Heritage Impact Assessment
DRAFT

Victoria Bridge over the Thames River
Environmental Assessment

City of London

Project Number: 60527027

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Quality information

Prepared by	Checked by	Approved by
DRAFT	DRAFT	DRAFT
Michael Greguol, MA Cultural Heritage Specialist	Christopher Andreae, Ph.D., CAHP Senior Architectural Historian	John Pucchio, P.Eng Project Manager

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Prepared for:

City of London
Corporation of the City of London
300 Dufferin Avenue
London, ON
N6A 4L9

Prepared by:

Michael Greguol, MA
Cultural Heritage Specialist
T: 519-963-5866
M: 519-280-7659
E: michael.greguol@aecom.com

AECOM Canada Ltd.
250 York Street
Suite 410, Citi Plaza
London ON N6A 6K2
Canada

T: 519.673.0510
F: 519.673.5975
aecom.com

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Executive Summary

AECOM Canada Ltd. (AECOM) was retained by the City of London to conduct a Heritage Impact Assessment (HIA) for the Victoria Bridge on Ridout Street, in London, Ontario (Figures 1 and 2) as a part of the Class Environmental Assessment (EA) to evaluate rehabilitation or replacement alternatives for the structure. The evaluation of the alternatives will determine the best solution to address the general structural deterioration of the bridge and accommodation for all users.

Ridout Street South is classified as a primary collector roadway with 12,000 vehicles per day. The road is also a primary cycle and pedestrian route in the City of London, connecting the Old South area to the downtown core and the Thames Valley Parkway. Since the first Victoria Bridge was opened in 1848, this crossing has provided the connecting link across the south branch of the Thames River. The current bridge was built in 1926 and the last major rehabilitation work was completed in 1956. Given the structure's age, repair needs, structural capacity limitations, functional deck width, safe accommodation for cyclists, existing utilities supported by the bridge, and other considerations, the City of London has initiated the Class EA to evaluate rehabilitation and replacement alternatives.

The City of London's "Request for Proposal 16-51, Consulting Engineering Assignment for the Victoria Bridge – Class 'C' Environmental Assessment" required that the crossing alternatives should be evaluated according to the eight conservation options identified in the Ontario Ministry of Transportation's (MTO) *Ontario Heritage Bridge Guidelines* (Interim 2008). For the purposes of this report, AECOM undertook the following tasks:

1. Review and preparation of summary of historical information as presented in the Cultural Heritage Evaluation Report (CHER) prepared by AECOM, in June 2016;
2. Review of Statement of Cultural Heritage Value and Heritage Attributes, as identified in the CHER;
3. Review and analysis of the proposed alternatives identified for the EA and their potential impacts on the cultural heritage value of the bridge;
4. Assess the *Ontario Heritage Bridge Guidelines* eight conservation options to the proposed undertaking for the Victoria Bridge;
5. Identification of mitigation options for any potential impacts of the proposed alternatives;
6. Preparation of recommendations.

With regards to the conservation of cultural heritage value and heritage attributes Alternative A, a major rehabilitation with improved accommodation for pedestrians and cyclists would be the preferred alternative in order to conserve the heritage attributes for the Victoria Bridge.

1. Introduction

1.1 Study Purpose

AECOM Canada Ltd. (AECOM) was retained by the City of London to conduct a Heritage Impact Assessment (HIA) for the Victoria Bridge on Ridout Street, in London, Ontario (Figures 1 and 2) as a part of the Class Environmental Assessment (EA) to evaluate rehabilitation or replacement alternatives for the structure. The evaluation of the alternatives will determine the best solution to address the general structural deterioration of the bridge and accommodation for all users.

