Alexandra Bridge Replacement Project

Detailed Project Description

Summary

Following the requirements of the

IMPACT ASSESSMENT ACT

Public Services and Procurement Canada

in collaboration with

National Capital Commission

PSPC Project No.: [R.103064]

Date: January 26, 2023

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List of Acronyms

ATRIS	Aboriginal and Treaty Rights Information System
ACPDR	NCC's Advisory Committee on Planning Design and Realty
ACUA	NCC's Advisory Committee on Universal Accessibility
AMSL	Above mean sea level
ARCDW	*Act respecting the conservation and development of wildlife* (Quebec)
ARTVS	*Act respecting threatened or vulnerable species* (Quebec)
BMP	Best Management Practices
CDPNQ	Centre de données sur le patrimoine naturel du Québec
CMA	Census Metropolitan Area
dBA	Decibels
DPD	Detailed Project Description
DFO	Fisheries and Oceans Canada
EASR	Environmental Activity and Sector Registry
ECCC	Environment and Climate Change Canada
EPP	Environmental Protection Plan
EQA	*Environmental Quality Act* (Quebec)
ESA	*Endangered Species Act, 2007* (Ontario)
FLUDTA	Federal Land Use, Design and Transaction Approval
FTE	Full-time employee
FWCA	*Fish and Wildlife Conservation Act, 1997* (Ontario)
GBA Plus	Gender-Based Analysis Plus
GDP	Gross Domestic Product
HIA	Heritage Impact Analysis
IAA	*Impact Assessment Act (Canada)*
IAAC	Impact Assessment Agency of Canada
IPD	Initial Project Description
IPT	Integrated Project Team
ISC	Indigenous Services Canada
LCCA	Lifecycle Cost Analysis
MBCA	*Migratory Birds Convention Act, 1994* (Canada)

MCC	Ministry of Culture and Communications (Quebec)
MECP	Ministry of the Environment, Conservation and Parks (Ontario)
MEFCCWP	Ministry of the Environment, the Fight Against Climate Change, Wildlife and Parks (Quebec)
MKAT	Mobilizing Knowledge for Active Transportation
MNRF	Ministry of Natural Resources and Forestry (Ontario)
MNRFQ	Ministry of Natural Resources and Forests (Quebec)
MTCS	Ministry of Tourism, Culture and Sport (Ontario)
MTO	Ministry of Transportation (Ontario)
MTQ	Ministry of Transportation (Québec)
NCC	National Capital Commission
NCR	National Capital Region
OHA	*Ontario Heritage Act*
PSPC	Public Services and Procurement Canada
PTTW	Permit to Take Water
SARA	*Species at Risk Act (Canada)*
SPI	Strategic Partnerships Initiative
SSPPS	Survey for Safety in Public and Private Spaces
STO	Société de transport de l'Outaouais
TC	Transport Canada

Disclaimer

Stantec Inc. and Innovation 7 contributed to the preparation of parts of this document. Any errors or omissions in this document are the responsibility of PSPC and the NCC.

1 BACKGROUND

The Alexandra Bridge is one of only five interprovincial bridges open to vehicular traffic in the National Capital Region (NCR) linking the cities of Ottawa, Ontario and Gatineau, Quebec. The Alexandra Bridge is an integral part of Confederation Boulevard's Ceremonial Route and links together the heart of the region from Major's Hill Park to Jacques-Cartier Park, to the Voyageurs Pathway and the Ottawa River Pathway.

The Alexandra Bridge, also known as the Royal Alexandra Interprovincial Bridge, was first opened as a crossing in 1901. It is a true pin steel truss structure, supported by six piers composed of concrete and masonry. The bridge crosses the Ottawa River from Nepean Point, just west of Ottawa's Byward Market, to the Canadian Museum of History in the Hull district of Gatineau. The Project location is highlighted in **Figure 1**.

According to a 2017 City of Ottawa traffic study, the bridge carries about 13,300 vehicles per day, which amounts to approximately 9% of the average daily interprovincial vehicular traffic in the NCR (IBI Group, 2020). The bridge is also used by about 33% of all pedestrians and cyclists crossing the Ottawa River (City of Ottawa, 2013), making it a key piece of active transportation infrastructure in the region.

The Alexandra Bridge is in an advanced state of deterioration and has several significant structural concerns which have resulted in the current reduced level of service and several mitigation measures implemented by Public Services and Procurement Canada (PSPC). At this time, the mitigation measures, and reduced level of service are precautions considered appropriate for the Alexandra Bridge to remain safe and in service until its replacement.

Due to the factors listed above and as part of a larger effort to improve interprovincial transportation in the NCR, PSPC and the National Capital Commission (NCC) have been directed by the federal government as part of Budget 2019 to develop a holistic strategy to ensure that the five (5) interprovincial crossings in the NCR remain safe and open for use by residents and visitors. This strategy includes pre-planning for the replacement of the Alexandra Bridge. The Project includes the deconstruction and reconstruction of the bridge, with construction anticipated to start in 2028 through 2032.

Given that the Project is located within the NCR, it is also subject to Federal Approval by NCC under the *National Capital Act*. In this region, work by federal departments, works on federal lands as well as the sale and/or transfer of federal lands are subject to the NCC's approval. The NCC evaluates applications based on the conformity with relevant legislation, federal plans, policies, public and stakeholder feedback, and discussions with Indigenous communities, as well as applicable design guidelines.

To date a federal approval has been granted for the Project's Planning and Design Principles (June 2021; available on the NCC's webpage). The Federal Land Use, Design and Transaction Approval (FLUDTA) process will include multiple rounds of review and approval, corresponding to the various stages of planning as well as design and construction of the Project. All stages of the Alexandra Bridge Replacement Project will be classed as Level 3 Projects, the highest-level classification for Federal Approvals. Level 3 Projects are subject to a comprehensive land use and design review, with input from the NCC's Advisory Committee on Planning Design and Realty (ACPDR) and the NCC's Advisory

Committee on Universal Accessibility (ACUA), as part of the federal approval process. Authorizations from other federal and provincial regulators will also be required for the Project.

Indigenous communities and the public were engaged early to identify values, issues, and concerns, as they relate to the Project. Engagement with Indigenous communities, stakeholders and the public will continue for the life of the Project. Their input will inform key elements that will contribute to the Project's planning, design and construction.

This report summarizes preliminary findings and proposed mitigation measures that may be implemented to minimize the potential impacts of the project on the environment, Indigenous communities, health, social and economic conditions of the NCR.

In this DPD, for simplicity, the term "phases" refers to the Impact Assessment process to align with the Impact Assessment Agency of Canada's (IAAC) terminology. The term "stages" is used to refer to the unique pre-planning, planning, design and construction components of the Project.

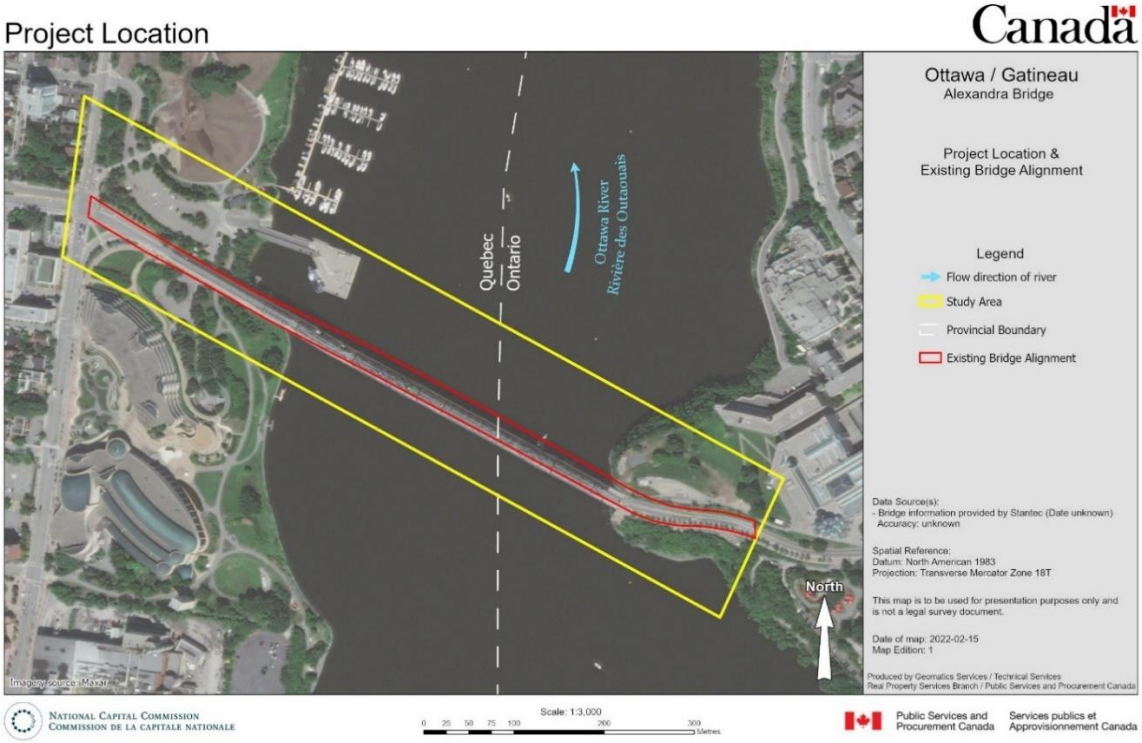

Figure 1: Project location on the Ottawa River

2 PROPONENT CONTACT INFORMATION

The Project Proponent is PSPC who is working in collaboration with the NCC, forming an Integrated Project team (IPT).

Note that the individuals identified below should be included in correspondence regarding this Project. Correspondence may be provided in either official language to the IPT, as identified in **Table 1**: Proponent contact informationbelow.

Table 1: Proponent contact information

Public Services and Procurement Canada 65 rue l'Hôtel-de-Ville, phase II, Place du Portage Gatineau (Quebec) J8X 0A3 Tel: 1-800-926-9105 Email: questions@tpsgc-pwgsc.gc.ca	**National Capital Commission** 202 - 40 Elgin Street Ottawa (Ontario) K1P 1C7 Tel: 1-800-465-1867 Email: info@ncc-ccn.ca
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Tina Hearty-Drummond Environmental Compliance 2720 Riverside Drive Ottawa (Ontario) K1A 0K9 Tel: 613-808-9327 Email: tina.hearty-drummond@tpsgc-pwgsc.gc.ca	

3 SUMMARY OF PUBLIC ENGAGEMENT

There will be several opportunities for members of the public to provide feedback on the Project throughout the different stages.

Best efforts to be inclusive of stakeholder groups that represent and/or whose membership reflects Canadians in all their diversity will continue. Stakeholders/ groups are various in type and vocation, and include community associations, local employers, women's organizations, cultural institutions, foreign missions, organizations that provide services to newcomers, tourism associations, sports clubs, business and industry groups, homeless shelters, environmental organizations, and active mobility advocacy groups, among others.

The first rounds of public consultation were held as part of the Project's pre-planning stage (2020-2022). **Table 2** provides a summary of completed key public engagement activities undertaken to date.

Table 2: Completed key public and stakeholder engagement activities

Consultation Stage	Activities
Consultation 1A	• meetings with stakeholders – Fall 2020 • online public consultation – Fall 2020 • Engagement with adjacent landowners and neighbouring stakeholders
Consultation 1B	• meetings with stakeholders – Fall 2021* • mail drop and survey – Fall 2021

*Meetings with adjacent landowners and neighbouring stakeholders continue.

Additional public consultation and stakeholder engagement opportunities are planned as the Project moves into the planning and design stages.

Planning Stage (2023–2025)

- Development of design options
- Public consultation 2: Functional Design options
- Public consultation 3: Preliminary Design
- Public consultation 4: Detailed Design

Procurement and Implementation Stages (2025–2032)

- Procurement process to award design and construction contract
- Public consultation 5: final design and construction plan
- Deconstruction of existing structure and start of new bridge construction

The IPT is actively pursuing new opportunities for dialogue with a broad range of stakeholders and members of the public, including but not limited to heritage coalitions, disability support organizations and accessibility advocacy groups, as well as adjacent landowners.

The IPT noted key issues and concerns that have been raised to date based on all engagement activities with the public as well as stakeholders and adjacent landowners (**Table 3)**.

Table 3: Summary of the key issues raised to date

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
Concerns related to the closure of the Alexandra Bridge		
Loss of link/access between Ottawa and Gatineau	Access between the tourism nodes, as well as business areas in the vicinity of the Project and the adjacent communities will be affected. The shortest, direct link that the bridge provides between Gatineau and Ottawa during the closure will not be available during construction. Closure of the bridge could impact business operations (negatively for businesses that rely on access to the docking site or who rely on active transportation users, like in the ByWard Market). It could also provide business opportunities that would need to be evaluated.	Adequate detours for residents, commuters and visitors and other means of transportation to tourist destinations are being explored (e.g., shuttle along Confederation Boulevard). Throughout the Project there will be ongoing engagement with stakeholders to discuss all options. To minimize the impact on users, PSPC is exploring various options, such as a de-icing system on the river to lengthen the water taxi season. Water taxi services (with universal accessibility) could play an important role in providing crossing services to active transportation users. Understanding seasonal limitations will be essential to tailoring the appropriate mitigation.
Access to buildings – services such as loading docks	Concerned about the impacts of changes in traffic flow to access roads, delivery zones and loading docks. Small loading dock accessed from Sussex Drive could be impacted. Ability to receive shipments is critical. Advanced planning and communication for alternative access will be required during construction.	If and/or when access to loading docks or delivery zones need to be constrained, timely communication and a strategy to ensure minimal disruption to operations will be put in place.
Access to buildings and amenities– public and employees' access	Closure of the bridge could impact employees who use it to get to work, access buildings near the bridge or shuttle between government buildings for meetings.	The NCC and PSPC are working together to ensure a seamless access to the public spaces will be included in the design. Throughout the Project there will be

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
	The grounds of surrounding spaces are used for multiple public events including large-scale celebrations which could be impacted by road closures or construction. Concerned about the impacts caused by the change in traffic flow on parishioners and tourists getting to the Notre-Dame Cathedral or adjacent parking lot. Consider access to employee parking on Lady Grey Drive.	ongoing engagement with stakeholders to discuss all options. A strategic communications plan will be developed to support the changes in access and detours accompanied by the appropriate signage. Ensuring that information regarding planned public events is communicated between stakeholders and the Project team will assist in understanding needs and preparing appropriate mitigation strategies.
Wayfinding	Wayfinding and signage of pathways to facilities will be essential to ensure that the public can safely reach the museums and other points of interest. Some stakeholders are engaged in pilot projects that may contribute to enhanced wayfinding. Utilize the findings from these projects to inform development of tools.	Wayfinding to reach public facilities as well as general safety of the public in the construction zone will be important aspects of construction planning. Noted for the future planning and follow up conversations.
Concerns related to the closure of Alexandra Bridge at the same time as closure of Portage or other bridges		
General access to buildings or services within the area	Access to the buildings would be impacted by closure of multiple bridges at once. Welcome kiosks and boarding for several tour operators are located at Jacques-Cartier Park, which could be impacted by closures of more than one bridge at a time, e.g., on tour buses and other patrons travelling to the park.	The IPT is collaborating with regional partners (cities and transport authorities) to develop a traffic management plan for future works to the interprovincial crossings that may impact traffic volumes and travel times. Closure of multiple bridges will be avoided as part of this Project, should closure need to occur, adequate and/or sufficient detours will be put in place to minimize disturbance to the general public.

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
		Detours and other changes to traffic patterns will be communicated to tour operators to ensure that clients know how to reach the dock.
Access to tourism nodes and points of interest in the area	Access to tourism services (such as boat tour operators or other points of interest) must be considered when planning detours. For example, some river tour clients arrive at the dock at Jacques-Cartier Park by tour bus, while others come individually. Detours must be communicated so that clients can be informed ahead of time. Consider a shuttle to provide a link to tourism nodes.	Suggestion is noted and will be considered as part of the mitigation strategies. Detours and other changes to traffic patterns will be communicated to tour operators to ensure that clients know how to reach the dock.
Traffic congestion on other bridges and roads	Discussions about what bridges might be used as detour routes and impacts on congestion. Closure of the Alexandra Bridge will have an impact on commuting times. Impact of bridge closures and increased traffic congestion on surrounding neighbourhoods and emergency vehicle routes. Concern that increased traffic congestion on neighbourhood roads may impede or block access to critical assets, e.g. recognized medical sites and emergency drop off zones at 256 King Edward Street. Concern that increased traffic will lead to safety issues caused by increased user conflicts vehicles/active uses).	The IPT anticipates more congestion on roads and bridges that provide access while the Alexandra Bridge is closed. Active modes and public transportation will be encouraged to ensure to mitigate for vehicular traffic. The IPT is exploring other options such as increased water taxi from the museum to the Rideau Canal locks. Coordination with OC Transpo and STO will also help to put in place access to public transportation. The IPT will continue to work in collaboration with regional partners (e. g. the cities of Ottawa and Gatineau, Ontario and Quebec transportation ministries and public transit authorities) to develop a traffic management plan for future works that may impact traffic volumes and travel times. Closure of multiple bridges will be avoided and adequate and/or sufficient detours will be put in place to minimize disturbance to the general public.

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
		Active modes and public transit will be encouraged to mitigate vehicular congestion on other bridges while the bridge is closed for construction.
Active mobility detours	Concerns about the length of the detours for active mobility users and options being considered during the closure of the bridge.	Several options are being considered including water taxis and using technology to maintain the channel open in winter.

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
Noise, Dust and Vibration Impacts		
Noise, dust and vibration created by construction on bedrock	Vibration may affect artifacts housed in the museum. Vibration caused by construction activities may impact the nearby structures, such as heritage buildings or others. Noise may impact employees working in areas of buildings or facilities that are closest to the bridge or facing the river. Health and safety issue regarding ongoing impacts of noise due to different construction projects. Request for a noise study to be completed. At 373 Sussex, vibrations related to the work could create a health and safety issue related to the presence of asbestos in the heritage buildings (Bloc A and B). Impacts of noise and dust on events, like weddings, planned religious events, ceremonies at the Peacekeeping Monument.	Varying pre-work, design work, impact assessments are being completed and there will be on-going discussions with stakeholders. Structural condition of the museums and other nearby structures before the start of construction will be needed to address specific concerns. Concern is noted for consideration during construction planning. Ensuring that information regarding planned public events is communicated between stakeholders and the Project team will assist in understanding needs and preparing appropriate mitigation strategies. Throughout the Project there will be ongoing engagement with stakeholders to discuss all options.
Addressing noise pollution from current bridge in the design of the new bridge	Vehicle travel on the current steel bridge deck create a lot of noise and impacts the enjoyment of tour boat clients and nearby outdoor events. Interest in determining if the new structure will address the noise issue.	The noise pollution is planned to be factored into the design of the new bridge. The new bridge is anticipated to have a solid deck that will contribute to reducing the noise from vehicular traffic.

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
Concerns related to the Loss of Heritage		
Loss of Heritage	Loss of the current bridge which represents a historically significant landmark in the Capital is a concern. Concerns about preserving the heritage characteristics of the bridge. Consider keeping some of the current architectural elements in the new bridge design.	The possibility of preserving some materials of the existing bridge is being assessed. Throughout the Project there will be ongoing engagement with the Canada Science and Technology Museum and the general public to explore options and ideas on how to protect the heritage of the bridge. Given the importance of the Alexandra Bridge's iconic heritage assets and impact of design, PSPC is working with the Royal Architectural Institute of Canada (RAIC) to establish a peer review panel, which will be engaged to provide independent advice to enable an appropriate response to the requirements for the preservation of heritage elements in the new build.
Concerns related to Navigation		
Access to mooring/docking facilities	Operations rely on access to docking spaces on both sides of the river. Docking must have sufficient water depth to accommodate larger boats. Operation of tourism business rely on the use of several boat ramps including the one in Jacques-Cartier Park.	Opportunities for installation of a temporary wharf that can meet all the needs for stakeholders who operate or rely on the current wharf are being explored.
Access to the navigation routes under the bridge	Access to travel in the designated channel underneath the Alexandra Bridge is important to provide travel to important viewpoints such as Parliament Hill and other sites of national symbols. Concerns that construction over the main water channel may prevent safe passage under the bridge. Channel marking and other navigation aids will be essential to ensuring safety of boaters during	Concerns regarding public safety are shared and noted to be factored into the planning and construction considerations. Temporary interruptions and closures will be well coordinated in advance with the various stakeholders involved particularly during the high season to reduce potential impacts to businesses. Noted for planning purposes – the high season for tourism operations range from late March or early April

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
	construction, particularly if the channel is temporarily relocated (travel in the dark or early morning)	to late November or early December depending on the weather conditions and client interest. Similar to road access changes, a strategic communications plan will be developed to ensure that the changes in navigation channels are communicated to river users and accompanied by the appropriate signage and markers.
Access to supporting infrastructure for tourism boats	Continued access to wharfs to pick up clients is important for tour operators. Continued access to the wharf in Jacques-Cartier Park and the dock at the Rideau Canal are needed to pick up clients. Facilities need to provide access to several support services such as electricity, water, pump out station as well ticketing and guest reception areas. Parking for guests would be required.	Noted for planning purposes. Supporting infrastructure will be considered as part of the development of temporary works, particularly in Jacques-Cartier Park. Need for parking is noted and will be considered as part of development of the temporary works.
Improvements to the river basin as a whole, that would enhance the experience on the water	The cross-sectional area of the water flow underneath the bridge and the bottom contours of the riverbed affects the surface river turbulence under the bridge. Smooth current is better than turbulent current, from a safety and utility perspective for small watercrafts.	Noted for consideration during the design process and in the design of alternate navigation channels during the construction period.
Opportunities to contribute to the development of viable mitigation strategies that utilize businesses operating in the area	Boat operators may have knowledge or essential equipment (such as passenger boats) that can contribute to the development of mitigation strategies.	Noted for future conversations with stakeholders as the project is better defined.

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
Concerns related to the design of the new bridge		
Use this project to enhance connectivity in the neighourhoods	There currently is a missing link along the south shore (National Gallery cuts off Lady Grey Dr.) for active transportation users. Would love to see that link improved - a connection to Kìwekì Point (formerly named Nepean Point). On the north shore – nicer connection so that active transportation users do not have to traverse the road network to get back down to the river.	In conjunction with the Alexandra Bridge project, the NCC has been undertaking the Adjacent Impacted Land study along with other planning initiatives to look for opportunities for that connection. The Planning and Design Principles provide direction for the new bridge. Of note, improvements in public access to the shorelines through pathway improvements for pedestrians and cyclists around the new bridge.
Highlight the importance of active modes of transportation and public transportation on the new bridge	Would love to see a prioritization of active modes of transportation and public transportation. Concern regarding increased vehicular traffic.	The focus for the design of the new bridge is on improving the facilities for active transportation users. The vision for the new bridge is to have vehicular lanes that can be converted to public transit in the future and a separation of cyclists and pedestrians.
Importance of the bridge as a destination not only a transportation link	A lookout point on the bridge for pedestrians that provides a destination or event space.	The addition of observation points or seating areas where people can sit and contemplate the view is also part of the conceptual design. The new design will seek to improve the over all experience for the active transportation users.
Improvements to the bridge that would enhance the river experience, e.g., attachment on the piers to set up start docks for rowers.	The bridge is used as a start line for races. Ability to set up temporary docks would be helpful.	Noted for consideration during the design process.

Area of concern or interest	Details of impact/enhancement	Integrated Project Team's response
Improvements to the safety features of the bridge.	Consider the safety of the bridge users. Concerned about the current safety measures on bridge and would like to see heightened measures in the new design to limit the fatalities.	The Planning and Design Principles provide direction for the new bridge. Priority must be given to the comfort, safety, and well-being of active mobility users.
Concerns related to business and operational impacts during the bridge construction		
Impacts of construction on future development projects	Consider how the construction and staging areas will impact future development projects, such as land encroachment. Encourage information sharing between different levels of government and transit authorities for consideration in future development planning.	The IPT will work in collaboration with other levels of government and regional partners (e.g., the cities of Ottawa and Gatineau, Ontario and Quebec transportation ministries and public transit authorities) to put in place broader access to public transportation and to develop traffic management and communication plans, including mitigating heavy truck traffic in anticipation of impacts related to traffic volumes. Detours will seek to minimize disturbance to the public, as much as possible.
Impacts of electrical grid interruptions due to construction	Considerations for potential impacts on business operations caused by planned interruptions to electricity.	The project team will continue to engage with affected stakeholders and the public, in a timely manner, to ensure that concerns are addressed as part of the efforts to minimize the disruptions to businesses and the project schedule. The project team is dedicated to fostering a no-surprise environment for affected businesses.

Plans for Future Engagement

The Project team is committed to remaining responsive to the needs of adjacent landowners, stakeholder groups and members of the public for deeper and more frequent engagement between and throughout the different stages of public consultation. In keeping with this commitment, members of the IPT have recently met with stakeholder groups and individuals who have expressed interest in following up on certain issues addressed during the first stage of public consultation. This includes heritage organizations with specific concerns about the bridge's replacement, and members of the public who want to share their ideas for the new bridge's design.

Moving forward, the NCC will allow participants to self-identify and continue to offer diverse approaches to facilitate participation in public consultation. Future consultations could include virtual town halls, surveys, and face-to-face consultation, if suitable. Efforts to ensure that all consultation is inclusive and considers diverse perspectives as part of the Project's public engagement process will be ongoing.

Table 4 provides an overview of plans for public engagement during each phase of the Impact Assessment Process.

Table 4: Overview of objectives and timelines for public engagement

Phases(s)/ Stages	Public engagement objectives	Expected activities	Public participation tools	Proposed Timelines
Planning **Impact Statement / Concept Design**	Provide members of the public with an opportunity to: • Share their thoughts and concerns about how they might be affected by the Project. • Share updates on the Project (e.g., timelines for alignment decision). • Propose additional ideas to minimize any adverse effects and identify other enhance any benefits. • Propose ideas as to how the history and built heritage of the Alexandra Bridge should be celebrated after its replacement. • Learn about the conceptual design options • Provide feedback on conceptual design options	Meetings with stakeholder groups	Mail drop – adjacent landowners Microsoft Teams meetings Email Advertising	2023
Impact Assessment / Functional Design	Provide members of the public with an opportunity to: • Learn about the preliminary design • Provide feedback on the preliminary design	Online public consultation	Project webpage Online survey Social media Email Advertising	2024

Phases(s)/ Stages	Public engagement objectives	Expected activities	Public participation tools	Proposed Timelines
	Continue engaging with key stakeholder groups on a flexible basis during and between formal consultation events	Meetings with stakeholder groups	Microsoft Teams meetings Social media Email Advertising	2024
Decision-making / Preliminary Design	Provide members of the public with an opportunity to: • Learn about the final design • Provide feedback on the final design	Online public consultation	Project webpage Online survey Social media Email Advertising	2025
	Continue engaging with key stakeholder groups on a flexible basis during and between formal consultation events	Meetings and correspondence with stakeholder groups	Microsoft Teams meetings Social media Email Advertising	2025
Post-Decision /Detailed Design **Deconstruction and Construction of new bridge** **Operation and Maintenance**	Continue engaging with key stakeholder groups on a flexible basis during and between formal consultation events	Meetings and correspondence with stakeholder groups	Microsoft Teams meetings Email Phone calls	Winter 2025 to fall 2032

4 SUMMARY OF ENGAGEMENT WITH INDIGENOUS COMMUNITIES

The IPT is aware of the importance of the river to Indigenous peoples and is committed to undertaking planning, consultation and execution of the project in a way that enhances aspects of its environment while preventing harm or detracting from peoples' experience.

The engagement of Indigenous peoples is key to the project. Indigenous knowledge will be sought out, respected and honoured and will be given the same consideration as scientific knowledge brought forward by the IPT and its external experts. The Indigenous knowledge may include detailed historical accounts of the Ottawa river and its environs, fish and animal species, plants, shoreline conditions and water quality. Knowledge of how previous construction projects on or near the Ottawa river affected these components and potentially affected the health and well-being of Indigenous peoples will also be sought. The knowledge will be integrated to further the understanding of potential impacts from the Project and how these may lead to impacts to Indigenous communities. In addition, Indigenous knowledge will be considered, as appropriate, into the design and construction of the replacement bridge and improvements in the Project area.

The fundamental purpose of Indigenous engagement for the Project is to:

- ensure Indigenous communities have sufficient information to understand the Project, provide their perspectives, voice their issues and concerns
- provide an avenue for collaboration with the IPT to ensure the issues and concerns raised are addressed through mitigation measures
- maximize benefits accruing to Indigenous people from the Project
- enhance the long-term relationship between Indigenous peoples and the Crown, for this and all subsequent projects.

Meaningful engagement and consultation involve reaching a shared understanding of the potential impacts of the Project on:

- Physical and cultural heritage
- The current use of lands and resources for traditional purposes
- Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance
- The health, social or economic conditions of Indigenous communities

The engagement activities will provide opportunities for each Indigenous community and organization to:

- review Project-specific details
- identify valued components
- participate in studies, conduct their own studies, gather and provide Indigenous knowledge as appropriate
- identify issues and concerns, recommend enhancements or mitigation measures, and
- increase opportunities for economic benefits to be obtained by Indigenous communities and businesses as a result of the Project.

The following list of Indigenous communities and organizations were identified for engagement:

- Algonquin Anishinabeg Nation Tribal Council (AANTC)
- Algonquin Nation Secretariat
- Algonquins of Ontario (AOO), including the member communities of:
    - Antoine
    - Bonnechere
    - Greater Golden Lake
    - Kijicho Manito Madaouskarini (Bancroft)
    - Mattawa/North Bay
    - Ottawa
    - Shabot Obaadjiwan (Sharbot Lake)
    - Snimikobi (Ardoch)
    - Whitney and Area
- Algonquins of Pikwakanagan First Nation
- Kebaowek First Nation
- Kitigan Zibi Anishinabeg First Nation
- La Nation Anishinabe du Lac Simon
- La Nation Huronne-Wendat
- Le Conseil de la Première Nation Abitibiwinni
- Le Conseil des Anicinapek de Kitcisakik
- Long Point First Nation
- Métis Nation of Ontario
- The Algonquins of Barrière Lake
- The Mohawk Council of Akwesasne
- The Mohawk Council of Kahnawake
- The Mohawk Council of Kanesatake
- Timiskaming First Nation
- Wahgoshig First Nation
- Wolf Lake First Nation

The IPT has reached out to all Indigenous communities, as identified above. Note that not all of Communities have submitted comments to the IPT. Initial discussions resulted in preliminary questions and concerns that are summarized in **Table 5**.

Table 5: Summary of the Key Issues Raised by Indigenous Communities

Indigenous Community	Area of Concern or Interest	Integrated Project Team's (IPT) response
Algonquin Anishinabeg Nation Tribal Council	Need for financial support for engagement activities and to support members to share in economic benefits.	Funding has been provided by PSPC for two consultation and procurement positions within the Algonquin Anishinabeg Nation Tribal Council. As engagement activities accelerate, the IPT will invite the Algonquin Anishinabeg Nation Tribal Council to consider a work plan and budget for expanded activities.
Algonquin Nation Secretariat	No issues have been identified yet.	The IPT will continue to communicate with the Nation.
Algonquins of Ontario	Damage to spawning grounds and fish habitat, harming fish populations throughout the Ottawa River watershed.	The bridge will be designed and constructed to not impede or restrict the movement of aquatic species throughout the project area. Through the implementation of habitat creation, restoration, and other offsetting measures, impacts from this Project on fish and fish habitat to achieve net environmental benefits may be positive over the long-term.

Indigenous Community	Area of Concern or Interest	Integrated Project Team's (IPT) response
	Need for fish habitat restoration and monitoring after completion of construction.	The effectiveness of mitigation measures will be monitored to ensure that there is no long-term harm to fish and other aquatic species. Areas affected by construction that can be rehabilitated will be restored. Habitat creation, restoration and other offsetting measures will be considered to achieve positive net environmental benefits over the long-term.
	Need for financial support for AOO engagement activities and environmental monitoring.	AOO has developed a five-year work plan and budget that has been approved by the IPT.

Indigenous Community	Area of Concern or Interest	Integrated Project Team's (IPT) response
Algonquins of Pikwakanagan First Nation	Participation in Project studies: community will conduct its own studies and will determine later how it will participate in studies led by the IPT.	Funding has been provided by the IPT according to a work plan and budget provided by Algonquins of Pikwakanagan First Nation. The community is interested in conducting some studies on its own and participating with the IPT on other studies. Draft Terms of Reference for Project studies are being shared in advance by the IPT to obtain community input and help it determine how it wishes to participate. Additional work items identified by Algonquins of Pikwakanagan First Nation during the Project development will be discussed by a joint working group.
	Participation/requirement to guide and develop environmental management and restoration plans, including environmental enhancements.	Early and continuous engagement will occur with all potentially impacted Indigenous communities. Indigenous knowledge will be considered along with scientific studies to create the best possible results and opportunities for shared learning.
	Protective and enhancement for wildlife, and habitat restoration plans must be developed with Indigenous involvement.	The IPT will provide opportunities for Indigenous communities to be involved in the creation of protective and enhancement wildlife and habitat restoration plans. Indigenous knowledge will be considered along with scientific studies to create the best possible results and opportunities for shared learning.

