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Alexandra Bridge Replacement

Planning & Design Principles



NATIONAL CAPITAL COMMISSION
COMMISSION DE LA CAPITALE NATIONALE



Public Services and
Procurement Canada

Services publics et
Approvisionnement Canada

Prepared for the National Capital Commission and Public Services and Procurement Canada

FOTENN

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1

Introduction

1.1 Scope of Project

Status

The Alexandra Bridge is an iconic feature of the Ottawa-Gatineau skyline that has stood for over 120 years. With its origins as the first interprovincial multimodal bridge between Ontario and Québec, the bridge remains an important link between communities for thousands of pedestrians, cyclists, and drivers in the National Capital Region. While ongoing repairs will allow the bridge to remain in service for another 10 years, the bridge is reaching the end of its service life and is to be replaced.

Opportunity

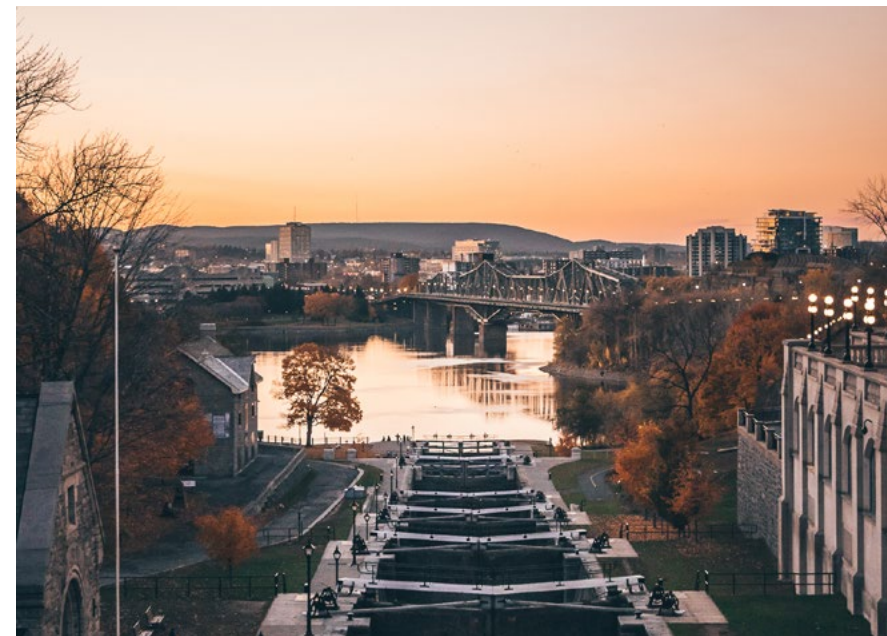
In 2017, a Comprehensive Detailed Inspection (CDI) of all components of the bridge, including an underwater inspection, was completed. The CDI noted that the structure was deemed in inadequate condition with the main means of deterioration being corrosion of the primary structural members. Ongoing structural steel replacement works have continued through to 2021, with planned boardwalk and articulation repairs for 2022-2023 that will require closure of the boardwalk lane. The bridge will remain open with one reversible lane for traffic and one lane for active transportation users during the boardwalk repairs.

Given the concerns raised in the 2017 CDI, Public Services and Procurement Canada (PSPC) undertook a life cycle analysis for the Alexandra Bridge to assist in the decision to either maintain the existing bridge or to replace it with a standard bridge, a new steel truss cantilever bridge or replace it with a 'signature' bridge structure. The lifecycle report was prepared in full consultation with the National Capital Commission (NCC), the City of Ottawa, the City of Gatineau, the Province of Ontario and the Province of Québec; with the NCC confirming to proceed with the signature bridge option.

Due to its deteriorating condition, increasing maintenance costs, and inability to serve current and future transportation needs, PSPC, jointly with the NCC, recommended in 2019 that the bridge be replaced within ten years, which was directed by the Government of Canada through its

budget that same year. This decision was based on the above analyses as well as a comprehensive risk assessment and a 2010 heritage assessment of the bridge. The intent is to replace rather than rehabilitate this essential piece of infrastructure as an effort to improve interprovincial transportation in Canada's Capital Region. This is a unique opportunity to reimagine this vital connection between Ottawa and Gatineau.

PSPC and the National Capital Commission are working as an Integrated Project Team to plan and implement the Alexandra Bridge replacement. As part of the replacement project, a fulsome Impact Assessment in accordance with the Impact Assessment Act (2019) will be conducted. This assessment will include many factors such as socioeconomic, transportation planning, cultural and heritage significance, life cycle assessment and environmental impacts.



Rideau Locks and Alexandra Bridge at dusk. Source: Fotenn Planning and Design

The replacement of the Alexandra Bridge will take place in the following stages*:



*Subject to the NCC's Federal Land Use, Transaction and Design Approval process and requirements of the Federal Impact Assessment Act (IAA, 2019).

Function

The areas surrounding both sides of the bridge form an important part of the overall vision of the replacement. The bridge spans the Ottawa River from Nepean Point, perched atop a natural escarpment in Ottawa, to the Canadian Museum of History on the Hull Island in Gatineau. Bridging the Quartier du Musée and the Byward Market, two heritage neighbourhoods with working-class roots in the region's early lumber industry, the Alexandra Bridge accommodates approximately 9 percent of the daily interprovincial vehicle traffic, and accounts for 33 percent of all active transportation trips. From Major's Hill Park to Jacques-Cartier Park, to the Voyageurs Pathway and the Ottawa River Pathway, the Alexandra Bridge is the thread tying together the heart of the Nation's Capital. The bridge serves a function, but its splendor lies in the convergence of its site and place in the Nation's Capital.



Looking towards the Canadian Museum of History from Nepean Point. Source: NCC

Public Consultation

PSPC, in partnership with the National Capital Commission (NCC), is undertaking a comprehensive public engagement process. Initial online public consultations and stakeholder sessions about the bridge replacement project engaged 2,300 participants in Fall 2020.

Indigenous Engagement

A comprehensive engagement process, led in partnership by the NCC and PSPC, is also currently under way with the Algonquin Nation.

1.2 Purpose of Document

This document provides a cohesive vision, and the planning and design principles 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. To keep this document focused and concise, references to these documents appear within certain guidelines or may be included as appendices.

The principles and guidelines incorporate feedback received through the first phase of the stakeholder and public consultations conducted in 2020 and through a peer review exercise internal to PSPC and NCC, including review by the NCC's advisory committees. The Advisory Committee on Planning, Design and Realty (ACPDR) and the Advisory Committee on Universal Accessibility (ACUA) provided recommendations and endorsed the guidelines.

Highlights from the public consultation include statements referring to:

- / The uniqueness of the Alexandra Bridge as a historical structure of national importance.
- / The key role it plays in providing safe daily active transportation commutes.
- / Its role on the collective memory of the citizens of the National Capital Region.

Another common message was the necessity to consider the new bridge as a destination and that it should be commemorative of the historic structure in some shape or form. The replacement bridge must strive for design excellence and become a reference in sustainable infrastructure design providing state-of-the-art active and public transportation enhancements.

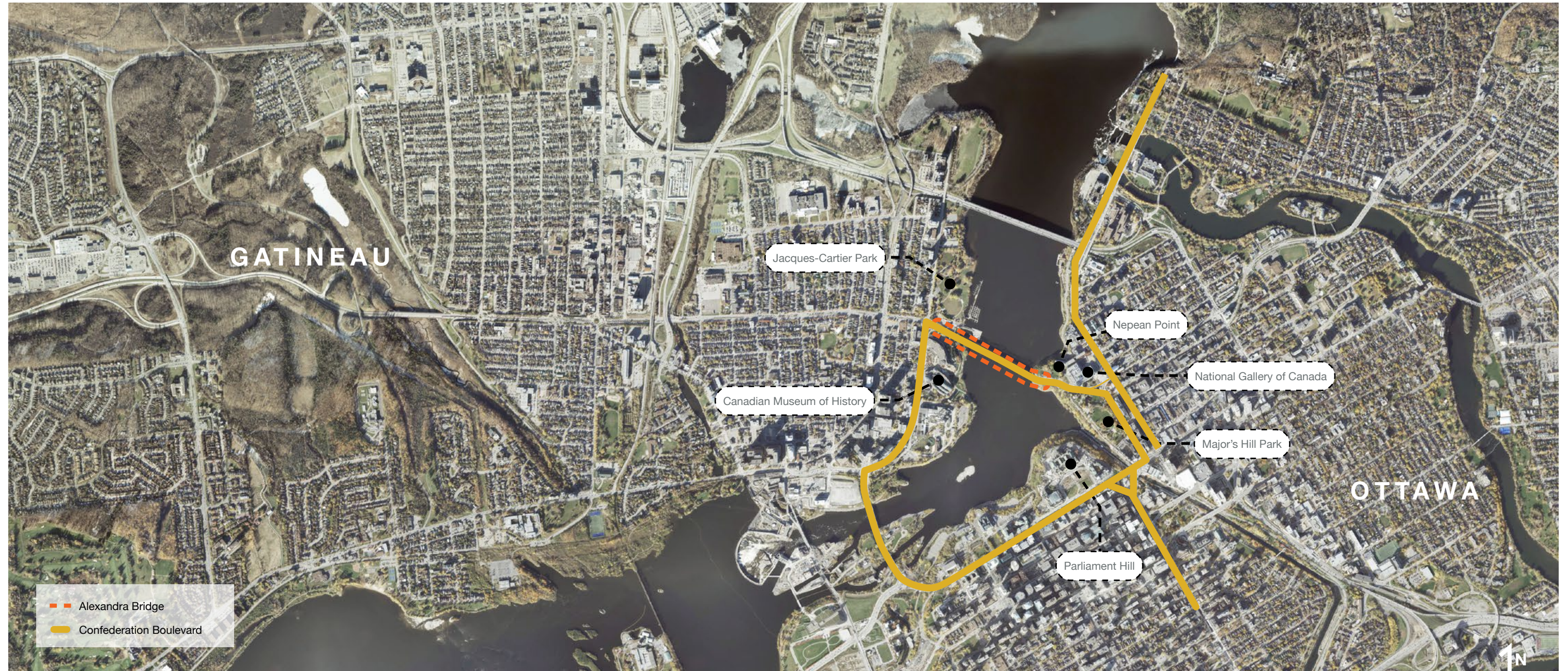
The intention of the vision, design principles and guidelines are to establish and clearly communicate the parameters within which future Bridge Designers and Builders should be working to develop a concept and detailed design for the Alexandra Bridge replacement. Adherence to the planning and design principles will ensure that the new bridge will exemplify a high-quality design, and that through all stages, in both the public and private realms, it will reinforce a healthy, vibrant, and integrated interprovincial connection of national importance. This document should also be used as a benchmark by the project proponents and approval authorities for assessing proposals, design concepts and detailed design elements. These principles also highlight and communicate preliminary mitigation measures for some types of impacts.

Further studies will need to be undertaken to more fully determine the potential impacts on archaeology and fisheries, as well as future mitigation and reinstatement requirements associated with the bridge replacement project. In addition, a Heritage Impact Analysis will be undertaken to 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.

2 Site and Context

2.1 Site Location and Description

The Alexandra Bridge is located on the traditional territory of the Algonquin Nation, spanning the Ottawa River and connecting the provinces of Québec and Ontario. Forming part of Confederation Boulevard, a ceremonial route connecting national historic sites and places of significance, the Alexandra Bridge is a crucial piece of infrastructure for pedestrians, cyclists, and drivers. The bridge connects Jacques-Cartier Park and the Canadian Museum of History to Nepean Point, the National Gallery of Canada and Major's Hill Park, and is also experienced as a place itself - an element in the cultural landscape from which key views and an appreciation of our national symbols and the National Capital Region's outgrowth can be taken in.



Aerial Map of Downtown Ottawa and Gatineau. Source: GeoOttawa

2.2 History, Heritage and Views

History

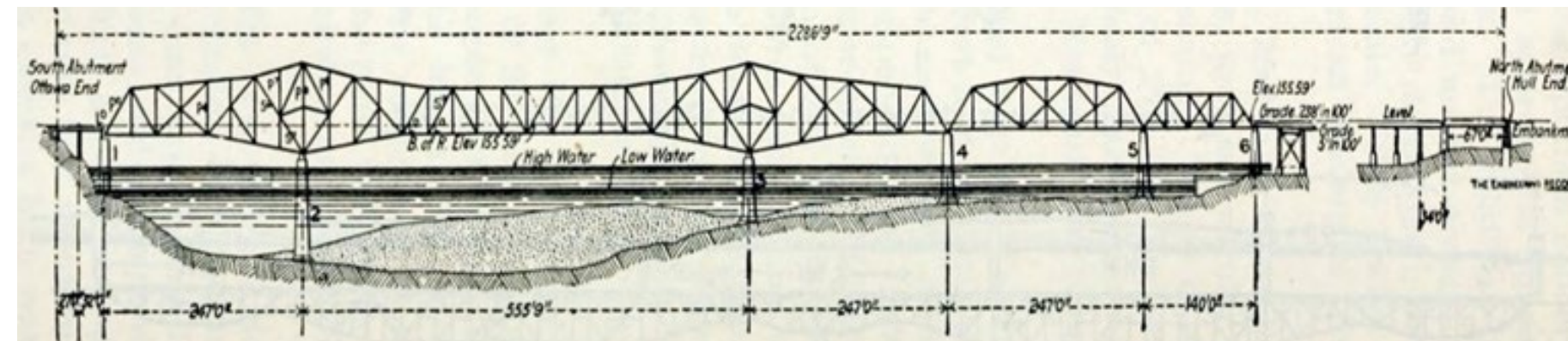
The Alexandra Bridge is located within the lands identified as ancestral territory of the Algonquin Anishinabeg Nation, with the Ottawa region considered traditional territory. Long before French explorer Samuel de Champlain arrived in the area that is now known as Ottawa in the early 1600s, the region was inhabited by tribes of Indigenous peoples. These tribal groups were the region's first residents, often teaching early newcomers skills like navigating the mighty Ottawa River, surviving the region's harsh winters and how to harvest the natural and seasonal food sources.

The Algonquin Anishinabeg 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, including important sacred sites not far from the bridge's location.

Archaeologists have found Indigenous tools in this area dating as far back as 8,500 years, but the ancestors of the present-day Algonquin Anishinabeg Nation have been here much longer. Although

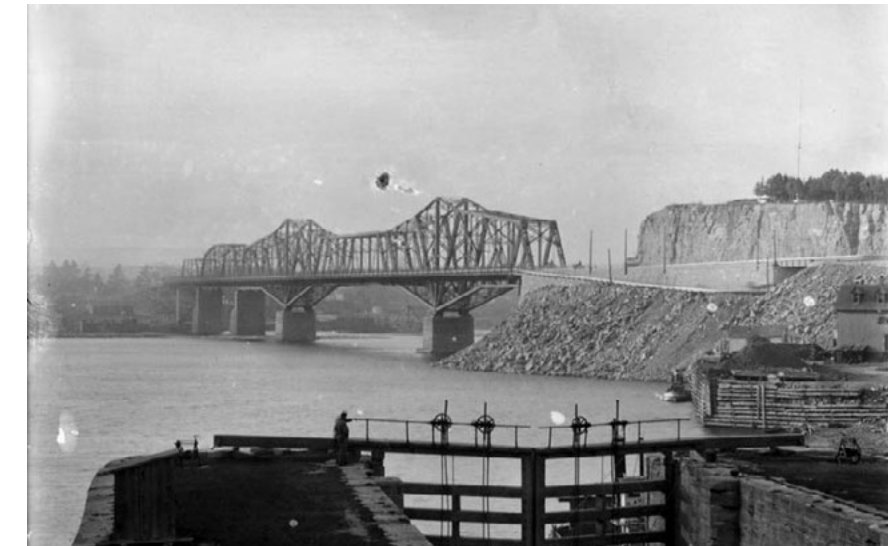
a considerable amount of information has been recovered from Archaeological sites, our knowledge of the long history of occupation of the Ottawa Valley by Indigenous peoples prior to the arrival of Europeans remains very incomplete. Settlement of this area by Europeans does not appear to have begun until 1818 with the arrival of soldier-settlers of the 99th Regiment destined for the newly established military settlement of Richmond.

In a time when shipping still reigned supreme, it was not without its drawbacks – most notably, the challenging and unpredictable Canadian winters. As the provinces of Ontario and Québec were developing rail networks of their own, the same waters that served as borders and a crucial shipping link in the early development of Canada now posed a new challenge for industry and nation-building alike. Stimulated by the desire for regional railway linkages, the Alexandra Bridge was originally designed and built as a railway line to raise Ottawa's stature as a railway city. Local support for the new bridge, including a cost-sharing arrangement with the city, led to an altered bridge design consisting of a widened deck to accommodate two electric streetcar tracks, two carriageways and ample pedestrian pathways, in addition to the planned railway.