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1.2 Study Method

This HIA was prepared according to the guidelines set out in the Ontario Ministry of Tourism, Culture, and Sport's (MTCS) *Heritage Resources in the Land Use Planning Process* documented, included as a part of the *Ontario Heritage Toolkit.* The following provincial documents were also consulted in preparing this HIA:

- *Environmental Assessment Act* (R.S.O 1990, Chapter E. 18)
  - *Guidelines for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (MCC-MOE 1992)
  - *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (MCR-MOE 1981)
- *Ontario Planning Act* (R.S.O 1990, Chapter P. 13)
  - *Heritage Resources in the Land Use Planning Process*, 2014 Provincial Policy Statement
- *Ontario Heritage Act* (R.S.O. 1990, Chapter O.18)
  - *Ontario Heritage Toolkit* (MCL 2006)
  - *Ontario Heritage Bridge Guidelines* (Interim Draft MTO 2008).

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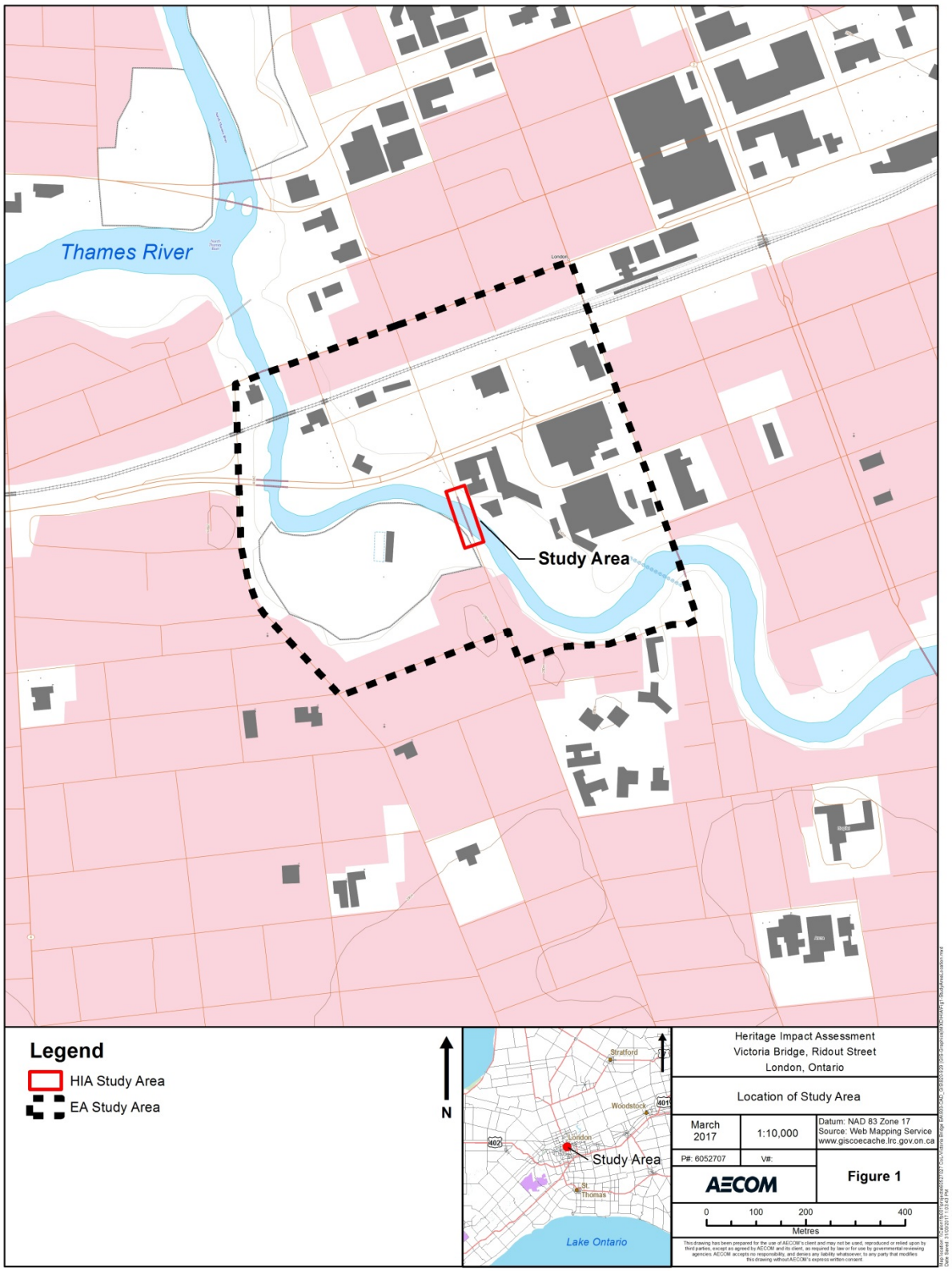