Indigenous Community	Area of Concern or Interest	Integrated Project Team's (IPT) response
	Algonquins of Pikwakanagan First Nation members and businesses must benefit from economic opportunities.	Engagement with Algonquins of Pikwakanagan First Nation is ongoing regarding procurement opportunities and the creation of Indigenous Participation Plans. Financial support has been provided by PSPC for the creation and maintenance of a skills and proficiencies inventory. The community is considering its long-term ambitions for training and development and will work with the IPT and private sector contractors, as appropriate, on achieving the goals.
Kebaowek First Nation	Impediments to the movement of aquatic species and damage to spawning grounds and fish habitat	The bridge will be designed and constructed to not impede or restrict the movement of aquatic species throughout the Project area.
	Need for fish habitat restoration and monitoring after completion of construction.	The effectiveness of mitigation measures will be monitored to ensure that there is no long-term harm to fish and other aquatic species. Areas affected by construction that can be rehabilitated will be restored. Habitat creation, restoration and other offsetting measures will be considered to achieve positive net environmental benefits over the long-term.

Indigenous Community	Area of Concern or Interest	Integrated Project Team's (IPT) response
	Need for financial support for engagement activities and to support members to share in economic benefits.	Collaboration is underway with the First Nation and the IPT to sign a Letter of Intent that identifies an initial level of funding to commence planning, to be followed by the submission of a multi-year work plan and budget.
Kitigan Zibi Anishinabeg First Nation	The community has yet to provide detailed comments on the IPD. Initial conversation highlighted the community's interests in water quality, fish habitat and the appropriate treatment of archaeological resources.	Meetings are occurring with senior staff to obtain comments on the Initial Project Description and to support the development of a work plan and budget.
La Nation Anishnabe du Lac Simon	Interest has been expressed in economic opportunities.	The IPT will work with the Nation on an Indigenous Participation Plan to ensure economic opportunities are available. The IPT will continue to communicate with the Nation and provide funding support when requested.

Indigenous Community	Area of Concern or Interest	Integrated Project Team's (IPT) response
La Nation Huronne-Wendat	The Nation has stated its intention to participate in environmental studies, archaeological studies, and economic opportunities.	The Nation is interested in conducting some studies on its own and participating with the IPT on other studies. Draft Terms of Reference for Project studies are being shared in advance by the IPT to obtain community input and help it determine how it wishes to participate. Additional work items identified by the Nation during the impact assessment will be discussed by a joint working group. The IPT will work with the Nation on an Indigenous Participation Plan to ensure economic opportunities are available. The Nation is the majority owner of a construction company and exploration of how it can be active on the Project will be undertaken
Le Conseil de la Première Nation Abitibiwinni	Interest has been expressed in economic opportunities and in training and development opportunities for youth.	The IPT will work with the Nation on an Indigenous Participation Plan to ensure economic opportunities are available. The Nation is the majority owner of a construction and environmental services company and exploration of how it can be active on the Project will be undertaken. The Nation will consider a long-term training and development program for consideration by the IPT.

Indigenous Community	Area of Concern or Interest	Integrated Project Team's (IPT) response
La Conseil Anicinape de Kitcisakik	The quality of the environment within the Ottawa River watershed.	Habitat creation, restoration and other offsetting measures will be considered to achieve positive net environmental benefits over the long-term.
Long Point First Nation	No issues have been identified yet.	The IPT will continue to communicate with the Nation and provide funding support when requested.
Métis Nation of Ontario	No issues have been identified yet.	The IPT will continue to communicate with the Nation.
The Algonquins of Barrière Lake	No issues have been identified yet.	The IPT will continue to communicate with the Nation.
The Mohawk Council of Akwesasne	No issues have been identified yet.	The IPT will continue to communicate with the Nation.
The Mohawk Council of Kahnawake	No issues have been identified yet.	The IPT will continue to communicate with the Nation.
The Mohawk Council of Kanesatake	No issues have been identified yet.	The IPT will continue to communicate with the Nation.
Timiskaming First Nation	Involvement in reviewing terms of reference for Project studies	The IPT will provide the opportunities for Indigenous communities to participate in the development of terms of reference for studies.

Indigenous Community	Area of Concern or Interest	Integrated Project Team's (IPT) response
	Studies should include a cumulative effects study considering historical use of the Ottawa River and how the next seven generations will be affected.	The spatial boundaries for the cumulative assessment on valued components of interest will be established in collaboration with Indigenous communities to determine if the residual effects of the Project after the application of mitigation strategies, may, in combination with others, cause a significant change now or in the future in the existing characteristics of the valued component.
Wahgoshig First Nation	No issues have been identified yet.	The IPT will continue to communicate with the Nation.
Wolf Lake First Nation	The Nation needs financial support for engagement.	Funds have been offered to support staff participation and the hiring of external experts.

Financial Support for Indigenous Engagement

Funding is being made available by the IPT to ensure the Indigenous communities and organizations have the capacity to participate throughout the Project. Budget funds have been allocated over a multi-year period. The IPT is working with Indigenous communities to develop five (5)- year budgets and work plans that will allow Indigenous communities to plan ahead and make commitments to staff that will ensure continuity of participation. It is understood that the funding and work plans are not final once approved and will be revisited as the project evolves.

The activities eligible for funding are extensive and not prescribed by list, giving the Indigenous communities flexibility to determine what they need to participate. Examples of activities identified to date by Indigenous communities include:

- Increasing staff capacity (recruiting), including hiring external consulting expertise
- Training staff and community volunteers, and
- Purchasing equipment to improve the ability to communicate with community members, attending meetings with community members, and undertaking studies of importance to the communities.

The amount of funding to be made available to each community and organization will be determined through a collaborative planning process whereby the Indigenous parties will identify their funding requirements.

Economic Benefits – Indigenous Participation Plans

The significant amount of contracting and employment associated with the bridge planning, construction and operations will offer many opportunities for Indigenous workers and companies to obtain economic benefits from the Project.

The IPT will utilize an approach to creating Indigenous benefits through Indigenous Participation Plans (IPP), to leverage training opportunities, employment, sub-contracting and capacity building for Indigenous businesses and people.

PSPC will be engaging private sector contractors to plan, build and operate the bridge through formal procurement processes and legal contracts. Each bidder will be required to submit an Indigenous Participation Plan with its bid, with a clear statement of the minimum amount of Indigenous benefits that the bidder proposes to provide, expressed in dollars and as a percentage of the total contract value. There will be a number of contracting opportunities throughout the life of the Project for example, there will be different contracts issued to undertake scientific studies, to design the bridge, to remove the existing bridge and build its replacement, and to maintain the bridge. Each contract will bring an opportunity for a unique IPP.

PSPC will work with potential bidders and Indigenous communities to support collaboration between the parties for the development of IPPs, especially concerning the identification of existing community capacity and desired areas of investment for future capacity. Following the signing of contracts with the successful bidders, PSPC will convene regular meetings with Indigenous communities and the contractor to monitor progress, address any issues or changing conditions that arise, and adjust the IPPs if necessary.

Each bidder will be required to provide information on how it will address key aspects of the IPP, including:

Human Resources Plan - how employment of Indigenous people will be managed:

- Details on the work to be carried out for each position proposed to be filled by an Indigenous person
- Strategies for recruitment of Indigenous persons
- Strategies for retention of Indigenous persons
- Succession planning and
- Staff management.

Skills Development Plan - how the Contractor or its subcontractor(s) intends to maximize the training and skills development of Indigenous persons through:

- Apprenticeship programs
- Pre-professional programs
- College programs
- On the job training and
- In-house training programs.

Indigenous Business Plan – how the Contractor intends to maximize the use of Indigenous firms, including:

- Identifying the work intended to be carried out by Indigenous firms, as well as the dollar value of the work
- Detailing how business with Indigenous firms will be managed, from developing sources of supply to administration and
- Detailing any development of new sources of supply, or new capabilities.

Innovative Approaches and Other Measures - any measures that produce Indigenous benefits and are not covered by previously listed categories. These include, but are not limited to:

- Specialized training or programs required for employment onsite
- Other activities related to but not specifically detailed in the Statement of Work
- Participation in careers events, such as high school visits, career presentations and scholarships
- Community outreach Projects to create a positive image and
- Innovative approaches that could stimulate economic development of Indigenous communities and contribute to capacity building for Indigenous Businesses and peoples.

Plans for Future Engagement

Engagement will be on-going with interested Indigenous communities, throughout the project design and development as well as operation of the new project. The importance of the Project to all parties and the extent of the Project planning process will give opportunities for those who wish to start engaging at a later date.

The IPT will continue to engage with Indigenous communities and organizations according to the pace and scope of engagement that the Indigenous communities desire. **Table 6** summarizes proposed

engagement activities for each phase of the impact assessment process and the design stages and into operation.

Table 6: Proposed engagement activities to operation of new bridge.

Year	Phase	Engagement Activities
2023 to 2024	**Planning** **Impact Statement / Concept Design** (Process - Phase 2) **Impact Assessment / Functional Design** (Impact Assessment Process - Phase 3)	The IPT will collect and validate information from Indigenous communities and communities on matters such as baseline conditions, technical expertise including Indigenous Knowledge, potential effects and impacts on health, social, economic and environmental conditions, enhancement measures, and mitigation and follow-up measures to address potential adverse effects or impacts of the Project. The IPT will engage with the Indigenous communities and organizations to address any gaps in the proposed studies. The IPT will engage with Indigenous communities and organizations on the design of the replacement bridge. The IPT will work with the Indigenous communities and organizations to carry out the Indigenous Participation Plans, including liaison with potential private sector contractors for a mutual understanding of challenges and opportunities, and with parties that can assist with training, education, apprenticeship, job site support and other factors critical to the success of Indigenous workers and contractors. The IPT will work with Indigenous communities and organizations to create and carry out Indigenous Participation Plans to generate socio-economic benefits for their members, including identifying obstacles and barriers to education and employment and working together to address the problems.
2025	**Decision Making Impact / Preliminary Design** (Decision Making – Phase 4)	The IPT will continue to consult with the Indigenous communities and organizations throughout the life of the Project. The IPT will also participate in IAAC-led consultations with Indigenous communities. The IPT will provide comments and follow-up program measures outlined in the IAAC's draft Impact Assessment Report and potential conditions.

Year	Phase	Engagement Activities
2025 to 2027	**Post-Decision / Detailed Design** (Post-Decision - Phase 5) Procurement and Detailed Design	The IPT will engage with Indigenous communities and organizations on the design of the replacement bridge. The IPT will work with Indigenous communities and organizations to carry out the Indigenous Participation Plans.
2028-2031	Construction Monitoring and adaptation	The IPT will work with Indigenous communities on monitoring and enforcement of contractual provisions to prevent the occurrence of negative impacts and effects. The IPT will work with Indigenous communities to ensure the provisions of the Indigenous Participation Plans are being realized.
2032 and beyond	Operations	The IPT will work with Indigenous communities on monitoring and to adapt mitigation measures as required. The IPT work with Indigenous communities to ensure the provisions of the Indigenous Participation Plans are being realized. Annual reports will be shared and discussed with Indigenous communities.

5 ENGAGEMENT WITH OTHER GOVERNMENT ENTITIES AND TRANSPORTATION PARTNERS

Engagement and collaboration of Engineering and Transportation Agencies related to Interprovincial Bridges and the Project was established among Federal, Provincial, Municipal Transportation partners and other stakeholders. Regional transportation partners include: NCC, PSPC, Ministry of Transportation Ontario (MTO), Ministère des Transports du Québec (MTQ), City of Gatineau and Ottawa, STO, OC Transpo, and Zibi (which is a waterfront community that is currently under development in close proximity to the Project area).

This partnership continues with the partners sharing upcoming construction Projects to ensure that the travelling public is not adversely affected by adjusting scheduled works when possible. This includes planning for when the Alexandra Bridge is no longer in service, and reconstruction begins in 2028.

This partnership has also served to discuss the functional requirements of the replacement Alexandra Bridge as well as the future design of the at the North approach of the bridge (corner of rue Laurier and boulevard des Allumettières in Gatineau) that is under additional study. Engagement has also taken place with federal government agencies to coordinate on early design considerations and opportunities for enhancements as the Project details are developed. Specifically, information sessions have been held by the NCC and PSPC with Transport Canada (TC) and Fisheries and Oceans Canada (DFO) in December 2020 and January 2021.

Engagement of Provincial Environmental Assessment Agencies was initiated in early summer 2021 to understand their regulatory requirements and explore ways to harmonize these. The contacts will be provided once established, along with information such as timelines, consultation plans, and issues/effects that the regulatory oversight would manage.

Ontario Environmental Assessment Services will be engaged through the Impact Assessment Agency's standard process. Ontario Environmental Assessment Services does not anticipate that the Project will trigger the need for a provincial assessment. The IPT will continue to engage the Province of Ontario as the Project progresses to apprise them of conversations with other Ministries or stakeholders.

The Government of Quebec's Ministry of the Environment, the Fight Against Climate Change, Wildlife and Parks (MEFCCWP) indicated that details regarding water encroachment are needed to determine how the Project qualifies under environmental impact assessment legislation. A Project that encroaches within the 2-year flood limit, over a distance of 500 m or an area of 5000 m^2 or more is subject to the province's environmental impact assessment procedure. This applies to both temporary and permanent encroachments. Should the Project require an impact assessment under provincial legislation, the IPT will work with the IAAC to harmonize the processes and coordinate with the Quebec Environmental Assessment office. Details of the design for the new bridge as well as temporary structures will be provided as they become available.

Plans for Future Engagement with Government Entities

The IPT has engaged with planning and engineering teams of the City of Gatineau, Ministry of Transport Quebec (MTQ), City of Ottawa, and the Ministry of Transportation Ontario (MTO) to explore potential functional alignments and designs, in keeping with approved plans and guidelines such as the NCC's Confederation Boulevard Planning and Design Principles and the Ottawa River North Shore Parklands

Plan (NCC, 2018b). Additional meetings with both municipalities and other government entities will be held as needed to discuss matters related to design issues, planning and coordination.

6 RELEVANT STUDIES

Assessments, scans and studies have been undertaken in the past for other purposes and Projects. This information will be referred to and used, as applicable, to support the current Project. **Table 7** provides an outline of the documents that will be referenced.

Table 7: Outline of scans and assessments that were completed in 2003, and 2018 respectively.

Scans, Studies and/or Plans	Completion Date	Details/Objectives of the Scans, Studies and/or Plans
Environment Assessment Screening (produced by DST Consulting Engineers Inc.)	2003	• An Environmental Assessment Screening (EAS) of the Bridges: The Chaudière Crossing, the Macdonald Cartier, and *the Alexandra Bridge.* • The EAS, highlighted areas of concern such as: the impacts on the Ottawa River, Cumulative effects, forestry waste, impacts on oil, and gas. • Highlighted individual mitigation measures for impact on biology, soil quality, water Groundwater quality and socioeconomic
Preliminary Scan	2018	• A preliminary scan was conducted to gather early environmental considerations for three (3) interprovincial bridges: The Chaudière Crossing, the Macdonald Cartier, and *the Alexandra Bridge.*

In addition to the existing scans and assessments, the NCC has Plans and Guidelines that form the basis of the proposed Project's evaluation under the FLUDTA process. A few of the most critical documents which will impact the analysis of Project alternatives include:

- The Plan for Canada's Capital 2017-2067 (2017)
- Canada's Capital Core Area Sector Plan (2005), currently under review
- Confederation Boulevard Guidelines (2011)
- Ottawa River North Shore Parklands Plan (2018)
- Canada's Capital Views Protection Plan (2007)
- Capital Illumination Plan, 2017-2027 (2017)
- Capital Pathway Strategic Plan (2020)
- NCC Sustainable development strategy, 2018-2023 (2018)

These plans and guidelines will also be used to support the Project, as applicable.

Strategic Assessment (Climate Change)

Under the Federal Sustainable Development Strategy (FSDS), the Government of Canada has made a commitment to "take action to understand the wide range of climate change impacts that could potentially affect federal assets, services and operations across the country." In addition, as stated in the FSDS, "All major real property projects will integrate climate change adaptation into the design, construction and operation aspects."

In addition, the Greening Government Strategy: A Government of Canada Directive states that "Departments will ensure that all new buildings and major building retrofits prioritize low-carbon and climate resilience. Investment decisions will be based on total cost of ownership: […] all new federal buildings, infrastructure and major building retrofits, including significant energy performance contracts, require a climate change risk assessment that incorporates both current and future climate conditions in the analysis".

As such and in keeping with section 95 of the *Act* and the FSDS, a Climate Risk Vulnerability Assessment (CRiVA) on Potential Climate and Weather Impacts will be conducted as part of the Project.

A climate risk and vulnerability assessment study will identify and assess potential site vulnerabilities to climate change and extreme weather and to make recommendations on adaptation measures that can be incorporated into the infrastructure engineering design to address the risks and vulnerabilities.

The Greening Government Strategy: A Government of Canada Directive states that:

"Departments will ensure that all new buildings and major building retrofits prioritize low-carbon and climate resilience. Investment decisions will be based on total cost of ownership:

all new federal buildings, infrastructure and major building retrofits, including significant energy performance contracts, require a climate risk assessment that incorporates both current and future climate conditions in the analysis."

To this end, a study of the crown-owned properties (Directory of Real Property sites 23280, 23287 and 04260) will be conducted to clarify the main climate hazards (nature and severity) to the new bridge, the vulnerability of the site, the level of risk, and strategies for mitigating the impacts of climate change.

The CRiVA study will be conducted in accordance with the Public Infrastructure Engineering Vulnerability Committee (PIEVC) protocol or Envision, which are compliant tools with ISO 31000 and ISO 14091 Risk Management and are recommended by the Infrastructure Canada's Climate Lens Program. This is consistent with the guidance provided in the Strategic Assessment of Climate Change (SACC) *section 5.1.5 on Climate change resilience*. The study will involve a review of available documentation for the Project site from the NCC and PSPC sources, including previous studies on the climate projections and climate hazards for the region. A gap analysis will be done to obtain any relevant climate parameters that are not available from the previous studies or detailed hydraulic modeling of the Ottawa River in the area of study, if required. In addition, infrastructure elements that may present vulnerabilities to climate hazards will be analyzed to estimate the likelihood of an interaction, effects, and risks associated with the identified climate events. Finally, recommendations for the design will be presented based on the findings of the study.

The IPT looks forward working with interested Indigenous communities to develop an approach to collect Indigenous Knowledge to be integrated in the climate vulnerability and risk assessment. Then, together, determine how the knowledge will contribute to mitigating and planning for the impacts of climate change.

Planned Studies

To address the data gaps identified in this section, there are a number of studies that are being scheduled within the next two to four years to inform the Project plan development and future regulatory requirements. Further details regarding the design and methods of construction will be developed in the design stages of the Project. The IPT will engage Indigenous communities to contribute Indigenous Knowledge, identify concerns and determine appropriate studies needed.

Table 8 provides a summary of these planned studies. It should be noted that the timing may change depending on expert recommendations and Project progress.

Table 8: Planned studies

Alexandra Bridge Replacement Project (For reference - Section Titles of the Tailored Impact Statement Guidelines are in bold)	
Studies and plans	**Estimated Timeline**
Baseline Condition: Biophysical Environment	
Atmospheric, acoustic, and visual environment *Air quality* (Deconstruction and Construction) *Greenhouse Gas (GHG) Analysis* (Deconstruction and Construction) *Acoustic Impact* (Deconstruction and Construction period)	Information will be updated once details of the Project are known. GHG Analysis planned for 2025
Meteorological Environment (Temperature, Precipitation, Wind, Visibility)	Update information if required based on climate risk assessment, desktop review or monitoring station data and analysis 2025
Climate Change - Climate Risk and Vulnerability Assessment	2023/spring 2024 Terms of reference currently under development
Geology, geochemistry and geological hazards	Phase II ESA analysis completed by WSP, 2021a Geotech Analysis completed by WSP, 2021c Additional work completed as part of the design of the bridge, if needed.
Topography, soil and sediment *Topographic Survey of the PDA, including bathymetric survey of the Ottawa River*	Geotech Analysis completed by WSP, 2021c Phase II ESA analysis completed by WSP, 2021a Additional work completed as part of the design of the bridge, if needed.
Riparian and wetland environments	Field work will be part of surface water studies
Groundwater and surface water *Hydrogeological assessment*	Geotech Analysis completed by WSP, 2021c Phase II ESA analysis completed by WSP, 2021a Hydrogeological assessment will be completed as part of the design of the bridge. Surface water quality sampling and assessment Summer/fall 2025

Alexandra Bridge Replacement Project **(For reference - Section Titles of the Tailored Impact Statement Guidelines are in bold)**	
Studies and plans	**Estimated Timeline**
Hydrology *Hydrology assessment*	Hydrology assessment will be completed as part of the design of the bridge. Anticipated 2024/2025
Ecological characterization of terrestrial and aquatic Project area (both shores, including staging areas and other potentially impacted lands), including ecological land classification (ELC), vegetation surveys, tree inventories, wetlands, terrestrial fauna, and fish and fish habitat, including species at risk. Breakdown of specific studies are provided below.	
Vegetation *Inventory for potential plant SAR/SOMC (or their suitable habitat) and invasives.* *Detailed vegetation surveys (including tree inventories, identification of ecological communities) within the proposed development footprint and other impacted sites.* *Butternut health assessments (as required)*	Spring/Summer/Fall 2023 Additional work in 2024 as required Once the adjacent impacted lands have been confirmed Following the detailed vegetation surveys (as required). Must be completed between May 15 and August 31 to be valid.
Birds, migratory birds and their habitat *Inventory of birds, including surveys for SAR/SOMC, migratory birds and their habitat use, breeding birds, winter bird surveys, and studies to determine seasonal and annual variation in bird populations.* *Bird nest searches prior to vegetation removal* *Scans for migrant birds using the area as a stop over*	Spring/Summer/Fall 2023 and Winter 2024 Within 48 hours of vegetation clearing if occurring during the breeding bird season Spring and Fall 2023 (if required)

Alexandra Bridge Replacement Project **(For reference - Section Titles of the Tailored Impact Statement Guidelines are in bold)**	
Studies and plans	**Estimated Timeline**
Terrestrial wildlife and their habitat (mammals and herpetofauna) *Inventory of potential animal SAR/SOMC (or their habitat)*	Spring/Summer/Fall 2023 + Winter 2024
Studies of the seasonal and annual variations in SAR occurrence and/or habitat use.	Spring/Summer/Fall 2023 + Winter 2024
SAR bat colony/maternity roost surveys, including a tree bat habitat maternity roost assessment and bat exit survey at the bridge.	June/July 2023
Studies of bat migration in the Project area and overwintering use by SAR wildlife	Spring/Fall 2023 + Winter 2024
Turtle emergence and basking surveys	May/June 2023
Turtle nesting site characterization and surveys	June 2023
Snake emergence surveys	May/June 2023
Amphibian surveys	Spring/Summer 2023
General mammal surveys (not including bats)	Spring/Summer/Fall 2023 and winter 2024 (during other surveys and inventories)
Fish and fish habitat *Field surveys to ID the presence of fish (including SAR/SOMC) and fish habitat (including aquatic, semi-aquatic and riparia habitats) within the Project area. Includes the description of the aquatic habitat (substrate type, aquatic vegetation, riparian vegetation), DFO Species at Risk mapping, electrofishing survey (if required) and SAR mussel inventory (to support the DFO Request for Review).* *Potential additional areas of study to assess alternative temporary wharf locations and other impacted lands if required.*	Spring/Summer/Fall 2023
Cumulative Effects *Cumulative effects assessment for Valued Components (VCs)*	2024-2025
Baseline Condition: Human Health	

Alexandra Bridge Replacement Project **(For reference - Section Titles of the Tailored Impact Statement Guidelines are in bold)**	
Studies and plans	**Estimated Timeline**
Assessment of benefits/impacts to human health of new structure *Human Health Risk Assessment (HHRA)*	Completed by PwC in 2021 An HHRA will be completed, if required.
Baseline Condition: Social	
Cultural Heritage *Heritage Impact Analysis (HIA)* *Bridge Heritage Recording and other mitigation work*	Winter 2022 to Winter 2024 Terms of Reference currently under development On-going
Land-based Archeological inventories (for defined areas if required)	Summer/Fall 2023
Underwater archaeological survey of the riverbed near the shoreline (for defined areas as required)	Summer/Fall 2023
Adjacent Impacted Lands Study	On-going
Transportation Impact Assessment	2024-2025
Baseline Condition: Economic	
Cost/Benefits analysis of new structure	Completed by PwC in 2021
Study of the current socioeconomic conditions within the Project area	Information will be updated, if required, once details of the Project are known.
Baseline Conditions: Indigenous Peoples	
Physical and Cultural Heritage	All information will be gathered through ongoing engagement and will vary for each Indigenous community.
Current Use of Lands and Resources for Traditional Uses - *Survey of traditional plants*	
- *Health, social and economic conditions*	
Conditions related to the Rights of Indigenous Peoples	
Predicted Changes to the Physical Environment	Discussed based on results of studies completed
Predicted Changes to Valued Components	Discussed based on results of studies completed

Other studies could be added as the Project progresses.

Continued engagement with Indigenous communities will help to contribute Indigenous Knowledge, identify concerns and determine some of the studies that may be needed. The nature of their participation will be determined by the Indigenous communities themselves, including:

- reviewing draft Terms of References for studies
- leading studies with financial support from the IPT and providing the results to the IPT
- participating in parallel with the work of external experts hired by the IPT
- reviewing the results of studies undertaken under the direction of the IPT and providing comments and guidance.

The following Indigenous communities have expressed initial interest in participating in or leading various studies:

- **Algonquins of Ontario (AOO)**
  - The IPT and the AOO have agreed on a multi-year work plan and budget that will support the completion of several studies of interest to the community.
  - The community has requested that the Kichi-Sibi Guardians participate in the development and implementation of fish surveys, the review of reports and various environmental monitoring efforts.
  - The community will conduct its own AOO Health and Socio-Economic Study and Algonquin Knowledge and Land Use Study (AKLUS).
- **Algonquins of Pikwakanagan First Nation (AOPFN)**
  - The community will conduct its own studies, including a cumulative effects assessment, and will determine at a later date how it will participate in studies led by the IPT.
  - AOPFN will share valuable Indigenous Knowledge to help support the development of the Climate Risk and Vulnerability Assessment.
  - The community has expressed a desire that AOPFN Knowledge Keepers participate in several biophysical studies, including:
    - The design of the bird field surveys
    - The creation of the list of species
    - The identification of the scale and scope of aquatic and semi-aquatic plant community surveys and contribution of Indigenous Knowledge to various aquatic surveys.
- **Kebaowek First Nation (KFN)**
  - The First Nation has indicated that it will conduct its own studies, including a cumulative effects or regional assessment of the Ottawa River watershed.
- **Kitigan Zibi Anishinabeg First Nation (KZA)**
  - The community is interested in all archaeological digs that may take place as a result of the Project.
- **La Nation Huronne-Wendat**
  - The Nation has expressed an interest in participating in and/or leading various environmental and cultural impact studies.
  - The Nation is particularly interested in reviewing the archaeological/heritage studies that have already been completed, including supplementing existing data and studies with their own as needed, as well as participating in the development of future studies.

- **Timiskaming First Nation**
    - The community has requested involvement in reviewing the terms of reference and participating in project studies. Species studies are of particular importance to the community.
    - The community also requested that communities be invited to help return aquatic species to the river during de-watering activities, as well as the opportunity to harvest any deceased organisms for possible consumption or use in traditional crafts.
- **Wahgoshig First Nation**
    - The community would like to create a workplan and budget to support their participation in the Project.
- **La Nation Huronne-Wendat**
    - The Nation has expressed an interest in participating in and/or leading various environmental and cultural impact studies.
    - The Nation is particularly interested in reviewing the archaeological/heritage studies that have already been completed, including supplementing existing data and studies with their own as needed, as well as participating in the development of future studies.
- **Timiskaming First Nation**
    - The community has requested involvement in reviewing the terms of reference and participating in project studies. Species studies are of particular importance to the community.
    - The community also requested that communities be invited to help return aquatic species to the river during de-watering activities, as well as the opportunity to harvest any deceased organisms for possible consumption or use in traditional crafts.
- **Wahgoshig First Nation**
    - The community would like to create a workplan and budget to support their participation in the Project.

7 NEED FOR THE PROJECT

The Alexandra Bridge is one of only five interprovincial bridges open to vehicular traffic in the NCR linking the cities of Ottawa, Ontario and Gatineau, Quebec. According to a 2017 City of Ottawa traffic study, the bridge carries about 13,300 vehicles per day, which amounts to approximately 9% of the average daily interprovincial vehicular traffic in the NCR (IBI Group, 2020). The bridge is also used by about 33% of all pedestrians and cyclists crossing the Ottawa River (City of Ottawa, 2013), making it a key piece of active transportation infrastructure in the region.

The Alexandra bridge is a key piece of regional transportation infrastructure and is integral to mobility planning in both cities and the region. It also has a unique heritage and aesthetic value due to its location and history, as well as physical and visual connections to both sides of the river. Its position relative to the Parliamentary Precinct and Rideau Canal underscores its significance to the region's residents and visitors alike and makes the bridge a destination in its own right for special events such as ceremonies and races. Additionally, the Bridge forms an inherent part of Confederation Boulevard, the Capital's ceremonial and discovery route, which connects many sites and symbols of national significance and forms a loop that connects both sides of the Ottawa River, linking Ontario and Quebec.

Condition Assessment of the Bridge

The bridge has experienced significant deterioration that will only accelerate over time. Deteriorating steel, the need to replace the existing East and West side cantilever decks, and high capital expenditures required to maintain the structure in a safe operating condition led PSPC to evaluate the rehabilitation versus replacement options. The LCCA report (WSP, 2018) concluded that the Alexandra Bridge is at the end of its life cycle, with replacement warranted as the most cost-effective alternative, given the bridge's advanced age and accelerating rate of deterioration.

Overall, the structure is currently in "inadequate" condition (rating of 2 on a scale of 1 to 6). This rating is based on the critically "inadequate" condition of the Boardwalk steel grating and stringers, the presence of crack indications on primary tension members of truss A and truss B, the structural articulation concerns, and the component buckling concerns. The minimal rating at which PSPC bridges are to be maintained is "fair" (rating of 4).

PSPC's standards for bridges are to maintain them to a level of service consistent with accepted industry practices which is described as a minimum condition of 'Fair'. This equates to a rating of four (4) out of six (6) as per the PSPC Bridge Inspection Manual. In 2017 PSPC commissioned a Comprehensive Detailed Inspection (CDI) (WSP, 2017), which classified the Alexandra Bridge as "inadequate" and rated its condition as two (2), meaning that the minimum established standards are not met. From a reliability of service standpoint, the interventions planned in the next 25 years would result in ongoing and unforeseen closures and disruptions to traffic with the rehabilitation approach compared to a replacement Project. A 2018, Asset Condition Risk Assessment (KPMG, 2019), completed for PSPC determined that after completing the 10-year program of work, the bridge's risk level would remain high in terms of safety and structural integrity.

The condition of the bridge has resulted in the current reduced level of service and implementation of several mitigation measures by PSPC. Currently, the mitigation measures and reduced level of service are sufficient for the Alexandra Bridge to remain safe and in service until its replacement.

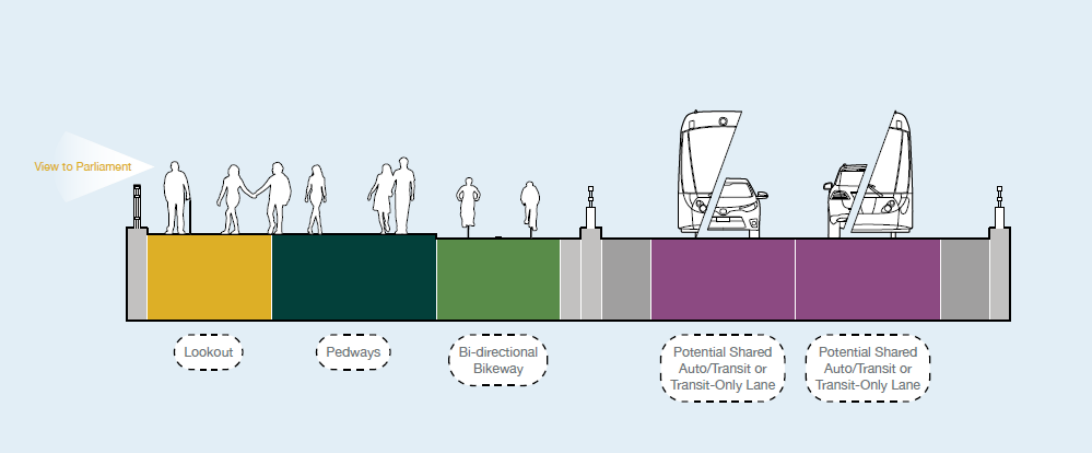
Based on these factors, in December 2018, the IPT was directed by government policy, to address repairs, replacement and operations for all five crossings in the NCR. The replacement of the Alexandra Bridge is a component of this holistic strategy. Funding was provided to PSPC in Budget 2019 to plan and implement this Project. The replacement of the Alexandra Bridge was also cited in the Minister of PSPC's Mandate Letter in December 2019.

The project team is working to develop a holistic strategy to adequately maintain and operate the five (5) interprovincial crossings in the NCR.