Source: The Engineering Record, Building Record and Sanitary Engineer - Volume 44 - 1901

The multimodal Alexandra Bridge, a Canadian transportation and engineering innovation, was constructed between 1898 and 1900 by the Dominion Bridge Company to provide passage for steam railway, streetcars, wagons, and pedestrians. The Interprovincial Bridge (as it was then known) connected the cities of Hull and Ottawa. The use of steel, poured concrete and other modern materials, as well as an innovative trussed cantilevered design, allowed the bridge to overcome significant challenges including unstable conditions on the riverbed due to sawdust deposits from the logging legacy along the Ottawa River. The main cantilevered span of 170 metres, made it the longest in Canada and one of the longest in the world at the time, and the second pier, located in the deepest part of the river, was then considered the largest pillar of poured concrete ever built. Overcoming significant functional and environmental issues, the Alexandra Bridge was celebrated as an achievement in engineering as Canada moved into the 20th century.



June 2021

In 1946, a dramatic fire caused by an electric tram destroyed much of the north end of the bridge. Though the Canadian Pacific Railway (CP) rails were quickly rebuilt, the tram rails were not and inter-provincial electric tram service between Hull and Ottawa ended. This same year, the Federal District Commission (FDC, predecessor to the NCC) established the National Capital Planning Committee in partnership with the local and federal governments to develop a master plan for the National Capital District. Jacques Gréber, a French architect specializing in landscape architecture and urban design, would recommend the expansion of the district to include territories on both provinces. The objective was to transform Ottawa and Hull from their industrial roots along the Ottawa River to a modern and attractive capital in the post-war era. As part of the Gréber Plan (1950), the majority of the rail network and industries at the heart of the capital would be relocated outside of the city centres, and the rails of the Alexandra Bridge were to be removed.



Historical images of Alexandra Bridge. Source: NCC

While the bridge was upgraded in the 1950s to carry pedestrian and vehicular traffic alongside the existing rail service, the development of a new, suburban train station in 1966 ushered in the end of rail for the Alexandra Bridge. In 1970, as part of the implementation of the Gréber Plan, the Canadian Pacific Railway ceased rail service on the bridge and the rails were removed. The Alexandra Bridge, about 70 years after becoming the first interprovincial rail bridge, was fully modernised for the age of the automobile and the expectations for the 21st century. Over 50 years after the last conversion of the bridge, the conversation has once again shifted to the future of the bridge and its role as a national symbol and vital piece of infrastructure.

Heritage and Archaeology

The heritage values of the bridge and its surrounding area, including archaeological resources, are taking prominence once again as the discussion shifts to the replacement of the Alexandra Bridge. Heritage and archaeology protection and considerations for the bridge project extend far beyond its structure and into its surrounding landscape – a rich archaeological site of ancient human occupation and a sustainable resource for enjoyment and recreation.

Archaeology

The NCC’s archaeological potential map indicates that the lands around the Alexandra Bridge in both Gatineau and Ottawa have the potential for pre-contact archaeological resources. The submerged concrete piers of the bridge are also considered to be of archaeological interest.

The Ottawa River’s north shore on Hull Island has a multitude of pre-contact archaeological sites reflecting thousands of years of history, including the potential remnants of a pre-contact ossuary on the southern edge of the Canadian Museum of History grounds, approximately 325 metres south of the bridge along an ancient portage trail around the Chaudière Falls. The pre-contact archaeological site closest to the study area is located near the Maison Charron, in Jacques-Cartier Park South,

about 250 metres north of the bridge. The site is situated in a zone ranging from medium to high potential for pre-contact archaeological resources and is part of a complex of 18 pre-contact sites extending north to the mouth of the Gatineau River.

Concentrations of pre-contact artifacts, resulting from the erosion of the shoreline, have been recently (in 2018 & 2019) collected from the north shoreline of Jacques-Cartier Park South, approximately 325 metres north of the bridge. These known archaeological resources are evidence of early occupation of this area, given that 19th and early 20th century industrial development (including bridge construction) affected the shoreline. Erosion of the Ottawa River shoreline within the Core Area is not unique to this site, evidenced by other eroding shoreline sites where tens of thousands of artifacts have been collected by the NCC.

Construction of the Canadian Museum of History, the Hull marina and its parking lots would have destroyed any historical archaeological resources of heritage value. An archaeological salvage excavation carried out in 1983 on the site of the Canadian Museum of Man (now the Canadian Museum of History) revealed the foundations of buildings associated with the early lumber and later pulp industries (Source: Archéologie des sites du Musée de l’Homme et de la Galerie nationale, Les recherches Arkhis, 1984, MCH Archives, Ms. 2455).

On the Ottawa side, archaeological remains may be present on the riverbed in the vicinity of the Alexandra Bridge and Entrance Bay, an area which historically operated as the landing for the 19th century steam ferry (located between the bridge and the Rideau Canal locks). At present there are no pre-contact archaeological sites registered in areas closest to the bridge, though pre-contact archaeological artifacts have been recovered around the Centre Block on Parliament Hill. The ruins of Colonel By’s estate and a former stone lined pond, infilled in 1945 are specific archaeological sites of importance in Major’s Hill Park.



HERITAGE AND ARCHAEOLOGICAL RESOURCES

- Archaeological Site
- ⊗ Possible Burial Site
- ⊛ Heritage Building (protected federal)
- H Building of Heritage Interest
- Zone of Archaeological Potential (pre-contact)
- Zone of Archaeological Potential (post-contact)

Ottawa River North Shore Parklands Plan - Source: NCC

Heritage

The Alexandra Bridge was designated in 1995 as a Historic Site for Civil Engineering by the Canadian Civil Engineering Society. Heritage protection and considerations for the bridge extend far beyond its structure and into adjacent built and natural areas. From the Rideau Canal, a UNESCO World Heritage Site, to the historic neighbourhoods of the ByWard Market, Lowertown and the Quartier du Musée, to the Canadian Heritage Rivers of the Ottawa (Kitchissippi) and Rideau, this rich heritage context at the heart of the National Capital Region must be preserved and enhanced for all Canadians.

In 2010, a Heritage Value Assessment was conducted regarding the bridge's heritage value. Based on this assessment the Alexandra Bridge was rated as an engineering asset of National Historic Importance. This rating does not preclude its replacement.

In May 2017, the bridge was included on the City of Ottawa's Heritage Register for its cultural heritage value or interest. In 2021, the Alexandra Bridge was added to the National Trust for Canada's Endangered Places List.

- Alexandra Bridge
- UNESCO Heritage Site
- National Historic Sites (nearby)
- 1 Earnscliffe National Historic Site of Canada
- 2 Royal Canadian Mint Historic Site of Canada
- 3 Former Archives Building Historic Site of Canada
- 4 Notre-Dame Basilica Historic Site of Canada
- 5 Former Geological Survey of Canada Building
- 6 Rideau Canal Historic Site of Canada
- 7 Connaught Building Historic Site of Canada
- 8 Chateau Laurier Historic Site of Canada
- 9 Public Grounds of the Parliament of Canada
- 10 Confederation Square Historic Site of Canada
- 11 National Arts Centre Historic Site of Canada
- 12 Office of the Prime Minister and Privy Council
- 13 Central Chambers Historic Site of Canada
- Recognized Federal Heritage Buildings - Hull Island
- 1 Gilmour and Hughson Limited Office
- 2 National Printing Bureau and Heating Plant
- 3 Monastery, Servantes de Jésus-Marie Congregation
- 4 Charron House
- 5 E. B. Eddy Digester Tower
- 6 Place du Portage, Phase 3
- City of Ottawa Heritage Conservation Districts / City of Gatineau site patrimonial



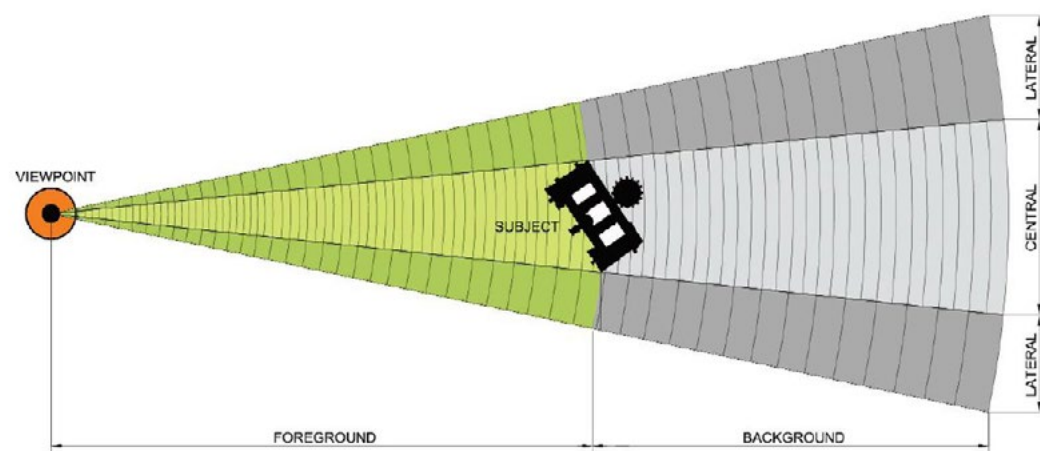
Heritage Resources of importance in proximity to the Alexandra Bridge

Views

Alexandra Bridge is a unique place that offers an important vantage point for observing significant views, drawing visitors and residents to experience the panoramic views of the Parliament Buildings, as well as national cultural symbols and the Ottawa River. As per the NCC's *Canada's Capital Views Protection Plan, 2007*, preserving the visual integrity of symbolically important natural treasures for future generations is of the utmost importance in planning for the National Capital Region.

This includes not only the significant views of Parliament Hill and other national symbols from key viewpoints located on and around the bridge itself, but also in protecting the views of foreground areas (including central and lateral foreground areas), when considered from points along Confederation Boulevard and from the public parklands and pathways along the Ottawa River shoreline.

A new bridge set within the Capital cultural and natural landscape will require consideration of its impacts on views to ensure that existing protected views and viewsheds are not dominated by a future bridge design and that the openness of the Ottawa River corridor is maintained. Issues of foreground protection relate primarily to visual access or openness, as well as to obstruction and /or framing of views, whereas issues of background protection relate primarily to obscuring or bracketing of the silhouette of the Parliament buildings and / or not being visually overpowered by the perceived mass and height of other objects rising above or beside it.

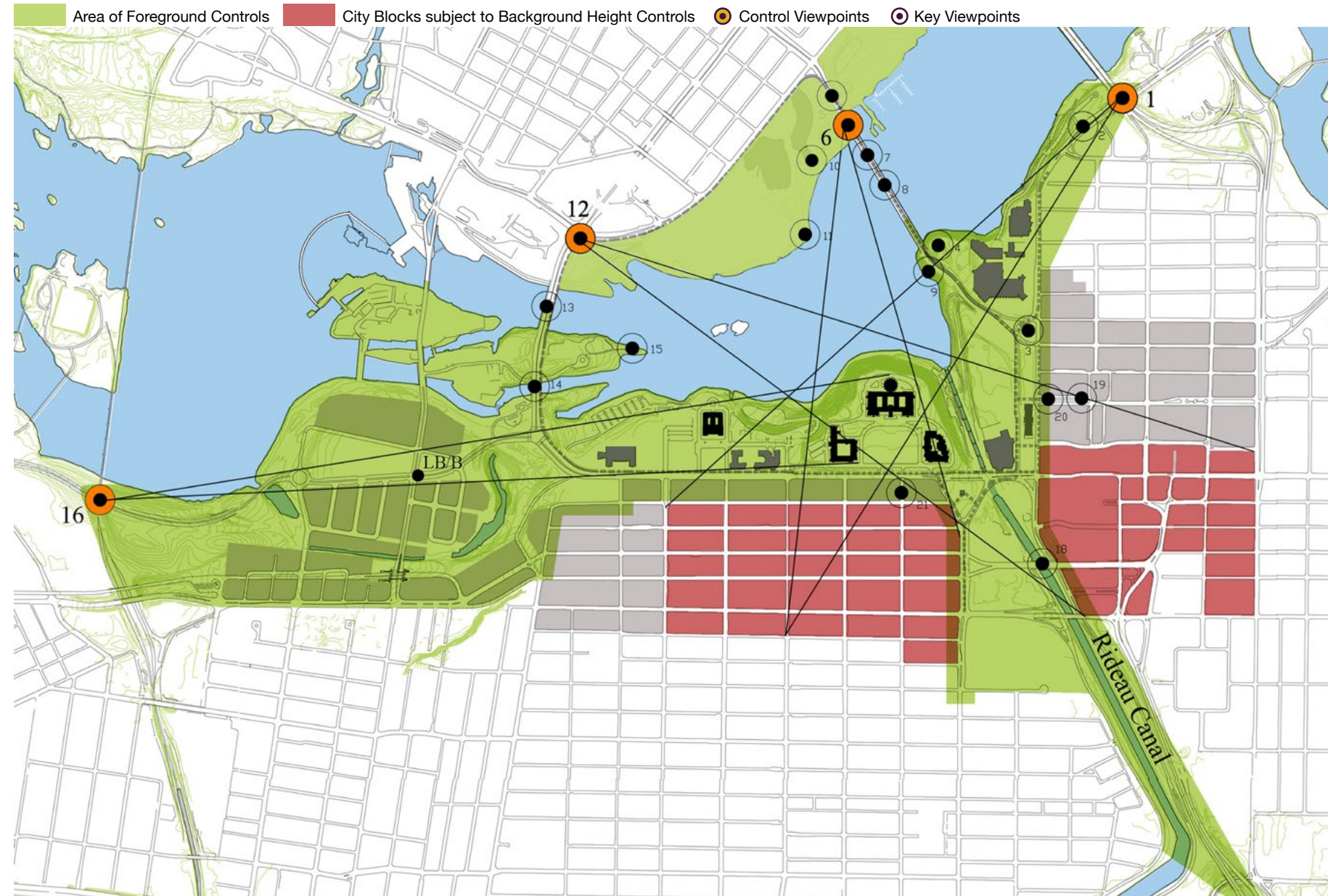


Anatomy of a Viewshed. Source: Canada's Capital Views Protection Plan

- Alexandra Bridge
- Foreground Protection Area
- Control Viewpoints
- Key Viewpoints
- Significant Viewpoint (by Stantec)



Map based on Canada's Capital Views Protection Plan's - Location of Key Viewpoints



Areas subject to Background and Foreground Height Controls. Source: Canada's Capital Views Protection Plan

2.3 Planning Framework

While the Alexandra Bridge connects two provinces, the bridge replacement is primarily impacted by a policy and regulatory framework at the federal and municipal levels, including both the City of Ottawa and the City of Gatineau. Requirements of Provincial (Ontario and Québec) regulatory systems will also need to be considered given that both Provincial governments own portions of the Ottawa River bed, shorelines and adjacent lands.

Public Services and Procurement Canada (PSPC) is the federal custodian managing and operating the Alexandra Bridge. PSPC is currently initiating the pre-planning design, and subsequent construction of a new signature bridge to replace the existing structure.

Federal Planning

The National Capital Commission (NCC) plays a leading role in the development and urban planning of the National Capital Region of Canada. Building on the work of its predecessors, the Federal District Commission and Ottawa Improvement Commission, the NCC fulfills three specific roles: long-term planner of federal lands, principal steward of nationally significant public places, and creative partner committed to design excellence in development and conservation.

The following four NCC plans are the most relevant to the Alexandra Bridge area:

- / Canada's Capital Core Area Sector Plan (2005, under review)
- / The Plan for Canada's Capital 2017-2067 (2017)
- / The Ottawa River North Shore Parklands Plan (2018)
- / The Capital Pathway Strategic Plan (2020)

The *Plan for Canada's Capital* is the NCC's overarching planning document, presenting a long-term vision for the development of the National Capital Region. Among major projects included in the plan is the renewal of Confederation Boulevard and the improvement of

interprovincial transportation. The redevelopment of the Alexandra Bridge plays a significant role in each of these transformative projects, which seek to increase safety and access for pedestrians, cyclists and public transit while maintaining the symbolic role and function of the bridge.

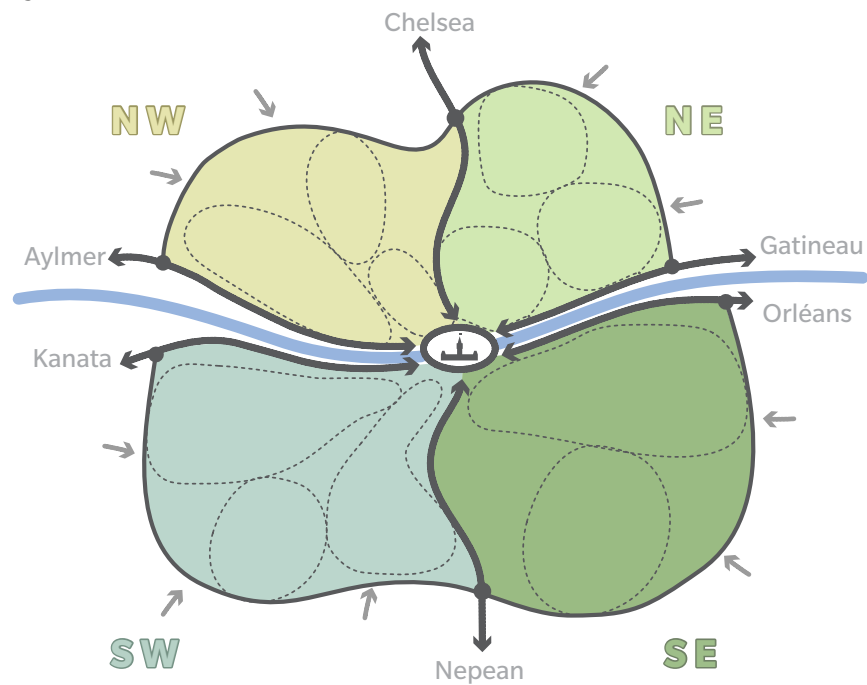
Three principal planning constructs form the foundation of the *Capital Core Area Sector Plan's* policies and proposals, and guide the NCC in the daily implementation of the Plan: sustainable development, the healthy communities movement, and smart growth. Among development initiatives is the goal of supporting the City of Gatineau in reviving the "urban village" character of the working-class residential area of Old Hull and endorsing the City of Ottawa's *Byward Market Public Realm Plan*, as a supportive and engaged partner. Design highlights of the *Byward Market Public Realm Plan* include normalized street designs with wide sidewalks



Looking north towards Gatineau. Source: NCC

and low vehicular travel speeds, signature light posts, wayfinding signage and improved amenities, such as a new downtown festival space and public washrooms.