Figure 1: Location of Victoria Bridge

Figure 2: Victoria Bridge Study Area in Detail

2. Policy and Planning Framework

2.1 Environmental Assessment Act

This report was prepared to satisfy cultural heritage reporting requirements undertaken as part of the Ontario EA process. Pursuant to the *Environmental Assessment Act* (R.S.O. 1990, Chapter E. 18), applicable infrastructure improvements and development projects are subject to appropriate studies to evaluate and assess the potential related impacts of a project on the social, economic, or cultural environment, (i.e. the cultural heritage of an area). Infrastructure improvement projects have the potential to impact cultural heritage resources in various ways including, but not limited to:

- Loss or displacement of cultural resources through removal or demolition;
- Disruption of cultural resources due to the introducion of physical, visual, audible, or atmospheric elements that are not in keeping with the significance of the resource and its contextual surroundings.

2.2 City of London Official Plan

The City of London Official Plan (OP) (1989, as amended) provides a policy context for land use planning, within the City of London. Chapter 13 of the OP identified planning policies, goals, and objectives associated with the identification, evaluation, and management of cultural heritage resources (built heritage, cultural heritage landscapes, and archaeological resources) within the City. Specific OP objectives that apply to heritage conservation include:

- Protect in accordance with Provincial policy those heritage resources which contribute to the identify and character of the City;
- Encourage the protection, enhancement, restoration, maintenance, and utilization of buildings, structures, areas, or sites within London which are considered to be of cultural heritage value or interest to the community;
- Encourage new development, redevelopment, and public works to be sensitive to, and in harmony with, the City's heritage resources; and
- Increase public awareness and appreciation of the City's heritage resources, and encourage participation by the public, corporations, and other levels of government in the protection, restoration, and utilization of these resources.

2.2.1 City of London's *London Plan* (2016)

The *London Plan* is the City's new Official Plan. The *London Plan* sets out a new approach for planning in London which emphasizes growing inward and upward, so that the City can reduce the costs of growth, create walkable communities, revitalize urban neighbourhoods and business areas, protect farmlands, and reduce greenhouse gases and energy consumption. The plan sets out to conserve the City's cultural heritage and protect environmental areas, hazard lands, and natural resources. The plan has currently been approved by the Ontario Ministry of Municipal Affairs.

Specifically related to heritage conservation, the *London Plan* outlines a number of policies related to the conservation of cultural heritage resources within the City. Most relevant to the Victoria Bridge EA, is the General Cultural Heritage Policies related to Design, which note:

> *New development, redevelopment, and all civic works and projects on and adjacent to heritage designated properties and properties listed on the Register will be design to protect the heritage attributes and character of those resources, to minimize visual and physical impact on these resources. A heritage impact assessment will be required for new development on and adjacent to heritage designated properties and properties listed on the Register to assess potential impacts, and explore alternative development approaches and mitigation measures to address any impact to the cultural heritage resource and its heritage attributes.*

2.2.2 City of London's *Inventory of Heritage Resources* (2006)

The City of London's *Inventory of Heritage Resources (the Register)* (2006) includes information related to the listing of properties in London of recognized or potential cultural heritage value or interest. The *Inventory (the Register)* includes a priority level system for identifying properties of greater priority and/or significance for heritage recognition. In addition, properties designated under the *Ontario Heritage Act* are maintained on the City's *Inventory* (*the Register)*. The *Inventory (Register)* is a living document subject to changes and approvals by Council, advised by the London Advisory Committee on Heritage (LACH). The Victoria Bridge is not presently listed on the *Inventory (the Register)* but is considered to have significant cultural heritage value or interest.