Functional Requirements

Through development of the Project Planning and Design Principles and engagement with key stakeholders, the following minimum functional requirements for the replacement of the Alexandra Bridge have been identified (refer to **Figure 2**):

1. Two lanes for vehicle traffic (one in each direction) designed to be adapted in the future for public transit via a tram or light rail system.
2. One lane for active mobility (e.g., pedestrians, cyclists, users with mobility aids, etc.) on the upstream (west) side of the bridge. The active mobility lane will be bidirectional, with separation of pedestrians and cyclists. The active mobility lane should include seating and viewing locations that provide rest points without compromising safety or obstructing users.
3. The traffic lanes and the active mobility lane will have a solid surface that will protect the bridge from the elements, de-icing products and dirt. This will allow for a longer-lasting structure.



Source: Planning and Design Principles

Figure 2: Section of the potential future traffic lanes

8 POTENTIAL ALTERNATIVES

From the Project's inception, alternatives and methods of carrying out the Project have been under consideration within the planning team and with external stakeholders. In the LCCA report prepared for PSPC (2018), two alternatives to the Project were assessed using conceptual designs that were developed as part of the report. The two major alternatives assessed were:

- Rehabilitation and continual maintenance
- Replacement of the bridge

Both major options identified (rehabilitation or replacement) will cause disruption to transportation and active users and multi-year shutdowns are expected.

Removal of Crossing

The deconstruction of the Alexandra Bridge without replacing it was not an option that the Government of Canada deemed viable, especially considering the bridge's significance, heritage value and integral role in interprovincial transportation and link between Ottawa and Gatineau.

Removal of the crossing without replacement would have significant social and economic impacts. It is an option that was deemed unacceptable and was not considered further, consequently it is not included in the comparison analysis.

Rehabilitation and Continual Maintenance

The rehabilitation option requires a significant scope of work to raise the existing structure to a rating of "fair" condition (rating of 4 on a scale of 1 to 6) within five years. Work would include the following:

- East and West side deck immediate repairs and replacement
- Expansion joint repairs (seals)
- Steel repairs
- Bearing replacement
- Complete bridge recoating
- Pier erosion protection
- Substructure masonry and abutment rehabilitation
- Barrier wall repairs
- Centre deck repairs/replacement.

In the medium to longer term (about 10 to 25 years), work required to maintain the structure in a "fair" condition was projected to include:

- Pin/eye bar retrofit
- Steel repairs
- Substructure masonry rehabilitation and pier erosion protection.

There are risks associated with future rehabilitation work as the extent required is not fully known. The risk for work required in the short term is lower, as the need and cost of repair can be determined more accurately. Over the long term however, the scope of work and costs associated with maintaining the bridge at a "fair" condition rating are more difficult to predict.

Replacement of Bridge

Given the “inadequate” condition of the structure, PSPC has implemented several risk mitigations measures for the short and medium term in anticipation of replacing the structure within 10 years, as directed by the federal government through Budget 2019.

With input from key stakeholders, namely the NCC, City of Ottawa, City of Gatineau, OC Transpo, the Société de Transport de l ’Outaouais (STO) and PSPC representatives, conceptual design criteria and functional plans were developed for the alternatives of replacement in kind, contemporary and signature alternatives. Considerations included the context and fit with the surrounding urban fabric of the nation’s capital, the approach roadways on the Ottawa and Gatineau sides, existing foundation and geotechnical conditions, local land ownership and usage as well as marine traffic. Functional needs for the Alexandra Bridge were decided to be maintained at existing levels and it was recommended to separate pedestrians and cyclists.

The LCCA provided a cost comparison between maintaining the bridge or replacing it. The analysis concluded that its replacement would be more economical than continuing to maintain the existing structure indefinitely and that it would present less risk to public safety.

9 ALTERNATIVE MEANS TO PROJECT EXECUTION

Alternative means to carrying out the Project are currently being investigated and considered by the IPT. At the time of writing, many high-level design decisions relating to the alignment as well as the number and length of spans are still to be determined, which have a direct impact on the means of executing the Project.

An important aspect under review is how to deconstruct the existing bridge and rebuild a new one. Design, engineering, environmental, social, and economic impacts will affect the selection of the approach. There are also constraints that need to be considered in the analysis including reducing the amount of time that the bridge will be offline to all users, managing the complexity and time associated with deconstruction and construction activities occurring simultaneously. In addition, views protection, including views of the Parliamentary and Judicial precincts from the bridge and the shorelines, as well as maintaining public spaces and navigation opportunities will be important considerations. Planning and Design Principles were developed to establish a framework for future design development. These, along with planned Decision Criteria will provide a structured approach to the decision-making process.

A proposed approach, which is under consideration, is to possibly “partially-twin” the new bridge during construction (

Figure 3: Conceptual drawing of a bridge following a curved alignment.). This would involve starting construction of the new bridge while the existing Alexandra Bridge is still in operation to some degree. A complete twinning is not feasible due to existing infrastructure or abrupt land features in Ottawa and Gatineau that prevent construction of new distinct approaches. Potential impacts of this approach would include longer project timelines, increase in project costs, and possible different alignment for the new bridge (“curved alignment” as opposed to “straight alignment”). Potential benefits might include less impacts to commuters if the crossing was out of service for a shorter period since the existing bridge could remain in service longer at the start of construction activities.

Figure 3: Conceptual drawing of a bridge following a curved alignment.

A different approach, required if the existing " straight" alignment is used for the new bridge shown in **Figure 4**, would be to partially or completely deconstruct the existing bridge before starting construction on the new one. Potential impacts would include the length of time that the crossing is not available to any of its current users. Potential benefits of this approach would be that the new structure would use nearly the same alignment as the existing bridge which would reduce the overall footprint of the Project ("straight" alignment) and lessen the overall construction time and cost.

Figure 4: Conceptual drawing of a new bridge in the same location as existing (straight alignment).

10 PLANNING AND DESIGN PRINCIPLES

Technical and background studies undertaken in 2019 and 2020 led to the development of a set of preliminary Planning and Design Principles for the Project.

In May and November 2020, the preliminary Planning and Design Principles for the Project were presented for consideration and comment to NCC's Advisory Committee on Planning, Design and Realty (ACPDR) as part of the regulatory approval process under FLUDTA. The Planning and Design Principles were developed to articulate the Vision for a "signature" bridge in the Nation's capital and to establish a framework for future design development. This included the preliminary development of several concepts for consideration by the Project team for further investigation and study.

The Planning and Design Principles for the Project (NCC Planning and Design Principles) were developed to provide future bridge designers and engineers with concrete considerations and directives to integrate within new bridge designs. These site-specific guidelines consider applicable federal and municipal plans, policies and guidelines given that the bridge is a national landmark and a significant connection between the municipalities of Ottawa and Gatineau.

The Planning and Design Principles set the foundation for bridge and urban design considerations given the complexity of the surrounding cultural and heritage context. Nearby sites of historical and cultural significance include National Historic Sites of Canada (the Parliamentary Precinct and Rideau Canal, which is also a UNESCO World Heritage Site), the National Gallery of Canada, the Canadian Museum of History, Nepean Point, Major's Hill Park, Jacques-Cartier Park, as well as the natural elements of the Ottawa River shoreline. The site-specific Planning and Design Principles will focus possibilities by providing a concise set of parameters that may also be used for the purposes of evaluation of future new bridge designs.

The Mission Statement that underlay the development of the Planning and Design Principles for the replacement of the Alexandra Bridge was defined as:

To create a sustainable interprovincial transportation connection that will prioritize active mobility and highlight the symbolic importance of the site to all Canadians for many generations to come.

Some of the key considerations of the Planning and Design Principles include the functional design requirements of the bridge, applicable NCC Plans and policies, and the protection and honouring of national values and interests, such as the Central Capital Landscape and Confederation Boulevard.

The vision for the Project recognizes that, just as the existing bridge has for the past 120 years, the new bridge will strongly become a representation of the identity of its place defined by its architectural, urban and structural character.

Based on this Mission Statement, the overall Vision that will be used to guide the design process throughout the Project is as follows:

Creating an emblematic bridge in the form of an exceptional civic site that reflects Canada's national identity and values, while respecting the integrity of the cultural landscape of the capital.

The Planning and Design Principles are organized under six broad categories including:

(1) Mobility and Continuity of the Urban Fabric

- This set of guidelines provides direction for the integration of the replacement bridge within the Confederation Boulevard ceremonial route and the importance of creating better active mobility network connections both across the river, but also between the new bridge and the shorelines. It emphasizes the importance of safe and comfortable active mobility, with pedestrians having first priority, in line with the NCC's Confederation Boulevard design guidelines.

(2) Public Spaces and Civic Experiences

- These guidelines support the consideration of the function of the bridge as a key part of the core area sector of the capital, connecting major urban parks but also being a civic space in its own right for residents and visitors alike to appreciate views of the national symbols.

(3) Structure, Height, Proportions and Lighting

- This set of guidelines necessitate the integration of the bridge within the cultural landscape and the overall design of the core area sector, through consideration of the bridge's structural composition and lighting. The intent is for the bridge to complement and be sensitively inserted into the landscape, so as to be an iconic structure without overpowering the landscape's natural features and the pre-eminence of the national symbols, such as the Parliamentary triad.

(4) Preserve Views and Celebrating the Legacy

- These guidelines highlight the importance of the cultural and historical context the new bridge must reflect, including enabling indigenous participation in the Project and design, honouring the legacy of the existing Alexandra Bridge, and ensuring appropriate integration into the cultural landscape. Special attention is given to the question of views protection, including views of the Parliamentary and Judicial precincts from the bridge and the shorelines.

(5) Sustainability and Materiality

- These guidelines call for the bridge design to achieve excellence in terms of sustainability, and in particular, protection and enhancement of natural features of the Ottawa river and its shoreline. Materials selection, ensuring ease of operations and maintenance, and designing for the local climate are also highlighted as key features of importance for a sustainable bridge.

(6) Universal Accessibility, Legibility and Wayfinding

- This section highlights the importance of considering accessibility right from the outset in designing the bridge, and of integrating detailed elements such as road signs and supports for interpretive features within the bridge design, while also being compatible with the system used for Confederation Boulevard and the capital pathway network.

The Project shall aim for the highest certifications and standards in terms of sustainable development, including following the directions of the NCC's *Sustainable Development Strategy 2018-2023* and future revised strategies. Long-term sustainability of the new bridge is a key consideration in the future assessment of alternative means to complete the replacement Project, with the Planning and Design Principles recommending the use of active and passive sustainability strategies, as well as ensuring a response to the sustainable development goals of the 2030 United Nations Agenda for Sustainable Development. Emphasis will be placed on low carbon material choices and the total cost of the materials (economic and environmental).

11 PROJECT ACTIVITIES

A Project of this scope and size requires a minimum practical construction area as well as several staging or mobilization sites. Specific construction conditions are not known at this stage of the Project. Generally expected activities associated with the Project include the organization of the site, the deconstruction of the existing bridge, and the construction of the new bridge. Many factors will be considered in the development of associated infrastructure and the selection of temporary facilities to support construction and deconstruction activities.

Criteria to support the decision-making process may include such categories as:

- **Technical considerations** such as the limited available options for staging areas near the bridge; the general vicinity of staging areas to reduce transportation and barging of materials; or conditions of use of certain areas to mitigate potential impacts (such as contamination)
- **Socio-economic considerations** such as impact to key partners and stakeholders operating in the area (e. g. wharf tenants, small businesses, museum, municipalities, park users, etc.)
- **Environmental considerations** such as proximity to the river and impact to other resources such as heritage or archeological features
- **Level of reversibility of all impacts**

Areas immediately adjacent to the bridge which could be impacted by construction activities include Jacques-Cartier Park and the Museum of History on the Gatineau side as well as Kìwekì Point (formerly named Nepean Point) and Majors' Hill Park on the Ottawa side. These public spaces support activities of social and economic importance that may be displaced during construction and deconstruction activities to ensure public safety. Consideration for temporary relocation of the infrastructure associated with these activities are included in this section.

Organization of Sites for Deconstruction and Construction

As part of the Project, temporary facilities will be required to properly organize the site for the Project. Given the urban setting of the Project and limited availability of staging areas near the bridge, several sites are likely to be required in the general vicinity to provide sufficient space for trailers, laydown area and parking for construction equipment.

Staging locations have not yet been confirmed, as they will be carefully evaluated to avoid, limit, or reduce any impacts on areas proposed.

Alternative Deconstruction and Construction Activity Sequencing

The two alignments, straight and curved, were considered in the development of deconstruction scenarios for the existing bridge. The deconstruction sequence for each case attempts to minimize:

- The traffic disruption time and the total duration of the work
- Complexity of the deconstruction process
- The ease of constructing the new approaches
- Accessibility to the navigation channel.

This is based on the areas of overlap between the deconstruction activities and the conceptual construction of the new bridge.

Unlike the curved alignment, the overlap area for the straight alignment completely covers the existing bridge. Given the geometry of the two proposed alignments, the overlapping areas will need to be cleared:

- So that construction of the new bridge can start in the straight alignment
- So that construction of the new bridge can progress in the curved alignment.

These are conceptual scenarios for consideration by designers in developing a feasible and efficient deconstruction sequence which will be essential to facilitate the new construction. Other deconstruction options may be explored and or implemented.

The existing Alexandra Bridge was originally built-in sequence which suggests an approach for the deconstruction. While developing potential deconstruction alternatives, it was found that the east and west cantilever tracks can be dismantled as required to reduce the weight of the structure itself. In addition, the concrete deck and parapet walls in the central lane can also be removed, if necessary. This part of the deconstruction can be completed first regardless of the alignment chosen.

For the curved alignment, the North and South trestle spans and the 'A' truss can be removed by crane from ground level or from a temporary platform without the use of barges. The removal of these spans can take place prior to the deconstruction of the main truss span as illustrated in **Figure 5**.

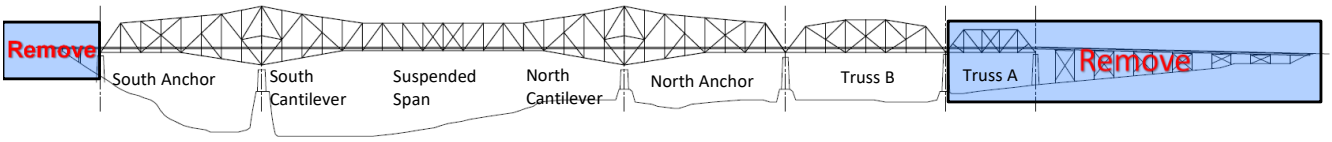


Figure 5: Deconstruction– curved alignment

Removal of the remaining main truss spans is proposed as the step 2 deconstruction. There are options related to the order in which the sequence of deconstruction is completed, each have different impacts on timing, cost, and navigation.

For the straight alignment, the removal is similar to that proposed for the curved alignment, but the 'B' truss is also included in the first stage of deconstruction, in addition to the 'A' truss, as well as the north and south trestle spans as illustrated in the **Figure 6**.

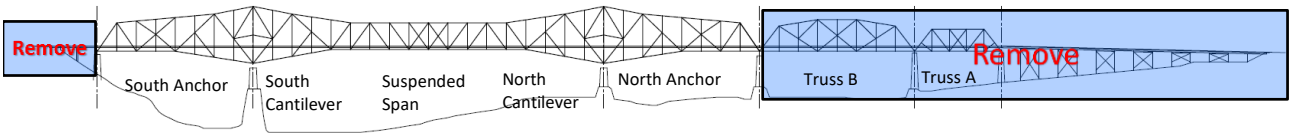


Figure 6: Deconstruction– straight alignment

Removal of the remaining main truss spans is proposed as the step 2 deconstruction. There are options related to the order in which the sequence of deconstruction is completed, each have different impacts on timing, cost, and navigation.

Construction Stage

The construction work may potentially be divided into four (4) Construction sub-stages. Construction activities will be further defined when technical components of the new bridge are developed and as the deconstruction process for the existing bridge is further developed. However, some sub- stages might be overlapped or completed simultaneously with other construction activities to reduce the overall construction time. In general, the construction sub-stages can be summarized as:

- Construction Sub-Stage 1 (Estimated 2028/29): organization of the construction site
- Construction Sub-Stage 2 (Estimated 2030): construction of traffic deck and boardwalk deck
- Construction Sub-Stage 3 (Estimated 2031/32): construction of traffic deck and boardwalk deck from piers to abutments
- Construction Sub-Stage 4 (Estimated 2032): clean-up of staging areas, removal of access roads, restoration of sites

Operations Stage

Maintenance and repair activities will be carried out throughout the life of the structure. The bridge design is not yet at a stage where maintenance and operating plans can be fully articulated.

Associated Infrastructure and Activities

To ensure public safety and provide sufficient area to allow construction activities to take place, a minimum construction area surrounding the bridge is required.

The areas to be used for construction activities might impact NCC-owned land around the approaches to the existing bridge. Initial options have been identified in Jacques-Cartier Park, the grounds of the Canadian Museum of History and the Kruger Industrial plant located next to the museum. Areas on the Ottawa side of the river will also need to be identified for worker access. Technical considerations include the proximity of available options for staging areas near the bridge; the general vicinity of staging areas to reduce transportation and barging of materials; and conditions of use of certain areas to mitigate potential impacts (such as contamination).

In addition, socio-economic factors that influence the final decisions such as impact to key partners and stakeholders operating in the area (e. g. wharf tenants, small businesses, museum, municipality) and environmental considerations such as proximity to the river, impact to other resources such as heritage or archeological features are all considerations in the final decisions.

Sites located immediately adjacent to the bridge, where public access may not be possible for safety reasons during construction activities, include the existing parking area, marina building, and wharf, as well as an area actively used within Jacques-Cartier Park. Use of Jacques-Cartier Park for staging is subject to NCC approval and requirements as a landowner. Depending on methods selected, deconstruction and construction activities may require use of docking or mooring structures within the park area to load and unload materials. There is also a concurrent need to maintain safe public access to the river to support commercial tourism operations and recreation activities. Options for infrastructure required to support ongoing operations while anticipating construction needs and the future use of the park are being evaluated. Impacted stakeholders will be engaged in the development of appropriate mitigation options.

Intersection Alignment

Construction of the new bridge provides an opportunity to make needed changes to the Gatineau approach and intersection of rue Laurier and Boulevard des Allumettières to address concerns related to vehicular accidents and safety for active mobility users. Changes to the intersection, which is owned by the City of Gatineau, may result in modifications to the bridge approach compared to its current location.

Preliminary Assessment of Project Footprint

The two alternative bridge alignments, curved and straight designs, show that the conceptual bridge could potentially have the same number of piers as the current bridge, two on the Ontario side and four on the Quebec side. This will be confirmed as the design becomes further defined.

A preliminary assessment of the potential footprint of the Project within the riverbed and shoreline below the 2-year flood level was undertaken to provide information required for the Quebec impact assessment process. The assessment considered the area that is anticipated to be needed for the removal of existing piers and construction of new piers, adding the area for cofferdams during deconstruction and construction activities. **Figure 7** provides a diagram of the piers and anticipated workspace. In summary, within the Quebec river area, the Project covers an area of approximately 1, 665m² as follows:

- the approximate area affected in the waterway to remove the existing piers is 765m²
- the approximate area affected in the waterway to construct the new piers is 900m²
- the approximate length of shoreline affected for the abutment of the bridge on the Quebec shoreline is 20m.

Installation of temporary construction wharfs required are shown in **Figure 7.**

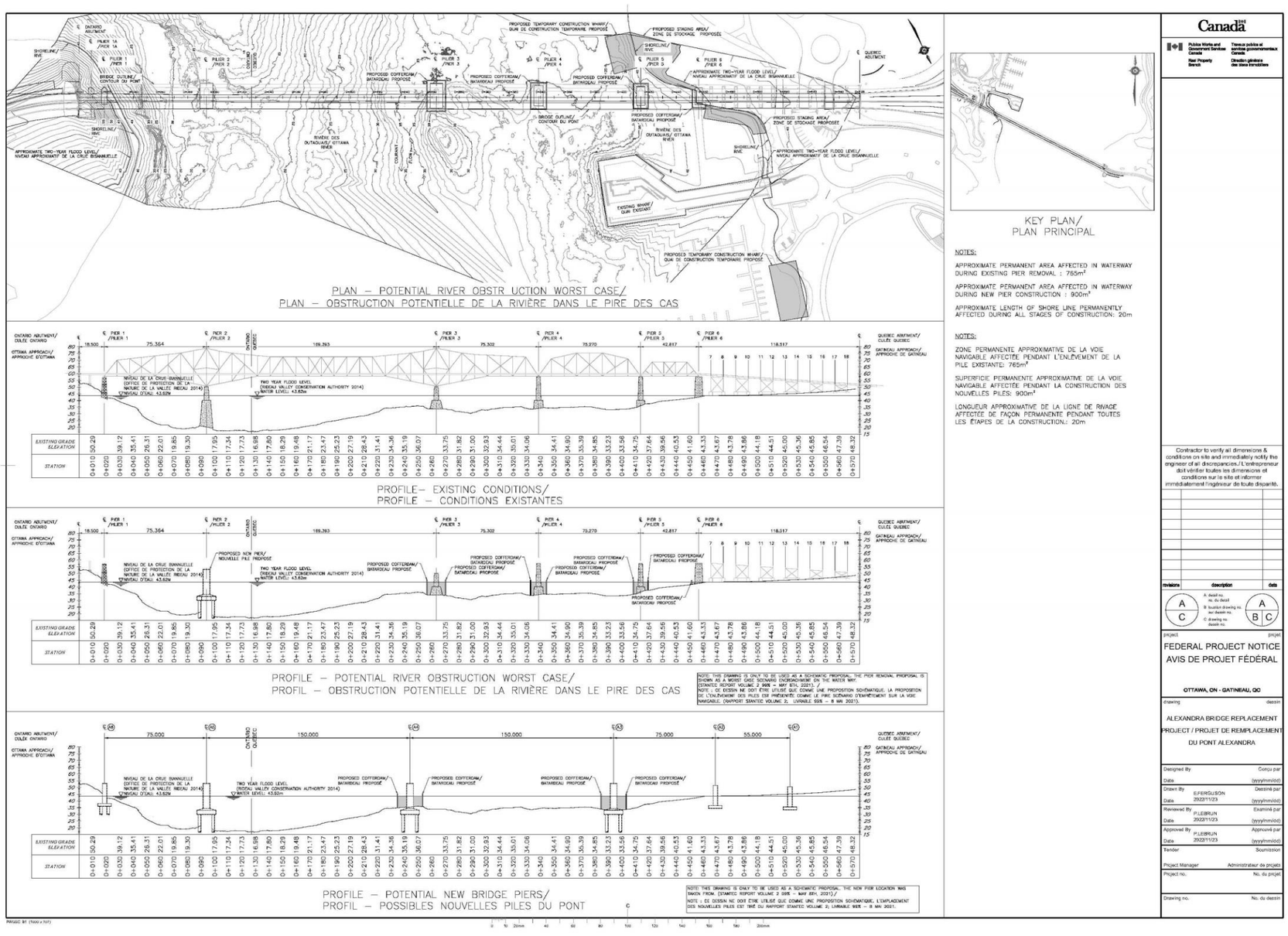


Figure 7: Potential footprint of the Project in the province of Quebec

12 SUMMARY SCHEDULE

The proposed Project is currently in the planning and design stages, with construction estimated to begin in 2028. Construction is currently estimated to be completed in 2032. The new bridge is expected to be in use for at least 100 years, as such there is no defined timeline for its decommissioning and abandonment.

Figure 8 provides a summary of key planning milestones and the overall Project timeline based on information currently available.

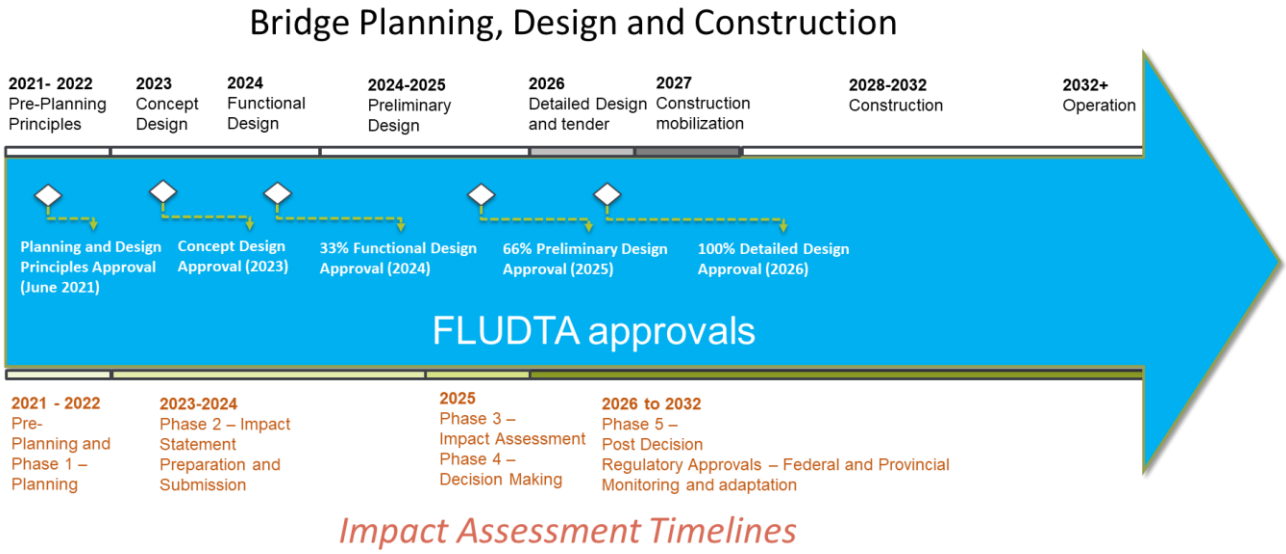


Figure 8: Alignment between construction stages, Impact Assessment Phases and FLUDTA Milestone

13 PROJECT LOCATION

The Alexandra Bridge is located at coordinates 45°25’49”N 75°42’16”W. The new bridge will make use of the existing approaches. The total length of the existing bridge is 563.27 m (1,848 ft).

Figure 9 provides a site map that shows the position of the bridge on the Ottawa River relative to the approaches in Gatineau and Ottawa. The yellow box represents the conceptual Project footprint that encompasses all potential alternative alignments. The red line is the current bridge right-of-way, the black shows the potential curved bridge design alignment, and the pink line shows the potential straight bridge design alignment.

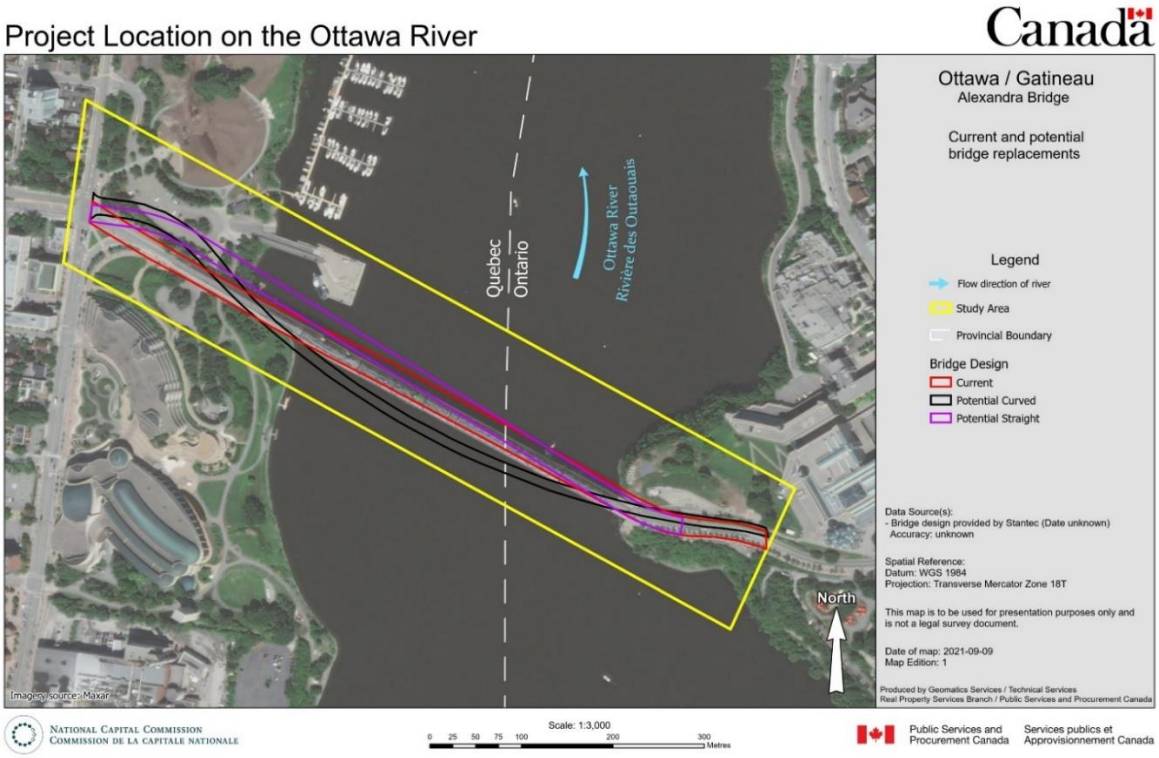


Figure 9: Project location on the Ottawa River

Proximity to Federal Lands

The Project is located on federal lands and is close to several federal properties and buildings. **Table 9** lists the name and location of federal lands, as well as the approximate distance to the Project at the Alexandra Bridge. The distances indicated in the table are relative to the nearest end of the Alexandra Bridge structure.

Areas to be affected by planned work will include NCC-owned land around the approaches to the existing bridge in both provinces. Some areas are yet to be confirmed, will be dependent on final design selection and there could also be sites identified on the Ottawa side.

Proposed federal locations that may be affected for the purpose of carrying out the Project include lots 145244 and 25139 of the Directory of Federal Real Property. These lots are Jacques-Cartier Park and the Canadian Museum of History, respectively.

Table 9: Federal properties near the Alexandra Bridge

Property Name	DFRP	Province	Approximate Distance to Alexandra Bridge (m)
Jacques-Cartier Park Wharf	23767	QC	180
Jacques-Cartier Park	145244	QC	0
Canadian Museum of History	25139	QC	180
Kìwekì Point (formerly named Nepean Point)	02751	ON	60
Access Road, 1 Rideau St	23797	ON	250
National Gallery of Canada	72001	ON	350
Land (War Museum)	09411	ON	270
Global Centre for Pluralism	144713	ON	310
Major's Hill Park	4127	ON	0

For additional reference, the location of the nearby Federal Properties are shown on the **Figure 10** and **Figure 11**.

Figure 10: Federal properties near the Alexandra Bridge – Ottawa

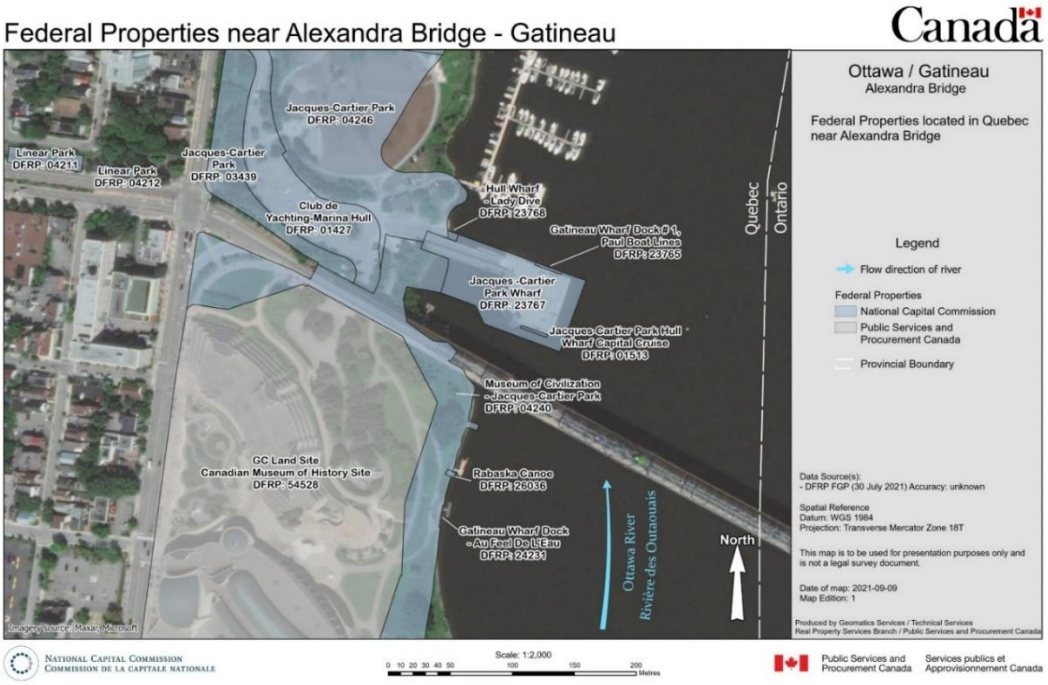


Figure 11: Federal properties near the Alexandra Bridge – Gatineau

Nearby Communities and Residences

The Project connects two cities and two provinces. As such, there are many surrounding communities that can access and benefit from their proximity to the structure. On the Ontario side of the bridge, neighbourhoods include Lowertown, Byward Market, Centretown, Parliament, and the Golden Triangle. On the Québec side, the nearest community is l'Île-de-Hull in the city of Gatineau. These communities will be engaged throughout the Project's lifecycle. The first stages of public consultation for the Project included two workshops with local stakeholder groups, an online consultation widely advertised in local media, and follow-up meetings with local community and business associations. Four additional stages of public consultation are planned, all of which will involve targeted engagement with nearby communities. The NCC and PSPC are also committed to engaging with nearby communities on an ongoing basis during and between formal stages of public consultation.