In recent years, the NCC has placed emphasis on the enhancement and management of the pathways and parks adjacent to the Ottawa River. The Capital Pathway, anchored around Parliament Hill (the “hub”), looks to connect Gatineau Park to Nepean, Gatineau to Aylmer, and Orléans to Kanata – and all of these to one another. As the primary link between the Voyageurs Pathway and Jacques-Cartier Park, and the Ottawa River Pathway and Major’s Hill Park, the Alexandra Bridge serves as a vital interprovincial link bringing the whole greenspace and pathway network together.



Capital Pathways Strategic Plan, 2020 - Source: NCC

Transportation Planning

The NCC, as long-range planner, is undertaking the *Long Range Integrated Interprovincial Crossings Plan* for Canada’s Capital Region. This long-term strategic plan is predicated on assumptions of meeting sustainable transportation targets that start with the introduction of policies, service improvements to transit and active mobility infrastructure, and initiatives that require minimal construction and capital investment to achieve a goal that - in the year 2050, 50% of all interprovincial crossings will be occurring by transit or active modes.

Further, a recent study to assess the feasibility and appropriateness of a looped rail transit system in the capital core area that uses the Portage and Alexandra Bridges is also under consideration. Implementation of a future Light Rail System (LRT) or tram on Alexandra Bridge must be incorporated within bridge replacement designs, with consideration to potential impacts of bridge design on the road geometry of Gatineau and Ottawa approaches.

Evolving Context

NCC Projects on the immediate horizon in proximity to the replacement bridge include:

Nepean Point Redevelopment and Pedestrian Bridge: Nepean Point is a nationally important landmark and vantage point, historically reserved for military purposes and developed as a public space in 1909. Current redevelopment plans are underway to enhance the landscape experience and observation points, including universal accessibility and the re-establishment of a pedestrian connection between Nepean Point and Major’s Hill Park. The “Big River Landscape” concept plan for Nepean Point (Janet Rosenberg & Studio) began construction in 2019 following an international design competition in 2017. It is anticipated the project will be completed in late spring 2023.

Redesign of Major’s Hill Park and Chateau Laurier: Major’s Hill Park is

Ottawa’s first official park. It was designed in the late 19th Century as a picturesque landscape and offers exceptional views and experiences of the Ottawa River, Rideau Canal, Parliament of Canada, and the Chateau Laurier. A new addition to the Chateau Laurier will replace a former 1960s parkade and establish a future direct link and amenities for the park. Preparatory site works for the hotel addition and park interface are anticipated to commence in 2021. In parallel, the NCC is focused on the development of a park masterplan that will renew the original picturesque vision, while balancing contemporary considerations and embracing the rugged and unique character of the park. The design may

include opportunities to reclaim spaces along Pioneer Way (the former rail corridor) and improve universal accessibility between the park plateau and the shoreline, as well as interfaces and connections along Confederation Boulevard.

Rideau Canal to Rideau Falls Waterfront Promenade: NCC Milestone 16 of the *Plan for Canada’s Capital* includes the creation of a new, multi-use promenade from the Rideau Canal east to the Rideau Falls, connecting existing public spaces overlooking the Ottawa River. The proposal provides for a multi-purpose universally accessible waterfront



Concept plan for Nepean Point. Source:NCC

promenade connecting existing public spaces overlooking the Ottawa River stretching from the downtown's Rideau Canal locks eastward to Rideau Falls. This future waterfront promenade will have to be coordinated with the bridge replacement project.

Jacques-Cartier Park: The NCC's 2018 *Ottawa River North Shore Parklands Plan* is a long-term vision for federal lands that run along the periphery of Hull Island in Gatineau, between the Ottawa River and Laurier Street and those along Brewery Creek, including site-specific directions for Jacques-Cartier Park and the National Museum of History lands. The parklands plan will serve as the basis for NCC's direction and input, as well as a decision-making tool regarding the bridge redevelopment and any activities that affect these federal shorelines and green spaces.

Given the potential for construction activities of the Alexandra Bridge replacement project to extend into adjacent Ottawa River shoreline areas, redevelopment opportunities for Jacques-Cartier Park (i.e. wharf, marina, boat launch) will be reviewed with adherence to plan policies to protect heritage, archaeological, cultural, recreational and natural environment resources (land, riparian and aquatic). Mitigation measures to offset any potential negative effects of the bridge replacement will be required and may include fish habitat restoration, increasing forest cover within the park, relocating parking to underground lots, providing for new waterway access points and developing interpretation areas, potentially coordinated with in-situ archaeological and historical resources of the park.

Confederation Boulevard Node and Gateway: The Gatineau landmark node at des Allumettières/Laurier Avenue intersection has a traffic engineering design deficiency due to its aged layout, including a slightly higher than standard deflection angle in the northbound approach and a wide right-hand turn (eastbound to bridge) without an adequate merging zone. Improvements to this intersection are thus required.



Ottawa River North Shore Parklands Plan - Source: NCC

The NCC's *Confederation Boulevard Guidelines* identify this intersection as a landmark node and an entry point (gateway) to the ceremonial route with an intention for it to have a degree of spatial definition, significant marker and entry features such as a commemoration of national importance. The Alexandra Bridge replacement provides the opportunity to improve its visual presence and meaning as a gateway to Confederation Boulevard. Bridge replacement designs should allow for space for the possible addition of a major commemoration.

City of Gatineau

The result of amalgamation in 2002, the City of Gatineau brings together the former municipalities of Aylmer, Buckingham, Hull, Gatineau, and Masson-Angers, and serves the function of both a municipality and a county as regional county municipality (RCM).

In 2015, the City of Gatineau adopted its new *Schéma d'aménagement de développement*, the highest-level policy document at the municipal level presenting a vision through 2051.

As part of its overall vision, the new Plan seeks to prioritize an urban fabric based on sustainability and mobility, including intensification of the urban core and transit-oriented development to connect residential and employment lands. The plan also emphasizes the protection of cultural and natural heritage resources, such as the Quartier du Musée and Jacques-Cartier Park – both of which are located on Hull Island and flank the Québec-side portion of the Alexandra Bridge.

The Quartier du Musée, a historically working-class neighbourhood, is bordered by the boulevard des Allumettières, an important arterial road in Hull, which becomes the entrance to the Alexandra Bridge on the Québec side.

City of Ottawa

Much like Gatineau, the City of Ottawa (2001) is the result of an amalgamation of several urban and rural municipalities and a regional government under a single municipal structure. The *City of Ottawa's Official Plan* presents a vision for the future growth of the city and provides policy direction for land use and development.

The City of Ottawa is currently in the process of creating a new Official Plan, scheduled for late 2021. The new plan includes ambitious mobility policies to achieve the goal that by 2046, most trips in the City of Ottawa will be made by sustainable transportation.

One of the City's key mobility policy directions is to actively work with the federal government, the provinces and the City of Gatineau to improve inter-city rail, high-speed rail, and a stronger regional transit network. This also includes improving pedestrian and cycling networks and connections to transit, creating a multimodal transportation network that supports the image and stature of Ottawa-Gatineau as an important metropolitan region, where it is possible to live a car-light and car-free lifestyle.

3 **Vision**

“The Alexandra Bridge replacement will be 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.”

3.1 Vision

The Alexandra Bridge replacement will be designed as an emblematic signature bridge, an expression of its time and location. It will become an urban icon that strongly represents the identity of place, city and community through its architectural, urban, and structural character. It shall also reflect Canadian values and identity representing our uniqueness as a people, which includes our flag, our culture and our values such as freedom of expression and respect for diversity.

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.”

Objectives:

- / The replacement bridge must strive for design excellence and become a reference in sustainable infrastructure design providing state-of-the-art active and public transportation enhancements. The architectural and structural design of the Alexandra Bridge replacement must ultimately respond and build on these guiding principles.
- / Design proposals must demonstrate how they address the principles through their structural and architectural articulation, and how the new bridge would become a new national landmark, a reflection of our national identity and be fitting with the National Capital Region’s ceremonial status.
- / It will become the backdrop for the continued evolution of the natural and urban capital cultural landscape.
- / The new bridge will celebrate the legacy of the Alexandra Bridge through the means of exceptional design that responds to current and future demands, while ensuring that the crossing of the Ottawa River remains a visually breathtaking experience, providing opportunities for pause and enjoyment, and a journey through the natural, historical, and cultural landscape of Canada’s Capital Region.

3.2 Guiding Principles



Mobility and Continuity of the Urban Fabric

The replacement bridge design shall ensure the physical continuity of its unique and symbolic character, connectivity for pedestrians, cyclists and drivers and a seamless connection between the City of Ottawa and the City of Gatineau to unify its form within the Capital Core Area.



Public Space and Civic Experiences

The new bridge will function not only as a structural link between vital public spaces along Confederation Boulevard, but as a strong and dynamic public space in its own right. The redevelopment of the bridge creates new opportunities for active users and for enhancing the communal, cultural and sensorial experience of all Canadians.



Structure, Height, Proportions and Lighting

The new bridge will be designed as a signature bridge, that will fit within the existing context of the built and natural heritage of the Capital Region. 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.



Preserve Views and Celebrating the Legacy

The Alexandra Bridge replacement will enhance the rich and diverse historical context of the site and create opportunities for new views to be experienced, while being mindful and respectful of the sequence of existing protected views, cultural landscapes and the built environment. The new bridge will hold the essence of the Alexandra Bridge, while continuing to allow visitors to view and experience the Ottawa River and the Capital's cultural landscape.



Sustainability and Materiality

The new structure will strive for sustainable design and material selection excellence. It should be a model of sustainability and respect traditional Indigenous knowledge as part of its core values and conceptualization.



Universal Accessibility, Legibility and Wayfinding

The new design shall provide equitable and safe access to all users and provide a clear and consistent message throughout the Confederation Boulevard circuit for daily commuters and visitors alike.

3.3 Functional Requirements

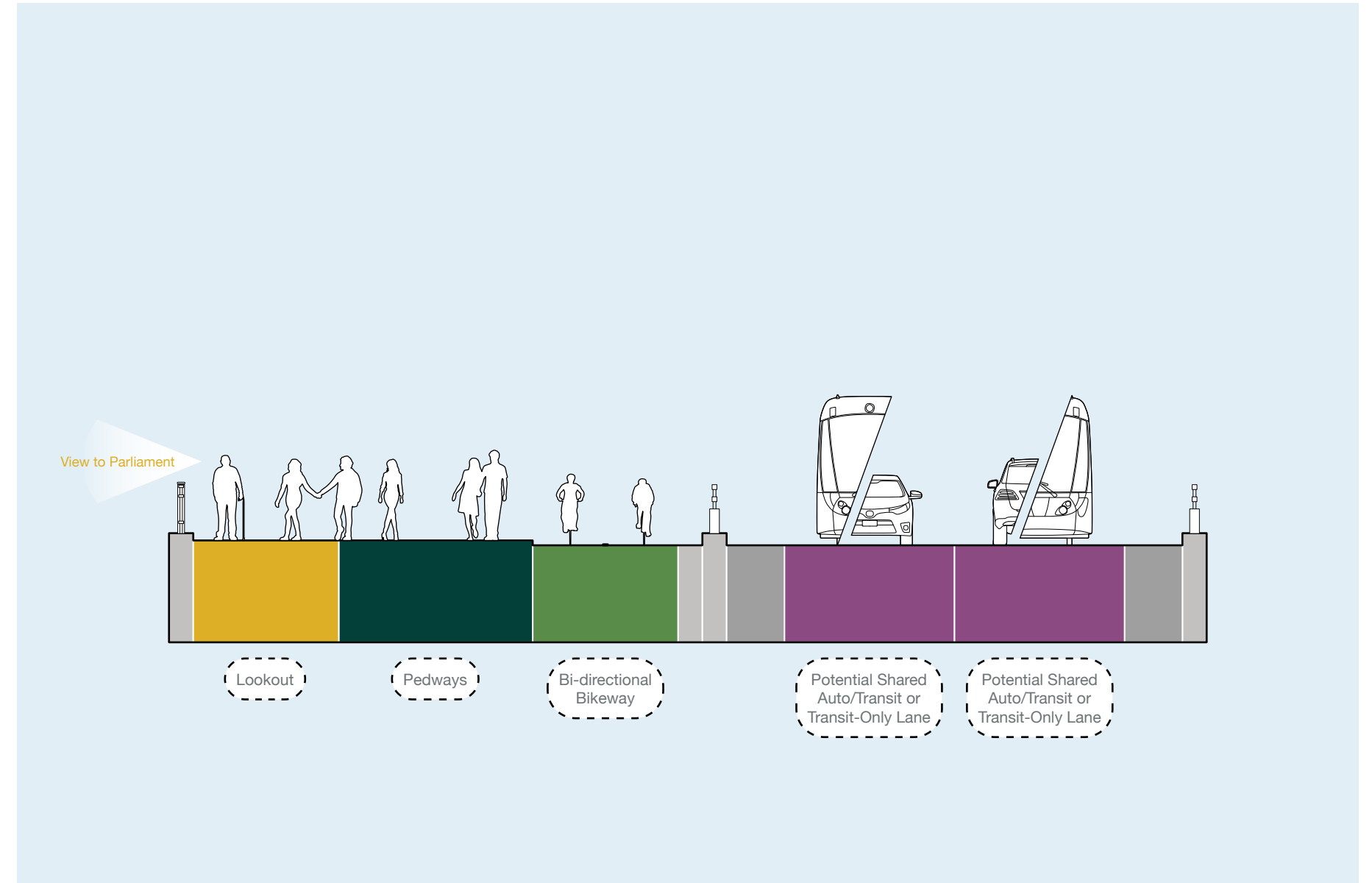
Over the past century, the current multimodal Alexandra Bridge was modified and adapted to respond to emergent transportation issues. Likewise, the new bridge design must underscore the use of finite resources and provide flexibility by demonstrating the possibility of accommodating numerous public transportation modes either concurrently (shared lanes) or through minimal asset upgrades.

The design of the new bridge must accommodate a mix of different transportation modes simultaneously, including active transportation, public transport, and personal vehicles.

The following minimum functional requirements must be provided on the new bridge:

- / Provide two (2) lanes for road traffic (one for each direction) that must be adaptable for a potential installation of a streetcar or light rail train system in the future. Vehicular traffic must comply with transportation regulations as set out in current best standards.
- / Provide at least one (1) active transportation lane (pedestrians and cyclists) on the upstream (west) side of the bridge to ensure the scenic views to the Parliament Hill complex. The active transportation lane must be a two-way path with a clear and distinct separation between pedestrians and cyclists. The active transportation route shall also include seating, rest points, observation decks and lookouts without compromising safety or obstructing users.
- / Road Traffic lanes and active transportation laneways will have a closed deck system to protect the superstructure from the elements, de-icing products and dirt contributing to a longer-lasting structure.

The functional section illustrated here shows a potential layout as indicated in the report *Feasibility Study on the use of Alexandra Bridge for an interprovincial public transit system in the Capital Core Area* prepared by Parsons. This is solely to provide guidance and is not intended to be prescriptive for the new bridge design. Other solutions should be studied, and an ultimate design solution must be provided.



Illustrative functional section.

4

**Planning and
Design Principles**

Each Guiding Principle provides an overall direction and intent to achieve the vision for the Alexandra Bridge Replacement bridge. In this section, each principle is further defined and broken down into several design guidelines that provide additional direction to designers to achieve the desired outcome through their design proposals. They also relate and reference other Federal documents, policies and standards that shall be considered and applied to this project.

It is important to note that these guidelines are not meant to be prescriptive or limiting to innovative design and solutions. They are a framework against which design proposals may be assessed and are intended to provide overall direction for future bridge design proposals that respond to the once-in-a-lifetime opportunity presented by this project to reimagine a core component of Canada's capital. With these design guidelines in hand, future bridge designers and engineers are invited to introduce a world-class, signature bridge befitting the setting of our national symbols.