2.2.3 City of London's *Strategic Plan*

The City of London's *Strategic Plan* (2015-2019) set out a broad direction for the future of London. It identifies Council's vision, mission, values, strategic areas for focus and the specific strategies that define how Council and Administration will respond to the needs and aspirations of Londoners. As such, as part of the City's initiative for "Building a Sustainable City," the *Strategic Plan* identifies the management of upgrading of transportation infrastructure such as heritage bridges, and more specifically, the *Heritage Bridge Preservation Strategy* as part of its focus on robust infrastructure.

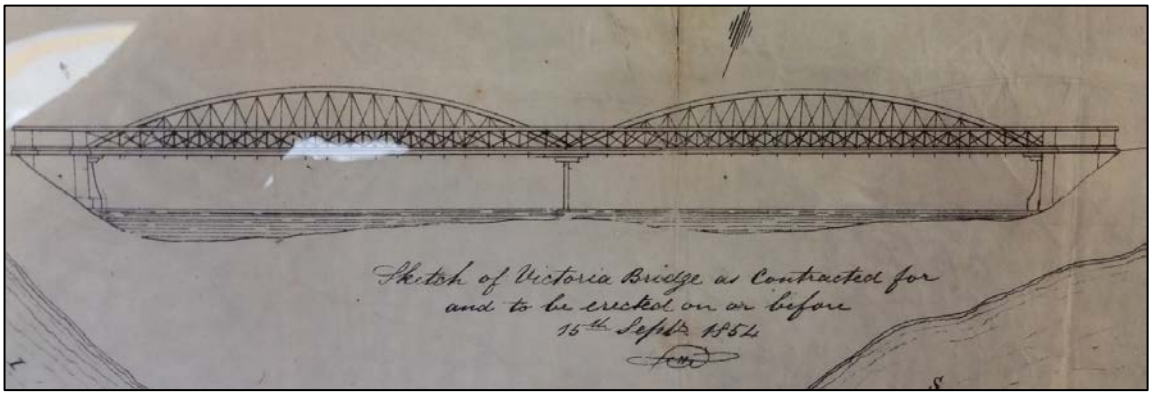
3. Historical Summary

The following section replicates the relevant subsection from the CHER, completed for the Victoria Bridge in June 2016. A more thorough historical summary of the local historical context, the history of bridge building in London and Ontario, as well as relevant organizations including the Hamilton Bridge Works Company, and John R. Rostron are documented in the CHER, while the subsection included below has been included for specific contextual purposes related to the bridge itself.[1]

3.1 Victoria Bridge

The existing Victoria Bridge was not the first bridge crossing over the Thames River at Ridout Street. There has been three previous crossings at this location dating back to 1848. Spring flooding of the Thames was a continual threat to the survival of the Victoria Bridge – and all other London – bridges.