Both ends of the bridge are bordered by major public national landscape spaces and national cultural institutions that form part of Canada's Capital. In Québec, the bridge is adjacent to the Canadian Museum of History, as well as NCC's Jacques-Cartier Park. The Ontario side is lined with the Capital's first park, Major's Hill Park and the nationally significant landmark, Kìwekì Point (formerly named Nepean Point), as well as the National Gallery of Canada.

The communities listed above are shown in the **Figure 12** for reference.

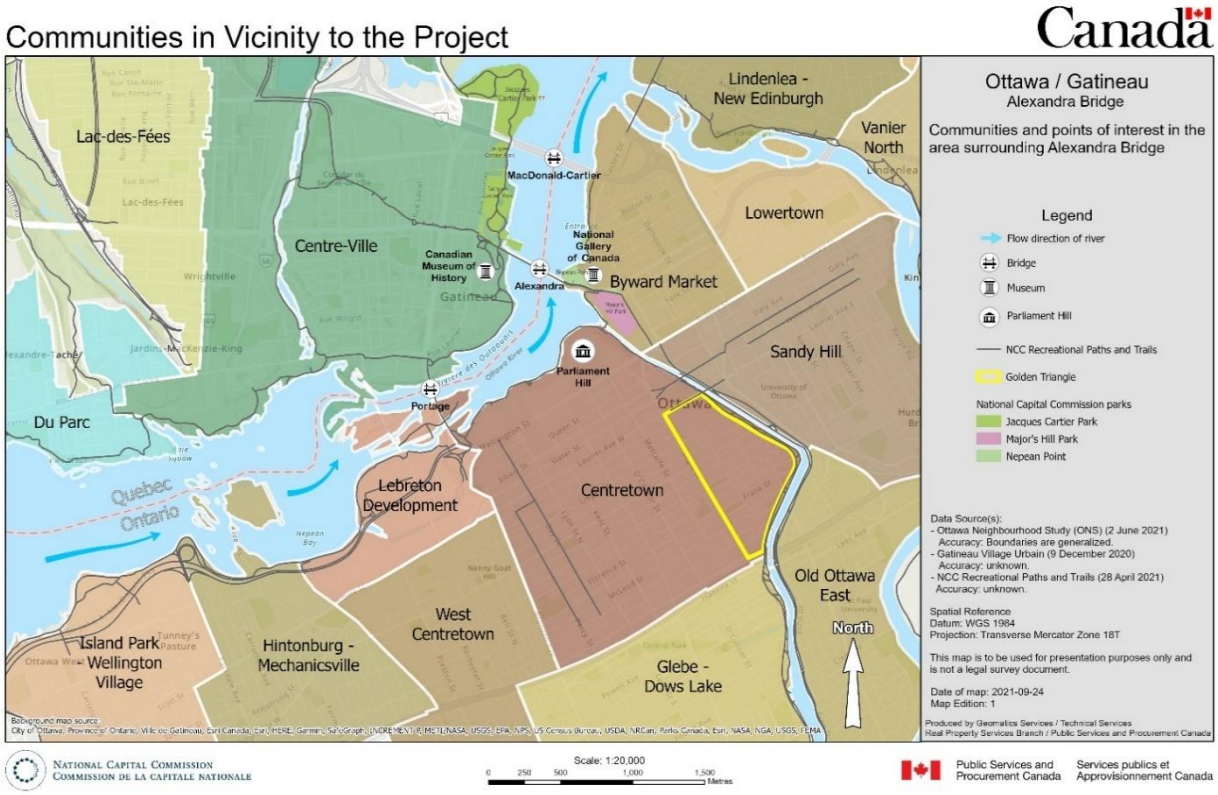


Figure 12: Communities in vicinity to the Project

Proximity to Indigenous Lands

The area in the vicinity of the Project has been a place of gathering, trade, harvesting and transportation for Indigenous Peoples for thousands of years (Walker, 2018).

All the Indigenous communities and organizations listed in this section consider that the Alexandra Bridge is within their traditional territories or have expressed interest in engaging with the IPT.

The location of the Alexandra Bridge and the watershed of the Ottawa River and its tributaries have been identified by Indigenous communities as subject to land claims, assertions of title, modern treaty negotiations and court cases to establish the existence of Indigenous rights.

The Project is within the traditional territories of eighteen First Nations and organisations, listed below. The communities are described below and the location of the business centres are shown in **Figure 13**. Population figures for First Nations are from Indigenous Services Canada, First Nation profiles, as of November 2021. The Métis Nation of Ontario has also stated the interest of the members of its Region 6, which includes Eastern Ontario and the location of the Project.

Algonquin Anishinabeg Nation Tribal Council (AANTC)
The AANTC provides consolidated advisory and technical services to seven Algonquin First Nations, of which six are in Quebec and one is in Ontario. The Council is governed by a Political Council of the Chiefs of each member Nation, and a Grand Chief and other executive members elected by the entire membership of the Algonquin Nations. The member Nations are:

- Le Conseil de la Première Nation Abitibiwinni
- Kebaowek First Nation
- Kitigan Zibi Anishinabeg Nation
- La Nation Anishinabe du Lac Simon
- Le Conseil des Anicinapek de Kitcisakik
- Long Point First Nation
- Wahgoshig First Nation

Algonquin Nation Secretariat
The Algonquin Nation Secretariat represents three Algonquin First Nations: Timiskaming, Wolf Lake and Barrière Lake. The secretariat has provided advisory services to the member Nations in the past, but no indication has been given by the secretariat or the three member Nations about its current role.

Algonquins of Ontario
Including the member Communities of:

- Antoine
- Bonnechere
- Greater Golden Lake
- Kijicho Manito Madaouskarini (Bancroft)
- Mattawa/North Bay
- Ottawa
- Shabot Obaadjiwan (Sharbot Lake)
- Snimikobi (Ardoch)
- Whitney and Area

Algonquins of Pikwakanagan First Nation
Algonquins of Pikwakanagan First Nation was created as a First Nation under the Indian Act in 1873 and was known at the time as the Golden Lake Reserve. It has an on-reserve population of 453 members and another 2,833 members live off-reserve. The First Nation is 122 km from the Project.

Kebaowek First Nation
Kebaowek is located 10 km west of Témiscamingue, on Lake Kipawa, 295 km from the Project. There are 295 members living on-reserve and 722 members off-reserve.

Kitigan Zibi Anishinabeg First Nation
Kitigan Zibi was established in 1853 and is the largest Algonquin Nation in Canada in both area and population. There are 1,618 people in the community and another 1,745 members living in other areas. The First Nation is 106 km from the Project and is the closest First Nation to the location of the Alexandra Bridge.

La Nation Anishnabe du Lac Simon
Lac Simon is near the town of Val d'or in Northwest Québec, with 1,787 members living on-reserve and 479 members living off-reserve. It is 318 km from the Project, and French is the primary language.

La Nation Huronne-Wendat
The Huronne-Wendat First Nation has one community; Wendake adjacent to Quebec City and is located 370 km away from the Project. La Nation Huronne-Wendat comprises of slightly over 1,477 members living on reserve, and 2,757 members off-reserve.

Le Conseil de la Première Nation Abitibiwinni
Abitibiwinni is near the town of Amos in Northwest Québec, with 591members living on-reserve in the community of Pikogan, and 492 members living off-reserve. It is 397 km from the Project, and French is the primary language.

La Communauté Anicinape de Kitcisakik
Kitcisakik is an Algonquin settlement on provincial Crown lands in la réserve faunique La Vérendrye, 269 km from the Project. There are 378 members living on-reserve and 138 off-reserve, and French is the primary language.

Long Point First Nation
Long Point, also known as Winneway, is located 116 km east of Ville-Marie in Western Québec and is 324 km from the Project. There are 505 members living on-reserve and 430 off-reserve.

Métis Nation of Ontario – Region 6
The Métis Nation of Ontario Region 6 council represents members of Métis Nation of Ontario living in Eastern Ontario.

The Algonquins of Barrière Lake
Barrière Lake is located 134 kilometres north of Maniwaki, on the shores of the Cabonga reservoir and is 217 km from the Project. There are 585 members living on-reserve and 210 living off-reserve.

The Mohawk Council of Akwesasne
The Mohawks of Akwesasne are located 111 km from the Project. The Mohawks of Akwesasne comprises 10,099 members living on-reserve and 2,985 members off-reserve.

The Mohawk Council of Kahnawake
The Mohawks of Kahnawake e are located 157 km from the Project. The Mohawks of Kahnawake comprise of approximately 7,940 members living on-reserve and 3,270 members off reserve.

The Mohawk Council of Kanesatake
The Mohawks of Kanesatake are located 156 km from the Project. The Mohawks of Kanesatake comprise 1,374 members living on-reserve and 1,292 members off-reserve.

Timiskaming First Nation
Timiskaming First Nation adjoins the municipality of Notre-Dame-du-Nord in Western Québec and is 377 km from the Project. There are 647 members living on-reserve and 1,701 off-reserve.

Wahgoshig First Nation

Wahgoshig was created in 1906 as the Abitibi-Ontario Band of Abitibi Indians #70, which was part of a reserve situated in both Ontario and Québec. Wahgoshig was created as a distinct First Nation in Ontario with its new name in 1986. It has a population of 144 members on-reserve and 242 members off-reserve. The First Nation is about 484 km from the Project.

Wolf Lake First Nation

The 244 members of the Wolf Lake First Nation live in the community of Hunter's Point, near Témiscamingue, 296 km from the Project. The First Nation does not have a land base and the community leadership is seeking to secure title to reserve lands.

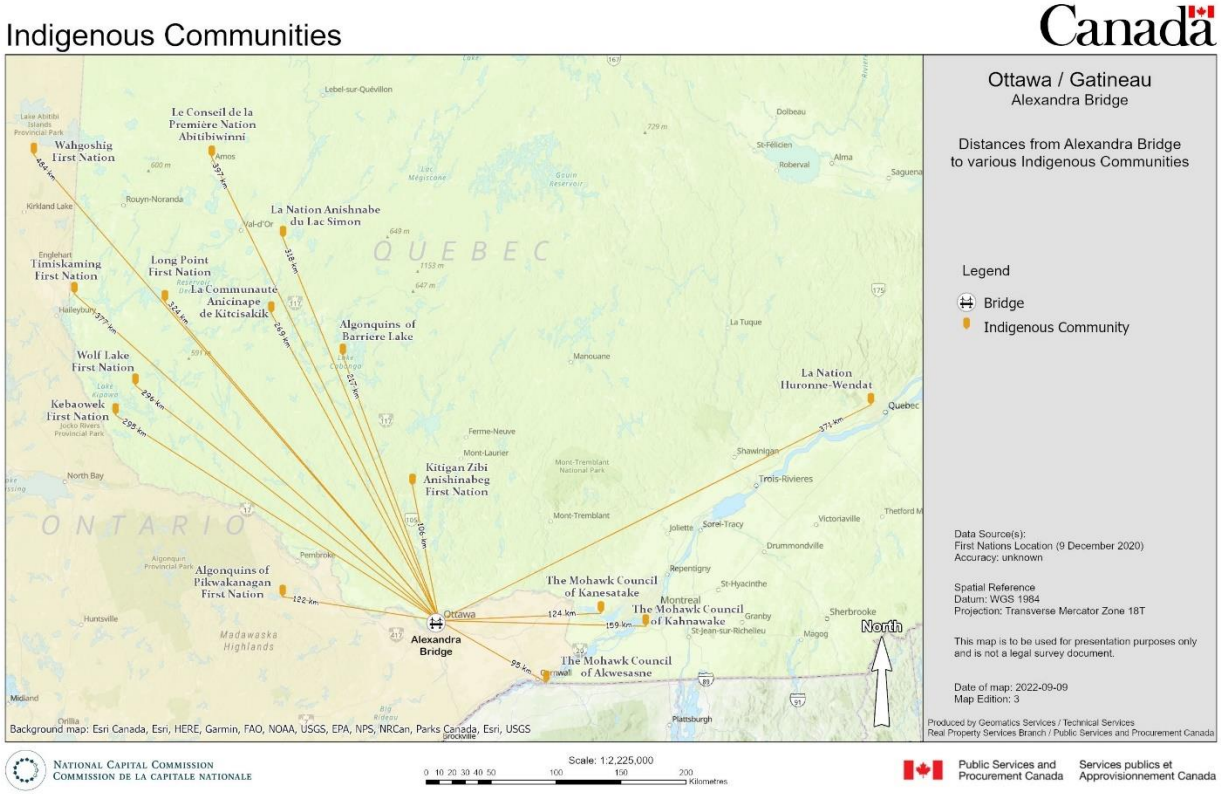


Figure 13: Distance of Indigenous communities to the Project

14 BIOPHYSICAL ENVIRONMENT AND POTENTIAL IMPACTS

To identify potential environmental considerations relevant to the Project, a desktop review of available information in the form of reports, maps and publicly available databases was conducted. Applicable information is provided throughout this section. Potential adverse environmental impacts of the Project were evaluated through consideration of the interactions between the Project and the natural (physical and biological) environment. Mitigation measures that could avoid or reduce potential adverse environmental impacts are also identified. A preliminary characterization of potential residual Project-related impacts is provided. Residual impacts will be further evaluated and confirmed at the design stage, as will cumulative effects where appropriate and recommended follow-up program measures. Regulatory oversight (federal, provincial or municipal authorizations) is indicated throughout the text below.

The spatial boundaries for assessing Project impacts include:

- Project Development Area (PDA) - Encompasses the anticipated area of physical disturbance associated with the construction and operation of the Project. The Conceptual Project Footprint was used as the basis for the preliminary assessments conducted during this stage. As the Project progresses, the PDA will be refined, as more detailed information becomes available.
- Local Assessment Area (LAA) - Encompasses the area in which Project-related impacts (direct or incidental) are predicted to occur. The LAA encompasses the PDA and a buffer around it (Valued Component specific).

For each valued component, specific spatial boundaries have been defined based on the anticipated area of impacts, as summarized in **Table 10**.

Table 10: Summary of local assessment areas

Valued Component	Local Assessment Area
Atmospheric Environment	500-m buffer around PDA
Acoustic Environment	500-m buffer around PDA
Physiography, Geology and Hydrogeology	200-m buffer around PDA
Drainage and Surface Water	200-m buffer around PDA
Vegetation	100-m buffer around PDA
Wildlife and Wildlife Habitat	100-m buffer around PDA
Aquatic Environment	200-m buffer around PDA

The proposed new bridge will meet the riverbank at roughly the same location as the existing bridge. For the purpose of this preliminary assessment, the PDA includes the footprint of the Project as required during decommissioning of the existing bridge and the construction and operation of the new bridge, including the area immediately surrounding the bridge and the approaches on both sides. In **Figure 14**, the circled areas represent the Local Assessment Areas for the following Valued Components:

- Green line - Vegetation, Wildlife and Wildlife Habitat
- Gold line - Drainage, Surface Water, Aquatic Environment, Physiography, Geology and Hydrogeology
- Pink line - Acoustic, and Atmospheric Environment

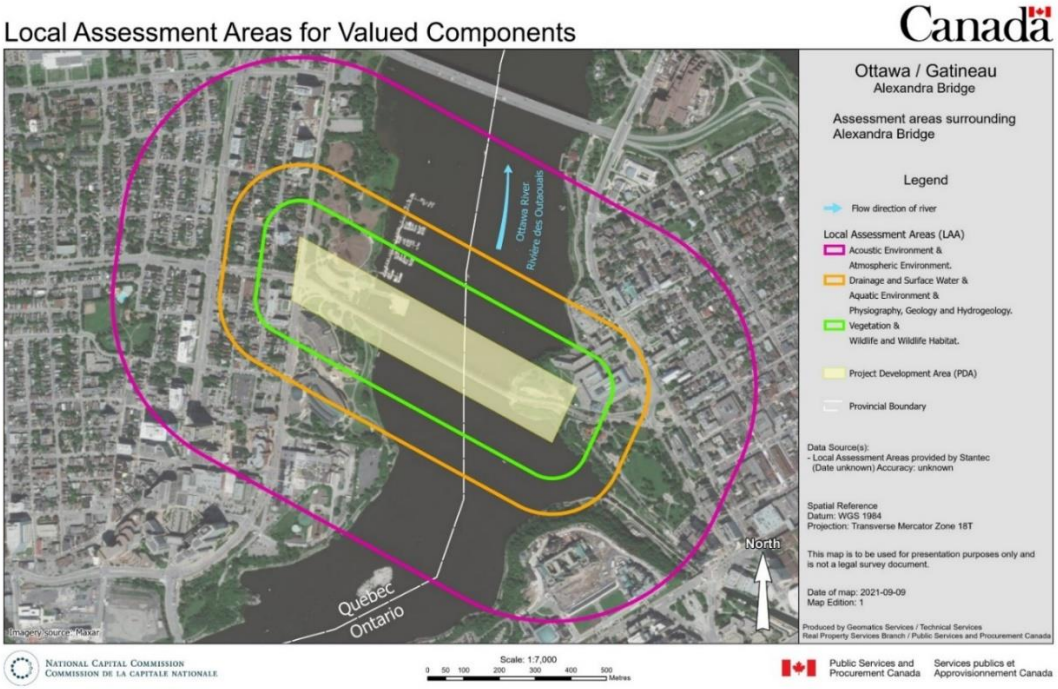


Figure 14: Local assessment areas for valued components

The following sections describe the existing physical and biological conditions potentially impacted by the Project and identify mitigation and enhancement measures proposed to address potential impacts.

Physical Setting

The Ottawa River, a primary physical feature within the Project area, divides the communities of Gatineau and Ottawa and necessitates the need for a bridge crossing. The Ottawa River supports many different species of wildlife and provides drinking water to communities in its surrounding area. As such, many conservation efforts have taken place to protect the Ottawa River.

In 2016, a 590-km section of the Ottawa River along the Ontario-Québec border was designated part of the Canadian Heritage Rivers System (CHRS). In addition, municipal initiatives to protect the Ottawa River have also been implemented by the City of Ottawa through its Ottawa River Action Plan, consisting of 17 individual Projects aimed at enhancing the health of the Ottawa River and protecting Ottawa's water environment for future generations (City of Ottawa, 2020).

Atmospheric Environment

Intermittent air emissions from equipment and vehicles will occur during the deconstruction of the existing bridge and during the construction stage of the new bridge, including the following sources: on-road mobile equipment (trucks), construction equipment (e.g., excavators, graders, concrete cutters). Deconstruction and construction activities associated with the Project will also have the potential to generate dust. The quantity of dust emissions depends on the area of land being worked, type of equipment on-site and level of construction activities. These emissions will be localized and of relatively short duration (i.e., 4 years of construction where not all equipment will be operating at the same time)

and are unlikely to have any long-lasting impacts on the surrounding area. Potential impacts to human health at this stage of the Project will be confirmed in future steps of Project analysis.

Construction activities and an inventory of all potential air contaminants of concern will be further defined when technical components of the new bridge are developed. Based on similar projects, potential contaminants of concern that could be emitted during deconstruction and construction include those associated with the operation of construction equipment and dust generated by equipment moving across the site.

During operation, traffic is predicted to be similar to existing conditions, which will result in similar or reduced emissions in the future in anticipation of regulatory reductions (greater emission controls on new vehicles) and advancements in engine technology (i.e., reduced emissions, zero-emission vehicles). At this stage of the Project, impacts to human health are anticipated to be positive, based on enhancements planned to support use of active transportation modes and advancements in vehicle technology that contribute to air quality.

Applicable air quality standards that would be considered in the assessment include the National Ambient Air Quality Objectives (NAAQOs) and Canadian Ambient Air Quality Standards (CAAQS). Where applicable federal standards do not exist for some contaminants, provincial standards would be used, such as Ontario's Ambient Air Quality Criteria (AAQC) set by the Ministry of the Environment, Conservation and Parks (MECP) or the Atmospheric Quality Standards (Sections 197 and 198 and Schedule K of the Clean Air Regulation) and criteria (*Environment Quality Act*) administered by the MEFCCWP in Quebec.

An Air Quality Impact Assessment may be required to predict concentrations of pollutants emitted during all project stages. Best Management Practices will be implemented where applicable, such as reducing vehicle idling time, shutting down equipment when not in use, stabilizing disturbed areas through the use of water for dust control, and providing proper maintenance of equipment and vehicles operating in work areas.

The methodology and approach for tracking and mitigating potential air pollutants will be determined based on the results of baseline studies as level of certainty about potential impacts increases, and a determination on residual impacts can be completed. Any follow-up and monitoring plans will be developed for Valued Components (VCs) where residual adverse effects are predicted or uncertain. The need for and extent for air quality studies will be confirmed and developed as the Project progresses. If required, a follow-up and monitoring plan would be implemented during relevant Project stages to verify the accuracy of predictions and determine the effectiveness of proposed air quality mitigation measures at representative sensitive receptors.

Project contributions to ambient air emissions during construction are predicted to be limited, temporary, and localized. With the implementation of mitigation measures, residual impacts may occur, but are anticipated to be low in magnitude and short term in duration.

The inclusion of a separate and protected laneway for mixed-use active transportation methods is proposed to increase the use of alternate modes of transportation, such as biking or walking. An increase in use of active transportation modes and a decrease in vehicular transportation could

contribute to an overall decreased level of vehicular emissions in the local area. The design of the bridge is also expected to include the potential to adapt the structure for use by a tramway or light rail system as part of a future upgrade.

Acoustic Environment

Construction noise is expected to be present from initial site preparation to completion of construction. Construction related sound levels might vary as construction activities change in location and intensity. Typically, construction noise impacts are temporary in nature and largely unavoidable. Construction noise impacts will be calculated for the Project later in the design stage once specific details of construction of the new and deconstruction of the existing bridge are determined. Noise associated with decommissioning of the existing bridge could include the use of pneumatic hammers and blunted chisel tools and will be confirmed later in the design stages. It is recommended that the detailed construction noise evaluation include deconstruction of the existing bridge and construction of the new bridge.

Project deconstruction and construction will require equipment whose operation may involve a temporary increase in noise levels. The most common noises associated with this stage will be from mobile equipment including trucks, cranes, excavators, bulldozers, compactors, tub boats, water pumps, generators, and drilling machines.

Residential areas in the District of Hull and the City of Ottawa that are located near the work area would potentially be affected by noise. The contractor will be required to ensure that the noise period and maximum possible noise level requirements for both cities of Gatineau and Ottawa are met.

Once operational, bridge-related noise will be similar to existing conditions generated by vehicles travelling on the existing bridge. As the new bridge will have 2 lanes for vehicles (same as existing bridge), noise levels during operation are not anticipated to change from existing conditions. There could be a reduction in the overall noise generated because the steel deck of the bridge will be replaced with a new surface material.

Traffic volumes and use are anticipated to be similar to existing conditions, and as such, it is not anticipated that the Project will result in increased levels of noise compared to existing conditions.

Mitigation measures will be implemented (e.g., muffler systems, restrict construction activities to daytime hours (7 am to 9 pm)) to avoid / reduce the impacts of construction noise. Municipal noise by-laws will be followed as applicable during construction. Any noise impacts resulting from construction are considered reversible and are expected to cease once construction activities are completed. The frequency of individual noise-generating activities (e.g., grading) is expected to be sporadic in nature. Additional information regarding noise mitigation and protection measures during construction and deconstruction will be determined and confirmed as the design stages progress.

An Acoustic Impact Assessment is anticipated to be needed as part of the project planning to identify existing receptors, establish baseline (ambient) noise conditions, and predict construction noise lasting longer than 1 year, including the magnitude of such changes and an evaluation of the change in percent highly annoyed (%HA) at each sensitive receptor. Where potential exceedances are predicted, appropriate noise mitigation measures will be employed. Temporary noise barriers will be considered during construction where the noise assessment indicates sensitive receptors may be affected.

Indicators of potential human health effects associated with noise include complaints and annoyance. A communication plan and complaints resolution process will be developed prior to construction to provide potentially affected individuals with information to address noise-related and other complaints during all construction activities.

Follow-up and monitoring plans will be developed for VCs where residual adverse effects are predicted or uncertain. If required, a follow-up and monitoring plan will be established to verify the accuracy of predictions and determine the effectiveness of proposed noise mitigation measures at representative sensitive receptors.

Project contributions to noise emissions during construction are predicted to be limited, temporary and localized. With the implementation of mitigation measures, residual impacts may occur, but are anticipated to be low in magnitude and short term in duration. Municipal noise by-laws will be followed as applicable during deconstruction and construction. The creation of a closed deck system should also contribute to an overall reduction of the vehicular noise experienced by visitors and users of Jacques-Cartier Park.

Physiography, Geology, and Hydrogeology

It is anticipated that anchors will be installed in bedrock and that bedrock is shallow or exposed at the Project area. Excavations are not expected to affect the nearby surface water intake at Lemieux Island or in Hull, both of which are located over 800 m upstream of the Project area.

During dewatering, discharge water may be released to the environment. An uncontrolled discharge of water during dewatering could cause localized downstream flooding, erosion or sedimentation.

If shallow overburden is encountered, disturbance to overburden during bridge construction may cause soil erosion and slumping during construction that may require rehabilitation, specifically in the steep area adjacent to the river.

No impacts to physiography, geology or hydrogeology are anticipated as a result of Project operations.

A geochemical analysis may be required to determine the acid rock drainage (ARD) potential and potential mitigation measures. Follow-up and monitoring plans will be developed for VCs where residual adverse effects are predicted or uncertain. If required, a follow-up and monitoring plan related to potential acid rock drainage would include water quality testing during construction and static testing of samples of excavated bedrock. Background samples will be taken upstream and downstream prior to commencement of works to assess the ongoing impact of construction.

To mitigate the potential effect of seismic activity, the new bridge will be designed and constructed in accordance with the seismic requirements of the National Building Code of Canada 2015 and the Canadian Highway Bridge Design Code (CSA, 2019), or those in effect during bridge design stages.

For groundwater dewatering, the Ministry of the Environment, Conservation and Parks (MECP) allows registration under the *Environmental Activity and Sector Registry* (EASR) for construction dewatering projects where groundwater takings will be greater than 50,000 L/day and less than 400,000 L/day, however, should groundwater takings exceed 400,000 L/day, a Permit to Take Water (PTTW) may be

required from the MECP. Dewatering may be necessary to construct the bridge piers and abutments, the extent of which would be determined through further study. Appropriate mitigation measures would be installed during isolation and dewatering activities to manage discharge water, including appropriate erosion and sediment controls and ensuring that discharge water is properly filtered (i.e., filter bags, discharge across grassed areas, check dams) prior to discharge to the Ottawa River. Groundwater dewatering is not anticipated to affect any groundwater drinking water supply sources in the LAA.

The bed of the Ottawa River represents a groundwater discharge zone, which could be encountered while installing and dewatering the caissons for bridge piers. This potential would be investigated through geotechnical investigations and hydrogeological conditions within the Project footprint would be confirmed through field studies, which may include measures such as geophysical profiling of the riverbed, drilling of pilot boreholes ahead of caisson installation, and grouting of bedrock to investigate if high conductivity features are present (faults or karst structures) to avoid uncontrolled groundwater inflow to the caissons. The results of the investigation will guide mitigation measures should they be required.

Existing conditions and predicted effects on water quality will be compared against the Canadian Council of Ministers of the Environment (CCME) *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CWQG-FAL) (CCME, 2012).

Based on this preliminary assessment, residual impacts on physiography, geology and hydrogeology as a result of construction activities, following the implementation of mitigation measures, are likely to occur, but are predicted to be low in magnitude, localized to the areas of potential dewatering activities, (i.e., within 200 m buffer around PDA), and be short-term and reversible following dewatering activities.

Drainage and Surface Water

Construction activities have the potential to impact water quality within the Ottawa River. Water quality during construction is regulated through Section 34 of the *Fisheries Act* with respect to deleterious substances which have the potential to degrade or alter the quality of the water. The construction stage of the Project has the potential to result in bed and bank disturbance/erosion, which may result in potential turbidity spikes, TSS loading and overall sedimentation.

The main potential contaminant of concern for construction dewatering activities is turbidity arising from elevated total suspended solids (TSS). The geotextile filter bags (or equivalent) will be used as mitigation measures. Additionally, visual and olfactory inspections of the discharge location shall be completed. The water being discharged would not contain hydrocarbons or other substances in amounts sufficient to create a visible film, sheen, foam, or discolouration in the discharge water.

The fluvial geomorphology, flow conveyance and water velocity of the river have the potential to be impacted by the removal of the existing bridge piers and design/installation of the new piers.

As such, both long-term and short-term erosion and sedimentation rates within the river can also be influenced by the design of the bridge piers. Similarly, bridge piers have a large potential impact on ice jam formation and separation and, therefore, need to be designed to combat these forces to reduce the risk of spring flooding.

The design of the bridge will consider potential impacts that may occur during a regional flood event, such that capacity is maintained to convey flows during a regional storm event without adversely affecting upstream flood elevations.

Hydrological assessments are anticipated to be required for the design of the piers for the new bridge to understand the risks for the structure as well as impacts on navigation and sediment transport from potential changes in the water flow and velocity. This assessment will provide guidance in the selection and configuration of coffer dams, if needed in the construction stages, as well as approaches to reduce impacts and provide direction on mitigation needed to isolate the construction areas. The IPT will engage Indigenous communities to contribute Indigenous Knowledge, identify concerns and discuss appropriate mitigation strategies.

Once the bridge design is advanced and construction activities and methods are determined, potential significant negative impacts on water temperature and flow levels in the vicinity of the bridge will be further evaluated, along with linkages to other potential impacts (disturbances to aquatic species, erosion of riverbank, etc.).

During operation, changes in water quality because of the Project are not anticipated to be any different from existing conditions. The new bridge is anticipated to have a solid deck with appropriate stormwater management systems that will contribute to reducing the potential for release of contaminants to the river. Operation of the new bridge is therefore not expected to have significant adverse impacts.

Working in and around watercourses requires adequate planning, design and environmental mitigation. Improper measures can result in harmful effects to aquatic habitats, fish populations, wildlife (e.g., mammals, amphibians, waterfowl, etc.), water quality and watercourse dynamics. An Environmental Protection Plan (EPP) will be developed by the construction team for the Project. The EPP will outline the proposed environmental protection measures and commitments to be carried out by the contractor during construction to avoid or reduce potential effects.

An Erosion and Sediment Control (ESC) Plan will be developed, implemented and enforced during construction to reduce potential impacts on water quality. The ESC Plan will include a multi-barrier approach defining the location and design of control mechanisms such as silt fencing, rock check dams, straw bale filters, drain covers, filter fabric under catch basins frame and gates and mud mats, as required.

Environmental monitoring will be implemented to confirm appropriate mitigation measures are in place, maintained and functioning during the construction stage. A qualified Environmental Inspector will be present during site set-up, in-water works, site restoration and during sensitive activities or immediately following major runoff events.

ESC measures will be implemented and maintained throughout all stages of construction to protect the receiving waters and surrounding environment. ESC measures should be installed around the extent of the construction work zone(s) as well as around the perimeter of stockpiles required for construction. All activities, including maintenance procedures, should be controlled to prevent the entry of petroleum products, debris, rubble, concrete or other deleterious (harmful) substances into the water.

During construction, another risk to surface water quality is the potential for a contaminant spill during a large storm event. To reduce the impact of potential contaminant spills, the contractor will implement spill management protocols such as secondary containment of any temporary fuel storage and preparation of a spill response plan. This will include providing spill containment kits on site in designated locations where risk of spill is deemed the greatest (e.g., refueling areas). These measures will be further developed at the detailed design stage of the Project.

Discharge from dewatering/unwatering activities must be treated, if required, and released to the environment at least 30 m from local watercourses or wetlands and allowed to drain through a well-vegetated area. Water quality will be compared against the Canadian Council of Ministers of the Environment (CCME) *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CWQG-FAL) (CCME, 2012). If this is not possible based on site layout constraints, additional implementation of ESC measures will be considered. This consideration will be further reviewed during the development of the EPP and ESC plans to establish conditions and mechanisms where such exceptions may be considered. Where feasible, dewatering effluent should not be sent directly to any watercourse, wetland or waterbody, or allowed to drain onto disturbed soils within the work area. These control measures should be monitored for effectiveness and maintained or revised to meet the objective of preventing the release of sediment-laden water.

In the case of dewatering a cofferdam (i.e., surrounding bridge piers where direct discharge to the Ottawa River cannot be avoided), a turbidity curtain would be installed around the perimeter of the in-water work zone and water could be pumped from the dry work zone into this cordoned area within the confounds of the turbidity curtain. Turbidity monitoring would be implemented to confirm the turbidity curtain is functioning as intended and not releasing turbid water to the Ottawa River.

Prior to being deconstructed, the existing concrete piers should be isolated from the stream flow. Pier deconstruction and removal will require the use of cofferdams and/or turbidity curtains to contain the construction waste. Similarly, cofferdams or equivalent will be required when installing the new bridge piers to create a dry work zone for curing the concrete.

Although not yet finalized, the design of the bridge deck will also take into consideration the use of salt and sand as road de-icers in winter months. Although paved decks increase the imperviousness of the structure, they are able to better capture, and control bridge runoff compared to the existing steel-grate deck. The proposed bridge deck will also incorporate stormwater management features to direct runoff from the bridge surface to limit the potential contaminants from directly entering the Ottawa River. The location of the near shore piers and overall bridge footprint will not decrease the width of the river at the bridge crossing. If the bridge design narrows/contracts the river, this can cause changes in flow patterns possibly leading to increased erosion and scour within the vicinity of the bridge.