Sunset on Alexandra Bridge. Source: Fotenn Planning and Design

4.1 Mobility and Continuity of the Urban Fabric

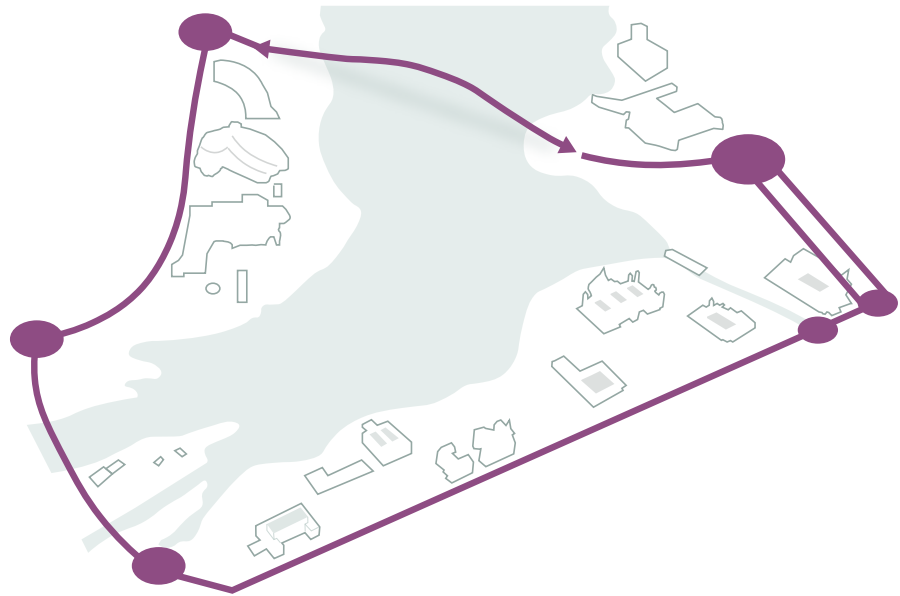
The Alexandra Bridge, along with the Portage Bridge, are integral parts of Confederation Boulevard's Ceremonial Route. As described in the history of the site, the evolution of this area reflects historical settlement patterns as well as engineered solutions to environmental conditions, which contributed to the area's setting as the political, cultural, and diplomatic centre of the nation's Capital. Today, the Alexandra Bridge effectively connects the landscapes of the Capital Region's riverbanks. The Boulevard establishes the defining image of federal institutions set in a verdant, river-oriented landscape. It also distinguishes between federal and civic spaces and identifies central Ottawa and Gatineau as a singular ceremonial route for national celebrations and processions.

The Alexandra Bridge is also an important connection between the City of Ottawa and the City of Gatineau, highly used in daily commutes throughout the year by pedestrians, cyclists, and automobiles alike. An entrance from a Capital Arrival route in Gatineau, the bridge introduces the Confederation Boulevard discovery route to all visitors with outstanding visuals of the Ottawa River, Parliament Hill and both municipalities.

As a multimodal transportation corridor that will prioritize active modes, street and pathway connections at the approaches should be clear, intuitive, and convenient with existing and future pathway and cycling networks. The *Ottawa River North Shore Parklands Plan* recognizes the Gatineau intersection of des Allumettières Boulevard and Laurier Avenue as a Capital entry point, identified for improvements that factor in the particular features of Confederation Boulevard and align with those marking the transition to the urban fabric of the City of Gatineau.

No pathways are currently provided under the bridge on the Ontario side. The proposed development of the NCC's Rideau Canal to Rideau Falls Waterfront promenade includes consideration of an active link from Major's Hill Park to Nepean Point, which must be reviewed with future bridge design solutions for the Ottawa approach.

The Alexandra Bridge is a national asset and its replacement must continue to complement the Confederation Boulevard Ceremonial Route.



Confederation Boulevard Ceremonial Route and Arch.
Source: Alexandra Bridge Replacement Program and Design Guidelines



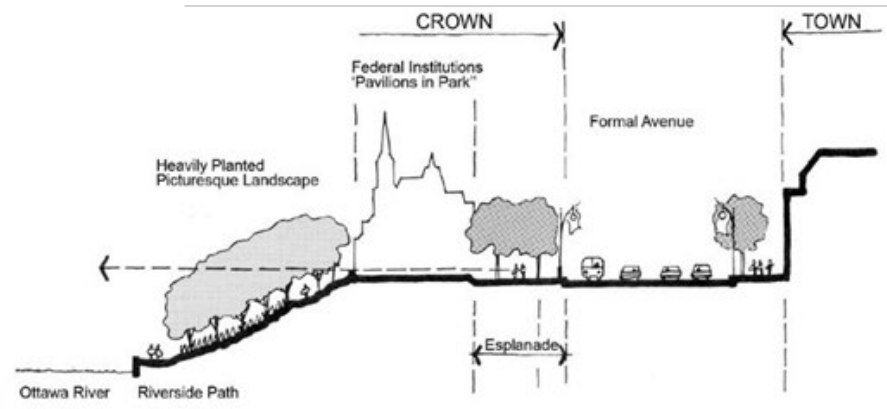
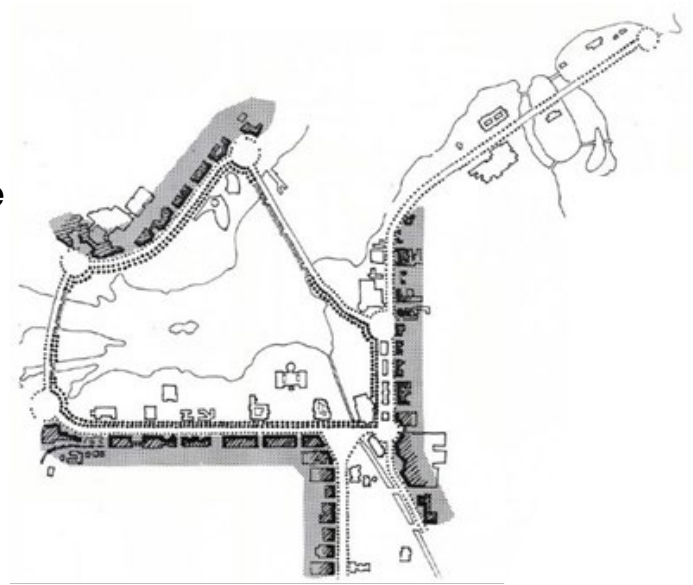
Aerial view of Confederation Boulevard. Source: based image from Google Earth

4.1.1 Reinforce Confederation Boulevard Ceremonial Route

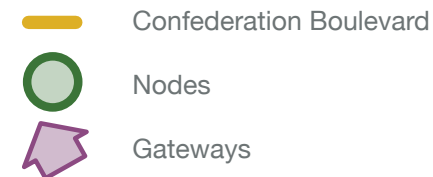
Confederation Boulevard is a key feature of the Capital Core that is not only closely identified with the National Symbols, but also widely recognized as a destination in its own right. Alexandra Bridge is a national asset, integral to Confederation Boulevard and its replacement must complement its role as part of the Confederation Boulevard Ceremonial route. The primary components of the ceremonial route include the Grand Esplanade (pedestrian promenade), Links, Nodes and Gateways. The NCC's *Confederation Boulevard Guidelines, Management and Stewardship of Our Capital Legacy* report defines major components that reinforce the image of a continuous circuit around the Capital Realm.

Alexandra Bridge is a structural portion of Confederation Boulevard's Ceremonial route, thus the replacement bridge design shall ensure the physical continuity of the Grand Esplanade and a seamless connection between the City of Ottawa and the City of Gatineau to form a single federal precinct. Street intersections on either end of the bridge simultaneously function as gateways and nodes to signify entry to Confederation Boulevard.

- / The new bridge must offer a generously wide and relatively open pedestrian link that allows movement between the different destinations along the ceremonial route, and provides different observation points to national symbols, the natural landscape, and the Ottawa River.
- / High quality materials, finishes and furnishings must convey the importance and stature of the pedestrian (Grand Esplanade) link, while reflecting the visual and symbolic significance of the national buildings and landscape of the Crown territory.
- / A new bridge design must integrate considerations to elevate the Gatineau node at the intersection of des Allumettières Boulevard and Laurier Avenue by improving its visual presence and meaning as a gateway by allowing space for entry features such as a major commemoration of national importance.



Ceremonial Route. Source: Confederation Boulevard Guidelines, Management and Stewardship of Our Capital Legacy



Nodes and Gateways. Map based on Confederation Boulevard Guidelines, Management and Stewardship of Our Capital Legacy

4.1.2 Pedestrian and Cyclist Connectivity to the North Shore

The *Ottawa River North Shore Parklands Plan*, 2018 recognizes that riverfront lands are attractive public places offering opportunities for contemplation, recreation, and cultural activities, with vibrant activity areas planned within Jacques-Cartier Park and at the Canadian Museum of History site. One of the key planning strategies of the *Ottawa River North Shore Parklands Plan* is to provide connectivity and continuity between sites, as well as multiple connections to the waterways. Alexandra Bridge is the key element of the multi-use pathway system that connects the NCC's Capital Pathways in downtown Ottawa to Gatineau's Voyageurs Pathway (which passes under the bridge connecting Jacques-Cartier Park South with the Canadian Museum of History lands) and the De l'île Pathway (connecting Jacques-Cartier Park/Laurier Street to the Ruisseau de la Brasserie Pathway, running through the heart of old Hull).

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.

- / Bridge design must accommodate proposed municipal road network configurations at the intersection at Laurier Street/ des Allumettières Boulevard which reclaims space from the roadway (i.e. removal of right-hand turn lane onto Alexandra Bridge), simplifies pedestrian crossings and integrates with the bikeway along Laurier Street.
- / Design concepts should consider the public realm and prioritize active users by visually shielding and better integrating the existing marina parking and museum service vehicle requirements.

- / Improvements in public access to the shorelines through pathway improvements for pedestrians and cyclists around the new bridge must increase permeability and unification of the shoreline areas and the adjacent urban fabric to increase use of these spaces.
- / A bridge design must facilitate connectivity by providing safe, direct, visible links (i.e. indications marking sites and distances between them) that are usable throughout the year, including during winter months.
- / Design solutions must resolve elevation differences between the bridge and shorelines, and the diagonal crossing pattern at the Laurier Avenue and des Allumettières Boulevard intersection to access De L'île pathway.



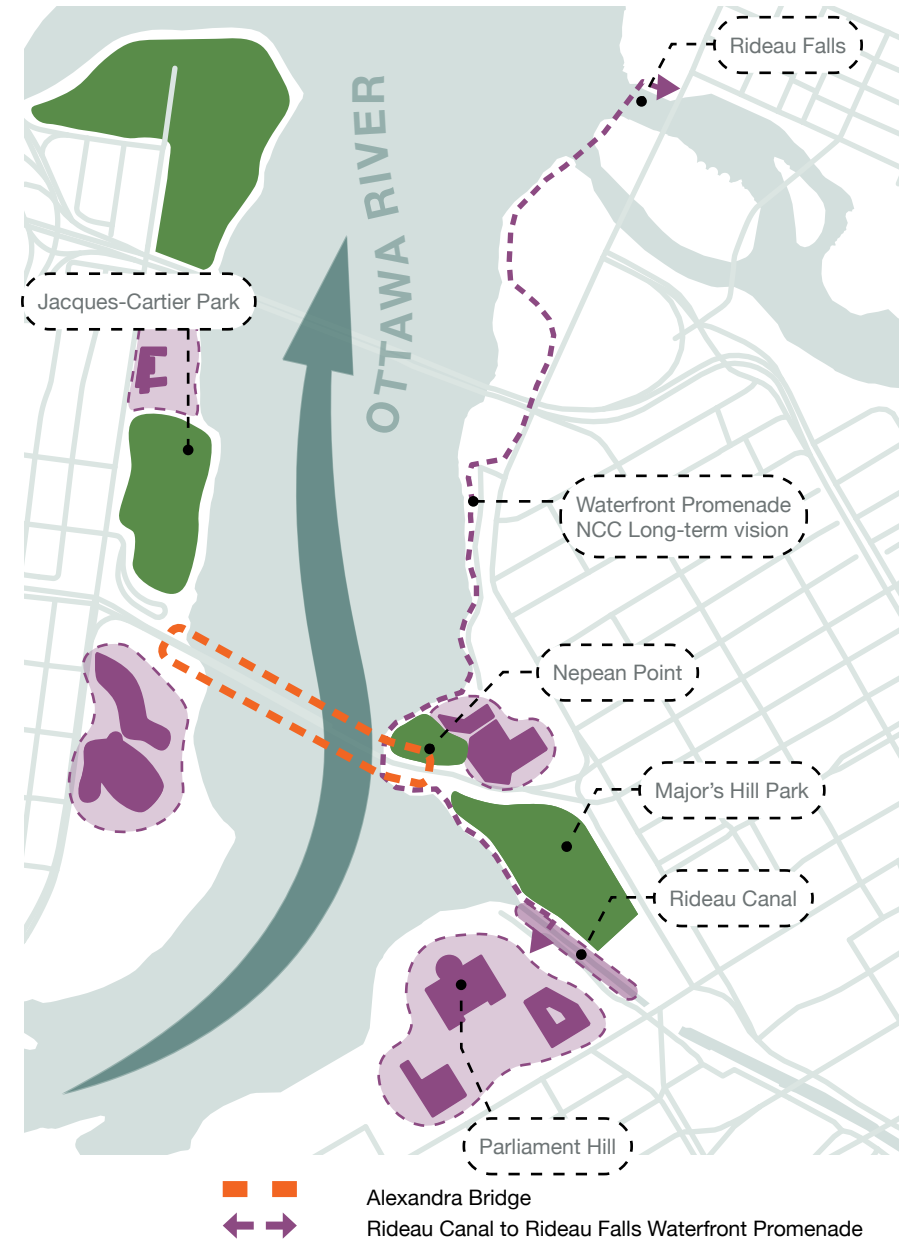
Ottawa River North Shore Parklands Plan Source: NCC

4.1.3 Treatment of the South Shoreline

Three major redevelopment projects are underway on the Ottawa south shoreline, currently at various stages of planning and construction: (1) Nepean Point Redevelopment - design complete with anticipated completion late Spring 2023; (2) Park Masterplan for Major's Hill Park – early design stage with long-term implementation planned; and (3) Rideau Canal to Rideau Falls Waterfront Promenade – NCC's long term vision to create a new, multi-use promenade on the Ottawa side to connect existing public spaces overlooking the Ottawa River.

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.

- / The design of the new bridge must consider and complement the design proposal for Nepean Point, which includes a pedestrian bridge (vertical clearance height of 5.3 metres) over St. Patrick's Street, linking Nepean Point to Major's Hill Park.
- / A new bridge design must review and ensure integration with the NCC's redesign plan for Major's Hill Park, which includes reclaiming spaces along Pioneer way (the former rail corridor), improved universal accessibility between the park plateau and the shoreline, as well as improvements to interfaces and connections along Confederation Boulevard.
- / Pedestrian connectivity from the bridge must include safe, universal accessible linkages to locations below the embankment on the southern approach of the existing Alexandra Bridge to provide access to the Rideau Canal Locks and the Ottawa River Pathway. These linkages must be consistent with the NCC's vision for a long-term Waterfront Promenade between the Rideau Canal Locks and Rideau Falls.
- / Any new and re-established pathway connections along the river shoreline must include quality landscape designs. Where possible, underpasses beneath the bridges should be used to avoid at-grade street crossings.



Alexandra Bridge Replacement - Planning & Design Principles



Concept plan for Nepean Point. Source: NCC

4.1.4 Reflect Topography, Geology and Navigability

In crossing the Alexandra Bridge from Gatineau to Ottawa, there is a notable elevation change reflective of the natural topographical setting of the Ottawa River corridor. From Gatineau, the existing bridge's profile begins at an approximate elevation of 53 metres, rising at a 5% slope before flattening and continuing over the Ottawa River at an elevation of approximately 59 metres, before rising again at an approximate 4% slope to reach the general street elevation of 65 metres along St. Patrick Street near Sussex Drive in Ottawa.

As a navigable waterway, a minimum clearance for a navigation channel is required with dimensions of 90 metres x 11 metres. 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 level for minimal clearance elsewhere is 46.2 metres.

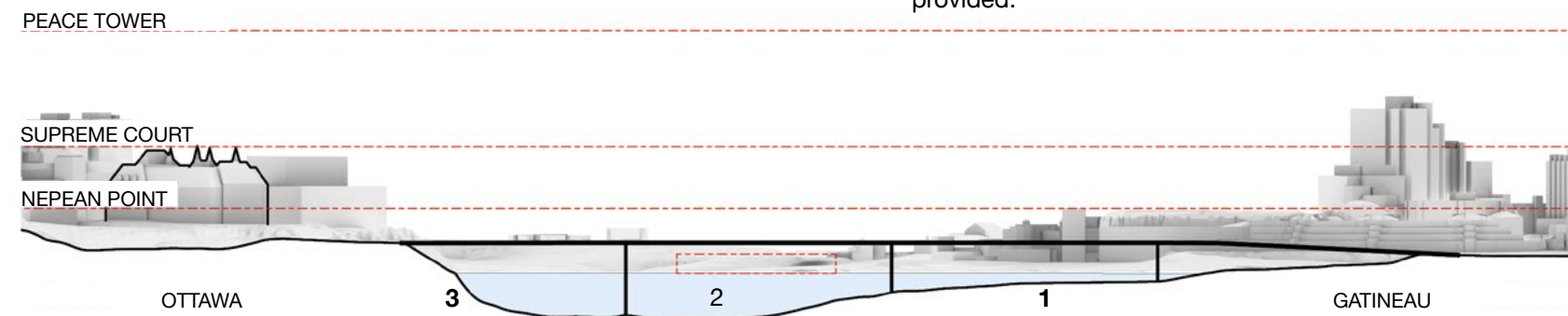
Existing geological conditions have the six central river-based piers of the Alexandra Bridge sitting directly on bedrock as is the abutment on the Ottawa side, whereas the abutment and piles on the Gatineau shore are buried and stabilized within the overburden soil. Previous geotechnical reviews indicate that the presence and condition of the bedrock at

and near the surface renders the site with a conservative Category B placement for seismic purposes, with further study required to confirm seismic category.

