Backfilling and compaction: trucks, hydraulic excavators, bulldozers, and compactors;
- Crowning wall: concrete mixers and concrete pumps.

7.3 DECOMMISSIONING OF THE SITE

The demobilization phase involves removing machinery, tanks, equipment, containers, and all residual materials generated during the work, mainly construction waste (e.g., concrete, wood, scrap metal). These materials will be recovered and disposed of by the contractor in accordance with current regulations and the specifications.

Once the work is complete, the secured areas in the sector will be cleared by removing fences and temporary signage.

7.4 RECOMMISSIONING OF THE WHARFS

The reconstruction of wharfs 104 to 106 aims to secure the infrastructure in the context explained above. At present, no new operations or changes to current operations on these wharfs are planned. Although the work will obviously disrupt the operations of port partners at Anse au Foulon, it is expected that some operations will continue during the work and that, once the work is completed, the various port operators will gradually resume their usual activities.

8. TIMELINES

The Port of Québec plans to begin reconstruction work on wharfs 104, 105, and 106 in the spring of 2027, depending on the time required to obtain the necessary authorizations. This work is expected to take approximately 30 months and therefore be completed in 2029.

The detailed work sequence will be developed by the team selected in the context of the progressive design-build approach.



9. POTENTIAL ENVIRONMENTAL EFFECTS

The project to rebuild wharfs 104, 105, and 106 is likely to have negative effects on the environment, in addition to causing some nuisance to nearby residents. An environmental impact study will therefore have to be carried out by independent experts. All valued environmental components likely to be affected by the Project will be considered.

An analysis of the receiving environment will make it possible to clearly define the baseline condition and the components that will be affected by the Project. However, given the nature of the Project and knowledge of the environment in which it will be carried out, certain effects can be anticipated and presented on a preliminary basis:

- **Noise environment** : There are already cohabitation issues in this sector due to noise pollution caused by port operations. Although several improvements have been made to operations in the past year, in addition to the addition of a new sophisticated monitoring network, some challenges remain. In this context, an assessment of the noise environment associated with the reconstruction of the wharfs will be carried out.
- **Transportation and traffic** : It is important to mention that transportation will be a key factor in assessing the potential impacts of the Project. Given its configuration and location, the work site can only be accessed via Champlain Boulevard. Although few concerns have been raised about traffic between the bridges and the site under study, the same cannot be said for traffic in the Old Quebec area. In this regard, many concerns have been raised by citizens in recent years, and this issue is still among those that the Port, the City of Quebec, the Ministry of Transport, and citizens themselves are trying to address. It will therefore be essential to properly assess the potential impacts of the Project in this regard.
- **Air quality** : The reconstruction of the wharfs may have an impact on local air quality due to the suspension of coarser particles (dust), but also due to transportation. Indeed, the supply of materials to the construction site and the removal of soil and other materials may generate a relatively large amount of transportation, in addition to the machinery on the construction site. In addition, fuel combustion by this equipment may have negative effects on fine particle emissions into the air.
- **Fish and habitat** : Relatively significant work in the water will be required to rebuild the wharfs. Among the anticipated impacts are the loss of habitat over an area of approximately 1.6 ha for the installation of sheet pile cells, as well as dredging to level the maneuvering area in front of the wharfs. Although these negative effects are assessed as part of the IAMP, they will also be subject to the permit application process under the *Fisheries Act*. A formal analysis will therefore be conducted by Fisheries and Oceans Canada (DFO).
- **Surface water quality** : Throughout the work, special attention must be paid to surface water quality. Major work on infrastructure located in the river and subject to tides can result in suspended matter being carried into the water. In addition, dredging work could cause temporary degradation of water quality due to the suspension of particulate matter. Effective mitigation and monitoring measures will have to be proposed for this component.
- **Light pollution** : Since it will be essential to maintain a good pace at the construction site and optimize the efficiency of the work while ensuring worker safety, it is likely that temporary lighting will be added to the site. This increase in light intensity in the evening or at night will be considered in the assessment of the Project's environmental effects.

It should be noted that all environmental components likely to be affected by the Project must be considered in the environmental impact assessment.

9.1 ENVISION™ SILVER CERTIFICATION

The Port of Québec is seeking Envision™ Silver certification, which recognizes efforts in sustainability, resilience, and environmental performance, as well as the harmonious integration of the Project into its host environment.

To help achieve this goal, specific criteria will be incorporated into the design, particularly in terms of stormwater management, noise reduction, responsible sourcing, and carbon footprint reduction. This certification will enhance the Project's value to stakeholders and demonstrate the Port's commitment to ESG principles.

10. NAVIGATION INFORMATION

The St. Lawrence River is a navigable waterway under the *Canadian Navigable Waters Act* (CNWA). The anticipated impact on navigation is considered to be minor, as the stabilization work will be carried out exclusively on the shore, and the work site is managed by the Port of Québec. In addition, validations have been made with pilotage experts and no impact on ship navigation is anticipated.

No approval is required under the CWLA, as the site is located in waters under the Port of Québec.



11. CONTACT

For any questions regarding the project, please contact:

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APPENDIX A – Photographic Directory