The stormwater management system will be developed in later stages of the Project. Post-construction (operational) bridge stormwater discharge monitoring is not proposed as it is not a typical practice for the construction of bridges. During construction, water quality will be checked by monitoring for turbidity (monitor upstream baseline and downstream turbidity) to assess stormwater quality effects during ground disturbance and in-water works. During construction, disturbed area runoff will be contained within an ESC area(s). Construction based stormwater runoff will be captured, retained and released through sedimentation features such as filter bags, sedimentation basins/traps and perimeter

silt/sediment fencing. Mitigation of any salt effects would be limited to the road authority's application of salt, sand and other road de-icers in winter months, which should be in keeping with the Salt Management Plans of both Ottawa and Gatineau.

In developing the Accidents and Malfunctions Response Plan, the potential for environmental impacts associated with accidents and malfunctions will be assessed. The purpose of this assessment will be to identify plausible accidental events or malfunctions (i.e., spills resulting from refueling or accidental release during construction) that could occur as a result of the deconstruction of the existing bridge and construction of the new bridge. In the case of the Project, it is anticipated that the proposed spill response and mitigation measures will reduce the potential residual effects sufficiently to be considered insignificant. This assessment will be further refined and confirmed in the design phases.

Based on this preliminary assessment, residual impacts on surface water as a result of construction activities, following the implementation of mitigation measures, are likely to occur, but are predicted to be low in magnitude, extend to the LAA (200-m buffer around PDA), and short-term and reversible following construction activities.

A thorough assessment of the proposed bridge abutment design should be conducted to enhance the design so that riverbed scour around the abutments is decreased to the extent possible. Further, considering natural channel design principles and best practices during the design stages of the Project may provide potential to enhance the existing river shoreline and associated aquatic habitat.

Biological Setting

Vegetation

Potential impacts on vegetation (including species at risk (SAR) / species of management concern (SOMC)) and ecological communities resulting from the deconstruction of the existing bridge and construction of the new bridge include changes to community diversity (including community loss), changes to species diversity, and introduction or spread of invasive species through vehicle and equipment movement. These potential impacts would be localized in nature. Given that there are no wetlands in proximity to the PDA, no impacts on wetlands are anticipated as a result of the Project.

Activities related to construction, including vegetation clearing, stockpiling of materials, laydown areas, and excavation, may result in the removal and degradation of vegetation along the shoreline of the Ottawa River. While direct (i.e., due to removal or accidental damage) and incidental (i.e., due to compaction, erosion, spills or changes in the microclimate as a result of alterations to the tree canopy) disturbance of existing vegetation communities in the vicinity of the bridge abutments and staging/stockpiling areas are possible during construction, incidental disturbance to vegetation during operation are not anticipated. Given that this Project is a replacement of an existing structure, fragmentation of vegetation communities is not anticipated to be any greater than under existing conditions.

Due to the urban nature of the Project area, potential impacts to SAR plants are expected to be limited to harming individuals of a listed species. While impacts at a local population level are possible, they are not anticipated to negatively affect any given species' chances of survival or recovery. Construction activities that may encroach on SAR plants will require site specific review prior to construction to confirm presence / absence of these species.

In addition, construction activities and machinery may introduce invasive species to the Project area during construction (i.e., seed transfer) or contribute to the spread of invasive plants and/or diseases (i.e., Butternut canker, fungal pathogens of American ginseng) already located within the PDA and LAA.

It is not anticipated that vegetation will be affected by the Project during operations.

Field surveys will be conducted prior to the initial stages of design to identify the vegetation (including SAR/SOMC) and ecological communities within the PDA and any adjacent impacted lands. After field surveys are conducted and a list of terrestrial vegetation and SAR is identified, species-specific mitigation measures and permit requirements will be confirmed, and a management approach will be developed. Mitigation efforts will prioritize avoidance and protection of any SAR observed during these surveys. If it is determined that SAR plants are present and will be impacted, appropriate SAR permits will be obtained, and mitigation/compensation plans will be developed for the specific species to minimize or compensate for the adverse effects. Any works involving SAR plants that are susceptible to certain diseases may require special mitigation measures related to preventing the spread of these diseases (i.e., Butternut canker).

The limits of the construction footprint will be identified in the field, to allow for the protection of off-site natural areas and vegetation and to avoid incidental encroachment into adjacent areas. Limited clearing of vegetation may be required to facilitate construction activities. A detailed inventory of vegetation within the construction footprint and other impacted sites will be completed, and adequate compensation through replanting and/or financial contributions to various enhancement measures such as habitat restoration will be required, in accordance with the NCC Forest Strategy (NCC, 2021b).

Storage of construction materials or equipment should not occur within the critical root zone[1] of any tree species in the PDA and LAA to avoid impacting potential habitat areas not directly affected by the Project footprint. Any emissions from machinery should be directed away from foliage and vegetation.

A pre-construction survey of the development footprint of the Project and adjacent impacted lands will be undertaken to confirm the presence or absence of invasive plants. An invasive species management plan will be developed as part of the EPP to mitigate the spread of invasive species. Any follow-up and monitoring plans will be developed for VCs where residual adverse effects are predicted or uncertain.

The DPD provides a preliminary assessment that is based on publicly available information that will need to be confirmed with vegetation studies and as the Project design progresses and more detailed information becomes available, improving the level of certainty associated with impact assessment predictions. If required, a follow-up and monitoring plan will be implemented during relevant Project

[1] The critical root zone (CRZ) extends to the dripline of the tree canopy or 12 times the diameter at breast height (DBH in cm) of the tree, whichever is greater.

phases to verify the accuracy of predictions and determine the effectiveness of proposed vegetation mitigation measures at representative sensitive receptors.

Based on this preliminary assessment, residual impacts of the Project on vegetation, following the implementation of mitigation measures, are likely to occur and may extend to the LAA (100 m buffer around PDA), but are predicted to be low in magnitude, localized, short-term and reversible following post-construction reclamation.

Any trees to be removed will be compensated at a minimum ratio of 2:1, however a higher ratio or a monetary value may be required to compensate for the loss of larger trees. Compensation for the loss of vegetation other than trees may also be required. Tree planting and habitat restoration plans will be developed using only native, non-invasive species.

Wildlife and Wildlife Habitat

Bird SAR and migratory birds are vulnerable to disturbances during the breeding season (between April 8 and August 28 for the PDA, although nesting also infrequently occurs outside of this period) (ECCC, 2018). Bridge deconstruction and construction may disrupt nesting opportunities for some migratory birds and bird SAR either through removal of existing nests or disturbance of nesting habitat. Direct disturbances include vegetation removal (i.e., tree clearing) and construction activities (i.e., deconstruction of the bridge), which may result in the destruction of nests and/or eggs. Incidental disturbances include sensory disturbances associated with construction activities (i.e., noise, vibrations, and light) which may lead to nest abandonment. Disturbance impacts may be temporary (i.e., noise, vibrations and lighting during deconstruction and construction) or permanent (i.e., due to vegetation removal, bridge lighting and/or if the design of the replacement structure does not provide nesting habitat). Birds (including SAR) nesting on the bridge structure, such as Barn Swallow and Eastern Phoebe, and in nearby vegetation may be impacted.

The same is true for any SAR bats that may be using the existing bridge or nearby vegetation for roosting (from April 1 up to September 30; to be confirmed with federal and provincial agencies), with deconstruction and tree removal disrupting or removing suitable habitat (either temporarily or permanently, depending on the future bridge design) and sensory disturbances leading to the abandonment of maternity/roosting sites or hibernacula.

Activities during deconstruction and construction have the potential to result in direct and incidental effects on turtles as a result of construction noise and disturbance (i.e., increased turbidity in the water, changes to water flow and sediment transport regimes, increased human activity causing turtles to abandon the area, alteration to nesting or basking sites), or direct mortality through contact with construction equipment and/or the loss of habitat. Excavation activities also have the potential to result in the destruction of nests and/or overwintering habitat. Turtle nesting typically takes place between mid-May and late July, with eggs remaining in the nest until September or October (or in some cases, overwinter).

Construction activity can result in direct mortality to snakes, which are vulnerable during emergence from a hibernaculum, re-entrance, and basking periods, and may seek out construction materials to bask under. The Project may also have direct or incidental impacts on nesting sites and hibernacula, either

through destruction of habitat or disturbance leading to abandonment of the area, while changes to water flow and sediment transport regimes may impact the aquatic Northern Watersnake. Potential impacts will be further assessed and confirmed as Project design progresses.

Potential direct and incidental impacts on amphibians may result from contact with construction equipment during the terrestrial and aquatic phases of their lifecycle, fragmentation, modification or loss of breeding, feeding and overwintering habitats and dispersal pathways, changes to water flow, and modification of riparian areas. Similarly, invertebrates may experience direct impacts from contact with equipment and incidental impacts from the modification or destruction of foraging, nesting and overwintering habitats.

Wildlife potentially present adjacent to the active construction site are species that are already acclimatized to the disturbed urban environment and impacts to these species from increased noise and lighting are expected to be low. Due to the urban nature of the Project area, potential impacts to SAR wildlife are expected to be limited to harming individuals of a listed species. While impacts at a local population level are possible, they are not anticipated to negatively affect any given species' chances of survival or recovery.

Limited vegetation clearing may be required to facilitate construction activities, which may also affect nests or habitat of migratory birds, potential SAR bat maternity roost tree habitat and habitat for common urban wildlife species.

During operation, changes in wildlife habitat as a result of the Project may occur as a result of use of the infrastructure and maintenance/repair activities. Noise levels are expected to be similar to those under current conditions and any vegetation or habitat removal resulting from the Project will have occurred during construction.

Wildlife and wildlife habitat protection and mitigation measures will be included as a component of the EPP to identify specific wildlife protection measures to be implemented during construction. This plan will include a variety of measures to be implemented during design and construction of the Project, such as adherence to wildlife timing windows, species monitoring, and wildlife handling protocols.

Field surveys will be conducted prior to the initial design stages to identify the presence of wildlife (including SAR/SOMC) and wildlife habitat (including aquatic, semi-aquatic, riparian and terrestrial habitats) within the PDA and any adjacent impacted lands, as well as to develop a more complete understanding of the likelihood of breeding, migration, and overwintering use by SAR (including bats), migratory birds, reptiles, amphibians and invertebrates and the annual variation in SAR occurrence and/or habitat use within the Project area. After field surveys are conducted and a list of terrestrial/semi-aquatic species and SAR/SOMC are identified, species-specific mitigation measures and permit requirements will be confirmed, and a management approach will be developed. The need for and extent of any follow-up program will be confirmed and developed through the design process. Detailed mitigation measures, the management approach and follow-up programs will form part of the EEP.

Detailed design of the construction area will be reviewed to avoid and minimize impacts on wildlife habitat and vegetated areas to the extent possible. Where possible, wildlife timing windows will be

respected to avoid disturbance to wildlife during the breeding season. If work during critical timing windows is unavoidable, appropriate exclusion measures will be implemented. If necessary, alternative nesting/roosting structures may be constructed. Long-term impacts to wildlife will also be considered in the design of the new bridge.

If work is scheduled to take place during the bird breeding season, which is generally from April 8 to August 28 in the Ottawa region (ECCC, 2018), a breeding bird survey will be completed. A qualified avian biologist will conduct a pre-construction survey to identify the presence of migratory or SAR bird nests on the bridge and in areas identified for vegetation removal. If migratory birds or SAR are found nesting in the Project area, consultation will be undertaken with ECCC and/or MECP/MNRF and/or MEFCCWP prior to commencing work. If migratory or SAR bird nests are identified in proximity to construction/rehabilitation activities within the work area, construction activities near the nest will cease until ECCC/MECP/MNRF/MEFCCWP can be contacted for advice. Nests will not be removed from the bridge without consulting an avian biologist and issuance of a *Species at Risk Act* (SARA) and/or *Migratory Birds Convention Act, 1994* (MBCA) permit and/or relevant provincial permit, if required, from the ECCC/MECP/MNRF/MEFCCWP.

Construction activities with the potential to remove migratory bird habitat, such as bridge deconstruction and vegetation clearing, will be avoided to the extent possible during the breeding season. If under-bridge work is proposed during this period, exclusionary measures (e.g., netting, bioacoustic deterrence) will be installed prior to April 1 to deter nesting on the bridge following guidance outlined in *Best Management Practices for Excluding Barn Swallows and Chimney Swifts from Buildings and Structures* (MNRF, 2017). The exclusion netting would be regularly inspected and maintained in good repair. Geese may be temporarily deterred from the Project area during construction using measures identified in section 7 of the *Canada and Cackling Geese: Management and Population Control in Southern Canada Handbook* (CWS, 2010). Some of the deterrent measures may require a permit from ECCC, which will be the responsibility of the contractor and will be secured prior to implementation. If vegetation clearing is required during this period, an avian biologist will be retained to search suitable areas prior to work. The biologist will search for nests to manage risks to active nests protected by the MBCA, the SARA, the *Endangered Species Act* (Ontario) (ESA), the *Act respecting threatened or vulnerable species* (Quebec) (ARTVS), the Ontario *Fish and Wildlife Conservation Act, 1997* (FWCA) and the Quebec *Act respecting the conservation and development of wildlife* (ARCDW). Nest searches must be completed within 48 hours before commencement of the proposed works. If work is not completed within 48 hours following the nest search, the search will be repeated to search for new nests that may have been established during that period.

If Barn Swallow nests are observed on the bridge, and deconstruction activities cannot be completed outside the breeding season, Barn Swallow nesting structures would be installed near the PDA prior to deconstruction of the existing bridge to compensate for the loss of nesting habitat under the bridge (see Creating Nesting Habitat for Barn Swallows; MNRF, 2016). These structures would be installed before the onset of the active nesting season.

As many birds migrate at night, navigating by the moon and stars, artificial light can cause disorienting and confusing signals, drawing birds into the lights. Given that the Ottawa River is designated as a dark sky zone as per the National Capital Illumination Plan (NCC, 2017a), any lighting for the replacement

bridge will consider this designation, as well as the NCC Bird-Safe Design Guidelines (NCC, 2021a) and the City of Ottawa's Bird-friendly Design Guidelines (City of Ottawa, 2021).

Bat roost/maternity exit surveys are proposed to confirm the presence/absence of SAR species. If work is anticipated to impact SAR bats, a permit under SARA/ESA/ARTVS may be required. In the event that a SAR bat maternity roost is identified (i.e., within a tree or in/around the bridge structure) during the baseline studies, ECCC/MECP/MEFCCWP will be contacted for further guidance.

To mitigate disturbance or potential harm to any roosting bats confirmed through the proposed bat surveys, any tree clearing and construction/deconstruction activities on the bridge would be completed outside the roosting timing window for bats (from April 1 up to September 30; to be confirmed with federal and provincial agencies). If avoidance is not possible during bridge deconstruction, the installation of 3/8" netting prior to the roosting season would be required to prevent bats from roosting on the bridge structure (Fraser, 2019). This exclusion netting would also serve to exclude migratory birds from the structure and would be regularly inspected and maintained in good repair.

If bat roosting is observed on the bridge, and deconstruction activities cannot be completed outside the summer roosting, alternative roosting structures as recommended by ECCC/MECP/MEFCCWP would be installed near the PDA prior to deconstruction of the existing bridge to compensate for the loss of roosting habitat under the bridge. These structures would also be installed before the onset of the active roosting season.

Where SAR turtle, snake and/or amphibian habitat is confirmed during site investigations, mitigation measures would be developed in consultation with ECCC, MECP and MEFCCWP. Examples of standard mitigation to keep reptiles and amphibians out of construction areas include the installation of an exclusion fence designed in accordance with the *Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing* (MNRF, 2013). In addition, a reptile and amphibian salvage and relocation plan will be developed to deal with any animals encountered within the construction area.

With respect to turtles, the exclusion fencing would need to be installed prior to the beginning of the nesting season (by end of April at the latest) and be maintained around the work area for the duration of the turtle active season (mid-April to end of October).

If construction occurs during the spring, summer or fall (i.e., peak active season for herptiles: April 1 through October 31), potential snake cover (i.e., old boards, logs, construction debris) would be removed by hand and any snakes found underneath given the chance to leave without being harassed. Additionally, drivers and equipment operators should watch for basking snakes on the road.

Where feasible to do so, the timing of deconstruction and construction activities will also be scheduled to avoid or minimize potential impacts on amphibians and their habitats during sensitive phases of their lifecycle (i.e., breeding, migration/dispersal, overwintering).

If work is conducted during the Monarch breeding season (May to October), areas of high milkweed density will be avoided. Post-construction habitat restoration efforts will include considerations for pollinators, such as the restoration or creation of native foraging habitat for species such as the Monarch and the Yellow-banded Bumble Bee.

Visual searches during deconstruction and construction will include inspection of structures, machinery and equipment, prior to starting equipment. If any wildlife is encountered during construction, work at that location will stop until the wildlife leaves the Project area on their own accord. Standard environmental protection measures for erosion and sediment control will be modified to serve as wildlife barriers where construction borders areas of natural vegetation (see the *Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing* (MNRF, 2013)).

Any wildlife incidentally encountered during construction will not be knowingly harmed. Work will be conducted to not disturb habitat and/or individual SAR and migratory birds. Project activities will be planned to protect SARs and their habitats, which will include training workers in the identification of potential SAR they may encounter, and a protocol developed if a species is encountered.

Any follow-up and monitoring plans will be developed for VCs where residual adverse effects are predicted or uncertain. If required, a follow-up and monitoring plan would be implemented during relevant Project phases to verify the accuracy of predictions and determine the effectiveness of proposed wildlife and wildlife habitat mitigation measures at representative sensitive receptors.

Based on this preliminary assessment, residual impacts on wildlife habitat as a result of construction activities, potentially including SAR, following the implementation of mitigation measures, are possible (i.e., depends on the species and habitat present in the LAA), but are predicted to be low in magnitude (given the urbanized nature of the area), extend to the LAA (100 m buffer around PDA), are short-term in duration and reversible following post-construction reclamation. Through the implementation of habitat creation, restoration and other offsetting measures, impacts from this Project on wildlife and wildlife habitat to achieve net environmental benefits may be positive over the long-term.

Compensation for removal of SAR habitat may be required and will be determined in consultation with ECCC/MECP/MEFCCWP. There are also opportunities to implement these wildlife habitat structures or other habitat restoration and enhancement measures to offset some of the past impacts of urban developments in this region. Finally, it may be possible to design the new bridge in a way that maintains or improves the conditions required for successful nesting and roosting on the structure.

Potential changes to Migratory birds, as defined in subsection 2(1) of the Migratory Birds Convention Act, 1994

Project implementation could result in changes to migratory birds, as defined in subsection 2(1) of the *Migratory Birds Convention Act*. There is a small amount of vegetated habitat within the anticipated Project Development Area. There is also potential for migratory birds to nest on the bridge structure. Clearing of vegetation and bridge deconstruction will preferentially be conducted outside of the breeding bird season (April 8 – August 28). Through the implementation of mitigation measures, the Project is not expected to adversely affect migratory birds, as defined under the *Migratory Birds Convention Act*. Potential effects of construction noise on migratory birds are also not anticipated due to the temporary nature of construction noise. Timing windows for valued components are currently based on existing studies, however these will be confirmed after field studies elucidate the presence or absence of specific species.

The bird species identified in the DPD are those most likely to be nesting on the bridge structure or adjacent areas based on existing information regarding habitat features. Confirmation of any migratory

birds potentially affected by the Project would be subject to the completion of more detailed breeding and habitat surveys.

Based on a preliminary assessment, effects on migratory birds, nests and eggs, after the implementation of mitigation measures, are not anticipated due to the temporary nature of construction and the urbanized nature of the area. However, residual effects, including likelihood of effects, will be properly characterized after field surveys are conducted and as the project design progresses.

Aquatic Environment

Given that the Alexandra Bridge crosses the interprovincial boundary and touches both the Ontario and Quebec sides of the Ottawa River, the restrictions on in-water work to protect fish during spawning and other critical life stages established by the two provinces, as well as those identified by Fisheries and Oceans Canada (DFO), must be respected. Timing restrictions are particularly important and are based on a waterbody's thermal regime and the presence of spring and/or fall spawning species. DFO provides timing window guidance (DFO, 2019b) for individual species based on broadly categorized Regions but defers to provincial agencies if those timing windows differ from provincial guidance provided by local agency offices. The Lac Dollard-des-Ormeaux reach is part of Ontario's FMZ 12, where timing restrictions for in-water works apply from January 1 to July 15; therefore, work is only authorized between July 16 and December 31. The Lac Dollard-des-Ormeaux reach is also part of Quebec's fisheries region 7, where timing restrictions apply from April 1 to July 15 (work is therefore authorized between July 16 and March 31). However, if fall-spawning species are potentially present, the timing window is further restricted to July 16 – September 30.

Since two different timing windows exist for the same area, the most conservative work restriction period should be considered for the site under study. However, this may turn out to be too restrictive and unrealistic in practice for the Project. Both the Ontario and Quebec government note that standard timing restrictions are preliminary and that additional timing guidelines may apply depending on further review and fish species found during surveys. Therefore, appropriate timing windows as well as authorization requirements will be confirmed through discussions with both the Ontario MNRF, the Quebec MEFCCWP and DFO based on the site-specific fisheries and fish habitat data to be collected for the areas potentially affected by the Project.

If any interactions with aquatic species at risk are identified during the detailed design, mitigation could include scheduling of work to avoid fish migration and spawning windows, restrictions on construction methods to reduce noise/vibration levels and/or compensation if and as required by DFO.

The existing Alexandra Bridge structure is supported beneath by six piers constructed of concrete and masonry. While the specific design of the new bridge has not yet been determined, a structure that will result in a reduction of the number of supporting piers required will decrease the footprint of impact on physical fish habitat in the river. Such an approach would allow for rehabilitation and restoration of fish habitat in areas where piers are removed, which could potentially be viewed as a positive impact.

A more detailed assessment of the potential impacts of the Project on fish and fish habitats, including SAR, species native to the Ottawa River and the Rideau Canal, and species of importance to Indigenous communities, will be completed based on the findings of future fish surveys and following the development of the initial designs stages and the construction methods.

Potential changes that may affect fish, fish habitat, and aquatic species would occur primarily during the construction stage of the Project. Construction activities and work carried out in the water and on land adjacent to the water have the potential to impact fish and fish habitat. The Project area provides general habitat for a number of fish species and likely acts as a seasonal migration corridor for species that are moving into potential spawning grounds, such as Walleye and Lake Sturgeon that spawn below Chaudière Falls and Victoria Island, respectively.

Fish habitat may be temporarily affected during the deconstruction of old piers and construction of new piers. During deconstruction, equipment operation and deconstruction activities have the potential to directly interfere with existing habitat in the vicinity of the piers, and debris generated during deconstruction may enter the water column and rest on the riverbed. During construction of new piers, there will be a requirement for excavation or other disturbance of the riverbed and existing habitat features to facilitate the construction of footings to support the pier.

As noted previously, deconstruction and construction activities have the potential to impact water quality through contaminant spills as well as the introduction of debris, dust and sediment. The construction stage of the Project has the potential to result in bed and bank disturbance/erosion which can result in turbidity spikes, TSS loading and overall sedimentation, all of which can be detrimental to physical habitat structure (e.g., spawning beds) as well as to the physiological processes of fish. Increased sediment loading can cause gill abrasion and may force fish to avoid the area, which can be interpreted as a disruption to fish habitat use.

The deconstruction of the existing piers and in particular, the construction of new piers, will require review by DFO and possibly by the provincial authorities (MNRF/MEFCCWP). DFO authorization can only be provided after the IAAC determination is issued, and provincial authorizations will require a detailed design. As a preferred design is determined and detailed design is in progress, DFO and the provincial authorities will be engaged through the submission of a Request for Review and follow-up consultation.

During operation, changes in fish habitat as a result of the Project are not anticipated from existing conditions. During operation, water quality may be affected by the introduction of suspended solids (e.g., during works in-water on the riverbank), petroleum hydrocarbons (e.g., accidental spills) and de-icing salts into the receiving environment.

Field surveys will be conducted prior to the detailed design stage to identify the presence of fish (including SAR/SOMC) and fish habitat (including aquatic, semi-aquatic and riparian habitats) within the Project area. After field surveys are conducted and a list of aquatic species, SAR/SOMC and potential fish habitat is identified, species specific mitigation measures and permit requirements will be identified, and a management approach will be developed. Detailed mitigation measures, the management approach and follow-up programs will form part of the EEP.

Mitigation measures for in-water works can include passive approaches, such as respecting timing windows and other avoidance mechanisms, as well as physical measures to reduce the area of potential effect to the immediate work area.

As described in the mitigation and protective measures for surface water, the EPP will include an Erosion and Sediment Control (ESC) Plan that will be developed, implemented and enforced during construction

to reduce potential impacts on water quality. The ESC Plan will include a multi-barrier approach defining the location and design of control mechanisms such as silt fencing, rock check dams, straw bale filters, drain covers, filter fabric under catch basins frame and gates and mud mats, as required. In addition, the EPP will include a Fish and Fish Habitat Protection and Offsetting Plan.

Appropriate and reasonable timing windows for in-water works will be determined with the appropriate federal and provincial authorities during the detailed design stage. Provincially established timing windows are available for the Lac Dollard-des-Ormeaux reach of the Ottawa River from both Ontario and Quebec natural resource management agencies. The appropriate timing window for the Project will be discussed with approval agencies and will be scientifically based on the species present in the area, and their likelihood of using habitat in the area for specific sensitive life periods (e.g., spawning and incubation of eggs, spawning migration, etc.).

During construction, the use of cofferdams to isolate in-river work areas will reduce the impacts noted above. However, there will be temporary impacts associated with the coffer dams, including loss of water cover within the dammed area, drying of the riverbed in the dammed area and some bed disturbance associated with the installation and removal of the dams. Mitigation measures include fish and mussel rescues from the dammed area prior to complete dewatering, and the use of low impact dam materials such as Aqua-Barrier or Aqua Dam coffer dams.

A turbidity curtain will be installed around the perimeter of the in-water work zone to further promote isolation of the construction zone, as well as reduce water quality impacts and the downstream migration of silt and sediment from dewatering activities. Turbidity will be monitored daily during in-water construction activities to confirm there are no increases as a result of Project construction.

Mitigation measures for the prevention of excessive sedimentation and debris encroachment are similar to those employed to minimize water quality impacts. Erosion and sedimentation control (ESC) measures will be implemented and maintained throughout all stages of construction to protect the receiving waters and surrounding environment. ESC measures will be installed around the extent of the construction work zone(s) as well as around the perimeter of stockpiles required for construction.

All activities, including maintenance procedures, will be controlled to prevent the entry of petroleum products, debris, rubble, concrete or other deleterious substances into the water. A spill prevention and management plan will also be developed for the Project. For the deconstruction of old piers and the construction of new piers, the work area in the vicinity of the piers will be isolated.

By incorporating best management practices such as those discussed above and in previous sections pertaining to water quality, the overall impact of the bridge replacement on aquatic habitat and resident fish species will be reduced.

The Project will require review by DFO and is expected to require a *Fisheries Act* authorization. A typical condition of a *Fisheries Act* authorization is the requirement for post-construction monitoring over a period of up to three years, or for another period of duration to be discussed with DFO. Typical monitoring components include examining the construction zone and downstream environments for stability, habitat restoration success and function as per the intent of the design. Monitoring may also be required during deconstruction and construction, such as turbidity monitoring as mentioned

previously, and continuous supervision by qualified inspectors during in-water construction activities to report on the installation and performance of recommended mitigation measures.

Based on this preliminary assessment, residual impacts to fish and fish habitat, potentially including aquatic SAR, as a result of construction activities are likely to occur following the implementation of mitigation measures. However, they are predicted to be low in magnitude, and localized to the construction zone. At a maximum, they may extend to the LAA (200 m buffer around the PDA) and will be short-term. Impacts are expected to be reversible following the implementation of habitat restoration and enhancement measures.

While the specific design of the new bridge has not yet been determined, a structure that will result in a reduction of the number of supporting piers required will decrease the footprint of impact on physical fish habitat in the river. Such an approach would allow for rehabilitation and restoration of fish habitat in areas where piers are removed. Through the implementation of habitat creation, restoration and other offsetting measures, impacts from this Project on fish and fish habitat to achieve net environmental benefits may be positive over the long-term. In addition, there may be an opportunity for works with environmental benefits to be completed as part of this Project to offset some of the cumulative impacts of urban developments in this region. The IPT will work with the study team as well as agency experts from DFO/MNRF/MEFCCWP and will consider enhancement measures or compensation measures (if required) during the design of shoreline restoration works that could improve general fish habitat and spawning habitat during shoreline restoration works for fish in the Ottawa River, including the American Eel.

Potential Changes to Fish and Fish habitat, as defined in subsection 2(1) of the Fisheries Act
Project implementation could result in changes to fish and fish habitat, as defined in subsection 2(1) of the *Fisheries Act*. The Project is likely to result in the Harmful Alteration, Disruption or Destruction (HADD) of fish habitat and will likely require Authorization under the *Fisheries Act*. The destruction of fish habitat that is likely to occur as a result of new pier construction might be partially offset by the restoration of habitat in the area of removal of old piers. However, the details of habitat offsetting will require further analysis and calculation of habitat impacts at the detailed design stage.

Any required permits and approvals will be obtained from applicable provincial and federal agencies, and any impacts to fish and fish habitat will be compensated if required as per the current *Fisheries Act*.

Environmental Changes That May Occur on Federal Lands, In Other Provinces or Outside of Canada
Depending on the final bridge design, the Project footprint may extend beyond the existing Alexandra Bridge footprint. There is potential for temporary environmental changes (for example, vegetation loss) to federal lands during construction due to equipment and material storage and movement. These changes will be minimized wherever possible, such as staging on paved areas and protecting trees, and the site will be reinstated at the end of the construction stage.

The potential for minor temporary adverse impacts (such as erosion, etc.) during construction will be addressed through appropriate mitigation measures such as the use of erosion and sediment control measures and cutting of vegetation outside of the breeding bird season. The loss of vegetation will be adequately compensated (e.g., trees will be replaced at a minimum ratio of 2:1), as will impacted shorelines and/or fish habitat (e.g., through habitat restoration). In addition to the potential impacts on

the environment and related mitigation measures outlined throughout this section, additional mitigation measures will be developed during detailed design to address potential environmental impacts on federal lands.

15 SOCIO-ECONOMIC SETTING

To identify potential social, economic, and human health considerations relevant to the Project, a desktop review of available information in the form of reports, maps and publicly available databases has been conducted (see Appendix G of the IPD). Applicable information is provided throughout this section. It is to be noted that the IPT continues to work with Indigenous communities to identify socio-economic benefits as a result of the Project along with impacts and appropriate mitigation measures.

Potential adverse impacts of the Project were evaluated through consideration of the interactions between the Project and the social, economic, and human health environment. Mitigation measures that could avoid or reduce potential adverse social impacts are also identified. Residual impacts along with cumulative effects (where applicable) will be further evaluated and confirmed at the Impact Statement phase.

Social Context

The Alexandra Bridge is the thread tying together the heart of Canada's National Capital Region (NCR) from Major's Hill Park to Jacques-Cartier Park, to the Voyageurs Pathway and the Ottawa River Pathway. The bridge serves a function, but its splendor lies in the convergence of its site and place in the Nation's Capital. The NCR covers an area of 4,715 km2 in both Québec and Ontario along the Ottawa River. The region is located within the traditional territory of the Algonquin people. This area is composed of several jurisdictions, including the City of Ottawa, Ville de Gatineau, and the Municipalité régionale de comté (MRC) des Collines-de-l'Outaouais (and its member municipalities of Chelsea, La Pêche and Pontiac). Transportation to the NCR is served by multiple airports, railways, and interprovincial highways. There are two rapid-transit public transport networks in the NCR: the Rapibus system (SRB) operated by the Société de transport de l'Outaouais (STO) in Gatineau and the O-Train Light Rail Transit system (LRT) and city bus system operated by OC Transpo in Ottawa.

As the planning and design of the new structure progresses, the IPT will be forward thinking in anticipating how the Project could potentially impact this particular segment of the population and how these impacts can be mitigated.

Potential Impacts

Potential impacts and the mitigation measures discussed in this section are those anticipated from the Project as defined to date and include the comments received from respondents to public consultation outreach. Additional potential impacts will be identified as planning and design for the new structure progresses. These will be addressed as they are documented to ensure that the Project remains responsive to changes.

The enhancement measures are drawn from the Planning and Design Principles because they provide a cohesive vision for the replacement of the bridge including its integration with the surrounding transportation network and public spaces.

Impacts on Mobility
During the deconstruction and construction stage of the Project, it is anticipated that the crossing will be closed to traffic, including active mobility transportation, for approximately three to four years between 2028 and 2032. Disruptions will be different for those who own their own vehicle and are able to change their commuting or travel habits compared to individuals who rely on public transit or active modes of transportation.

Based on initial public consultation, widely shared concerns about the Project involved:

- The effects of deconstruction and construction activities including the duration of the bridge's closure and the adequacy of alternative transportation routes particularly for active mobility users
- The closure will likely significantly disrupt the flow of vehicular, active mobility, and commercial transportation
- The closure will likely negatively affect tourism in the region by limiting circulation between tourist destinations

Disadvantaged or vulnerable individuals who predominantly use active modes of transportation may be more significantly impacted by the closure of the bridge and may require special mitigation measures tailored to their needs.