The figure below illustrates a general cross section of the riverbed under the bridge showing three distinct parts within the cross section: 1. The Gatineau (Hull) approach, 2. The principal and navigable span of deeper waters, and 3. A short and steep embankment on the Ottawa side.

Bridge designs must accommodate vertical profiles that meet the minimum navigation channel requirements and consider pedestrian and cyclist connectivity solutions in keeping with the guidelines in Section 4.1.2 (North shoreline) and Section 4.1.3 (South Shoreline).

- / Special consideration must be given to the existing topographical changes and differences between the Ottawa and Gatineau shorelines. The layout of the bridge must consider the unique characteristics of the topography, riverbed, and geological conditions of the site.
- / The new bridge design must allow for the navigability of the river to be maintained, comparable to current standards. A navigation channel of 90 metres (horizontal) by 11 metres (vertical), measured from the high-water mark, must be provided.



Existing riverbed cross section - Source: Alexandra Bridge Replacement Program and Design Guidelines

4.1.5 Provide Generous Pathways

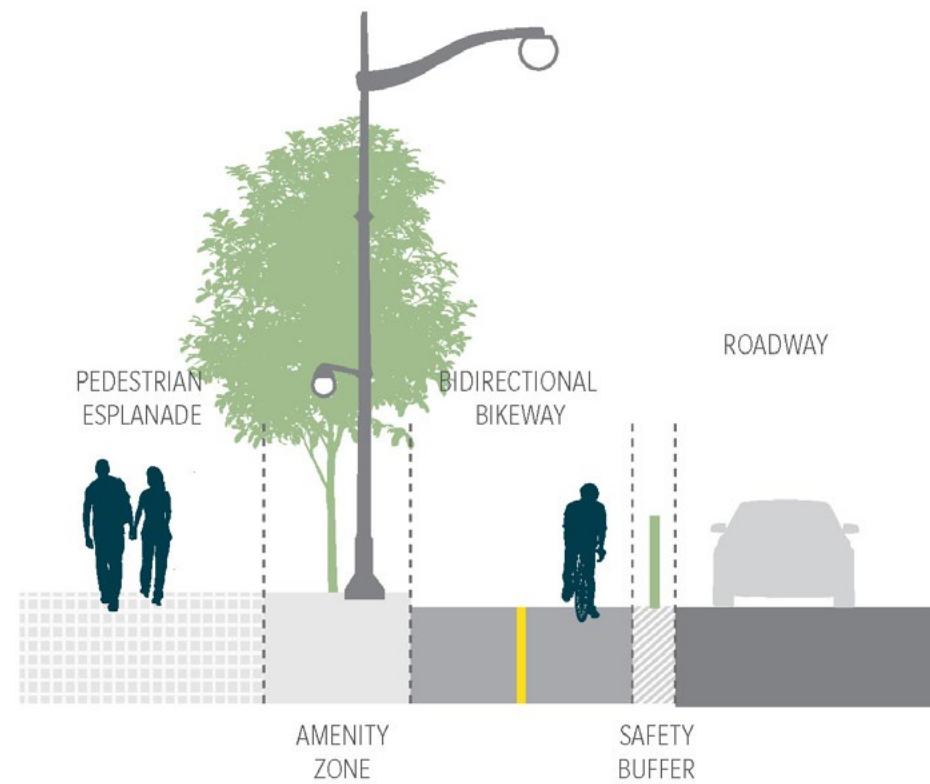
Many respondents from the first public consultation phase for the bridge replacement project remarked that the current bridge is the safest active mobility crossing between Ottawa and Gatineau, as well as the shortest and most conveniently located route between the two downtown cores. The existing segregated pathway is a highly prized feature that many hoped would be enhanced for the experience and safety of active mobility users and to promote sustainable transportation. The functional design for the active mobility lane on the new bridge indicates that active lanes must be bidirectional, with separation of pedestrians and cyclists and include seating and viewing locations that provide rest points without compromising safety or obstructing users.

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.

- / The design of the new bridge must provide generous pedestrian and cycling spaces, with streetscape elements that should be custom designed to ensure integration of the Grand Esplanade, reflective and well coordinated with Confederation Boulevard designs.
- / Priority must be given to the comfort, safety, and well-being of pedestrians, as well as to the movement of cyclists (tourists and commuters), ensuring fluidity throughout the year through well-defined exclusive corridors free of elements that impede movement, with adequate buffers where appropriate.
- / A thoughtful and cohesive design of the pedestrian esplanade on the interprovincial bridge must meet the guidelines of the *Capital Pathway Strategic Plan*, as well as the *Confederation Boulevard Guidelines, Management and Stewardship of Our Capital Legacy*. A minimum width of 4 metres and a separation of pedestrians from bidirectional bikeways with a focus on the esplanade's quality for user experience (sights and sounds) must be incorporated.
- / Cycling slowdown zones at the bridge's approaches should be provided.



Source: Capital Pathway Strategic Plan



Confederation Boulevard

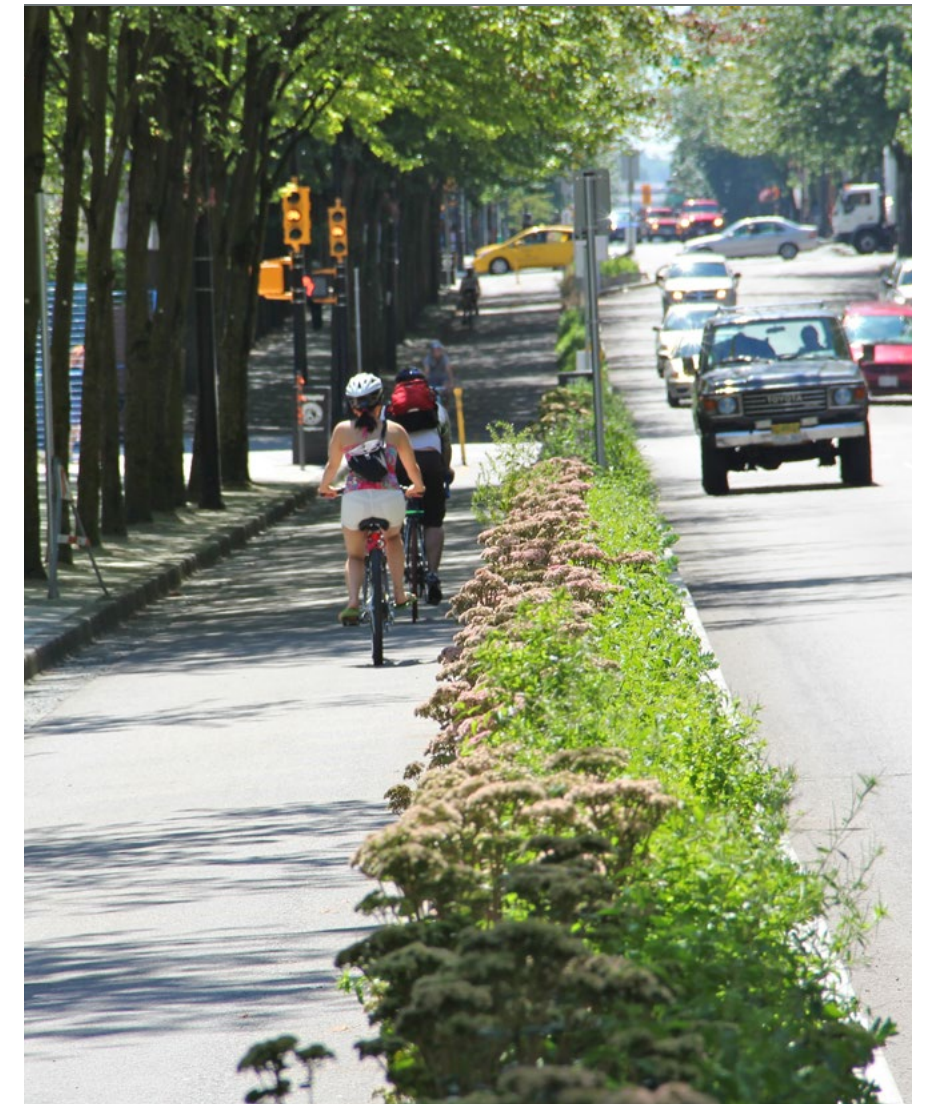
Source: Capital Pathway Strategic Plan

4.1.6 Adaptable Traffic Measures

A feasibility study of the functional requirements for the Alexandra Bridge Replacement concluded that two roadway lanes (one for each direction of travel) suitable for a mix of transportation modes (such as cars, streetcars, and a light rail train system) must be adaptable and flexible for either conversion or sharing of lanes. Addition of trams or a light rail train system in the future could have an impact on the road geometry at the Ottawa and Gatineau approaches.

The fluidity of vehicular traffic lanes, with potential for future trams or a light rail train system, will need to be ensured by a good design configuration at the accesses and approaches on each side of the Ottawa River.

- / The Alexandra Bridge replacement may be slightly realigned to better integrate with the existing road fabric.
- / The design configuration must promote slower speeds on the bridge through appropriate traffic calming measures and signage.
- / Appropriate separation buffers (such as guard rails, medians, or physical separation) between active modes of transportation and vehicular lanes should be incorporated into the design to ensure comfort and safety of active users.
- / Bridge designs must ensure that drivers and future public transit users have an exceptional experience that communicates the importance of the ceremonial route and provides a unique experience through views and a sense of place.



Example of buffer between modes of transportation Source: Paul Krueger

4.2 Public Spaces and Civic Experiences

The new bridge will function as both a link between vital public spaces along Confederation Boulevard and as a dynamic public space in its own right. It is the cornerstone of connection between parts of the Capital that are dominated by the National Capital function or presence, with those parts of Ottawa and Gatineau that are more local and civic in their character:

- / Capital Parks and Public Open Spaces – Jacques-Cartier Park, Major’s Hill Park and Nepean Point.
- / Cultural Institutions – Canadian Museum of History and the National Art Gallery.
- / National Symbols – Parliament Hill, Centre Block, Parliamentary Library, Peace Tower, East and West Blocks and the Supreme Court of Canada.
- / Local Civic Spaces and Neighbourhoods – Quartier du Musée, Hull Island, By-ward Market and Lowertown.

The bridge has multiple entry points and must be designed to accommodate a multitude of uses both in motion and stationary including: utilitarian travel, recreation and tourist travel, sightseeing and resting. At special celebratory times, the bridge may also function as a gathering place.

The public consultation feedback highlighted aspects of the current Alexandra Bridge that set it apart with a distinct character. Comments included:

- / its uniqueness;
- / the history and heritage it evokes;
- / the appearance and character of the bridge;
- / its wooden boardwalk, and its separation from the roadway;
- / the sight, smell, sound and feel of the boardwalk that provides unique experiences to pedestrians and cyclists, albeit also recognized as needing improvement to provide a more even surface.

Together, these elements contribute to the creation of a sense of place that enriches the overall users’ memorable experience of the current bridge.

The redevelopment of the bridge creates new opportunities for enhancing the communal, cultural, and sensorial experience for all Canadians.



National Gallery of Canada. Source: Louise Bourgeois



Source: Canadian Museum of History



Park Jacques-Cartier Source: NCC



Nepean Point. Source: Ross Dunn

4.2.1 The Bridge as a Link

The new bridge will remain as a key interprovincial transportation link between the two core areas of Ottawa and Gatineau, prioritizing active transportation modes through its form and design as a component of Confederation Boulevard.

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 new bridge must continue to serve as a vital link between communities, as a public space to move-through and go-to.
- / In keeping with the bridge's role and purpose of linkage between entry gateways and nodes of Confederation

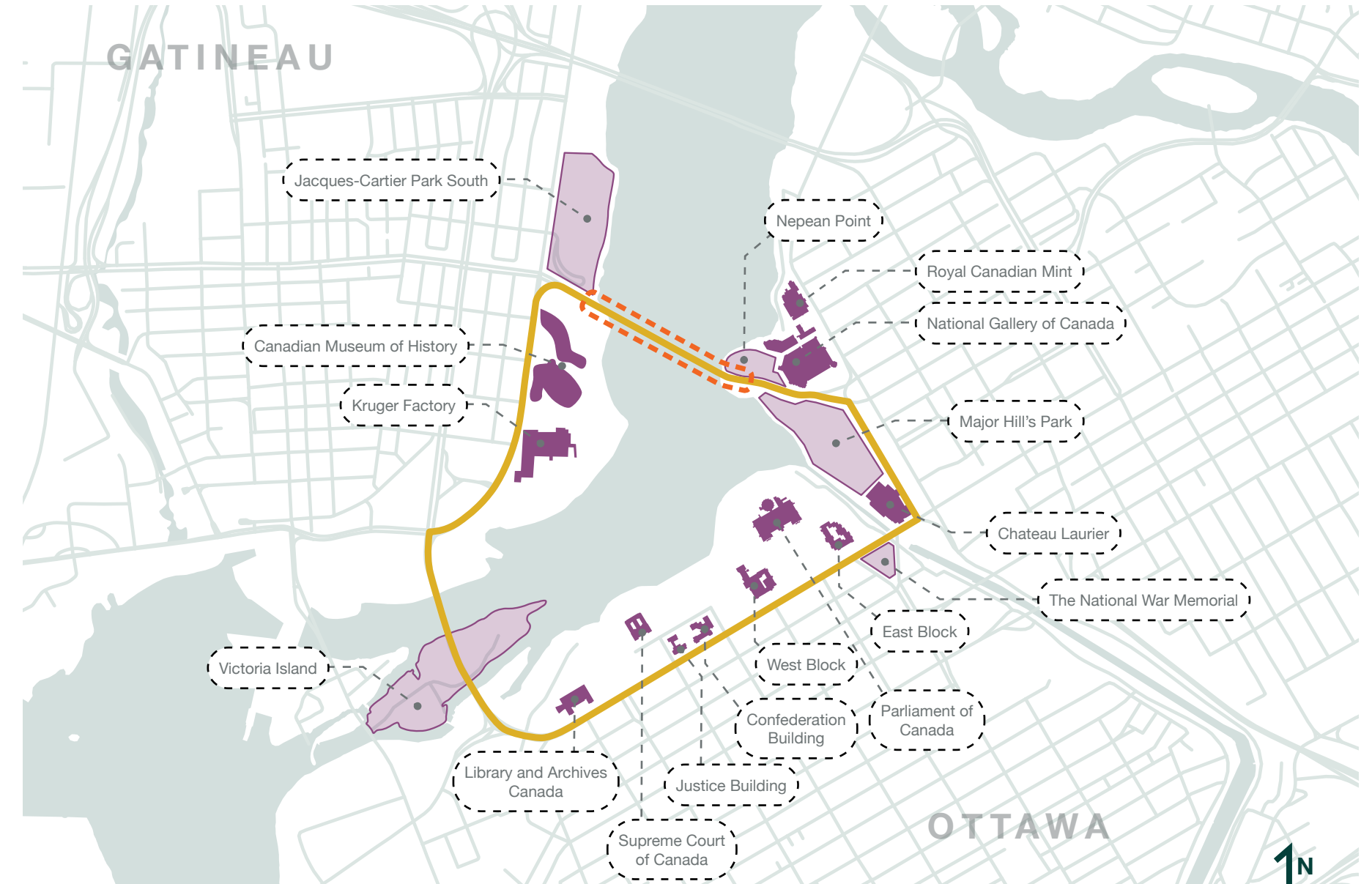
Boulevard, the new bridge design must integrate with the future design of the Gatineau node at the intersection of des Allumettières Boulevard and Laurier Avenue.

- / As a vessel, the bridge must visually and structurally support the vitality of the Capital Realm.

The Capital Realm is the heart of the National Capital's Core Area, focused on the Ottawa River and adjacent lands. Its base is the unique aquatic and geologic features of the waterways and landforms of the Capital Core Area. It comprises the major public landscapes associated with the Ottawa River. Within and adjacent to these public waterside landscapes are situated the primary national symbols and a host of other national symbols, civic, governmental, and institutional buildings.



Source: Fotenn Planning and Design



4.2.2 The Bridge as a Gathering Civic Space

Alexandra Bridge offers a unique platform from which residents, tourists and visitors can stop and take in views of emblematic and symbolic elements, and to ponder while observing the national treasures of the Capital and panoramic views of the River. Seasonal celebrations held in the core area bring individuals together and invite the sharing of the space as a place of gathering. Accommodating and supporting active uses during year-round special events, whether it be for the Capital's Winterlude Festival or Canada Day celebrations, must be considered in the design of the new bridge.