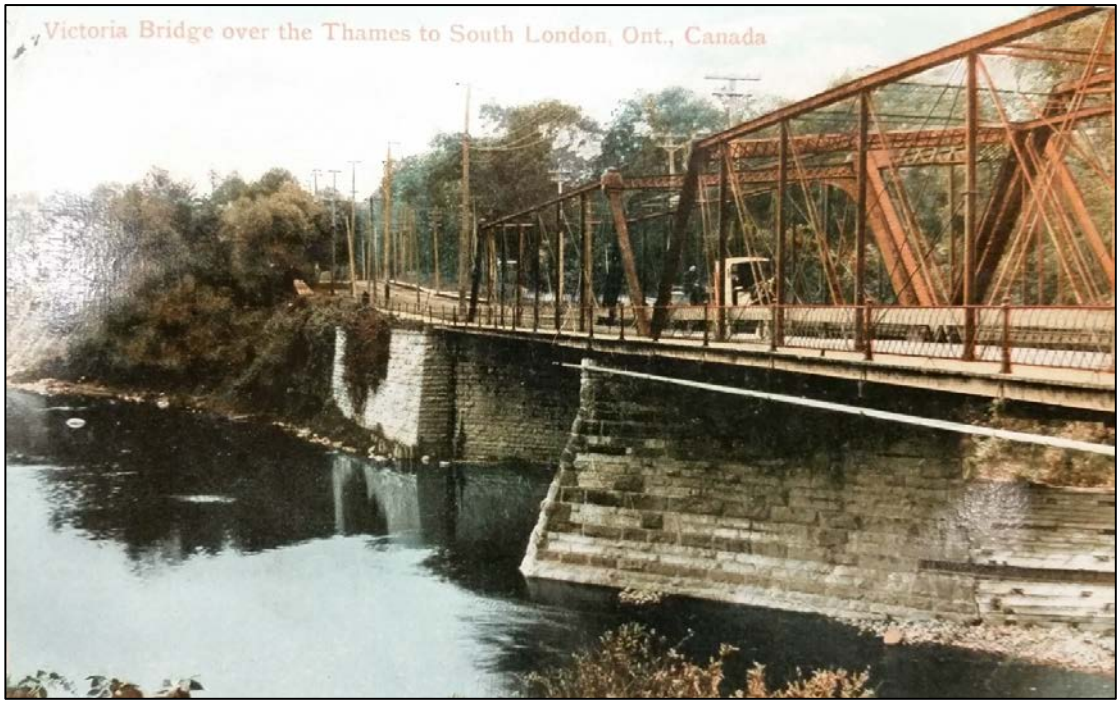
The first crossing of the Thames at Ridout Street was opened in 1848 and was the fourth bridge constructed in London. The bridge was a short lived wood structure, the first to be named after Queen Victoria. Newspapers reported that during construction, the piles for the structure were not driven properly. The reports indicated that the pile drivers sawed off the tops of the piles to expedite their work process but within a few months the rising Thames River washed the bridge away. The crossing was not rebuilt until the 1860s, leaving a ferry to provide the only method of crossing at this location until a new structure was built. A new structure was planned in 1854 and designed by Samuel Peters, the Town Engineer for London between 1852 and 1854, then City Engineer for the newly incorporated City in 1855, however the structure never came to fruition (Photograph 1). The second Victoria Bridge was constructed in 1863, but no description exists of its design. In February 1874 a flood swept the bridge away.[2]



Photograph 1: Proposed Victoria Bridge designed by Samuel Peters, 1854 (Plan of Part of Lot No. 7, East Side of the Wortley Road in the Township of Westminster, 1854, London Room)

The third Victoria Bridge, a much longer lived structure, was then built of wrought iron in 1875 (Photograph 6, Figures 3-5). The new bridge was constructed by the Wrought Iron Bridge Company of Canton, Ohio, that had been building the Blackfriars Bridge, when the Victoria Bridge was destroyed. The new bridge was a two-span iron structure of 258 feet, with an 18-foot roadway and one sidewalk. The abutments and the centre pier were of stone. The bridge design was a pin-connected through Pratt truss, a common truss bridge design. The bridge deck was suspended by stirrup hangers. Although designed for road traffic, it was sufficiently sturdy to accommodate the weight of the London Street Railway cars when streetcar service was extended into south London in the late 1890s. The bridge reached the end of its service life by 1919, and was ruled unsafe for motorists, however, Londoners voted against the use of public funds for construction of a new crossing. By 1925, the Ontario Railway and Municipal Board declared the bridge unsafe and closed the structure.[3]

[1] For a more complete historic record of the Victoria Bridge and its surroundings, please see AECOM, “Cultural Heritage Evaluation Report, Victoria Bridge over the Thames River, Ridout Street, London, Ontario,” June, 2016.
[2] London Free Press, Feb 1949; Arthur McClelland, “Bridges to the Past”; Arthur McClelland, “All things Victorian,”; Samuel Peters, Plan of Part of Lot No. 7, East of Wortley Road in the Township of Westminster.
[3] Ibid.