Impacts on Views and Public Spaces
Concerns were expressed for the potential loss of the bridge's defining role in maintaining the area's visual identity, and in connecting residents and visitors to the past. Given the location of the bridge, significant changes to the structure, height or proportions of the new bridge could have impacts on this key feature of the Confederation Boulevard's Ceremonial Route. Concerns were expressed that the replacement bridge would, in sharp contrast with the Alexandra Bridge, end up being utilitarian and visually uninspiring. Loss of the charm of the bridge was expressed as a concern.

Impacts on Landmark and Scenic Heritage
Initial public consultation also revealed widely shared concerns about broader implications and risks tied to the bridge's role as a landmark and destination, the loss of the unique character and heritage of the bridge and loss of scenic views. Due to the bridge's heritage values and importance, the design and heritage aspects related to this Project are addressed in more substantive details in Design and Heritage of Structure section.

Whether as a crossing, a landmark, or a public space, public consultation participants made it clear that the Alexandra Bridge cannot be thought of as just any other bridge. The concerns and aspirations articulated by participants regarding the replacement Project are closely tied to what, in their eyes, makes the Alexandra Bridge unique.

Together, these elements contribute to the creation of a sense of place that enriches the overall users' memorable experience of the current bridge. The Planning and Design Principles provide direction to the design team to ensure that these elements are considered in the design of the new bridge, while measures are also being considered to mitigate for the potential impacts from the deconstruction of the current bridge.

Mitigation and Protective Measures

In response to expressed concerns, development of appropriate mitigation measures to support active mobility users during the deconstruction and construction period are key considerations in the planning process.

Mobility

The IPT is working to assess viable options and determine required supporting infrastructure or services needed to implement suitable mitigation measures. Ideas being evaluated include enhancement to existing pathways to improve usability and serviceability including in winter and development of temporary structures to remove potential barriers for all users including those with reduced mobility. Conditions on the bridge may be especially difficult during winter months for those who use assistive devices and/or technology that could be impacted by snow. Preparing for additional costs or design features that can facilitate snow removal and equipping the structure for winter conditions will help ensure the infrastructure and active transportation routes are accessible to all groups year-round. Potential costs to users associated with alternatives such as ferry or shuttle services, and length of detours are factors under consideration particularly considering potential financial burden on individuals from disadvantaged communities.

During the deconstruction and construction years, the other interprovincial crossings are expected to be able to compensate for re-routed traffic outside peak hours. Length of detours will be considered to manage the volume of additional emissions created by longer trips. During peak hours, special traffic management measures may need to be implemented to reduce congestion and reduce idling. The IPT will work with both the Cities of Ottawa and the City of Gatineau to develop appropriate traffic management strategies. Strategies will also take into consideration specific needs to support circulation between tourist destinations to mitigate potential impacts to business operations on both sides of the river. Different user groups will also be engaged to find workable solutions to transportation challenges.

The existing segregated pathway is a highly prized feature that many public consultation participants hope will be enhanced for the experience and safety of active mobility users and to promote sustainable transportation throughout the region.

The inclusion of a separate and protected laneway for mixed-use active transportation methods is suggested to increase the use of alternate modes of transportation, such as biking or walking. The Planning and Design Principles for the bridge will require the pedestrian area of the bridge to meet the highest standards of accessibility in the bridge's function as both an active transportation connection and as a contemplative space, such that all Canadians and visitors can benefit from a full and equitable experience of the bridge. This includes requirements regarding travel lanes, rest areas and interpretive elements to be installed on the bridge. Refer to **Figure 2**, which provides a conceptual section of the potential future traffic lanes.

The new bridge will be designed to accommodate all vehicles, including trucks and tour buses. However, as it is part of Confederation Boulevard, commercial trucks would be rerouted to other bridges, such as the Macdonald-Cartier Bridge. Notwithstanding any future changes, it is unlikely that commercial trucks would use the new bridge. The current approaches limit the amount of traffic that can flow across the bridge. Traffic volumes on the new bridge are not expected to increase greatly given the network to which it is connected, and the Functional Requirements established for the new bridge.

The replacement bridge design is expected to ensure the physical continuity of its unique and symbolic character, connectivity for pedestrians, cyclists and drivers and a seamless connection between two cities and two provinces in Canada's Capital.

Loss of Public Spaces
During the deconstruction and construction years when the bridge and adjacent areas are not safely accessible to the public, there will be a loss of the public space currently provided by the bridge. Other nearby public venues such as Nepean Point, Jacques-Cartier Park and the grounds of the Canadian Museum of History will play key roles in providing temporary venues for celebrations and events.

Measures to mitigate for the loss of aesthetic and heritage values related to this Project are further discussed in more substantive details in Design and Heritage of Structure section.

In keeping with recommendations for improvements provided by public consultation respondents, the new bridge should be designed to attract tourists, with space to take pictures, sit down, and enjoy the views. Respondents also emphasized the importance of beauty in the bridge's design, of a kind that would blend in harmoniously with the architecture of nearby historic sites. A small number of respondents recommended integrating nature into the design, including trees and green strips. These recommendations along with additional public comments will be used to direct mitigation efforts during deconstruction and construction and will influence the design of the new bridge.

Landmark and Scenic Heritage
The bridge boardwalk offers spectacular panoramic views towards the River shorelines and upriver, with these views encompassing the Chateau Laurier, the Rideau Canal, Parliament Hill and the whole Parliamentary Precinct, the Supreme Court, Library and Archives Canada, and beyond to the Islands and the Portage Bridge.

Protection of scenic views is directed by the NCC's Canada's Capital Views Protection Plan (NCC, 2007), which mandates that views from key viewpoints shall be preserved and enhanced to ensure the visual integrity and symbolic primacy of the Parliament buildings (Centre Block, Parliamentary Library, Peace Tower) within the setting of the Ottawa River corridor.

Of these key Viewpoints, Viewpoint #6 located on the existing Alexandra Bridge boardwalk close to the Québec approach, is a "Control Viewpoint" that is used to establish maximum background heights within the City of Ottawa's Core area, west of the Canal, to ensure that no background buildings impact views of the silhouette of the Centre Block and Peace Tower. Future bridge design development will be required, through views analysis, to ensure that this viewpoint is maintained for the full enjoyment of Canadians and visitors of the Capital.

The Planning and Design Principles (NCC Planning and Design Principles), offer a vision for the future operation and enhancement measures of the new bridge.

Principle (1): Mobility and Continuity of the Urban Fabric

- The new bridge must provide better connections for pedestrians and cyclists at the Gatineau approach to the riverbank, Jacques-Cartier Park, and the grounds of the Canadian Museum of History.

- The design of the new bridge must provide direct pedestrian connections to other important urban elements in its immediate context taking into consideration challenges due to the steep, vegetated rock escarpments of the Ottawa River shoreline.
- Alexandra Bridge replacement offers the opportunity to accommodate a multitude of active uses such as sightseeing, resting, strolling, jogging and cycling, as well as lookout points for viewing scenic features.

Principle (2): Public Spaces and Civic Experiences

- Beyond being a civic space in its own right, the new bridge must function as a multimodal transportation connection and a connector of major civic and public spaces.
- The Bridge should be designed as an urban agora and reminders of the Indigenous community should be incorporated into the development of public space. The outcomes of ongoing discussions with the Algonquin Nation will play a key role.

Principle (4): Preserve Views and Celebrating the Legacy

- The Algonquin Nations have been stewards of the Ottawa Valley since their ancient oral history records their stories of creation in the territories and waterways of the land. The design process of the bridge will provide opportunities for Indigenous engagement and dialogue throughout all development phases. Designers must seek to understand traditional knowledge and incorporate the Algonquin Nation's perspectives and values.

Principle (6): Universal Accessibility, Legibility and Wayfinding

- In keeping with the principle of creating an interprovincial transportation connection that prioritizes active mobility, accessibility must be intrinsic to the bridge design of all pedestrian and cycling accesses at the approaches and along the length of the bridge, as well as in connections to other surrounding urban features and structures (parks, museums, etc.). Accessible and inclusive design must follow the recommendations of the Best Practices Guide to the Accessible Design of the NCC's Outdoor Spaces, as a minimum, as well as requirements of the *Accessible Canada Act* and any applicable regulations.
- In addition, any spaces dedicated to pedestrian usage (including lanes and lookout spaces) on the bridge should be accessible to all users by following the Universal Design principles. Universal Design encompasses seven general principles:

Bridge design features must ensure inclusive, safe, equitable and universally accessible gathering public space(s), exemplified through attention to lighting, interfaces that include pathways or railings, viewing areas, visual sightlines, furnishings, structural features and impacts of inclement weather, amongst others.

Designing the bridge in parallel with a universally accessible wayfinding system would allow ease of access to important information whether it be to historical facts on an interpretation panel, orientating signs or security information.

Signage on the new bridge structure (site identification, wayfinding, operational, regulatory, interpretative) is required to be developed through an integrated design approach, providing specific locations for implementation during the design process to avoid after-thought solutions.

Economic Context

The following information identifies potential impacts on the labour force and the Gross Domestic Product (GDP) growth, as they relate to the Project. This section also includes a summary of proposed mitigation and enhanced measures.

Gross Domestic Product

The GDP in the NCR also experienced a decline in 2020, reported at **-3.2%.** In 2017-18, the GDP growth within the NCR was reported as the seventh (7) highest amongst twenty (20) major cities in Canada. Major contributors to the GDP are High Technology and the Federal Government sectors, which account for about $25million or slightly over 37% of the total GDP (in the NCR). As of 2019, Ottawa-Gatineau's real GDP was reported at approximately $67.24 billion (Statistics Canada, 2021).

Notably, the NCR experienced minimal economic flux (aside from during the current pandemic), contrary to other municipalities, due primarily to the Federal Government sector which has been stable over the years.

National Capital Region

Within Ottawa-Gatineau (NCR), the labour force reflects the diversity of the region, which includes Aboriginal peoples, visible and non-visible minorities, male, female, transgender and non-binary workers. In 2016 the total labour force comprised of approximately 1.1million workers, whereby females formed slightly higher than 51% of the overall force. Males accounted for a higher percentage of those employed – 51% vs female at 49.2%.

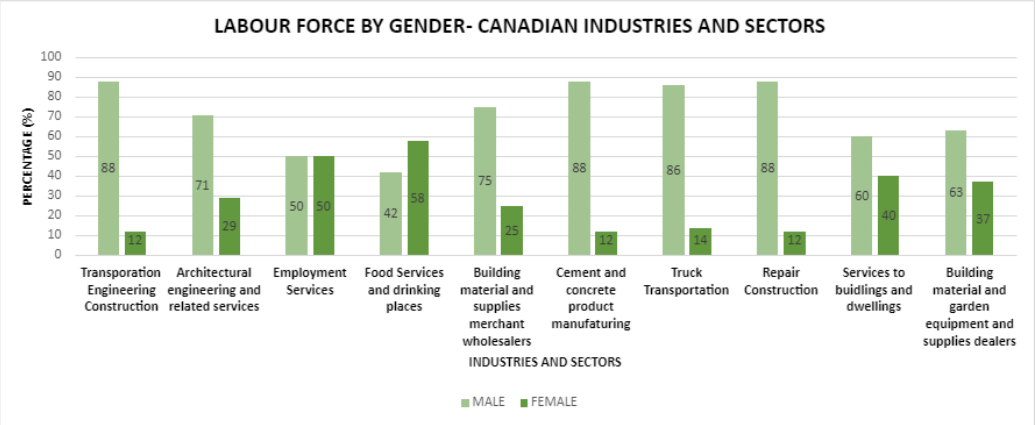
Of the 1.1 million people, Aboriginal peoples accounted for approximately 30,710 or 2.85%, visible minorities accounted for 215,690 individuals or 20%, and non-visible minorities 827,420 individuals or 77%. Of note, data on non-binary and transgender status within the labour force was not reported (Statistics Canada, 2017).

From January 2016 to March of 2016 unemployment rates remained relatively stable. There was a slight increase in unemployment from April to October of 2016. During this time, it was reported that women were unemployed at rate marginally higher than men.

In the first reporting quarter of 2017, both the employment and unemployment rate remained relatively stable. As of the last reporting quarter, the unemployment rate experienced a slight increase in comparison to the unemployment in 2018 at approximately 4.5%.

Statistics highlight that there is a disparity within the labour force amongst male and female. **Figure 15** captures the ratio of male to female in select industries and sectors. Primarily, the largest disparity evidenced by the data below is within the following industries/sectors:

- Transportation Engineering Construction
- Cement and concrete product manufacturing
- Repair Construction
- Building material and garden equipment and supplies dealers



Source: PwC, 2021

Figure 15: Labour force by gender

An important aspect of the pandemic is its disproportional impact between genders (Statistics Canada 2020). Gender employment gaps are evident in various industrial sectors - women being more affected than men.

As part of the Project, a socio-economic study was commissioned by PSPC. The study (produced by PriceWaterhouseCoopers (PWC) 2021), assessed the economic footprint of the Project (and surrounding areas) and provided a quantitative assessment on the GDP, and employment indicators within the NCR.

- Employment: The Project will primarily influence the construction industry and its specialized sub-industries. It is expected that there will be a greater demand for labour and raw materials (at the start of construction in 2028), which in turn generates additional demand for the workers within this employment sector. The potential impact on employment is further elaborated upon in the deconstruction/construction and Operation stages.
- GDP: It is expected that that the economic activity generated by the Project will significantly impact the Ottawa-Gatineau GDP. As of 2019, the construction sector accounted for approximately $2.69 million or 4% of Ottawa-Gatineau's GDP ($67.24 billion).

It is recognized that the construction and deconstruction as well as the operation and maintenance of the bridge will require capital expenditures. Such expenditures may be viewed as negative impacts however, the economic activity including the GDP growth and the creation of employment is expected to off-set costs related to deconstruction and construction.

Potential Impact

Employment

The deconstruction and construction of the bridge is anticipated to generate economic activity within the industries identified below. Approximately 45% or 2,990 full time equivalent (FTE) employment opportunities will be created by this Project in the transportation engineering construction within the Ottawa- Gatineau area.

In addition, approximately 43% or 2,571 employment opportunities will also be created by this project within other industries such as cement and concrete product manufacturing, truck transportation, and banking.

Direct, Indirect and Induced Impact on GDP

In addition to the impact on employment, it is anticipated that the Project will contribute to the growth of the GDP within the Ottawa-Gatineau area. The demand for supplies and construction/trade workers is expected to rise significantly during the deconstruction and construction stage along with the operation and maintenance, which will be further discussed below.

Table 11 summarizes the direct, indirect and induced impact on the GDP (construction industry) within Ontario, Quebec and Canada as a whole. As highlighted the project will inject, over a period of four (4) years, about $675 million into the Ottawa – Gatineau GDP.

Table 11: Alexandra Bridge Replacement Project Impact on GDP ($ millions)

Industry		Ontario	Quebec	Rest of Canada	Total (Millions)
Construction (Cumulative, 4 years)	**Direct**	124.9	148.8		273.7
	Indirect	142.3	107.7	26.4	276.4
	Induced	84.4	66.7	16.6	167.8
Total construction		351.6	323.2	43.0	717.9

Public Services and Procurement Canada (PSPC) Alexandra Bridge Replacement Project: Socio-Economic Study, PwC, May 2021

Given the scale and significance of the Project, the total deconstruction and construction of the bridge will fundamentally require strategic planning and sound capital expenditures (estimated at $350M year (1) one). Cost associated to this stage of the Project will be off-set by the positive economic activity generated through GDP growth (approximately $675 million in the Ottawa-Gatineau area) and the creation of employment (approximately 6,297 FTE). The IPT will ensure that all stages of the Project align with Treasury Board Secretariat's directives and policies.

Throughout the life of the Project, PSPC and NCC will demonstrate sound stewardship and implement financially responsible management practices that maximize the long-term economic advantage to the Crown and provides best value to the Canadian taxpayer.

The operation and maintenance of the bridge may generate economic activity within the Ottawa – Gatineau area. About 6 FTE opportunities will be created within the repair construction industry and about 3 FTE opportunities in other related industries.

The operation and maintenance of the bridge is also anticipated to create a certain economic activity throughout the years of operation. It is worth noting that the economic activity created by this stage will not yield the same activity created by the construction stage. Notwithstanding, it is important and will be discussed accordingly. Operations and maintenance impacts are calculated based on the annual average impacts over the life of the Replacement Bridge. The average Direct, Indirect, and Induced economic impacts of the Project on the GDP are outlined in millions in **Table 12**.

Table 12: Alexandra Bridge Replacement Project Impact on GDP ($ millions) *

Industry		Ontario	Quebec	Rest of Canada	Total (Millions)
Operations and maintenance (average annual)	**Direct**	0.4	0.3		0.6
	Indirect	0.1	0.1	0.2	0.2
	Induced	0.2	0.1	0.2	0.3
Total annual operations and maintenance		0.6	0.5	0.4	1.1

*Due to rounding, total FTEs and total impact value may not equal the sum of direct, indirect and induced footprints.

Public Services and Procurement Canada (PSPC) Alexandra Bridge Replacement Project: Socio-Economic Study, PwC, May 2021

In summary, the Project will impact the NCR's economy and Canada, as a whole. Impacts specific to the infrastructure investment and the construction sector (increased employment and activity) are expected. The total contribution to the GDP during construction (2028 to 2032) is estimated at $718 million, generating 6,589 jobs in Ottawa and Gatineau and Canada. In addition to these positive impacts, it is anticipated that there will be lower operation and maintenance costs.

It is important to note that the bridge closure will affect the NCR's population, the active users, and businesses within proximity to the bridge including the wharf and the boat launch in Jacques-Cartier Park. The active users such as cyclists and pedestrians who utilize the bridge will be required to use detours that have been put in place and rely on the availability of other means of transportation to cross the river.

The bridge closure has the potential to reduce tourism (contributor to the NCR's GDP) in the area which will affect some of the businesses operating within proximity to the bridge. This includes NCC tenants as well as the wharf, boat launch and marina in Jacques-Cartier Park. All NCC commercial leases are expected to continue during the construction period. The IPT is dedicated to working with all small business owners, including NCC tenants, to develop strategic plans to mitigate impacts.

The project has the potential to have a positive economic impact on Indigenous communities. In fact, the significant amount of contracting and employment associated with the bridge planning, construction and operations will offer many opportunities for Indigenous workers and companies to obtain economic benefits from the Project.

Human Health Context

This section provides a brief overview of the human health of residents in the NCR, including physical and mental, as well as how these may be impacted by the Project. Potential mitigation measures to minimize such impacts have also been highlighted. Note that the Project is in the planning stage and the full extent of impacts on such things as human health, socio-economic conditions and in some cases environmental are unknown.

The west deck of the bridge provides scenic views of the Ottawa-Gatineau skyline, the Ottawa River and Parliament Buildings. It is used by pedestrians, cyclists and others and notably is on the official route of the Trans Canada Trail. Its central location in the heart of both the Ottawa and Gatineau downtown core, coupled with its scale make it a key active-transit corridor for local residents and workers. The Alexandra Bridge attracts 32% of daily interprovincial bike trips while simultaneously providing one of the more scenic and low-stress routes for cyclists (City of Ottawa, 2013). Each day the bridge carries approximately 2000 pedestrians and 1300 cyclists, as of 2009.

Potential Impacts

During deconstruction and construction stages, some of the main concerns related to the residents' health and overall well-being include noise, vibration, air quality, dust, loss or decreased access to green space, and longer commute times.

Noise and Vibration

The construction process is expected to marginally increase noise levels above existing conditions. Varied construction activities are expected to create isolated and short-term noise, and potential vibration impacts on the environment. These have the potential to induce adverse health effects. Health Canada reports that exposure to noise for long durations can contribute and cause such things as:

- Sleep disturbance
- Lack of concentration
- Low tolerance/high annoyance

The effects of the above have been linked to increased fatigue; irritability, which have been linked to broader health effects – namely, mental health, cardiovascular effect and in some cases accidents.

Air Quality/Dust

The construction process is expected to marginally increase air pollution and dust in the region. Residents with underlying breathing conditions and or heart conditions are more susceptible to experiencing short term health effects from air pollution and/or dust. Health Canada and the Public Health Agency report that air pollution can cause and/or contribute to the:

- Breathing and lung conditions, such as:
    - asthma
    - allergies
    - chronic obstructive pulmonary disease (COPD)
- Heart conditions, such as:
    - angina
    - arrhythmia
    - heart attack
    - heart failure
    - hypertension

As a result of these impacts, individuals affected by the Project may experience

- Tiredness
- Headache or dizziness
- Coughing and sneezing
- Wheezing or difficulty breathing
- More mucous in the nose or throat
- Dry or irritated eyes, nose, throat and skin

Overall, these are expected to be short term impacts; nevertheless, will affect the well-being and health of those living in proximity to the bridge, and regular users of the bridge.

Temporary decrease in access to public realm and green space

The construction stage, including the requirement for staging areas, will result in and contribute to the loss and/or decrease of access to public realm and green spaces within the Project footprint and other areas in close proximity.

Such loss, is directly linked to a potential decrease in physical activity amongst residents, such as biking or outdoor sports (e.g., soccer, yoga), which can be attributed to the following:

- Obesity
- Change in energy levels
- Depression
- Cardio-vascular diseases

Mitigation and Protective Measures

The IPT is exploring and developing a strategy for mitigating the effects according to the Best Management Practices (BMPs) intended to satisfy safety thresholds by limiting dust, and vibrations as specified in any applicable regulating standards, health Canada's regulations and by-laws.

Noise Vibration

Some of the proposed mitigation measures to minimize the impacts that noise and/or vibration will have on the residents' health include:

- Limiting the speeds of heavy vehicles within and around the site
- Providing compacted smooth surfaces and avoiding abrupt steps and ditches
- Utilizing movable noise barriers and/or temporary enclosures
- Keeping equipment and maintained as per manufacture's recommendation

Mitigation measures will align with best management practices (BMPs), and health Canada's guidance as well as any other applicable regulations and by-law.

Air Emissions and Dust

Some of the proposed mitigation measures to minimize the impacts that air emissions and dust will have on the residents' health include:

- Monitoring wind conditions, and planning operations accordingly
- Minimizing storage of any granular material in heights and/or un-covered on site
- Ensure movable wind breaks are available on site
- Use water spray and suppression techniques to control fugitive dust
- Cover haul trucks and keep access routes to the construction site clean of debris

Mitigation measures will align with best management practices (BMPs), and Environment and Climate Change Canada's guidance as well as any other applicable regulations and by-law.

Loss and/or Decreased access to Public Realm and green Space

It is acknowledged that temporary loss and or decreased access to green space will have an impact on resident's health. The IPT will work with the public and key stakeholders, during public consultations and other engagement to develop a strategic action plan to address concerns related to the loss of such space.

Gender-Based Violence

In an effort to discourage any gender-based violence, which can affect victims on an economic, emotional and mental health level, the IPT will explore the following options to ensure the real and perceived safety of individuals crossing or using the bridge:

- Consider incorporating into the bridge design panic buttons and camera surveillance;
- Illumination/ lighting of the bridge and surrounding area(s) will follow the principles and guidelines described in the Capital Illumination Plan (NCC, 2017a), particularly to address safety concerns

- Include in the design a segregated pathways/ boardwalk: The functional requirements provides for both a cycling lane and pedestrian boardwalk. The new design will provide enhanced opportunities to support active mobility, providing segregated safe lanes for cyclists, pedestrians, and motorists
- Accessibility: To ensure that active mobility users have access to the bridge and can use it as a safe connection across the river, the Planning and Design Principles for the bridge require that the highest standards of accessibility be met, and that safe and segregated travel lanes be provided for pedestrians and cyclists respectively
- The construction and operation of the new bridge will have a positive impact on the community. This Project will be designed to support active mobility and enhance the bridge's walkability compared to the current structure. Widened and segregated cyclist and pedestrian lanes are expected to promote use of active transportation modes and enhance the overall community's health condition.

Design and Heritage of Structure

Heritage significance

The Alexandra Bridge is a unique and nationally significant engineering structure, a heritage and historical landmark, and a key element of some of the Capital's most iconic views. The bridge is an important example of a significant engineering work conceived by Canadian interests, designed by Canadian engineers and built by Canadian companies at a time when American and British expertise was dominant. It represents a major innovative engineering achievement for the era in which it was built, using leading-edge technology including all steel construction and the use of a through truss cantilever system with the deck carried mid-truss through the anchor and cantilever spans. It was the fourth largest span in the world in 1900.

The bridge has a PSPC Rated "Level II" heritage rating (National Historic Importance) as it was deemed an outstanding example of the work of the Dominion Bridge Company, an internationally significant Canadian company that was responsible for the design and/or construction of some of the most important works of engineering in Canada from the 1880s through the 20th century.

As such, careful consideration must be given to the documentation and recording of the existing bridge, the preservation and enhancement of current views to and from the bridge, as well as to the use of materials (such as local stone in piers, steel in the structure) that take inspiration from and/or reuse of materials from the structure.

The cultural landscape context

In addition to its design and aesthetic values, the Alexandra Bridge also forms part of a broader cultural landscape that includes the Parliamentary Precinct, numerous national cultural institutions, the Rideau Canal Locks (part of a UNESCO designated World Heritage Site and a National Historic Site of Canada: Rideau Canal WHS and NHSC) and the Ottawa River itself (which has been designated a Canadian Heritage River). The Heritage Value Assessment Report (URS, 2010) identifies the following significant views from the bridge:

- The ascending ramp of the boardwalk along the bridge, just east of Laurier Street in Hull
- The high point of the ramp of the bridge's boardwalk, where a pedestrian obtains the first panoramic view of the Parliament Buildings and other national symbols

- Approximately mid-point on the bridge
- The viewing platform at the bridge's south end

The bridge has become integrated as an important part of the waterfront and river panorama and has had a powerful impact on the character of the city skyline. The bridge is highly visible from the Portage and Macdonald Cartier Bridges, the Rideau Canal, Jacques-Cartier Park, the Canadian Museum of History, Parliament Hill, the Supreme Court of Canada, Kìwekì Point (formerly named Nepean Point) and from along the Ottawa River. It also graces the cover of the NCC's Plan for Canada's Capital (NCC, 2017b). For both residents and visitors alike, the Alexandra Bridge has become a much-appreciated landmark and amenity from which to enjoy exemplary views from its wide promenade, including the entrance valley of the Rideau Canal World Heritage Site, the Parliament Buildings/Parliament Hill, the Supreme Court, the Chaudière District, and the Canadian Museum of History.

Potential impacts and the mitigation measures discussed in this section are those anticipated from the project as defined to date. Comments received from initial public consultation outreach are used to inform next steps. Additional potential impacts will be identified as planning and design for the new structure progresses. These will be addressed as they are documented to ensure that the project remains responsive to changes.

Design features and alignment alternatives are important considerations to ensure that the new bridge reflects the history of the site and commemorates the Alexandra Bridge. The choice of alignment will also impact the quality of views from different points.

Potential Impacts

Heritage

Based on initial consultation outreach, a number of respondents thought that the design of the bridge should reflect the different histories that overlay the land on which it will be built within that region (309 mentions), of Indigenous Peoples (210 mentions), and of Canada (28 mentions). Other suggestions in this vein focused instead on the bonds that have shaped collective histories, including the relationship between Quebec and Ontario (68 mentions) and the ties that contribute to unity at a national level (26 mentions). For many respondents, there is no better way to highlight local history and heritage than by having the new bridge emulate the Alexandra Bridge's design (368 mentions).

As part of the project, the IPT will document and record all elements of the existing bridge, preserve and enhance existing views to and from the bridge, and will use materials (such as local stone in piers, steel in the structure) that take inspiration from and/or reuse materials from the existing structure.

Where deemed appropriate (and possible) interpretive panels and other items that preserve the memory, significance of the bridge as well as the heritage of surrounding areas, will be incorporated. The IPT will collaborate with museums to explore the possibility of a museum exhibit about the bridge.

Views

Contemplated changes in the alignment and the height of the bridge must consider the protection of the viewpoints as much as possible.

The design of the new bridge must preserve the visual integrity and symbolic importance of national treasures by protecting views to the Canadian Parliament and Parliament Hill. Existing views will be preserved and enhanced.

The visual integrity of cultural landscapes will be preserved by a harmonious integration of the new bridge with the urban and natural environment. This integration requires an appropriate mesh to the urban fabric, its scale and materiality, and underscoring the importance of the Indigenous community in this place.

Mitigation and Protective Measures

Heritage

Work has begun with the Royal Architectural Institute of Canada to establish a peer review panel, which will be engaged to provide independent advice to enable an appropriate response to the requirements for the preservation of heritage elements in the new build.

Other ideas brought forward by participants in outreach opportunities included the reuse of material as part of the new bridge, which the IPT intends to explore. Opportunities to retain existing materials and incorporate them into the design of the new bridge is an idea also being assessed. The broader use of such material will also be explored, where possible.

Heritage subject matter experts (SMEs) form part of the IPT and will provide advice and guidance on best practices/measures to respect and preserve the heritage value of the bridge. A Heritage Impact Analysis (HIA) is planned to help inform the conservation decision-making process by assessing the value of the Alexandra Bridge within its broader cultural landscape setting and provide a comprehensive understanding of the heritage value and character-defining elements unique to the structure and its cultural landscape setting.

The HIA will endeavor to highlight additional specific considerations for this cultural landscape in providing a comprehensive analysis and corresponding recommendations, reflecting the full narrative of this iconic setting. An objective list of screening criteria, specific to the context and location of the bridge, will serve to evaluate alternative options and will include important considerations, such as: functional, economic, construction, maintenance and operations, environment, aesthetics, urban design, social and cultural significance, etc. The bridge's long service life and history of repair works is to be captured in the review and analysis of background documentation.

Views

The design of the new bridge will be geared towards preserving and celebrating the history of the current Alexandra Bridge, which was recognized worldwide for its innovative design at the beginning of the last century. This commemoration will be done, both by the design of an exceptional world-class new bridge, as well as by its architectural form. The bridge will also allow the installation of interpretive elements along the pedestrian route.

Building on and continuing the legacy of our national icons, the bridge will work both as foreground and a background, a sculpture and a setting to the experience of the nation's capital. Guiding Principle 4, Preserve Views and Celebrating the Legacy, of the Planning and Design Principles provide further guidance to the concepts that will be used in the development of the new bridge.

- The relationship between the bridge and its existing urban and natural environment context has been shaped by its place within the history of the capital landscape and the iconic bridge has emerged with a compatible and cohesive presentation unique to its setting.
- The new design, that will replace the existing steel structure, must build on its legacy and important historical context through a state of- the-art world-class architectural and structural bridge design that is both a statement of the present time and reflective of the past.

There is also an opportunity to develop a legacy public history initiative in the form of a book and/or online publication, to assemble, commemorate and celebrate the history of the Alexandra Bridge.

Archaeological Potential

The Alexandra Bridge is located within lands identified as ancestral territory of the Algonquin Nation, with the Ottawa region considered traditional territory. These Peoples were the region's first residents, often teaching skills to early newcomers such as how to navigate the mighty Ottawa River, survive the region's harsh winters and how to harvest the natural and seasonal food sources.

The Algonquin Nation have stewarded the Ottawa River Valley for thousands of years. The river is a defining feature of the Algonquin Nation territory and was historically fundamental for trading between nations. It is also considered a meeting and gathering place, with important sacred sites located within a short distance of the bridge.

Archaeologists have found pre-contact Indigenous campsites in this area dating as far back as 8,500 years, but the ancestors of the present-day Algonquin Nation have been here much longer. Strategically located at the confluence of the Ottawa, Rideau and Gatineau rivers, the region lays at the heart of a vast pre-contact communications and trade network spanning northeastern North America. Beginning about 6,000 years ago, goods, raw materials and ideas flowed into the region over long distances for 5 millennia, with indigenous communities from geographically widespread areas continuing to frequent the region well after the arrival of European settlers.

Although a considerable amount of information has been recovered from archaeological sites, our knowledge of the long history of occupation of the Ottawa Valley by Indigenous Peoples prior to the arrival of Europeans remains incomplete. Permanent settlement of the Capital region by Euro-Canadians began with the arrival in 1800 of Philemon Wright and his pioneers, who founded Wright's Ville on the Quebec side of the Chaudière Falls.

A major transportation route for the fur trade, missionaries and explorers during the 17th and 18th centuries, the Ottawa River also served as a principal artery for the 19th century lumber industry, fostering the construction of numerous sawmills, pulp-and-paper mills and later hydro-electric and other industrial developments with numerous docks and wharves extending into the river to support the enterprises that lined its shores in the Capital region.

The NCC's pre-contact archaeological potential map indicates that this site is situated in an area ranging from medium to high potential for pre-contact archaeological resources. In Gatineau, the registered pre-contact site closest to the study area is the BiFw-23 site, located near the Maison Charron, in Jacques-Cartier Park South, about 250 metres north of the bridge (refer to **Figure 16**). BiFw-23 is part of a complex of 18 pre-contact sites extending north to the mouth of the Gatineau River.