- / Creative bridge designs must be informed by the needs of persons or small groups in daily gatherings, as well as by the needs of much larger groups given the Capital's host role for numerous seasonal events, celebrations, and programming.
- / 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.
- / Lookouts, rest areas, and programmable areas outside the travel lanes should be flexible and safe to allow for gatherings and circulation of various sized groups, including the infrequent large public gatherings that may occur on the bridge.
- / Use of defensive architecture techniques must protect the users of the pedestrian pathway and outlook areas through intentional locations for urban equipment and/or signage elements including benches, bicycle racks and spaces for interchangeable art pieces or interpretation panels.
- / To make full use of the bridge for civic uses including events and scenic views, areas on, around and under the bridge, including the riverbanks, paths, and approaches, should be optimized as part of the overall design. Opportunities may



Picnic on Alexandra Bridge during Canada 150 celebrations. Source: NCC



Alexandra Bridge as a backdrop for Winterlude festival. Source: Fotenn Planning and Design

include an easier and safer access to the water through decks and piers, designated areas for taking photographs, strategic communal seating to observe sunset/sunrise or fireworks, permanent or temporary urban art installations, platform for performances, etc.

Being a fundamental component of Confederation Boulevard, the new bridge must align with the Confederation Boulevard guiding principles, including:

- / A Memorable Image: Confederation Boulevard projects an image that is dignified, unique and lasting, and that is reflective of Canadian values, heritage, and achievements.
- / A Vibrant Public Space: Confederation Boulevard is a vibrant public place that presents Canadians with a range of opportunities for enhanced community, intellectual and emotional experience.
- / Pedestrians First: Confederation Boulevard gives first priority to the comfort, safety and enjoyment of pedestrians, and then to the accommodation of cyclists, public transit and other vehicles.
- / Universal Accessibility: Confederation Boulevard is accessible to all persons, and shall extend accessibility to those beyond the National Capital through a range of communication media.
- / Sustainability: Confederation Boulevard is a demonstration of the NCC's leadership in environmental sustainability and stewardship.

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.



Seating area by Alexandra Bridge Source: Alexandra Bridge Replacement Program and Design guidelines



Canada 150 years Celebrations (MosaiCanada 150) - Source: Fotenn Planning and Design

4.3 Structure, Height, Proportions and Lighting

Building on and continuing the legacy of our national icons, the bridge provides both a foreground and background to be experienced when crossing the bridge and taking in the grandeur of the nation's capital.

The new structure shall be designed as a signature bridge considering aesthetic, technical and operational aspects that differentiate it from a standard bridge design. The final design must demonstrate a good understanding of these features to result in an elegant, aesthetic, and durable design that will complement the landscape and landmarks of the Capital.

The new bridge must be sensitively designed to fit within the existing context of the built and natural heritage of the Capital Region.



Source: Fotenn

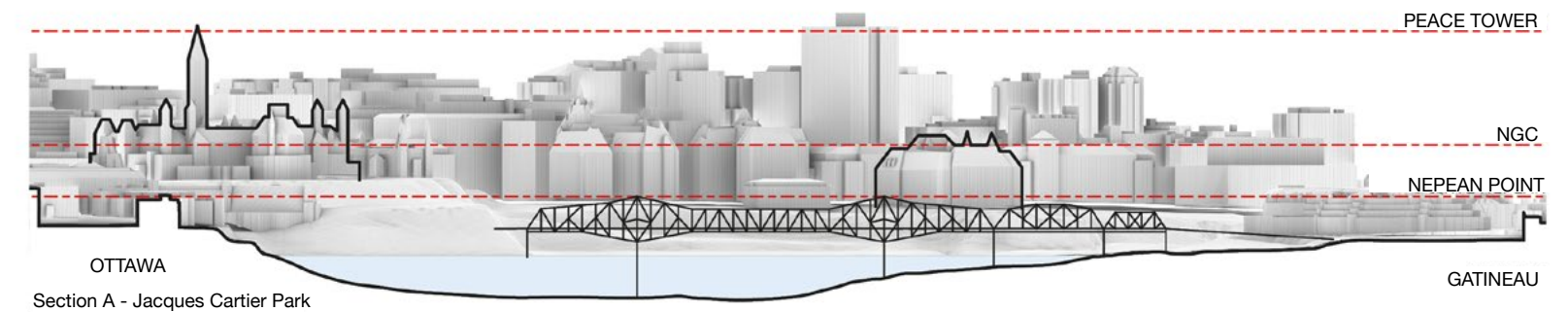
4.3.1 Superstructure Design and Limits

The Alexandra Bridge replacement must receive an elegant design and provide a sense of wonder over the thought-provoking structure. Structuring principles must be established early and as part of the conceptual bridge design stage that will ultimately result in a clear, orderly, and well-proportioned structural system that is cost effective, robust, and resilient, but does not limit the architectural design expression characteristic of a landmark bridge. Specific technical bridge engineering requirements in relation to aspects such as safe waterways marine navigation, bridge alignment, structure width and pier locations will be finalized during the detailed design stage.

The new bridge must be designed as a structure that will be proportional to its existing context including landmarks, key views and other reference points.

The sections shown here illustrate important points and heights of major monuments in the cultural landscape of the nation's capital. These sections may be used to determine points of reference, such as the promontory of Nepean Point and the open, expansive landscape on the Québec side encompassing Jacques-Cartier Park and the Museum of History lands to illustrate the general sandbox for an integrated architectural bridge design.

- / The height of the bridge should not distort the proportions of the landscape and shall fit within the complete panorama of other national symbols and monuments. The main structure of the bridge should respect the height of Nepean Point, with some flexibility in the final design for sensitively integrated architectural features and elements.
- / The form shall create a signature bridge that fits within the National Capital landscape and evokes the existing architectural history of the bridge.
- / Integration of optimal bridge spans, given river bathymetry and navigation requirements, with a desire to limit aerial structural heights may affect bridge type selection.
- / The massing of the bridge will need to have regard for all applicable scales. As a macro level, the bridge must fit within its natural landscape while at a micro level, it must ensure comfort and accessibility for all users.
- / Design approaches could consider, for example, the geomorphologically contrasting approaches, as landscape elements potentially in tension, each demanding of separation for visibility. In this way, a signature bridge design could include features / height elements mid-river to ensure space and visibility to the approaches.



Height versus site scale and cultural landscape. Source: Alexandra Bridge Replacement Program and Design Guidelines

4.3.2 Create Iconic Silhouette

The Alexandra Bridge is an iconic landmark, a recognizable feature of the Capital's landscape with a unique silhouette that differentiates it from the other four interprovincial bridges (Champlain Bridge, Chaudières Bridge, Portage Bridge and MacDonald-Cartier Bridge). Its trussed profile and cantilevered structure make it a memorable urban element in people's memory of the National Capital Region since its construction.

The replacement bridge will feature prominently at the centre of the Capital for the next 100 years and will become a new reference point in the identity of the region.

- / The design of the new bridge should focus on a structural strategy with interesting aerial elements that allow for visual permeability through the structure. The height, quantity,

location, and rhythm of these elements should resonate with the proportions of the surrounding built and natural landscapes.

- / Moreover, their design should not compete with the presence and primacy of national monuments but complete the panorama and continue the story being told by Confederation Boulevard's Ceremonial Route.
- / Opportunities to view the bridge silhouette from above and afar, such as from the higher elevation at Nepean Point or from Plaza Bridge, as well as from below, such as from the shorelines and Jacques Cartier Park, must also be considered during the design development.
- / The design must also consider and allow for future supporting structures and accessories for transit enhancements.



The Alexandra Bridge from the Ottawa River. Source: NCC

4.3.3 Lighting Design Excellence

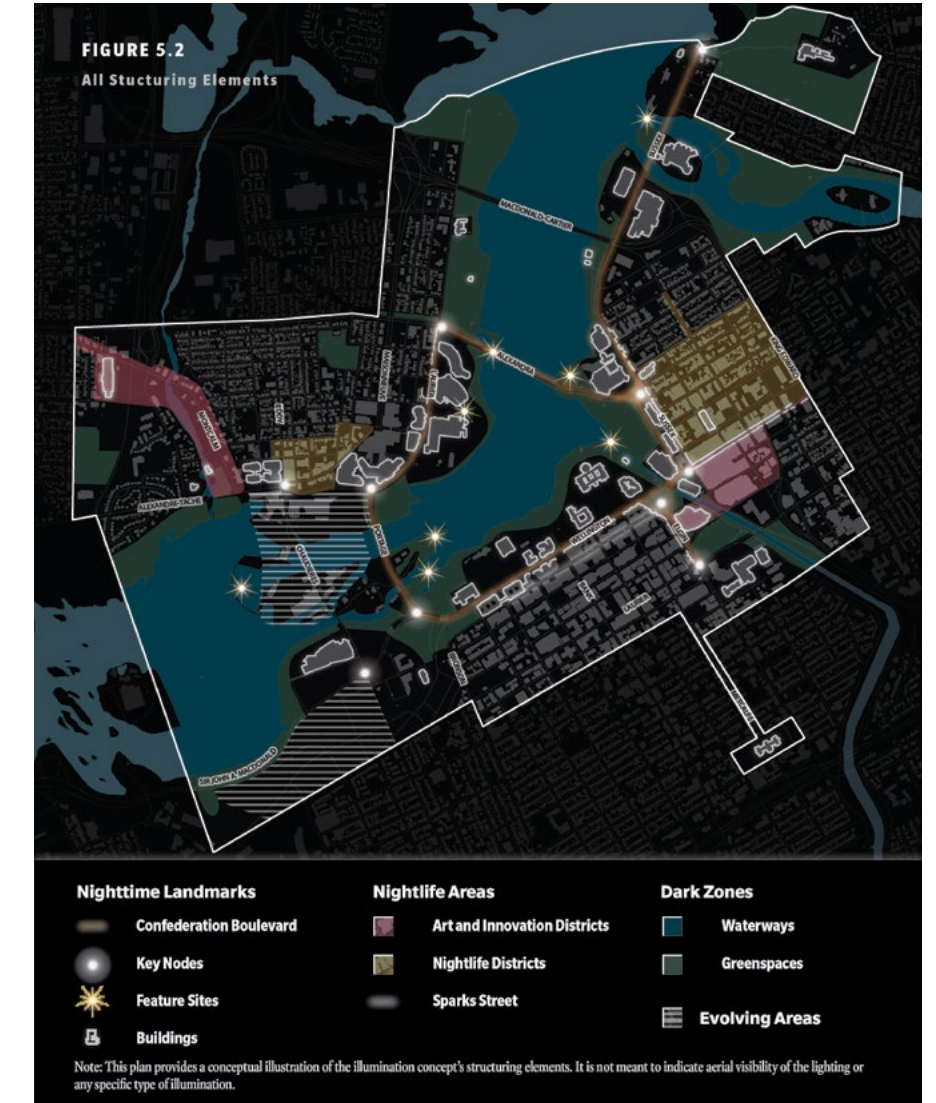
Lighting in the core area is governed by the *Capital Illumination Plan, 2017–2027*, which defines lighting strategies to enhance the nighttime landscape of the Central Capital Landscape Sector, which includes Confederation Boulevard. The illumination objectives for this sector are as follows:

- / Consolidate the notion of a nighttime foreground.
- / Showcase the exceptional beauty of the landscapes, symbols, and heritage.
- / Strengthen the continuity of the Confederation Boulevard Route.
- / Support nighttime activities and strengthen connections to nightlife areas.

Further, recommendations for the future lighting design of Alexandra Bridge (or its replacement) are as follows:

- / Consider a renewed architectural illumination of the bridge.
- / Favour illumination of the interior structure above the road and minimize lighting below the bridge.
- / Ensure visual continuity with Confederation Boulevard public lighting. However, if Alexandra Bridge receives an architectural illumination, promote a visual link with Confederation Boulevard at both ends of the bridge, rather than along its full length.
- / In addition to permanent illumination, consider temporary artistic, high-quality, and subtle lighting projects.

The Alexandra Bridge replacement should receive an exquisite Lighting Design Scheme that will allow it to be used and enjoyed at all hours of the day, independent of seasonal daylight variations. Through sensitively designed lighting features and other elements, the bridge is not to dominate, but integrate, within the existing landscape.



Source: Capital Illumination Plan

- / The lighting design scheme for the bridge should consider the local environment and the nature of the site with lighting strategies that are subtle and respectful of the memory of the place, and that create a sense of ambiance for a nightly streetscape.
- / Light should only be used as a complementary layer that highlights the bridge's architectural expression rather than overbearing it. The lighting design scheme must ensure that the bridge will not compromise or take away from the visual primacy of the buildings that compose the National Capital's core landscape.
- / Functional road lighting and the lighting treatment of architectural elements should favour and embellish the bridge's design (in terms of safety, aesthetics, enhancements) while reducing the impact on the river, vegetation and local wildlife species, especially birds, by implementing current best practices and standards, including CSA A460:19, Bird-friendly building design.

- / Amber or warm white tones are preferred to reduce impacts on the river and native wildlife.
- / Lighting fixtures proposed should be located out of sight and be chosen based on durability, longevity, low maintenance, and more importantly energy efficiency and efficacy that will contribute to a more sustainable design. LEDs and other highly efficient lighting systems are encouraged.
- / Creative solutions should allow for flexibility in usage, permitting selective use of colour in addition to ephemeral, artistic and/or original lighting themes to be integrated into the civic space and bridge during national holidays, special events and seasonal festivities.



Example of adequate lighting scheme. Source: Capital Illumination Plan



Source: Capital Illumination Plan

4.4 Preserve Views and Celebrating the Legacy

Alexandra Bridge is situated in a unique cultural, archaeological, recreational and interprovincial urban setting within a rich heritage context of high significance. It is bookended by two of the most important cultural institutions in the National Capital, the Canadian Museum of History, and the National Gallery of Canada. The bridge is located approximately 250m from the Rideau Canal locks, a UNESCO World Heritage site and Parliament Hill. It also sits next to several iconic open spaces of the National Capital Region including Nepean Point, Major Hill's Park and Jacques-Cartier Park, the latter annually hosting the Capital's winter festival, Winterlude.

The Ottawa River Corridor comprises the cultural and natural features contained within the boundaries of the waterway and surrounding lands. The *Definition and Assessment of Cultural Landscapes of Heritage Value on NCC Lands, 2004*, describes that the value of the Ottawa River Cultural Landscape is connected to three principal sets of cultural ideas:

1. The first are ideas expressed by First Nations, for whom the river has social, economic, and spiritual value. The focus of First Nations cultural expression includes the rich archeological resources of ancient human occupation.
2. The second are ideas expressed by the NCC, which has established an important presence throughout the landscape's areas and created spaces that speak directly to Capital-making through approaches to urban design, ecology, and recreation including its continuing contributions as a sublime setting for Parliament Hill, and as a positive organizing principle in the urban fabric of the Capital.
3. The third are ideas associated with the history of settlement, exploration, fur trade and industry, particularly in connection to the role that the river played in the Ottawa Valley lumber industry.

The Ottawa River is an important water route in the history of Canada's First Nations and European exploration, trade and settlement. It is a major urban design organizing element and a symbol of the Nation's Capital.

The presence of such a rich and diverse historical context creates opportunities for views of national symbols to be enhanced, but the new bridge design must also be mindful, respect and protect the sequence of existing views of the Capital's cultural and heritage landscape.





Red moose statue by Indigenous artist Simon Brascoupe at Pimisi LRT station, Ottawa. Source: NCC

4.4.1 Honour the Traditional Indigenous Culture

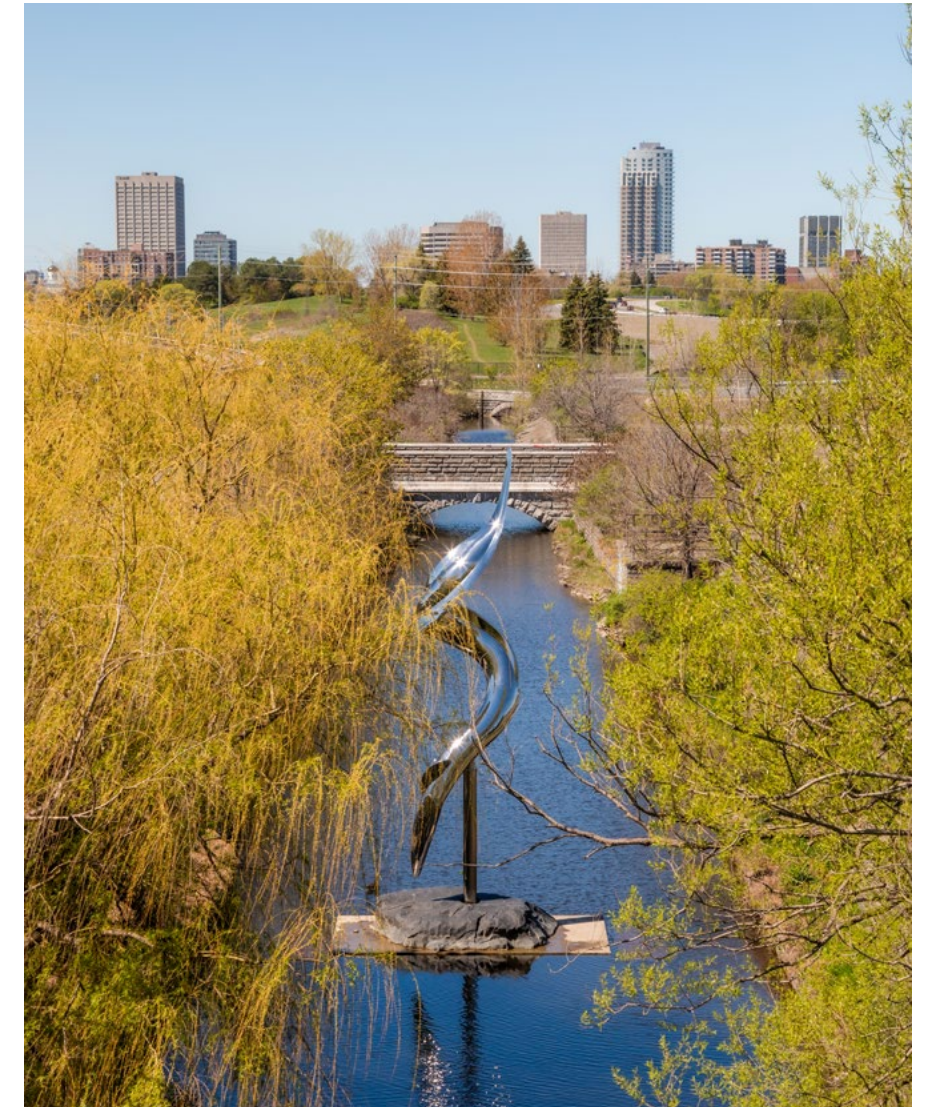
The Algonquin Anishinabeg have been stewards of the Ottawa Valley since their ancient oral history records their stories of creation in the territories and waterways of the land. The territories of the Algonquin Anishinabeg Nation cover the entire Kichi Sibi (Ottawa River) watershed from the headwaters to the St. Lawrence River. Prior to contact with Europeans, dividers such as the Ontario-Québec border were nonexistent. The entire territory was inhabited by the Algonquin Anishinabeg Nation and they remain the host Indigenous nation in the National Capital Region.