Photograph 2: Early-20th century postcard showing the third Victoria Bridge that was used between 1875 and 1925 (Victoria Bridge Clippings File, London Room)

Photograph 3: Victoria Bridge under construction in 1925 (Victoria Bridge Clippings File, London Room)

The existing Victoria Bridge was the fourth structure built over the Thames River at this location. The bridge was designed by John R. Rostron, a municipal engineer with the City of London, and was built in 1926 as a steel pony truss design, constructed by the Hamilton Bridge Company. This 258-foot bridge, with two spans of 126 feet and a 31 foot wide deck, also carried a streetcar track with two six-foot sidewalks suspended on the outside of the bridge trusses. The bridge was opened in January of 1927 (Figure 6).[4]

In 1927, the *Canadian Engineer*, a weekly paper published an article written by Rostron in which he outlines the context for the construction of the new bridge and a series of design challenges associated with the bridge. Given the public objection to the use of public funds for a new bridge, Rostron highlighted the particular challenge of building a bridge that would be elegant but not costly. In addition, the 41 degree skew, together with the cramped room for depth construction presented a particular design challenge. The decision to retain the existing stone pier and abutments and encase them in concrete with an extension to accommodate widening the structure provided an economical solution. The City also wished to do away with overhead obstructions on this structure. As a result, the use of a pony truss was decided on (Photographs 2 – 9).[5]

The present bridge was built on a sharp skew of 41 degrees due to the angle at which Ridout Street crossed the Thames River at this location. The designer reused the abutments and centre pier of the previous bridge but it is unknown if the two earlier bridges were also on a skew. A skew design adds to the complexity of the bridge construction.

The chief aesthetic consideration for this bridge was centered on the approach to the crossing. At the time of design and construction it was determined that viewing the bridge from the east and west would not be very common so the approaches were to be the most elegant feature. As such, cut stone pilasters with concrete cores and solid cut stone newel posts were placed at the ends of the railings to provide a gateway-like design for the structure. Functionally, the abutments each had expansion bearings and the bearings on the pier were fixed. In addition to the sidewalks, a 10 inch gas main, an 8 inch sewer pipe, and a Bell conduit was carried across the river under the sidewalks, the remnants of which can still be seen.[6]

In the mid-20th century the bridge underwent major repairs and reconstruction as a result of gradual deterioration. The bridge was closed in 1956 to repair damages to the abutments and piers caused by seasonal flooding. The bridge was closed first in March of that year, but by April the east side of the south abutments crumbled and collapsed resulting in additional reconstruction work. The bridge stayed closed until November of 1956. The bridge was also closed for a month in 1960 for replacement of the deck.[7]

[4] Ibid.; Armstrong, p. 105.
[5] Rostron, “Victoria Bridge, Ridout Street, London, Ont.” Canadian Engineer, 1927.; London Free Press.
[6] Ibid.
[7] Ibid.

Photograph 4: Victoria Bridge under construction in 1925 (Victoria Bridge Clippings File, London Room)

Photograph 5: Victoria Bridge under construction in 1925 showing trusses nearing completion (Victoria Bridge Clippings File, London Room)

Photograph 6: Victoria Bridge under construction in 1925, showing temporary trestle structure under the bridge during construction (Victoria Bridge Clippings File, London Room)

Photograph 7: Victoria Bridge under construction in 1925 (Victoria Bridge Clippings File, London Room)

Photograph 8: Victoria Bridge following rising flood waters, 1937. The centre pier appears to be nearly submerged. (Victoria Bridge Clippings File, London Room)

Photograph 9: Original approaches to the Victoria Bridge showing the concrete posts and integrated light fixtures. The only remnants of these approach features is a portion of a concrete post on the northwest side of the bridge (Canadian Engineer, 1927)

4. Cultural Heritage Value

In 2016, Victoria Bridge was evaluated as part of a CHER conducted as part of a preliminary investigation evaluating the feasibility of accommodating bicycle lanes and the general rehabilitation, as well as the overall condition, and future uses of the Victoria Bridge. As part of the CHER, the bridge was evaluated according to *Ontario Regulation 9/06, Criteria for Determining Cultural Heritage Value or Interest* which determined that the Victoria Bridge has cultural heritage value as a result of its design/physical, historic/associative, and contextual value.