The City of Ottawa archaeological potential map suggests that remnants of historical shoreline structures as well as other archaeological remains may be present on the riverbed in the vicinity of the Alexandra bridge and Entrance Bay, leading to the Rideau Canal locks. The NCC supports this suggestion and considers the riverbed in the Gatineau portion of the study area to have similar archaeological potential. The submerged concrete piers of the bridge are also considered to be of archaeological interest. To lay the piers directly on bedrock, special techniques were required to remove the refuse from the mills deposited on the riverbed. These deposits consisted mainly of sawdust, mixed with wood slabs and logs, and measured from 8 to 20 feet in thickness. An underwater archaeological survey of the inshore riverbed adjacent to the bridge's approaches and around its submerged concrete piers should be carried out prior to the initiation of the Project construction work.

The archaeological potential information will be validated as part of the Indigenous Community engagement process.

In some cases, archaeological salvage excavations to recover artifacts may be necessary. Areas along the shoreline within Jacques-Cartier Park, shown in the **Figure 16** are within the flood zone of the river and are owned by the Province of Québec. The bed of the river is owned by both the Provinces of Québec and Ontario. Should artifacts be threatened by construction activities on these lands, regulatory application for permits from the Ontario Ministry of Heritage, Sports, Tourism and Culture Industries (MHSTCI) under the Cultural Heritage Law, Archaeological Research Regulations or the Ministère de la Culture et des Communications du Québec (MCCQ) under the *Loi sur le patrimoine culturel* will be required. For archaeological resources within the river, the IPT will work with Parks Canada and both provinces to collaborate on recovery initiatives.

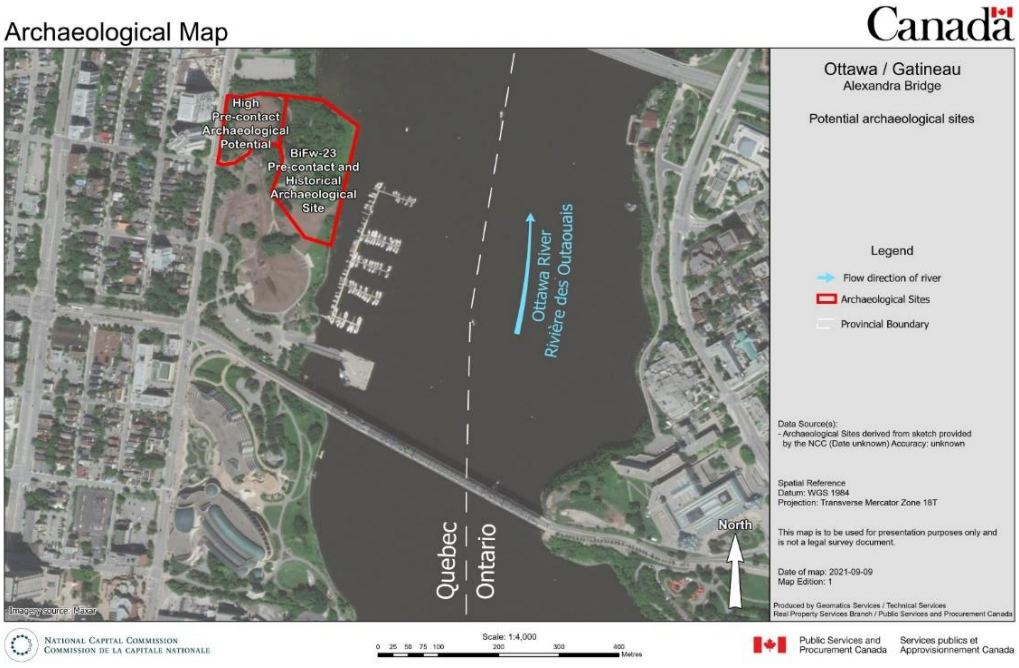


Figure 16: High potential for pre-contact archeological map

In the unlikely event that bridge replacement work extends onto Nepean Point, the NCC's recommendations for the *Nepean Point Revitalization Projec*t will, if necessary, be implemented. The remaining recommendations comprise documenting the lookout and associated structures on the escarpment. This activity will be carried out by a professional archaeologist.

The location of the former artificial pond retains medium potential for pre-contact and historical archaeological resources. It is recommended that any excavation work in this area related to the Project be monitored by a professional archaeologist.

Lieutenant-Colonel John By's Estate is considered to have national, regional and local heritage value. To protect this site from the potential impacts of the Project, no excavation work or other activities related to the Project that may cause soil disturbance will be permitted within the limits of the site.

The shoreline of Entrance Bay bordering Major's Hill Park retains medium potential for historical archaeological resources, in spite of extensive landscaping in this area over the years. It is thus recommended that any excavation work or other activities, such as the installation of moorings, in this area related to the Project be monitored by a professional archaeologist.

The northernmost portion of Major's Hill Park has a low potential for pre-contact and historical archaeological resources. No further archaeological investigation or monitoring of Project work in this area is recommended.

The inshore portions of the Ottawa Riverbed on the Quebec and Ontario sides of the Alexandra Bridge are evaluated as having historical archaeological potential.

An underwater archaeological survey of the riverbed within 30 to 50 metres of the shoreline on Entrance Bay, Nepean point and the northern end of the Canadian Museum of History grounds is therefore recommended. The submerged concrete piers of the bridge are also considered to be of historical interest and will be included in this survey.

As the Project becomes better defined, the IPT will continue to work with Indigenous communities to determine potential impacts on archeological resources and develop suitable recovery strategies.

Once commissioned, operation of the bridge is not anticipated to have ongoing impacts to archaeological resources. The shoreline component may undergo active erosion particularly after significant flooding events. Annual monitoring by the NCC's Assessment and Rescue of Archaeological Legacy (ARAL) Project may be required. Any reinstatement and shoreline erosion measures proposed should be coordinated closely with ARAL rescue activities.

To protect the BiFw-23 site and zone of high pre-contact archaeological potential in Jacques-Cartier Park South from the impacts of the Project, no construction work and other activities, such staging areas and fence installation, related to the Project that may cause soil disturbance will be permitted within the area outlined in the **Figure 16**. Access to the shoreline of this area for the purposes of the Project will also be prohibited.

The immediate surroundings of the Alexandra Bridge share the rich and unique history of the Capital Region's core sector. The preparation of an overview detailing the prehistory, historical developments and the past archaeological investigations undertaken within those surroundings is another recommendation to be taken into consideration. A document of this nature would be a fitting contribution to the legacy of the Alexandra Bridge.

Future bridge construction activities must protect the rich archaeological resources of the river and shoreline, with archaeological sites to be managed in collaboration with the Algonquin Nation and in accordance with the Protocol for the Co-management of Archaeological Resources, 2017 and Parks Canada's Cultural Resource Management Policy.

An underwater archaeological survey of the riverbed within 30 to 50 metres of the two shorelines, along with a survey of the submerged concrete piers of the bridge, is recommended.

A detailed archaeological study will be undertaken to identify all known archaeological resources and areas of pre-contact and historical archaeological potential to be avoided by Project work as well as to determine remediation measures (e.g., rescue excavation and monitoring) for zones of archaeological sensitivity that cannot be avoided.

Navigation and Waterway Activities

In addition to its historical importance, the Ottawa River portion from Lake Temiskaming to East Hawkesbury was designated as a Canadian Heritage River in 2016 for its cultural heritage values. Boaters can reach Kingston via the Rideau Canal and Rideau River waterways which provide opportunities to enjoy unique heritage sites, discover the beauty of the cultural landscape and the charm of the locks while travelling through various small municipalities south of Ottawa. Boaters can also continue on down the Ottawa River to reach Montreal.

As a navigable waterway, a minimum clearance for a navigation channel is required with dimensions of 90 metres x 11 metres clearance from the river. Past study reviews of normal Ottawa River water levels, 100-year flood levels and predicted river level increases due to climate change have indicated that an elevation of 57.2 metres is required to ensure clearance over the river at the location of the navigation channel. The deepest channel is closest to the Ottawa shoreline under the suspended span of the bridge. The level for minimal clearance elsewhere is 46.2 metres.

Commercial and recreational users

The river shuttles and Aqua-Taxi act as an alternative mode of transportation between the shores of Ottawa and Gatineau. **Figure 17** illustrates the waterway and the route of the river shuttle between the Canadian Museum of History, Jacques-Cartier Park and the locks.

In addition, boat trips are offered on the Ottawa River to discover and appreciate the capital's landscape from a different perspective. Tours normally depart at the bottom of the locks as well as from Hull Marina in Jacques-Cartier Park.

There are also several launch ramps and marinas that provide access to the river for diverse recreation activities including fishing and other aquatic activities.

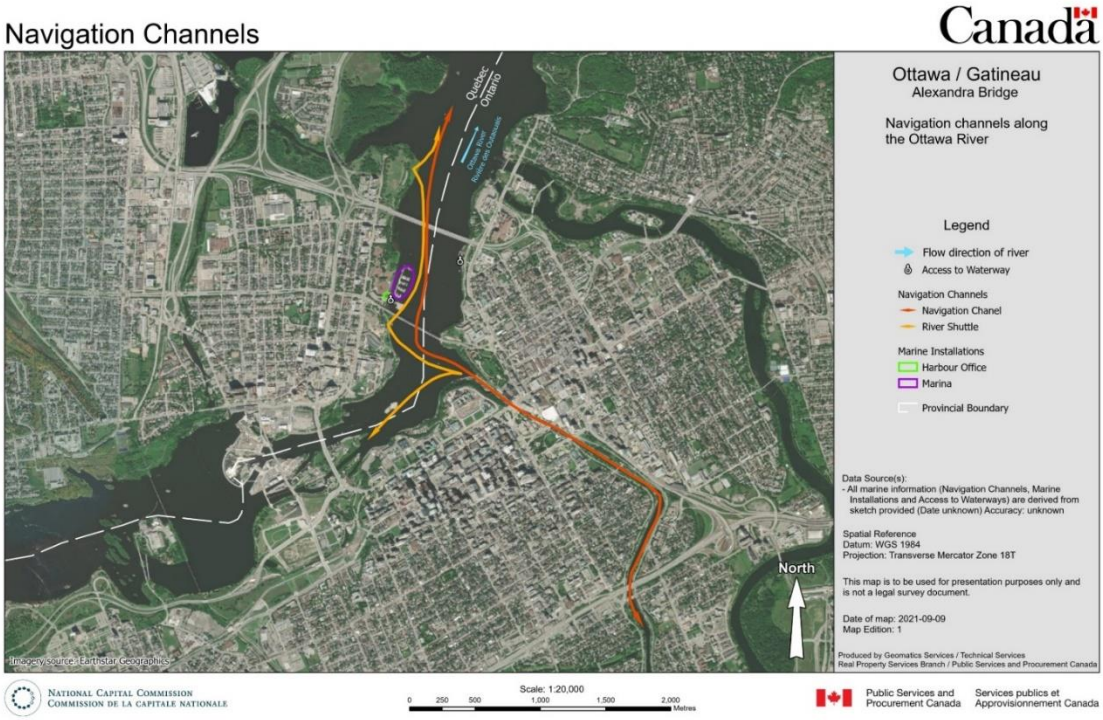


Figure 17: Navigation channels along the Ottawa River

Planning for the deconstruction and construction activities will take into consideration the need to maintain navigation opportunities. An adequate access route under the bridge will be provided for vessels that could be reasonably expected to navigate in the area.

Because of the complexity of the Project and the potential for a portion of the work to be completed from barges, heavy traffic along the river during the work to move materials and workers could occur. Short-term restrictions or closures have the possibility to temporarily disrupt commercial, tourism and recreational boating. Since the area around the bridge will be a construction zone, work in the water will require restrictions to public access for health and safety reasons which will limit recreational boating, fishing and other aquatic activities in the area.

A navigation management plan will be developed if required based on the construction approach and methods. Proposed temporary interruptions and closures will be well coordinated in advance with the various stakeholders involved including considerations such as:

- During the high season, navigation could be interrupted and accommodated with night closures on any day from 10 pm to 5 am
- During the off-season, temporary closures to navigation could be required and accommodated with weekend closures from Friday 10 pm to Monday 5 am

The wharf, boat launch and marina in Jacques-Cartier Park are within a space that could form part of the practical work area to support construction activities. Public access to these facilities may not be possible due to public safety concerns.

The NCC has agreements with tenants for those facilities which support local tourism businesses. These businesses may be impacted by construction activities. Engagement with affected stakeholders will be key to understanding potential impacts to existing commitments and businesses that are dependent on the Park's facilities to reconcile challenges and limitations and minimize potential impacts. Stakeholder engagement will also seek to determine alternative temporary or permanent relocation options for important infrastructure such as the wharf, boat launch, marina and parking areas to support continued operations during the construction period to inform the Project.

The Project may also impact the traditional travel routes of Indigenous communities and their use of waterways. Information will be sought from each of Indigenous communities to understand the potential impacts and seek acceptable mitigation strategies.

Following construction, impacts to navigation are anticipated to be similar to conditions that currently exist. The new design is expected to have taken into consideration navigation requirements to minimize the number of piers, and to locate them to maintain the minimum required clearance for a navigation channel. Current piers will also be deconstructed to a depth that will minimize the potential hazard to navigation outside the primary channel.

Documentation of the sizes and types of vessels stationed in the Ottawa area and/or likely to come in the area may be undertaken during the planning stages. In part, current ship traffic on the river will help to identify the fleet that uses the river and ensure that clearance requirements are considered during all stages of the Project.

If short-term interruptions to navigation are expected during any stage of the Project (deconstruction or construction), information will be provided regarding the length of time anticipated and how vessels will be informed or notified.

Mitigation measures will be implemented during the Project, in particular:

- When possible, keep a channel open for recreational boating, provide one or more marked channels to ensure safe passage and have the required notices to users of marinas and other anchoring facilities
- Communications with marinas in the vicinity of the work
- Issue notices to boaters regarding temporary and permanent obstructions
- Deconstruction of the piers of the present bridge will be completed to a depth required to ensure that the navigation channel is not obstructed and address potential hazards across the river
- Signage will be required during the Project to advise mariners of changes to navigation

A website and a telephone line will be available to provide information and record complaints from users. Any adjustments required as work progresses will be published.

Transport Canada's Navigation Protection Program will enforce conditions attached to authorizations under the *Canadian Navigable Waters Act*. Worksite visits could be carried out to ensure compliance with temporary mitigation measures and, if necessary, adjustments will be required to ensure the safety of recreational boating and commercial navigation.

During deconstruction of the existing bridge, bathymetric surveys could be required to ensure that the remains of the piers do not cause obstacles to navigation.

Guiding Principle 1, Mobility and Continuity of the Urban Fabric, of the Planning and Design Principles also provide direction for the conceptual design of the new bridge.

- The Bridge designs must accommodate vertical profiles that meet the minimum navigation channel requirements.

The NCC's Ottawa River North Shore Parklands Plan (NCC, 2018b) describes a site concept where the waterfront experience will be enhanced by nautical activities and the creation of spaces where users can come in contact with the Ottawa River and enjoy its natural features. This Plan describes a vision where the current business operating at the wharf and marina are engaged with the NCC in developing new facilities and services that support the creation of a port of call to receive recreational boaters from outside the region and offer recreational services and activities that are compatible with river boat-tour operations.

"To ensure that all interprovincial crossings remain safe and open for residents and visitors, Budget 2019 proposed to replace the Alexandra bridge as it is now more than 100 years old and needs to be replaced. The new bridge will provide long-lasting economic benefits to the communities on each side of the Ottawa River and more broadly to the region as a whole."

16 REGULATORY REQUIREMENTS

If and when applicable, all permits, licenses, approvals and monitoring requirements under environmental laws and planning and heritage will be reviewed, confirmed and obtained prior to the construction of the Project. An outline of key federal, provincial and municipal legislation and regulations that are anticipated to apply to the proposed Project are outlined below.

The Project is following federal Impact Assessment requirements (and related federal requirements) and applicable requirements for Ontario and Québec, as described in the tables below. Under the *National Capital Act*, the Project is also following the requirements under the Federal Land Use, Design and Transaction Approvals (FLUDTA) as a Level 3 Project.

Federal Level

The *Impact Assessment Act* (IAA) applies to Projects described in the Physical Activities Regulations, or as designated by the Minister. Section 48(a) of the Physical Activities Regulations includes the construction, operation, decommissioning and abandonment of a new international or interprovincial bridge or tunnel. Accordingly, this Initial Project Description is being submitted to fulfill the requirements for a designated Project to enable the Impact Assessment Agency of Canada (IAAC) to determine if the designated Project requires an impact assessment under the IAA.

In addition to the determination under the IAA process, an Approval pursuant to the *National Capital Act* (s.12) following the Federal Land Use, Design and Transaction Approval (FLUDTA) process is required for the Project to proceed.

The Proponent's Guide to the Federal Land Use, Design and Transaction Approval Process (FLUDTA) (NCC, 2021d), provides information on the role of the NCC. The approval responsibilities of the NCC are fundamental to its mandate as the federal planning and coordinating agency within the National Capital Region.

The FLUDTA approval process has the following objectives:

- to coordinate land use, development and other works on federal lands in order to reinforce and positively contribute to the unique character, identity and quality of the Capital "in accordance with its national significance"
- to ensure that federal properties and buildings are effectively planned and developed to standards and criteria appropriate to their location and context in the Capital
- to implement federal legislation and NCC approved plans, and other environmental and heritage policies.

Level 3 Projects are subject to a comprehensive land use planning and design review, with input from the NCC's ACPDR and ACUA, as part of the federal approval process. In summary, due to its complexity, this Project will require approvals at various stages of design development. As a minimum, federal approval will be required at the concept design stage (approximately 15% design development), reference design stage (approximately 33% design development), preliminary design stage (approximately 66% design development), detailed design stage (approximately 99% design development), and final construction/deconstruction stage (construction plans). In the federal approvals framework, the "construction" period refers to the undertaking of works as approved in the federal

approval letter. The term construction, and associated conditions, would also apply to the deconstruction and any other approved "works" per the *National Capital Act* (s.12).

The *Planning and Design Principles*, provide a cohesive vision, and the guidelines for the replacement of the bridge including its integration with the surrounding transportation network and public spaces. The six principles described in this document are based on the project mission statement "To create a sustainable interprovincial transportation connection that will prioritize active mobility and highlight the symbolic importance of the site to all Canadians for many generations to come." The Planning and Design Principles will guide the design development of the replacement bridge and are based on Federal plans, policies and studies prepared for the areas in and around Alexandra Bridge and Confederation Boulevard, as well as other NCC design guidelines for monuments and sites within the Capital Region.

The *Performance Criteria for Bridge Design*, provide transparency and predictability of NCC's expectations for a successful Federal Approval. The performance criteria summarize the NCC's Capital Interests that apply to the Project, consistent with their mandate, plans, policies, guidelines and the Alexandra Bridge Planning and Design Principles approved by the NCC Board of Directors in June 2021. It is expected that the Proponent will undertake public, stakeholder and Indigenous engagement and demonstrate that input from these parties and project partners was considered in the design of the new bridge.

After the federal approval letter has been issued, the monitoring period begins. During this period NCC staff will follow up on the implementation of the approval conditions. This process may include project audit and site visits. NCC staff will communicate with the proponent prior to any site visit and the implementation of any corrective measures that may apply. The NCC review and approval process is complete at substantial completion of project. A signed notification will be submitted to the NCC indicating that the project has reached substantial completion and that all the conditions of the federal approval have been met.

The NCC federal approval includes standard conditions, as well as project-specific conditions. The standard conditions related to the environment and monitoring of conditions require that the Proponent satisfy the requirements of all other regulatory authorities and comply with all applicable laws and regulations related to the design and construction of their proposal. Further, the conditions make the Proponent responsible for demonstrating compliance with the approval conditions, including providing requested documentation in a timely manner to the satisfaction of the NCC's regulatory team.

In the case of non-compliance, the NCC federal approval manager will notify the Proponent of areas of non-compliance and work with them to resolve the issues and bring the project and its execution into compliance. If the project is not brought into compliance, the following avenues may be pursued:

- Corrective construction measure identified and recommended to proponent
- Amendment to the federal approval, if the deviation from the original approval is deemed overall beneficial
- Revocation of the federal approval, and block on considering any further applications for federal approval for the subject site, until the project is brought into compliance.

Authorizations will also be required under the *Fisheries Act* and *Canadian Navigable Waters Act. In addition, permits may be required under the Species at Risk Act* and the *Migratory Birds Convention Act*.

In addition to the above, it is important to note that:

- As the Project design progresses, the IPT will seek advice from internal and external experts, including federal authorities such as ECCC and DFO to confirm proposed mitigation measures related to species at risk and their habitat, fish and fish habitat or water quality matters, as required. Provincial authorities such as MNRF, MECP, MEFCCWP will also be consulted to address potential impacts within their jurisdiction.
- Through the Federal Heritage Buildings Review Office (FHBRO), Parks Canada provides:
    - criteria and a process for evaluating and designating heritage character
    - provides advice and recommendations to other departments
    - maintains a register of federal heritage buildings

Federal built heritage comprises the places, buildings and monuments that have been recognized as having heritage value. Parks Canada establishes national goals to protect federal heritage buildings and national historic sites.

- Parks Canada Agency is the federal government expert on the archaeological work that takes place on federal lands and federal lands underwater. As such, Parks may have a role in providing policy advice and joint preparation with the NCC of the Statement of Work for the archaeological consultant. An Archaeological Overview is the first step in identifying potential archaeological resources in the study area and will determine whether an Archaeological Inventory will be required
- The Project will also account for and comply with the policies, regulations and obligations of federal departments that may exist under other applicable federal legislation, such as the *Accessible Canada Act* (2019)
- Commemoration or interpretive features (e.g., panels, virtual site experiences, etc.) require review and sign off from Canadian Heritage

Provincial Level

Since this Project straddles both Quebec and Ontario, both provincial permitting and approvals regimes are applicable, as discussed below.

The Project team will consult and work with all provincial regulators prior to submission of the Initial Project Description. The contact information will be provided once established, along with information such as timelines, required approvals, required consultation, and issues/effects that the regulatory oversight would manage.

Québec

Based on preliminary design considerations, it is not anticipated that the Project will require a provincial Environmental Assessment (EA). However, divesting of provincial land may be required, which may trigger the need for an EA. This will be confirmed upon outreach, and if needed, requirements will be harmonized. For road infrastructure, Part II of the Environmental Quality Act (EQA) states that:

> (3) the construction of a road designed for 4 lanes or more or whose planned right of way has a width equal to or greater than 35 m over a minimum length of 1 km situated within an urbanization perimeter indicated in the land use planning and development plan applicable to the territory concerned or to an Indian reserve.

The Project is designed for 2 lanes of vehicular traffic, right of way will be less than 35 m, and the length of the bridge will be less than 1 km; therefore, the EQA does not apply.

In addition, for work in wetlands and bodies of water, Part II of the EQA states that:

> (1) dredging, clearing, filling, or levelling off work, for any purpose whatsoever, within the 2-year flood line of a river or lake, over a cumulative distance equal to or greater than 500 m or over a cumulative area equal to or greater than 5,000 m^2, for a same river or lake.

the initial concept for the Project covers an area of approximately 1, 665m and the approximate length of shoreline affected for the abutment of the bridge on the Quebec shoreline is 20m. Therefore, none of the thresholds above trigger the EQA, it is not anticipated that a provincial EA will be required.

Ontario

Based on preliminary design considerations, it is not anticipated that the Project will require a provincial EA under the Ontario *Environmental Assessment Act* (EA Act). Since the proponent of this Project is PSPC and the NCC, the bridge replacement would not be considered an undertaking to which the EA Act would apply. The Project team has reached out to the Ontario Environmental Assessment Program to notify them of the Project and confirm the team's understanding of applicable provincial requirements.

It should be noted that the Ontario government has recently amended the EA Act (July 2020), and with the recent changes, a "Project List" will be developed through future regulations that would identify Projects subject to the EA Act. At this time, a draft "Proposed Comprehensive Environmental Assessment Project List" has been released for public comment on the Environmental Registry of Ontario (ERO# 019- 2377). While not yet in force, this Project is not a listed Project on the draft Project List and therefore is not anticipated to trigger the need for a comprehensive EA (although any updates should be monitored and application of the Project to the EA Act confirmed with the MECP). It should be noted that the EA Act contains measures to harmonize and align with the *Impact Assessment Act* in an effort to reduce duplication (i.e., with federal approvals) and allow for substitution where both Ontario and federal IA requirements apply (i.e., one harmonized process that requires two decisions). If this Act applies to the Project, efforts to coordinate with the federal process would be encouraged.

The contractor will be required to abide by all applicable municipal, provincial and federal regulations, including, but not limited to:

- Soils and excavated material disposal to licensed facilities
- All applicable health and safety regulations
- Obtain materials from authorized facilities, such as aggregates from sources duly authorized under the applicable regulations (*Aggregate Resources Act*)
- Respect all applicable municipal by-Laws

Municipal

Given the Project's footprint, ongoing discussions are occurring with the City of Ottawa and the City of Gatineau.

All applicable Acts, By-laws, Zoning By-laws, licenses, permits and regulations will be adhered to, where applicable.

The IPT will continue to consult and engage with both Cities, Ottawa and Gatineau, including their respective Committees (e.g., Built Heritage Sub-Committee, Planning Committee and other committees as required) throughout the life of the Project. It is recognized that heritage planning is of importance to all levels of government and as such, is a fundamental part of the Project.

17 POTENTIAL IMPACTS ON INDIGENOUS COMMUNITIES

The following potential impacts to Indigenous communities and potential mitigation measures were identified based on:

- Engagement with Indigenous communities and work taking place for other projects in the area
- Responses to the comments raised by Indigenous communities to the Initial Project Description submitted to the IAAC.
- Review of literature and other project reports
- Knowledge of relevant federal legislation

The IPT has experience engaging with Indigenous communities for such projects as the LeBreton Flats redevelopment, Kìwekì Point (formerly named Nepean Point), Pangishimo Park, Victoria Island, Chaudière Falls, the Energy Services Acquisition Program, increasing public access to the Ottawa River shoreline, and the Timiskaming Dam-Bridge of Quebec Replacement Project. Engaging the communities in these initiatives yielded valuable understanding and a solid foundation upon which to build.

Initial Assessment of Impacts on Indigenous Communities – Changes in the Environment

The IPT recognizes that the potential impacts, mitigations, and enhancements measures identified to date are preliminary. Continued engagement with Indigenous communities, studies undertaken to inform the design of the bridge, and studies led by interested Indigenous communities and organizations, will identify specific issues that will require exploration of appropriate mitigation strategies and follow-up measures. Based on initial engagement, the IPT noted some potential impacts and mitigations strategies for further discussion with Indigenous communities and organizations.

Biophysical Impacts

- Physiography, Geology, and Hydrogeology
- Drainage and Surface Water
- Vegetation
- Wildlife and Wildlife Habitat: Migratory Birds and Species at Risk
- Fish and Fish Habitat

Flooding, erosion and sediment transport impacts to water quality, wildlife and wildlife habitat or fish and fish habitat and mitigation strategies will be managed through several EPPs such as Accidents and Malfunctions Response Plan, Spill Response Plan, and Erosion and Sediment Control Plan.

Hydrological assessments are anticipated to be required for the design of the piers for the new bridge to understand the risks for the structure as well as impacts on navigation and sediment transport from potential changes in the water flow and velocity. These assessments will provide guidance in the selection and configuration of coffer dams, if needed in the construction stages, as well as approaches to reduce impacts and provide direction on mitigation needed to isolate the construction areas.

Field surveys will be conducted prior to the initial stages of design to identify the vegetation, wildlife habitat, and fish habitat (including SAR/SOMC) as well as ecological communities within the PDA and any adjacent impacted lands. Survey methodologies will be developed using recognized survey protocols and in consultation with relevant federal and provincial authorities (ECCC, DFO, MECP, MNRF, C, etc.). The IPT will seek advice from internal and external experts, including federal and provincial authorities

(ECCC, DFO, MNRF, MEFCCWP, etc.), and will engage with Indigenous communities to contribute Indigenous Knowledge that will help to shape proposed mitigation, enhancement measures and compensation measures if required.

Initial Assessment of Impacts on Indigenous Communities - Social, Health and Economic Conditions

Sites of Historical and Archaeological Significance

The NCC's pre-contact archaeological potential map indicates that the lands immediately around the Alexandra Bridge in both Gatineau and Ottawa have a low potential for pre-contact archaeological resources. There is a pre-contact archaeological site in Jacques-Cartier Park South (BiFw-23) and a pre-contact ossuary on the southern limit of the Canadian Museum of History. It is also known that the shoreline of the Ottawa River between the museum and the mouth of the Gatineau River was densely occupied seasonally from at least 5,000 years ago until up to about 500 years ago.

A protocol between the NCC, Kitigan Zibi Anishinabeg First Nation and the Algonquins of Pikwakanagan First Nation was signed on August 22, 2012, and updated on March 13, 2017, that provides a framework for the engagement of the Kitigan Zibi Anishinabeg First Nation and the Algonquins of Pikwakanagan First Nation in all stages of archaeological investigations undertaken on NCC land. It ensures that Kitigan Zibi Anishinabeg First Nation and the Algonquins of Pikwakanagan First Nation are fully informed of such investigations and fully involved in the decision-making process regarding the co-management of archaeological resources discovered through investigations or construction and development work.

The Kitigan Zibi Anishinabeg First Nation agrees in the protocol to inform members of the Algonquin Anishinabeg Nation Tribal Council and other Algonquin Anishinabeg communities in Quebec about activities and issues.

Kitigan Zibi Anishinabeg Council stated in a letter of August 6, 2020 (see record #69 of Appendix D of the IPD) that it is interested in any/all potential archaeological digs that may take place as a result of working being carried out.

Concerns for potential impacts to culturally sacred sites located in the vicinity of the Project were expressed. The concern for access to several areas will be discussed with Indigenous communities during planning for construction related activities. Detours resulting from the closure of the bridge will consider the need to retain opportunities to access sites identified by Indigenous communities.

The IPT acknowledges that other Indigenous communities may have an interest in the archaeological field work. The IPT will work with interested Indigenous communities to provide opportunities for meaningful engagement.

Health Impacts

The comments to date in engagement with Indigenous communities and organizations about health impacts of the Project have been at a high level.

In the design stages of the project, when more detailed information is known about the project components, a Human Health Risk Assessment (HHRA) will be completed following Health Canada Guidance documents, if required, to mitigate potential impacts.

Economic Impacts

The Indigenous communities and organizations engaged to date have indicated a strong interest in potential economic benefits from the planning, construction and operation of the Project, as shown in the summary of records below.

The tools available to the IPT to be able to provide economic benefits to Indigenous people and businesses include:

- Promoting and ensuring their participation in increased numbers in contracting, as per the Minister's mandate to ensure that at least 5% of federal contracts are awarded to businesses managed and led by Indigenous Peoples
- Funding for community-based economic development strategies to assist people and businesses to increase their skills and capacities
- The human resource capabilities of PSPC and the NCC to hire and train Indigenous people for skilled careers
- Creating comprehensive Indigenous Benefits Plans (IPP).

Indigenous Participation Plans

The Request for Proposals for the removal of the existing bridge, the design and construction of the replacement bridge and for long-term operations will include a requirement for bidders to submit Indigenous Participation Plans (IPP) stating how they intend to generate socio-economic benefits for the people and/or business community of targeted Indigenous communities and organizations. The IPPs will address employment, training, skills development, apprenticeship programs, sub-contracting, and equitability. PSPC, as the contracting authority, will determine a target as a percentage of the total value of the contract for participation of Indigenous workers and businesses.

The IPP shall include a Human Resources Plan detailing how the Contractor or its subcontractor(s) intends to maximize the use of Indigenous employment. The Human Resources Plan shall address how employment of Indigenous people will be managed and must provide details on the work to be carried out for each position proposed to be filled by an Indigenous person; strategies for recruitment of Indigenous persons; strategies for retention of Indigenous persons; succession planning; and staff management.

The IPP must describe how the contractor intends to address the utilization and/or sub-contracting of Indigenous businesses and must describe how the contractor currently or intends to engage the local Indigenous business communities.

The IPP can include a provision for bidders to identify other benefits of value to Indigenous communities, with flexibility for the bidders to put forward innovative ideas.

Community-Based Economic Development Plans

Indigenous communities have stated during engagement meetings that IPPs and other targeting approaches will not result in increased economic participation for their members without work being done to:

- Identify the current skills and capacities of community members and businesses
- Compare the current capacity with the opportunities resulting from future bridge work
- Prioritizing the development of skills and capacities for members in areas of potential
- Increase access to training, development and apprenticeships
- Foster relations with private sector industry representatives to promote more understanding between the non-Indigenous business world and Indigenous Peoples
- Promote joint ventures between non-Indigenous and Indigenous businesses
- Identify and eliminate barriers that prevent Indigenous businesses from winning Government of Canada contracts
- Identify and eliminate barriers that prevent Indigenous people from accessing training, obtaining certifications, getting hired, and being successful and respected in their places of work

The IPT will provide funding for Indigenous communities and organizations to create community economic development strategies that address the issues above and other concerns. The funding can include salaries for staff positions within the Indigenous government to manage the strategic work.

The IPT will also support Indigenous communities and organizations as they seek funding, collaboration and other forms of support from other Government of Canada departments and agencies, other levels of government, training and educational institutes, unions, and contractors to increase the economic participation of their members.

Human Resource Capacities of PSPC and the NCC
PSPC and the NCC will hire and provide training for Indigenous people in all aspects of their work associated with planning and administration of crossings.