The design process of the bridge will provide opportunities for Indigenous engagement and dialogue throughout all development phases.

Opportunities to acknowledge Algonquin territory and culture may include:

- / Bridge naming, and use of Algonquin language
- / Artistic, interpretive or commemorative elements
- / Sustainable values, materials and aesthetic considerations
- / Direct involvement in the project development

Designers must seek to understand traditional knowledge and incorporate the Algonquin Anishinabeg perspectives and values.



The chrome eel at the Pimisi LRT station in Ottawa. Created by indigenous artist Nadia Myre. Source: NCC

4.4.2 Visual Integrity

The bridge boardwalk offers spectacular panoramic views towards the River shorelines and upriver, with panorama 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. Views from key Viewpoints #4 to #9, as identified within the NCC's *Canada's Capital Views Protection Plan, 2007*, 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 are visible above the Centre Block.

The new bridge design must preserve the visual integrity and symbolic primacy of the Parliament buildings, as demonstrated through a views analysis which clearly articulates and considers the bridge's physical contribution to the Capital's cultural and natural landscape.

- / Impacts of future bridge designs on views from key Viewpoints #4 to #9 shall be reviewed during development of future bridge designs.

- / Additional key view locations that were identified during background studies should also be taken into consideration, as part of a views analysis. New bridge design and alignment (i.e. height of bridge structures such as towers, arches and bows; width and elevation of proposed bridge; number, size, footprint and design of foundations, piers, and piles) must not result in an overall significant negative impact on views of the Capital's cultural and natural landscapes, specially from these locations:

- / Elevated views from Nepean Point and the Parliamentary Precinct, Plaza Bridge, the Chateau Laurier terrace and Supreme Court,
- / Views from the interior of the Canadian Museum of History, the National Gallery of Canada and the Library of Parliament,
- / Views from along Confederation Boulevard, including views of the Alexandra Bridge itself, and
- / The lower views from active users (pedestrian and cyclists) along waterfront trails and from Jacques-Cartier Park, as well as viewers from recreational and tourist operating boats at the Hull Marina or travelling on the Ottawa River.

- / The views analysis must include potential impacts of the new bridge on the views of national symbols including the foregrounds (central and lateral) and backgrounds of viewsheds.
- / The views analysis should detail any alterations to existing views that may potentially arise (i.e. issues of obstruction, obscuring and visual domineering of scene) with the addition of a new bridge design.



View from the approximate location of Control Viewpoint #6. Source: Michel Rathwell

4.4.3 Protect Control Viewpoint #6

The Alexandra Bridge replacement design may be slightly realigned to better integrate with the existing road fabric, providing a seamless and safer experience for all users.

Control Viewpoint #6 is located at the existing Alexandra Bridge sidewalk level. This viewpoint is part of a visual sequence that goes from the Canadian Museum of History to the National Gallery of Canada and must be respected.

The principal criteria for the protection of Control Viewpoint #6 viewed are to ensure that no background buildings are visible above the Centre Block as determined in the *Canada's Capital Views Protection Plan, 2007*.

It is important to note that the new bridge design must be compatible with the existing characteristics of Control Viewpoint #6, including the bridge deck level. The precise location and level of viewing platforms on the new bridge will have to be validated through a Views Impact Study to prove that views to the National Symbols will continue to be protected as intended by Control Viewpoint #6.

New bridge design must be compatible with the existing characteristics of Control Viewpoint #6 such that views from the bridge deck level should avoid existing background buildings being exposed and interfering with the silhouette of the Parliament Hill buildings.

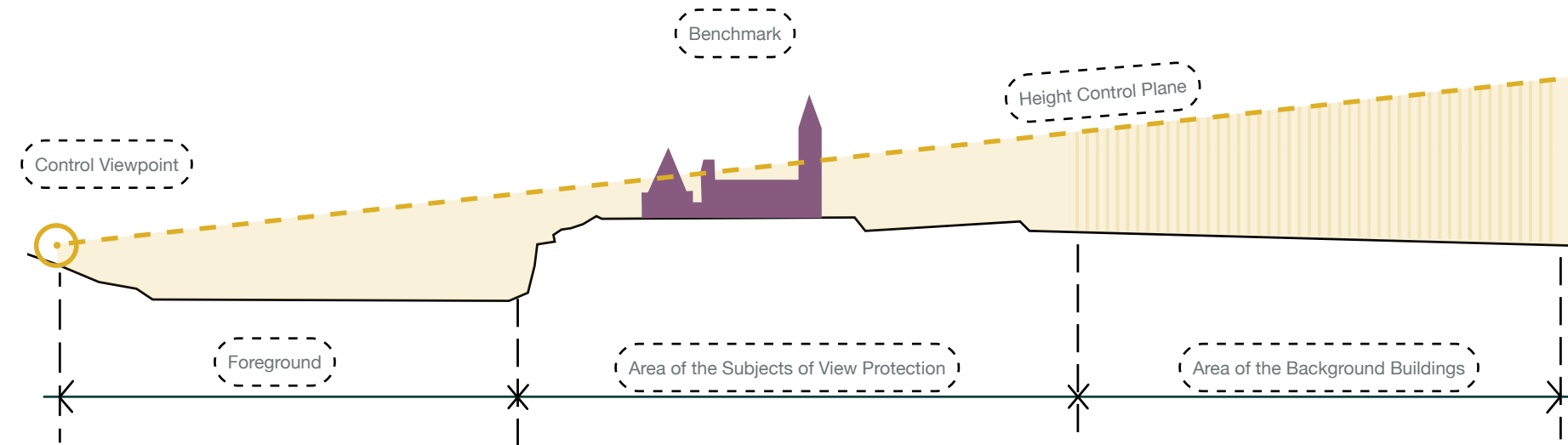
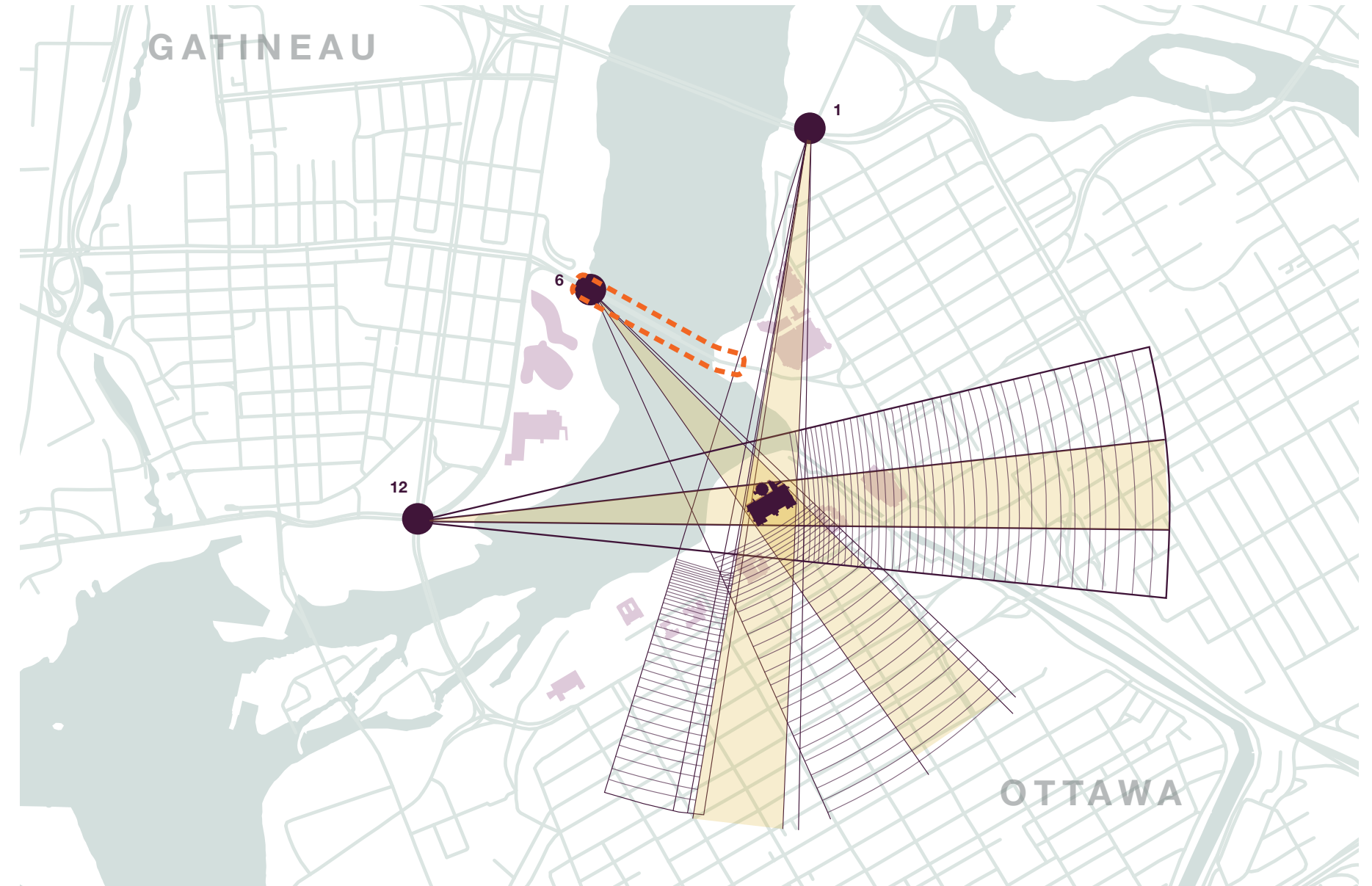


Diagram of a Background Height Control Plane based on Canada's Capital Views Protection Plan (pg. 86)



Map based on Canada's Capital Views Protection Plan - Background Control Viewpoints and Views (pg.62)

4.4.4 Scenic Views and Approaches

Alexandra Bridge is both a part of and a place for observing key views within the cultural and natural heritage of the Capital Region. Its replacement has the inevitability of becoming a landmark and visual attraction in the central capital landscape, and any new design must preserve the visual integrity and symbolic primacy of the Parliament buildings) within the setting of the Ottawa River corridor.

Views of the bridge both as an artifact symbol and landmark, and the bridge as a viewing platform and experience in its own right are to be respected.

- / As a sculptural element crossing the Ottawa River, the new bridge must contribute to the scenic route sequencing and the approaches on both sides of the bridge shall receive high quality architectural, urban and landscape designs. These may reflect the history of the river, the bridge and its link to the former rail system as well as provide access to the water.
- / The new bridge must provide pedestrian and cycling paths that preserve the site views and allow for interpretive elements to be installed along the walkway.
- / New views and viewing outlooks to and from the new bridge may be proposed and integrated into the bridge design.



View across Alexandra Bridge approach to Parliament Hill from Nepean Point. Source: Fotenn



- ■ Alexandra Bridge
- Major Vehicular Approach Roads and Urban Streets
- Important Dynamic View Zones
- Important Viewpoints
- Entrance Viewpoints
- The Central Capital Landscape
- Viewpoint #6

Map based on Canada's Capital Views Protection Plan - Viewpoints and View Sequence on the Approach Routes and City Streets (pg.44)

4.4.5 Continuity of Cultural Landscape

The Alexandra Bridge is a key feature of the evolved central Capital cultural landscape with its approaches sensitively positioned to respect the geomorphology of the Ottawa River's shorelines and escarpments. The continuity of this cultural landscape is highly valued within NCC policies and by the public. Bridge designs must respect features and values congruent with the bridge's landmark identity and opportunities to pay tribute to the surrounding heritage will be expressed in aspects such as materials, form, and spatial organization.

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.

- / Bridge designers should review heritage reports completed for Alexandra Bridge to understand the character-defining elements of the existing bridge and their collective contribution to the cultural landscape to ensure forthcoming designs do not introduce incompatible features to the setting in terms of size, scale or design.
- / The visual integrity of the cultural landscape shall be preserved with a seamless integration of the new bridge into the existing and evolving urban and natural environment context.
- / The new design must provide continuity with the existing urban fabric, with materials and scale appropriateness contributing to the seamless visual integration.
- / Landscape integration along the shorelines and approaches shall maintain the green cohesiveness of the Ottawa River corridor.
- / Designers shall consider impacts of bridge design details such as railings, lane separation features and ramps, on the physical and visual continuity of the existing Capital Realm.

- Alexandra Bridge
- UNESCO Heritage Site
- National Historic Sites (nearby)
- 1 Earncliffe National Historic Site of Canada
- 2 Rideau Canal Historic Site of Canada
- 3 National Arts Centre Historic Site of Canada
- 4 Central Chambers Historic Site of Canada
- 5 Confederation Square Historic Site of Canada
- 6 Office of the Prime Minister and Privy Council
- 7 Public Grounds of the Parliament of Canada
- 8 Chateau Laurier Historic Site of Canada
- 9 Connaught Building Historic Site of Canada
- 10 Former Geological Survey of Canada Building
- 11 Notre-Dame Basilica Historic Site of Canada
- 12 Former Archives Building Historic Site of Canada
- 13 Royal Canadian Mint Historic Site of Canada
- Recognized Federal Heritage Buildings - Hull Island
- 1 Charron House
- 2 Place du Portage, Phase 3
- 3 E. B. Eddy Digester Tower
- 4 Gilmour and Hughson Limited Office
- 5 National Printing Bureau and Heating Plant
- 6 Monastery, Servantes de Jésus-Marie Congregation
- City of Ottawa Heritage Conservation Districts / City of Gatineau site patrimonial



Heritage Resources of importance in proximity to the Alexandra Bridge

4.4.6 Legacy

The Alexandra Bridge was a marvel of engineering at the time of its conception and construction, being recognized worldwide for its innovative design at the beginning of the 20th century. The inshore portions of the Ottawa River bed on the Québec and Ontario sides of the Alexandra Bridge are evaluated as having pre-contact and historical archaeological potential.

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.

- / The potential to reuse stones and other materials salvaged from the existing structure's demolition to create walls, staircases, benches, interpretive elements or to create a memory wall are encouraged to build on the memory and distinctiveness of the place.
- / Opportunities to pay tribute to the surrounding heritage could be expressed in aspects such as materials, form,

spatial organization, and interpretation offering visitors a rich experience aimed at expanding their understanding of the region's evolution.

- / 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.



The Interprovincial Bridge (now Alexandra Bridge) during construction, 1901. Source: LAC/Topley/PA-013866

4.5 Sustainability and Materiality

Much like the existing Alexandra Bridge pushed engineering boundaries to achieve a long bridge span at the time of its completion and was an engineering marvel with the use of carbon steel, a new material at the time, its replacement should strive to excel and respond to current human and environmental challenges such as the fight against climate change.

Highest sustainable development standards for a climate-resilient bridge will be achieved by aligning the design with applicable federal strategies and targets, and following Canadian federal sustainable development strategies, which support the environmentally focused goals from the United Nations 2030 Agenda for Sustainable Development:

- / NCC's Sustainable Development Strategy 2018-2023
- / Federal Sustainable Development Strategy 2019 to 2022

In addition, respect for traditional Indigenous knowledge will guide early Indigenous engagement efforts to understand and define community-driven planning processes that reflect their interests and circumstances.

The end result will be a bridge with a material identity and structure that is emblematic, timeless and durable to serve its purpose for at least a century with a Grand Esplanade that reflects the aesthetics of national monuments and the landscape of the Capital.