18 ESTIMATED GREENHOUSE GAS EMISSIONS

The planning stage estimate of greenhouse gas (GHG) emissions follows the guidance provided in "Strategic Assessment of Climate Change" (ECCC 2020) (referred to as the Guidance). The GHGs included in this assessment are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), grouped and reported as total carbon dioxide equivalents (CO_2e) (using the Global Warming Potential (GWP) of 1, 25, 298 for CO_2, CH_4, and N_2O, respectively). Other GHGs, i.e., hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), and nitrogen trifluoride (NF_3), are not included because the applicable emission sources (related to fossil fuel combustion) do not release those gases.

The geographical boundary for this GHG emission estimate is described in **Section 14**. The temporal boundary is related to the increase in GHG emissions due to the Project from existing GHG emissions regionally and globally.

The net GHG emissions were estimated using the following equation as per the Guidance:

Net GHG emissions = Direct GHG emissions + Acquired energy GHG emissions - CO_2 captured and stored - Avoided domestic GHG emissions - Offset credits

Note: Under direction from the Treasury Board of Canada, the offset credits in the calculation above are strategically purchased at the portfolio level, rather than for each individual Project.

The direct GHG emissions are those associated with direct fuel combustion which occurs in construction and operation stages of the Project.

The acquired energy GHG emissions are emissions associated with electricity or steam consumption during the Project. Project specific information is not available at this stage. Further, it is unlikely for the Project to have steam consumption or external electricity consumption. The electricity usage onsite would be obtained through portable generators where fuel consumption would be accounted for under direct GHG emissions. Thus, the acquired energy GHG emissions are assumed to be negligible and not considered further in this planning stage estimate.

There is no Project specific information available on CO_2 captured and stored, avoided domestic GHG emissions, and offset credits at this stage of the Project. Therefore, those terms were assumed to be zero for this planning stage estimate.

As per the above assumptions, net GHG emissions is therefore equal to the direct GHG emissions.

A high-level estimate of the upstream GHG emissions associated with production of materials used in typical major bridge construction as well as the production of fuels used in construction and operation is also provided. A GHG emissions estimation for the construction and operation stages will be revised, as Project design progresses, and updated results will be presented as Project design progresses. Estimation was organized according to "scope streams", as per the GHG Protocol developed by the World Resources Institute. As such, Scope 1 emissions include direct emissions from the activities, including fuel combustion on site. Scope 2 emissions include indirect emissions from grid electricity purchased and used for the Project. Scope 3 emissions include other indirect emissions occurring from sources that the IPT does not own or control, such as construction material production and fuel production.

The Greening Government Strategy (GGS) requires that the embodied carbon in the structural materials used in major construction projects be disclosed by 2022. The requirement corresponds to Scope 3 emissions associated with the extraction of raw materials, transportation of raw materials and manufacturing of structural materials. Furthermore, the GGS requires that the embodied carbon from structural materials in major construction projects be reduced by 30%, starting in 2025. Finally, the GGS requires that whole building life-cycle assessments be done for major infrastructure projects by 2025. These GGS requirements will be taken into account in the Alexandra Bridge project as it progresses.

Deconstruction and Construction Stages

During the construction stage of the Project, there will be a release of GHGs to the atmosphere associated with fuel combustion in heavy/construction equipment, off-road mobile equipment, and on-road vehicles used. The estimate of GHGs include the following activities:

- Deconstruction of the old bridge and construction of the new bridge; the GHG emissions are from the use of heavy/construction equipment, generators, and off-road equipment
- Transportation of old bridge debris for disposal; the GHG emissions are from on-road truck and trailers used to transport the debris to disposal locations
- Transportation of construction materials for the new bridge; the GHG emissions are from on-road trucks/trailers used to transport construction materials from manufacturers to the construction site
- Worker transportation: the GHG emissions associated with on-road vehicles used for workers' commute to and from Project location during bridge deconstruction /construction activities

The following activities are currently not included in this GHG estimate because information was not available during this assessment.

- Emissions associated with traffic delays/disruption and road detour due to construction/ deconstruction activities
- GHG emissions related to transportation of heavy/construction equipment to site for bridge deconstruction and construction
- Specific details pertaining to on and off-road vehicles, as these estimates were made based on previous studies

These activities will be incorporated in the GHG assessment once Project specific information is available.

A high-level estimate of GHG emissions for this Project's bridge deconstruction and construction was derived from the average emissions per bridge area m^2) from four (4) previous studies on bridge construction and operation. The average emission intensity (tCO_2e/m^2) was then applied to the existing Alexandra Bridge area. The four studies include:

1. Madawaska/Edmundston International Bridge Replacement Project (New Brunswick Department of Transportation and Infrastructure, 2018)
2. Baudette/Rainy River International Bridge Replacement Project (Stantec, 2017)
3. Tappan Zee Hudson River Crossing Project (U.S. Federal Highway Administration, 2012)
4. 5th Street Bridge Replacement Project (Dokken Engineering, 2011)

There is a high level of uncertainty for this GHG estimate because Project/site specific information was not available at the time of the estimate. Fuel usage for activities such as land clearing, site preparation, and landscaping are site specific in nature and generally independent of a size of bridge being constructed; therefore, emissions intensity in the other Projects varied widely. The Project specific GHG assessment will consider the detailed design when site specific data are available (e.g., if the replacement of the bridge involved new areas that may require vegetation clearing and/or land use change, it will be factored in GHG emissions assessment. However, tree removal will be reduced. Any tree to be removed will be compensated by replanting at a minimum ratio of 2:1.

Scope 1 – Direct Fossil Fuel Emissions

Transportation of Debris for Disposal

The GHG emissions for transport of debris are associated with fuel consumption in trucks/trailers used for transporting debris from deconstruction of the old bridge to disposal/recycling locations. The emissions were estimated using published emission factors for on-road mobile vehicles (ECCC, 2020) and estimated distance travelled.

The estimated GHG emissions from transportation of debris for disposal were 46.5 tCO_2e. Estimated debris was 6,916 tonnes of steel and 1,596 tonnes of cement concrete; therefore, there are 426 roundtrips for debris disposal, with 100 km per roundtrip. Total distance driven is 42,600 km.

Transportation of Construction Materials

The GHG emissions associated with fuel consumption in trucks/trailers used for transporting construction materials from manufacturing locations to the construction site were estimated to be 139.5 tCO_2e. Total distance driven is 127,800 km, estimated from 426 round-trips for material transport, with 300 km per round-trip.

Worker Transportation

The GHG emissions are related to fuel consumption in on-road vehicles for worker transportation to/from site. The emissions were estimated to be 2,825 tCO_2e, based on published emission factors for on-road mobile vehicles (ECCC, 2020) and estimated distance travelled.

Scope 2 - Indirect Fossil Fuel Emissions from Grid Electricity Usage

Electricity Usage During Deconstruction /Construction

It is assumed that there would be no grid electricity usage during deconstruction and construction of the Alexandra Bridge because electricity would be obtained through portable generators, and the fuel consumption would be accounted for under direct GHG emissions.

Operation Stage

The new bridge would have a functional equivalent to the old bridge, and it is assumed no substantial change to traffic volumes on the new bridge (i.e., there would be net zero increase from transport emissions related to vehicles crossing the bridge).

Scope 1 - Direct Fossil Fuel Emissions

Bridge Inspection, Maintenance, and Repair

For bridge inspection, maintenance and repair (I&M), the GHG emissions are estimated to be 63 tCO_2e/year.

The IPT expects that there is no major maintenance and repair work for the first 5 years of operation. In addition, the GHG emissions over the following 70 years are much smaller, compared to emissions from bridge construction. There would be zero increase of emission from the existing bridge based on the year of bridge operation and maintenance intervals/cycles. The emissions from the new bridge's operation will be re-assessed once Project specific information is available.

Scope 2 - Indirect Fossil Fuel Emissions from Grid Electricity Usage

Grid Electricity Usage for Lighting during Bridge Operation

There will be electricity usage for bridge and sign lighting during the bridge operation. However, since it is assumed no substantial change to the length of the bridge, it is expected that no considerable increase for electricity usage compared to existing conditions. There could be a reduction in electricity usage if the new bridge design uses energy efficient lighting system or renewable energy (e.g., solar cells). This will be re-assessed once Project specific information is available.

Future Decommissioning of the New Bridge

To estimate the GHG emissions for Decommissioning phase of the new bridge, the emissions were based on decommissioning of the existing bridge, which includes bridge deconstruction (based on literature review of similar projects), transportation of debris, and worker transportation activities. These emissions are associated with the combustion of diesel in heavy equipment and gasoline for worker transportation. The inputs to the emission calculation of the deconstruction associated with the proposed bridge were assumed to be identical emissions associated with the deconstruction of the existing bridge. The same methodologies and emission factors were used. **Table 13** provides estimated emissions for decommissioning of the new bridge.

Table 13: Estimated emissions for decommissioning of new bridge

Phase	Sources/Activities	Total Emissions Increase (tCO_2e)	Annual Emissions (tCO_2e/year) *
Decommissioning Phase	deconstruction of new bridge - Heavy equipment	13,938	13,938
Decommissioning Phase	Transportation of debris for disposal (new bridge)	46.5	46.5
Decommissioning Phase	Worker transportation – deconstruction only (new bridge)	404	404
Total		**14,389**	**14,389**

* Assumed that all activities for decommissioning occur in one year.

Total Direct GHG Emissions

Scope 1 – Direct Fossil Fuel Emissions

Direct emission increase due to the Project (from construction, operation, and decommissioning) are summarized in the **Table 14.** Total estimated direct GHG emission increase is 53,363 tCO_2e, which is the net GHG emissions. The annual direct emissions are also provided.

Table 14: Estimated direct GHG emissions (Increase) and annual direct emissions due to the Project at planning stage

Stage	Sources/Activities	Total Emissions (Increase) (tCO_2e)	Annual Emissions (Increase) (tCO_2e/year) **
Construction	Deconstruction of the old bridge	13,938	4,646
Construction	Construction of the new bridge	22,025	7,342
Construction	Transportation of debris for disposal (old bridge)	46.5	16
Construction	Transportation of construction materials (new bridge)	139.5	47
Construction	Worker transportation (deconstruction and construction)	2,825	942
Operation	Traffic crossing the new bridge*	0	0
Operation	Annual maintenance*	0**	63
Decommission (new bridge)	Deconstruction of new bridge - Heavy equipment	13,938	13,938
Decommission (new bridge)	Transportation of debris for disposal (new bridge)	46.5	46.5
Decommission (new bridge)	Worker transportation – Deconstruction only (new bridge)	404	404
Total Direct Emissions		**53,363**	**27,444**

*Assumed 3 years for construction Stage and 75 years for operation stage.
** based on the assumption provided in Section 20 DPD.

The annual net GHG emissions (increase) for each phase can be present in each term of equation 1 (*Net GHG emissions = Direct GHG emissions + Acquired energy GHG emissions - CO2 captured and stored - Avoided domestic GHG emissions - Offset credits*), are presented in **Table 15**.

Table 15: Estimated annual net GHG emissions (increase) for each phase

Phase	Net GHG emissions	Direct GHG emissions	Acquired energy GHG emissions	CO_2 captured and stored	Avoided domestic GHG emissions	Offset credits
Deconstruction / Construction	12,993	12,993	0	0	0	0
Operation	63	63	0	0	0	0
Decommissioning	14,389	14,389	0	0	0	0
Total	**27,444**	**27,444**	**0**	**0**	**0**	**0**

Note: Emissions presented are on annual basis.

Scope 2 - Indirect Fossil Fuel Emissions from Grid Electricity Usage
Total estimated indirect GHG emission increase is zero. The annual indirect emissions will be estimated once data are available.

Scope 3 – Upstream and Other Emissions
Upstream emissions were indirect GHG emissions associated with the following activities as per the Guidance:

- Production of materials used in bridge construction. The emissions were estimated based on published emission intensity (tCO_2e per tonnes of material) from the World Bank (World Bank, 2011) and amount of materials used. The amount of materials was calculated using the existing Alexandra Bridge's dimension and typical materials for major steel bridge (with an average span of 125 m) was assumed (World Bank, 2011) as the actual new bridge design is not available.

Production of fuels used in construction and operation stages of the Project. The quantification method is based on estimated fuel volumes and published emission factors (AEP, 2019), as shown in the example calculations below. The estimated upstream emissions are presented in the **Table 16**.

Table 16: Estimated upstream GHG emissions for the Project at planning stage

Stage	Parameter	Emissions (tCO_2e)
Construction	Construction Material Production	30,023
Construction and Operation	Fuel Production	5,818
Decommission	Fuel Production	2,148
Total Upstream Emissions		**37,989**

Litres of fuels in the calculation of fuel production emissions include fuels associated with all activities, i.e., deconstruction, construction, debris disposal, construction material transport, worker transportation, and bridge maintenance. It was estimated using total direct emissions (tCO_2e) and diesel emission factor of 0.00276 tCO_2e/L (assuming diesel fuels). For example, total litres = 38,974 tCO_2e/ 0.00276 tCO_2e/L = 14,121,014 L.

Comparison with Existing GHG Emissions

The GHG emissions due to the Project is assessed by comparing annual Project emissions with the existing annual total and transportation sector GHG emissions in Ontario, Quebec, Canada, and Global. The most recent data available for existing GHG emissions were used: 2018 data for Ontario, Quebec, and Canada (ECCC, 2020) and 2014 data for global (World Resources Institute, 2020).

The annual Project emissions from the construction stage and the operation stage were calculated by assuming a 3-year period of construction and 75-year period of operation, respectively. The GHG emissions from construction stage of this Project are 0.02% (or less) of GHG emissions from all sectors in Quebec, Ontario, Canada and global. The operation of the Project is not expected to result in a net increase in GHG emissions when compared to the GHG emissions from the existing bridge because the traffic volumes are not expected to change (i.e., the existing and new bridge would have the same or less quantity of emissions from traffic given advancements in regulatory emission controls and increased zero-emission vehicles expected over time).

The IPT currently does not have available information about the various alternatives in a level of detail needed to describe potential impacts of the alternatives on GHG emissions.

Once the location and design of each alternative are finalized, GHG emissions associated with land clearing emissions can be estimated based on the ECCC's "Overview of methodology to develop deforestation parameters for modelling projected GHG emissions". The following, but not limited to, estimated data inputs will be used:

- Ecoregion of the land being cleared
- Type of vegetation in the land clearing area (e.g., forests, cropland, grassland, wetlands, built-up land)
- Size/area of the land clearing
- Practice for land clearing, e.g., uproot and burn, decay, etc.
- Any estimates of % footprint reductions from business as usual

The activities that would result in an impact on carbon sinks as well as, land areas expected to be impacted by the Project are not known at this point. Specific factors from each alternative that could influence GHG emissions include bridge design and footprint (i.e., land clearing, length of the bridge), construction schedule (i.e., which alternative that takes longer to be built), level of complexity of construction (i.e., number of heavy/construction equipment required during construction and deconstruction, and for how long). However, the IPT currently does not have available information to estimate GHG emissions associated with each alternative. As the project progresses, the IPT will be able to estimate GHG emissions from each alternative under consideration.

The IPT currently does not have available information to estimate GHG emission reductions from each proposed mitigation measure. To quantify the reductions for each of these on an ongoing basis, more information is required such as fuel savings associated with each measure, biofuels usage in lieu of fossil fuels, traffic patterns and flow during construction and deconstruction.

Once the inputs to emission reductions quantification from each of the proposed measures above are provided, GHG emission reductions and the impact to the overall emissions can be estimated. For example, for every 10 litres of diesel consumption reduction, the GHG emissions would reduce by 27 kg-CO_2e. For every 10 litres of gasoline consumption reduction, the GHG emissions would reduce by 25 kgCO_2e. Every litre of biodiesel (B100) used instead of lean diesel would reduce GHG emissions approximately 7% and every litre of ethanol (E100) used would reduce approximately 30% of GHG emissions. For lighting systems, the ENERGY STAR-qualified LEDs would reduce energy approximately 75%–80% (US Dept of Energy) compared to the traditional incandescent bulbs they replaced.

If required, the IPT will consider offsetting GHG emissions generated by machinery during the work to make this site "carbon neutral". During the construction stage, annual emissions will be calculated based on the number of kilometres travelled by the machinery and transportation of materials and excavations. Compensation may take the form of buying carbon credits or of carrying out independent projects.

Mitigation Measures

The following mitigation measures will be applied to reduce GHG emissions.

- Limit changes to existing land and river infrastructure to a minimum to reduce fuel usage related to land clearing and earthwork
- Implement traffic planning to avoid traffic delays/vehicle idling and substantial detour during bridge deconstruction and construction activities
- Provide mass transportation for workers from/to site (e.g., shuttles)
- Properly maintain heavy equipment and vehicles to reduce fuel consumption
- Consider using local materials, bridge materials with the least environmental and carbon impact based on a life cycle assessment, or the specific manufacturing technology that involved recycled steel
- Incentivize active transportation via bridge design and ensure readiness for future public transit links
- Divert construction waste from landfills (aim for 90% diversion rate)
- Consider using biofuels in heavy/construction equipment where feasible
- Consider using energy efficiency lighting systems or renewable energy (e.g., solar cells) for signs and bridge lighting
- During the construction stage, annual emissions will be calculated based on the number of kilometres travelled by the machinery and transportation of materials and excavations. Compensation may take the form of buying carbon credits or of carrying out independent Projects

The Project and Canada's Efforts to Reduce Greenhouse Gas Emissions

The Project will release GHG emissions during the construction and operation stages. These emissions will be accounted for in annual provincial and federal GHG totals. As presented above, annual emissions from the Project during operation are not anticipated to increase from existing conditions. With advancements in regulatory emission controls and increased zero-emission vehicles expected over time, annual emissions during operation are expected to decrease. Furthermore, with the implementation of mitigation measures during construction, the Project is not anticipated to hinder the Government of Canada's efforts to reduce GHG emissions.

19 GENERATED WASTE AND EMISSIONS

The following emissions, discharges and waste are anticipated during the various stages of the Project:

Solid waste generated during construction: It is anticipated that a substantial amount of non-hazardous solid waste will be generated throughout this Project, primarily during deconstruction of the existing bridge.

Waste materials generated during construction of the new bridge and deconstruction of the existing bridge will be appropriately sorted, transported and disposed of in accordance with applicable provincial and federal laws and regulations , and in accordance with PSPC and waste management practices for Projects of this scope a waste management plan will be implemented for this Project as much of the waste generated from the steel replacement portion of the Project can and should be reused or recycled. The best practice set out by PSPC is to achieve a minimum of 90% diversion rate, however a higher diversion rate will be considered during the creation of the waste management plan. Where reusing or recycling is not possible, solid waste will be disposed of through licensed waste disposal companies at licensed facilities. The decommissioning of the existing bridge will result in removal of designated substances, specifically Asbestos-Containing Materials (ACMs), Lead, Mercury, PCBs, and Silica (DST, 2013). Therefore, a Designated Substances Assessment may be required to meet the requirements of O. Reg. 278/05 (Designated Substances – Asbestos on Construction Projects and in Buildings and Repair Operations) under the *Occupational Health and Safety Act*. The need for a Designated Substances Assessment will be confirmed during the detailed design stage.

Liquid discharges: potential sources of liquid discharges during construction include runoff arising from precipitation events. Standard ESC measures will be implemented to reduce potential suspended solids in runoff and other related environmental impacts. These measures will include a requirement that hazardous wastes (if any) shall be handled in a safe manner. Hazardous materials include chemical waste, oil, paint and contaminated soil. Examples of hazardous materials used in construction work include bitumen, gasoline, diesel, oil and grease, as well as any empty containers and waste associated with these materials. Contractors will be required to transport, store and handle all such substances as recommended by the suppliers/manufacturers and in compliance with all applicable provincial and federal regulations. If hazardous waste is generated or found to be present, this material must be managed in compliance with the *Environmental Quality Act, Regulation Respecting Hazardous Materials*. Additionally, subsequent shipments of hazardous waste must be conducted in compliance with the *Transportation of Dangerous Goods Act and Regulations*.

Air emissions during construction and deconstruction: intermittent air emissions from equipment and vehicles will occur during the construction stage of the Project. Best Management Practices will be implemented where applicable, such as reducing vehicle idling time, shutting down equipment when not in use, stabilizing disturbed areas through the use of water for dust control, provide proper maintenance of equipment and vehicles operating in work areas, etc.

Air emissions during operation: air emissions will occur during operation, but are not expected to change from existing conditions, since the new bridge will continue to have 2 lanes and it is not expected that the new bridge will attract more vehicles in comparison with existing conditions.

Surface water drainage: Bridge drains will also be installed on the new bridge. The number and location of drainage outlets and bridge drains will be established as part of detailed design. No other liquid discharges are anticipated as part of this Project.

Accidental Spills: Chemicals or liquids with the potential to result in a spill must be stored in a manner to reduce spill potential. In the case of an accidental spill, the appropriate agencies will be notified as required. Specific mitigation measures targeting an accidental spill and preparation of an accidental spill response plan will be developed during detailed design, but the following provides examples of measures that will be used to reduce potential spills:

- double walled containers or spill containment are required for storage containers larger than 100 L
- containers of 100 L or less must be stored on drip trays
- maintaining containers closed when not in use
- establishing storage locations at least 30 metres from environmentally sensitive areas or surface water bodies, and wherever possible at least 10 metres from the boundary of the PDA
- establishing storage locations away from high traffic areas and/or protecting the storage containers from vehicular impact

Non-Hazardous Solid Waste

Pursuant to PSPC's Real Property Sustainability Framework (v2015) and the Real Property Sustainable Development and Environmental Strategy (2018) and in response to the FSDS 2019-2022 and the Treasury Board's Greening Government Strategy (2020), all Projects greater than $1 million must implement Construction, Renovation and Demolition (CRD) waste management practices. These practices are comprised of reduction, reuse and recycling initiatives to achieve a minimum non-hazardous waste diversion rate of 90%, striving to achieve 100% diversion by 2030, and reduce the Project's waste intensity (tonnes/m^2) by 5%, where feasible.

CRD waste should not include any hazardous materials (i.e., waste generated from asbestos, mold, lead abatements, PCB ballasts, fuels, or other chemicals). Therefore, a clear distinction must be established between CRD non-hazardous and hazardous waste.

In addition, the following sections provide an overview of the basic steps for the Non-Hazardous Solid Waste (NHSW) management planning process. These steps are echoed in further detail in section 01 74 19 of the National Management System and should be considered when the Project specifications are being prepared.

The Project team must develop a Non-Hazardous CRD Waste Management Program for the Project, which must include the following key deliverables:

Prior to deconstruction and construction

Waste audit: determines the types and volumes of construction materials that will be produced as surplus to the Project, as well as the preliminary options and diversion potentials for waste reduction, reuse and recycling. Although PSPC has committed to a diversion target of 90%, all efforts should be made to maximize waste avoidance and diversion, setting a revised target based on the results of the waste audit. The Consolidated Waste Inventory will be used to inform the Waste Audit in full consultation and coordination with the Consultant based on the deconstruction and construction scope.

Waste Reduction Work Plan: identifies the overall waste diversion goal and material specific targets. It describes Project specific procedures to maximize the recovery of those materials identified in the Waste Audit. This also includes the Material Source Separation Program that details on-site sorting and labelling practices, tracking and reporting procedures and destinations for the materials recovered to be implemented during the construction stages of the Project.

Due to environmental concerns about hazardous substances reaching the Ottawa River, the deconstruction of the existing bridge and removal process will require a controlled deconstruction approach instead of using explosives. Containment procedures (for example, tarpaulin stretched under the work area) at superstructure cutting locations will be required as components are removed.

During and post-construction
Training: discuss the procedures and challenges of the Waste Reduction Work plan.

Waste Diversion Report: Documents the recovered construction materials to ensure that the results anticipated in the Waste Audit and Waste Reduction Work plan are realized to the highest degree possible. It records the results at the end of the Project, including overall Project diversion rate using hauling and tracking records to confirm the quantities (percent and tonnage) and final destinations of the materials diverted/landfilled.

Hazardous Solid Waste

If subject hazardous waste is generated or found to be present as defined by provincial regulations (i.e. Environmental Protection Act, for Ontario Regulation 347, General – Waste Management or Quebec Environment Quality Act, Land Protection and Rehabilitation Regulation Q-2, r. 37), this material must be managed in compliance with respective regulation. Additionally, subsequent shipments of hazardous waste deemed to be a dangerous good in accordance with the Transportation of Dangerous Goods Act and Regulations must be conducted in compliance with the Act and Regulation.

Identify, label and properly store all hazardous waste and/or hazardous materials (e.g., fuels, oil, lubricants, etc.) respecting the National Fire Code, occupational health and safety regulations or as otherwise prescribe in law, best practices or by relevant guidelines.

Hazardous waste and/or hazardous materials will be stored in cabinets or containers having secondary spill containment in such a manner that prevents releases to the natural environment.

Ensure all construction equipment is well maintained and free of leaks of fuels and other products.

20 ENVIRONMENTAL PROTECTION

Environmental Protection Plan (EPP) that will be developed by the construction team for the Project. The EPP must provide a comprehensive overview of known or potential environmental issues to be addressed during the Project. It will outline the proposed environmental protection measures and commitments to be carried out by the contractor during construction to avoid or reduce potential impacts. The IPT will work with interested Indigenous communities to include their interests and environmental knowledge in the Project. This effort will include ongoing consultation, the participation of Indigenous communities in studies, and discussion of potential mitigation options.

Components of the EPP may include, but are not limited to, various plans that must provide a comprehensive overview of known or potential environmental issues to be addressed during the Project. Anticipated Plans, containing an assessment of issues and guidance on reducing potential impacts, include:

- Accident and Malfunction Response Plan
- Spill Response and Action Plan
- Soil Management Plan
- Erosion and Sediment Control Plan
- Waste Management Plan
- Dust Management Strategy and Air Pollution Control Plan
- Heritage Conservation and Mitigation Plan
- Tree Protection and Compensation Plan
- Invasive Species Management Plan
- Construction Air Pollutant Emissions Reduction Plan
- Isolation and Dewatering Plan
- Environmental Protection Plan for Construction
- Site Restoration Plan
- Communications Plan
- Fish and Fish Habitat Protection and Offsetting Plan
- Wildlife Management Plan
- Navigation Management Plan

Sensitive environments around the Project include the Ottawa River and its associated fish habitat, wildlife habitat and one downstream drinking water intake (about 5 km downstream). During deconstruction and construction, protection of these features from the potential effects of erosion or sediment release, spill incidents or other accidents and malfunctions will be further described in respective plans. PSPC's Environmental Procedures define *environmental protection* as the prevention or control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

Preliminary information is presented for four plans which form part of the emergency response system:

- Accident and Malfunction Response Plan
- Spill Response Plan
- Material Management Plan
- Erosion and Sediment Control (ESC) Plan

The goal of these plans is to prevent accidents and unplanned releases to the environment through the implementation of prevention, mitigation and control measures. Should an event occur, the plans will describe obligations to report on emergencies and minimize the environmental impacts. The IPT will encourage the contractor to limit the use of chemicals and fuels on the site to the minimum amount required. The contractor will also be required to implement barriers to transmission like silt fences, check dams or straw bale filters. Environmental monitoring will be implemented to confirm appropriate measures are in place and functioning during the construction stage.

Accidents and Malfunctions Response Plan

The accident and malfunction response plan will provide an assessment of the risk of environmental impacts associated with the potential release of contaminants to the environment resulting from the failure of certain structures due to human error or exceptional natural events.

The focus of the Accidents and Malfunctions Response Plan will be to identify potential worst credible scenarios for accidents and malfunctions deemed significant and their impacts on the environment, including an explanation of how those events were identified and potential consequences. Significant events would be those that could have a material and measurable environmental impact or have a reasonable probability of occurring during the life of the Project. In addition, potential interactions with biophysical and social VCs will be identified and their environmental effects will be assessed.

Where the likelihood or sensitivity of an accident scenario is high, the assessment will include contaminants and other materials potentially released into the environment during the event that could result in an adverse environmental. The trajectory and/or dispersion modeling for accidental releases will be analyzed. Spatial boundaries would include the area covered by the Project footprint, rivers and water bodies within the Project footprint and adjacent areas, as well as communities and municipal roads.

The work will be conducted in accordance with all applicable environmental requirements under federal and provincial laws, regulations, guidelines and standards that provide direction to conduct the work, avoid potential unplanned events and take action to remedy issues should impacts occur as a result of occurrences.

Spill Response Plan

If an accidental release does occur, measures to control, contain, recover and clean up the release are to be implemented in a timely manner to minimize the potential for adverse environmental and human health effects.

For the Project, it is anticipated that spill response measures and proposed mitigation measures will reduce potential residual effects so that they are not significant. This will be further evaluated and

confirmed during detailed design. In addition, during the critical phases of work in water, emergency environmental response teams will be pre-deployed for high-risk operations.

Environmental emergency regulations: reporting a spill or release
Section 201 of the Canadian Environmental Protection Act, 1999 (CEPA 1999) requires that, when an environmental emergency occurs for any of the substances on the list established on Schedule 1 of the Environmental Emergency Regulations (E2 Regulations), requires that a verbal notification be made as soon as possible under the circumstances to the authorities identified in the schedule of the Release and Environmental Emergency Notification Regulations (Notification Regulations) or on the Report an environmental emergency webpage, and a written report as soon as possible under the circumstances to the relevant authorities designated pursuant to subsection 18(2) of the E2 Regulations.

If spills occur in Ontario, the Ministry of the Environment, Conservation and Parks (MECP) Spills Action Centre (1-800-268-6060) will be contacted, and all reasonable corrective action will be taken to contain and clean the spill immediately.

If spills occur in Québec, the équipes régionales d'intervention Urgence-Environnement (1 866 694-5454) of the Ministry of the Environment, the Fight Against Climate Change, Wildlife and Parks (MEFCCWP) will be contacted and all reasonable corrective action will be taken to contain and clean the spill immediately. In addition, reasonable efforts must be made to notify any member of the public who may be adversely affected by the environmental emergency.

Material Management Plan

As the project is occurring on federal land, the construction of the new bridge is being completed under a federal regulatory framework. The applicability of the provincial and municipal (City) regulatory framework will be considered and applied where deemed necessary.

The governing federal regulatory framework for characterizing excess soil and excess sediment quality are:

- Canadian Council of Ministers of the Environment (CCME), Soil Quality Guidelines for the Protection of Environmental and Human Health for a commercial land use with unprotected groundwater and coarse-textured soils; and for characterizing groundwater quality,
- Federal Interim Groundwater Quality Guidelines (FIGQG) for Federal Contaminated Sites for the Protection of Freshwater Aquatic Life in a coarse texture soil condition and industrial and commercial land uses.

Provincial regulations include information related to the management, testing and disposal of excess materials, such as soil and groundwater. Provincial regulations also include requirements related to permitting and certification of activities and persons involved in the removal, handling and receiving of such excess materials. Accordingly, the Contractor manage excess materials in accordance with the Ontario regulations for soil and groundwater management because, by definition, excess materials will be moved from the federal site to locations that fall under either Ontario provincial jurisdiction or Quebec provincial jurisdiction.

Management of Different Materials

Bedrock

Disposal of bedrock coming from Ontario and Quebec can be disposed off-site in Quebec at a facility licensed to receive such material in accordance with Regulation respecting the landfilling and incineration of residual materials (Q-2, r. 19). Should reuse of excess rock material be beneficial to the Project, the Contractor may consider this as part of their work, and shall discuss reuse opportunities with PSPC.

Soil

While the overburden has been confirmed to contain levels of certain chemical compounds in excess of CCME Guidelines as well as Provincial Standards (WSP, 2021a), analysis using the toxicity characteristic leaching procedure (TCLP) has shown the impacted soil is non-hazardous as all parameters are in compliance with MECP Schedule 4 of Ontario Regulation 558. Special requirements for handling and disposal of hazardous soils are not anticipated (WSP, 2021b).

Sediment

All excess sediment cannot be reused elsewhere on-site and must be disposed of at an off-site receiving site licenced to receive such sediment/soil.

Wood Chips

A significant quantity of wood chips was encountered in ESA Phase II (WSP, 2021a) completed in the Ottawa River Basin (BH20-R2 to BH20-R4). Samples submitted for chemical analysis were compared to the CCME Guidelines only as wood chips are not considered as soil. The results indicated that the wood chips contained elevated levels of metals (arsenic, cadmium copper and lead) and a number of PAH compounds. Testing as per Quebec hazardous waste regulations also showed the wood chips leachate was non-hazardous.

Erosion and Sediment Control Plan

Erosion and Sediment Control (ESC) measures will be implemented and maintained throughout all stages of construction to protect the receiving waters and surrounding environment. ESC measures should be installed around the extent of the construction work zone(s) as well as around the perimeter of stockpiles required for construction. ESC structures should be monitored to maintain their effectiveness through the life of construction and post-construction rehabilitation. If the erosion is resulting from a construction related activity, the activity should be halted immediately until the situation is rectified. All activities, including maintenance procedures, should be controlled to prevent the entry of petroleum products, debris, rubble, concrete or other deleterious (harmful) substances into the water.

The site erosion control measures generally comprise the following:

- Provision of overland drainage and conveyance routes to direct storm water and sediment toward the existing catchbasins and ditches
- Provision of appropriate erosion control measures such as gravel or rock lining within conveyance routes and rock check dams utilized to slow the conveyance of storm water flows.
- Provision of perimeter silt control fences

- Provision of additional erosion protection such as straw bales in the vicinity of ditches, and filter socks at catch basins can be provided during construction at the discretion of the Department Representative.

A detailed erosion control plan will be required prior to construction.

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