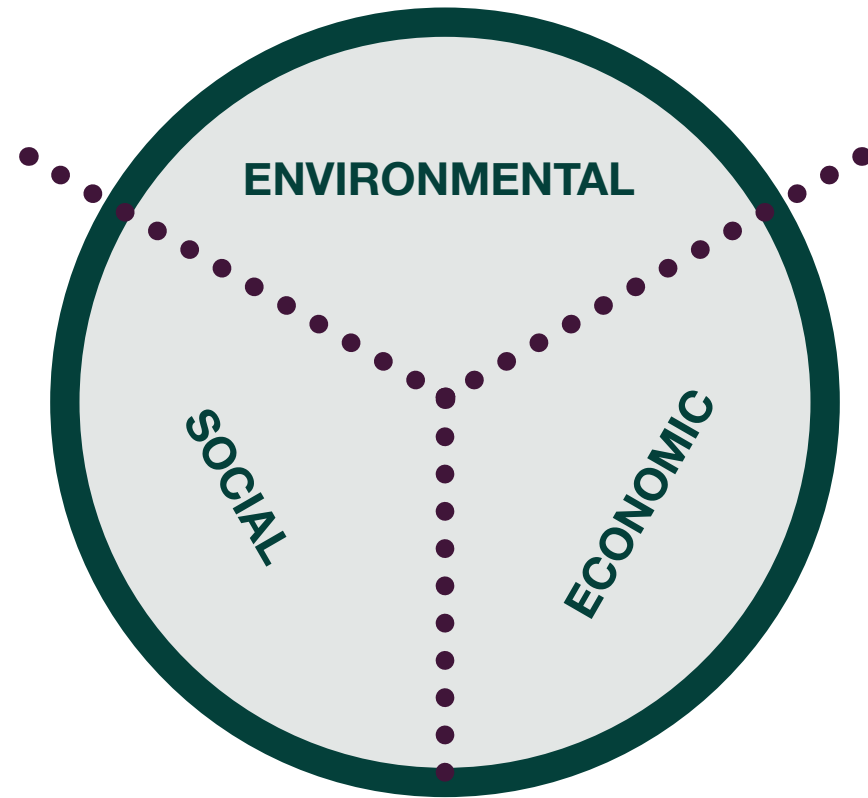
The new bridge shall be an example of sustainable infrastructure, must be long lasting and respect traditional Indigenous knowledge. It shall respond to the sustainability triple-bottom line: Social, Environmental and Economic.

SUSTAINABLE DEVELOPMENT GOALS



Source: United Nations

- / Limited number of piers/structural elements to limit impact
 - / Cognizant of high water level changes
 - / Bird-safe design best practices
- / Efficient material selection to reduce embodied carbon footprint
 - / Reduce light pollution
 - / Adapt to climate change



- User-friendly /
- Accessible, inclusive gathering spaces /
- Sheltered resting and seating areas /
- Direct routes from bridge to approaches and river /
- Unobstructed views /
- Reflect Canadian diversity and Indigenous perspectives /
- Reduce energy consumption /
- Avoid need for temporary construction support structures /
- Durable and low maintenance materials /
- Future proofing - design that is adaptable to future needs /

Infrastructural Sustainability - Bridge Projects. Source: UNStudio Sustainability Platform

4.5.1 Preserve and Enhance the Natural Environment

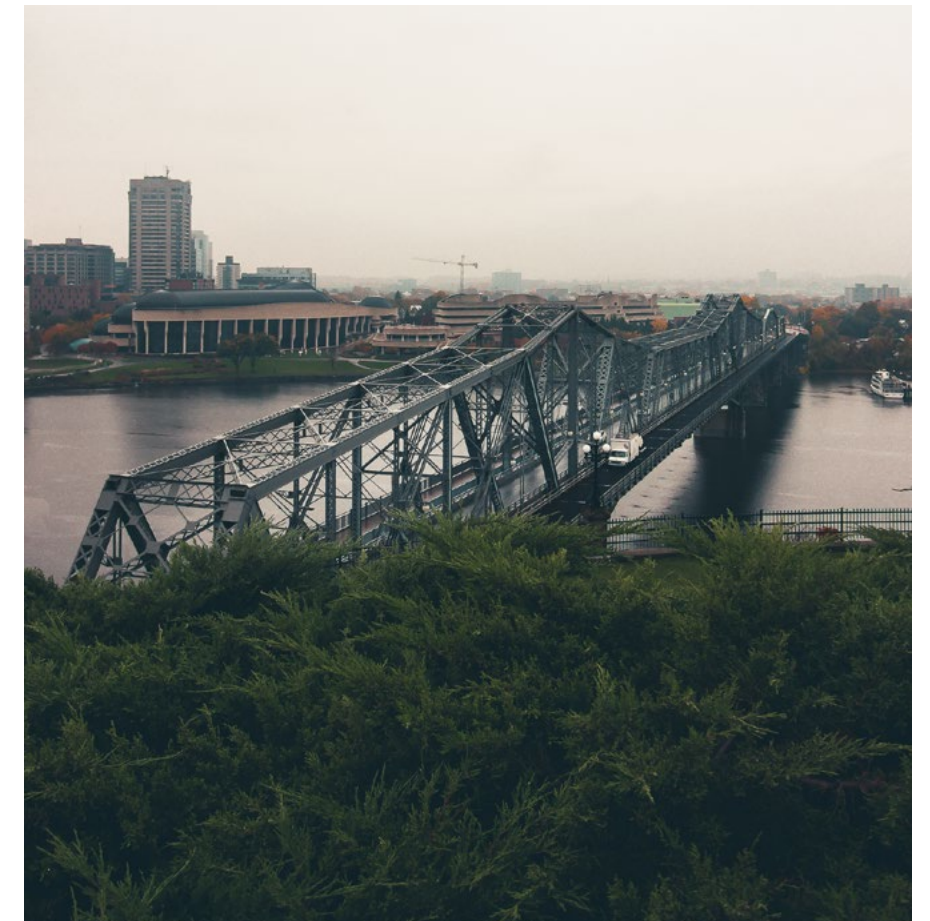
Riverfront lands, shoreline vegetation and the river provide a rich and diverse ecological setting for the Alexandra Bridge. A variety of shoreline typologies are found along the approaches and adjacent areas of the river shoreline, from wooded rocky natural sites to landscaped park open spaces with expanses of manicured lawns, pathways and cultural institutional buildings and spaces.

Representative of the area's resilience and biodiversity amid the urban setting, the Ottawa River corridor provides natural habitats for many fish, birds and wildlife species, including some species at risk. Protection and improvement of these natural environmental components are crucial to the health of the watershed, wildlife and vegetation and must be at the forefront of bridge design decisions.

Placement of the bridge structure (piers and abutments) and siting of bridge construction and deconstruction activities will interact with the river and shorelines. Bridge engineers and designers need to understand potential impacts and threats early to avoid damage to vulnerable aspects of the river ecosystem, habitats and living organisms.

- / Detailed fish, wildlife, and vegetation inventories, as well as habitat identification and assessment, must inform the detailed bridge design.
- / Opportunities to learn from traditional Indigenous knowledge should be explored and integrated into the final design of the bridge in these sensitive locations.
- / Natural environmental improvements and benefits to enhance the local urban forest cover, reduce shoreline erosion, limit contaminants, restore natural riparian vegetation and enhance plant, animal and fish habitats must be included within the overall bridge design approach.
- / Natural landscape improvements integrated with architectural gestures should utilize native vegetation to buffer human activities and provide balance between the built and natural environment.

- / Preservation of the overall River Corridor's iconic, lush green landscape between the mouth of Brewery Creek (to the north) and the Rideau Canal Locks, is important given this corridor is a gateway to the Capital that can be seen by visitors arriving from Montreal by boat on the Ottawa River.



Looking towards the Canadian Museum of History from Nepean Point. Source: Fotenn

4.5.2 Consider Local Climate

The Capital Region is located in a dynamic environment with a wide variety of seasonal meteorological events. Climate change over the next 100 years is likely to increase the intensity and frequency of atypical events. For a project to be truly sustainable, it must take into consideration regional and local climates accounting for peculiarities typical of all four seasons such as heat waves, snow, fall leaves, seasonal floods, high winds, tornados and frost and thaw cycles.

Given the unique landscape of the Ottawa River Valley, in addition to exceptional climate events, microclimates may also be observed and should be considered and addressed in the design details, with a focus on resiliency.

- / Stormwater collection systems on the bridge should be built to withstand 1:100 year storm events with design details functioning to protect bridge users, storm infrastructure systems and the river water quality and to prevent erosion of shorelines during storm events.
- / An assessment of the bridge design must review how the infrastructure will contribute to reduce carbon pollution and how it incorporates climate change risks to better withstand severe weather, floods, earthquakes and other possible disasters, linked to climate change.
- / Maintenance requirements of bridge components must be reviewed in keeping with expected degradation and weathering given local climatic conditions to guide durable and sustainable material selection and treatments.



Alexandra Bridge being used during winter months - Source: NCC



Rideau Locks and Alexandra Bridge in the summer - Source: Fotenn Planning and Design

4.5.3 Materials Selection Criteria

Architecturally and structurally, bridge material(s) selection will define the signature of the bridge replacement. Notwithstanding, bridge materials must be chosen based on durability, low maintenance, innovation and sustainability.

Priority will be given to products with reduced environmental footprint from recycled or local sources. Products will be highly durable, recyclable and consider life cycle assessments and cost on a perspective of 100 years or more. The choice of materials and construction methods must consider their impacts on long-term maintenance and repair requirements.

- / Demolition materials from the existing bridge may be repurposed or reused in the bridge design or in reinstatement efforts on affected adjacent lands to make walls, staircases, benches, interpretive elements or to create a memory wall to reduce the carbon footprint of the project.
- / The appearance of bridge materials must be considered integral with bridge form to achieve and satisfy the guidelines of, (1) Mobility and Continuity of the Urban Fabric, (2) Public Spaces and Civic Experiences, (3) Structure, Height, Proportions and Lighting, and (4) Preserve Views and Celebrating the Legacy.
- / Surface type (concrete, stone, paving) of bridge roadways and active transportation routes and materials for retaining walls, edge protection, stairs, landings, ramps, handrails, furniture, signage, lighting must consider effects of temperature, sunlight, wind and maintenance ease and cost.



Confederation Boulevard Material Palette. Source: Confederation Boulevard Guidelines, Management and Stewardship of Our Capital Legacy

4.5.4 Material Palette

The urban design origins of core area spaces, buildings and landmarks stem primarily from their placement and interaction with the Parliamentary Buildings and the natural picturesque setting of the Ottawa River corridor. Honouring the rich legacy of the Capital must be demonstrated through careful attention to the colours, tones, and textures to be layered by the bridge design onto the Central Capital Landscape. The colour palette of the existing bridge (grey and green) is complementary to the landscape and capital landmarks. New bridge designs should reinterpret the materiality of the architectural context of the capital in ways to complement the richness of textures and tones to fit as an extension of the landscape.

The material palette for the new bridge design shall adopt and interpret the tone established for the lush river corridor, Confederation Boulevard and resonate with the built heritage of the nation's capital which includes granite, copper, concrete and wood.

- / Enhance the visual perception of the bridge through intentional integration of colours and material textures to achieve visual continuity, relatedness and smooth transitions with the Grand Esplanade of Confederation Boulevard and the attributes of the river shorelines.
- / Durable and noble materials that will age gracefully and predictably, with anti-graffiti and anti-corrosion coatings, must be utilized.
- / Small, yet important functional components and details of bridge design such as handrails, lighting components and guard-rails must be conceived as an integral part of the overall design.

- / Custom designs may be required, while balancing the need to avoid overly onerous specialized operation or maintenance requirements.
- / Colour and texture contrast of different materials may be used strategically, for example to clearly indicate differences between bicycle and pedestrian paths.

4.5.5 Usability and Maintenance

As the future custodian of the bridge, the NCC will be responsible for its long-term operating and maintenance costs.

Design solutions and materials must allow for proper inspection, maintenance, replacement, and repair with adequate access.

- / Sub-structure elements, superstructure elements and related roadworks must be designed to facilitate inspection, monitoring, maintenance, and repair requirements with access facilities built into the bridge structure.
- / All vehicular traffic lanes, paths and public open spaces should be designed to avoid ice and snow accumulation and facilitate rapid snow removal.
- / All wires and/or vertical structure elements must comply with NRC's 2019 *Canadian Highway Bridge Design Code* performance base recommendations for ice and freezing rain resilience, management, and maintenance.
- / All solutions and materials (including electrical and other installations) must allow for proper inspection, maintenance, replacement, and repair needs with adequate access.
- / All materials and equipment specified in the project must be designed to avoid potential vandalism. Techniques such as anti-graffiti treatments are encouraged.
- / The new bridge design must allow for emergency vehicular access and circulation.



Alexandra Bridge walkway during Winter - Source: Fotenn Planning and Design

4.6 Universal Accessibility, Legibility and Wayfinding

Alexandra Bridge is one of the most important structural elements of Confederation Boulevard providing a pedestrian, cycling and vehicular connection within the National Capital Region that is used daily by both commuters and visitors alike. The new interprovincial bridge shall maintain the same function with expanded capacity to accommodate public transit (tram or a light rail train system) and to ensure an equitable and safe access for all users.

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.

In keeping with the 2019 Accessible Canada Act and the federal government's commitment to building an inclusive and accessible Canada, the new bridge must meet new accessibility requirements to ensure barrier-free movement within and around public spaces.



4.6.1 Accessibility and Universal Design

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 National Capital Commission'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 7 general principles:

- / Equitable Use
- / Flexibility in Use
- / Simple and Intuitive Use
- / Perceptible Information
- / Tolerance for Error
- / Low Physical Effort
- / Size and Space for Approach and Use

Any spaces dedicated and available for use by pedestrians and users of mobility aids (motorized wheelchair or scooters), including lanes and lookout spaces on the bridge, should be accessible to all users by following Universal Design principles.

- / Materials for floor coverings and treatments shall meet the accessibility criteria according to *CSA B651-12, Accessible Design for the Built Environment*, as well as the work carried out by the Nazareth Institute, Louis Braille and the Logical Society entitled *Critères of universal accessibility: visual impairment, exterior facilities* (2014).
- / The materials proposed must result in continuous, firm, non-slip walkways.
- / Tactile indicators shall be integrated into the layout and detailed configuration of floor covering patterns as per current accessibility standards.



4.6.2 Signage – Graphic Design and Legibility

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.

- / All proposed signage must contribute to the beauty and uniqueness of Canada's Capital Region.
- / The graphic design should reflect the distinctive quality of the buildings, landscapes, and streets of the capital, and strengthen the character, design intention and function of the sign's placement.
- / Signs should be adequate in size and proportions and be well incorporated into their context. They should be minimal in numbers, just enough to provide the adequate amount of information and legibility. Recommendations from the NCC's *Signage Design Guidelines*, 2012 must be incorporated.
- / All signage located on active transportation lanes must be accessible to all and not interfere with travel or produce physical obstacles to pedestrians and/or cyclists.
- / Signage should contain clear and easy-to-understand information for all and text must be provided in both English and French. The Algonquin language may be incorporated in pedestrian-focused signage to raise awareness, encourage, and strengthen its revival.



Trilingual pedestrian signage. Source: Jim Moodie - Sudbury Star

4.6.3 Wayfinding

The existing pedestrian wayfinding system along Confederation Boulevard, including the bas-relief bronze map that facilitates orientation along the Ceremonial Route and the Morris columns located close to the approaches on both sides of the river, must be considered to ensure consistency along Confederation Boulevard and with applicable NCC design standards.

The new bridge design must provide a wayfinding system that seamlessly merges with the remainder of Confederation Boulevard and follows the direction given in the *Capital Pathway Strategic Plan*, 2020.



Existing Morris Columns and relief bronze map. Source: Confederation Boulevard Guidelines, Management and Stewardship of Our Capital Legacy

4.6.4 Adequate Road Signage

Road signs on the replacement bridge will comply with current road safety standards while being small in size and in numbers in order to respect the iconic character of the bridge and minimize visual clutter.

4.6.5 Innovative Interpretation Strategies

The Department of Canadian Heritage plays a vital role in the cultural, civic, and economic life of Canadians. Its mandate focuses on promoting the Canadian identity, cultural development, and heritage. Therefore, all interpretation strategies within federal projects are managed by Canadian Heritage and should be developed as part of a broader interpretation strategy for the Capital, ensuring an appropriate and consistent theme and message is put forward. The Department often collaborates with a range of partners to foster and enrich cultural experiences, strengthen identity, and promote participation, diversity, and inclusion.

Innovative technologies and strategies are encouraged to provide interpretative information. These may be integral to the structure itself and/or explore other senses to create a truly interactive experience.

- / These new technologies however must not take away from the natural landscape or compete with the structure or the primacy of heritage buildings and surrounding landmarks.
- / If traditional interpretive panels are proposed, these should be designed to reinforce the character of the place and reflect the distinctive quality of the ceremonial route along Confederation Boulevard.
- / Interpretative topics shall be defined by the Department of Canadian Heritage and the NCC, with final review and approval by Canadian Heritage required.



Interpretive panels on Alexandra Bridge. Source: Alexandra Bridge Replacement Program and Design Guidelines



Innovative Interpretation methods. Credit: teamLab



Source: Fotenn Planning and Design

5

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