4.1 Ontario Regulation 9/06

The results of the Ontario Regulation 9/06 as presented in the CHER evaluation are presented in Table 4-1 below, and are described in the following subsections.

Table 4-1: O.Reg. 9/06 Evaluation undertaken in June 2016, as part of Victoria Bridge CHER

Criteria	Site Specific Value
1) The property has *design or physical value* because it:	
i) Is a rare, unique, representative or early example of a style, type, expression, material or construction method.	The Victoria Bridge is a representative example of a modified Warren truss structure. The use of steel trusses in highway bridge design is increasingly rare. A number of steel truss bridges remain in London, however, this is one of two modified Warren pony trusses in the City.
ii) Displays a high degree of craftsmanship or artistic merit.	None identified
iii) Demonstrates a high degree of technical or scientific achievement.	None identified
2) The property has *historic value or associate value* because it:	
i) Has direct associations with a theme, event, belief, person, activity, organization, or institution that is significant to a community.	Historically, a crossing of the Thames River at Ridout Street has provided an important link in connecting London to its growing surroundings
ii) Yields, or has the potential to yield information that contributes to an understanding of a community or culture.	The bridge was designed by John R. Rostron, a municipal engineer for the City of London. In addition, the bridge was built by the Hamilton Bridge Co., a well-known bridge manufacturing company in the early-20th century.
iii) Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to a community.	None identified
3) The property has *contextual value* because it:	
i) Is important in defining, maintaining or supporting the character of an area.	The Victoria Bridge, along with the King Street, Kensington and Blackfriars bridges form a grouping of historic bridges in downtown London.
ii) Is physically, functionally, visually or historically linked to its surroundings.	The Victoria Bridge is historically linked to its surroundings as one of the four crossings at this location.
iii) Is a landmark.	None identified

4.2 Statement of Cultural Heritage Value

The following Statement of Cultural Heritage Value was prepared as a part of the CHER:

> The Victoria Bridge, is a seven panel modified Warren steel-pony truss bridge that carries Ridout Street over the South Branch of the Thames River. The two-span structure was built in 1926 as the fourth crossing of the Thames River at this location. It was designed by municipal engineer John R. Rostron as an elegant but

affordable design that would utilize the remaining stone abutments and pier from the previous bridge at this crossing. As such, the concrete pier and abutments at the Victoria Bridge also include an undetermined amount of stone that has been encased in the concrete since 1926. The bridge is one of several historic truss crossings of the Thames River in London.

4.3 Heritage Attributes

The following elements are the heritage attributes of the Victoria Bridge, identified as a part of the CHER:

- Riveted, modified Warren truss structure with seven panels;
- Remnants of decorative stone and concrete end post at north abutment;
- Decorative lamp posts in centre of the bridge spans;
- Bridge skew evident in abutments, pier and truss alignments; and
- Hand railings original to the design of the bridge.

4.4 Review of Heritage Registers and Consultation

As a part of the evaluation undertaken for this CHER, AECOM reviewed municipal, provincial, and federal heritage registers and inventories including:

- *City of London, Inventory of Heritage Resources (2006);*
- *Ontario Heritage Trust Plaque Guide;*
- *Canadian Register of Historic Places; and*
- *Federal Heritage Designations.*

The 1926 Victoria Bridge does not appear on any of the above registers or inventories. In addition, consultation with Kyle Gonyou, Heritage Planner for the City of London indicated that the bridge is not listed or designated under the *Ontario Heritage Act*, however it was noted to be among one the older of London's bridges. It was also noted that the 1930 Kensington Bridge, similar to the existing Victoria Bridge, is designated under Part V of the *Ontario Heritage Act* as part of the Blackfriars-Petersville Heritage Conservation District.

Lastly, the Thames River is a designated river as part of the Canadian Heritage Rivers System (CHRS). The CHRS is a conservation program that promotes, protects, and enhances Canada's river heritage and ensure that Canada's leading rivers are sustainably managed. As part of the designation application and the on-going monitoring and reporting for the Thames River, a series of publications have been developed to preserve and enhance the natural and cultural heritage of the river.

Figure 3: Study Area, 1878

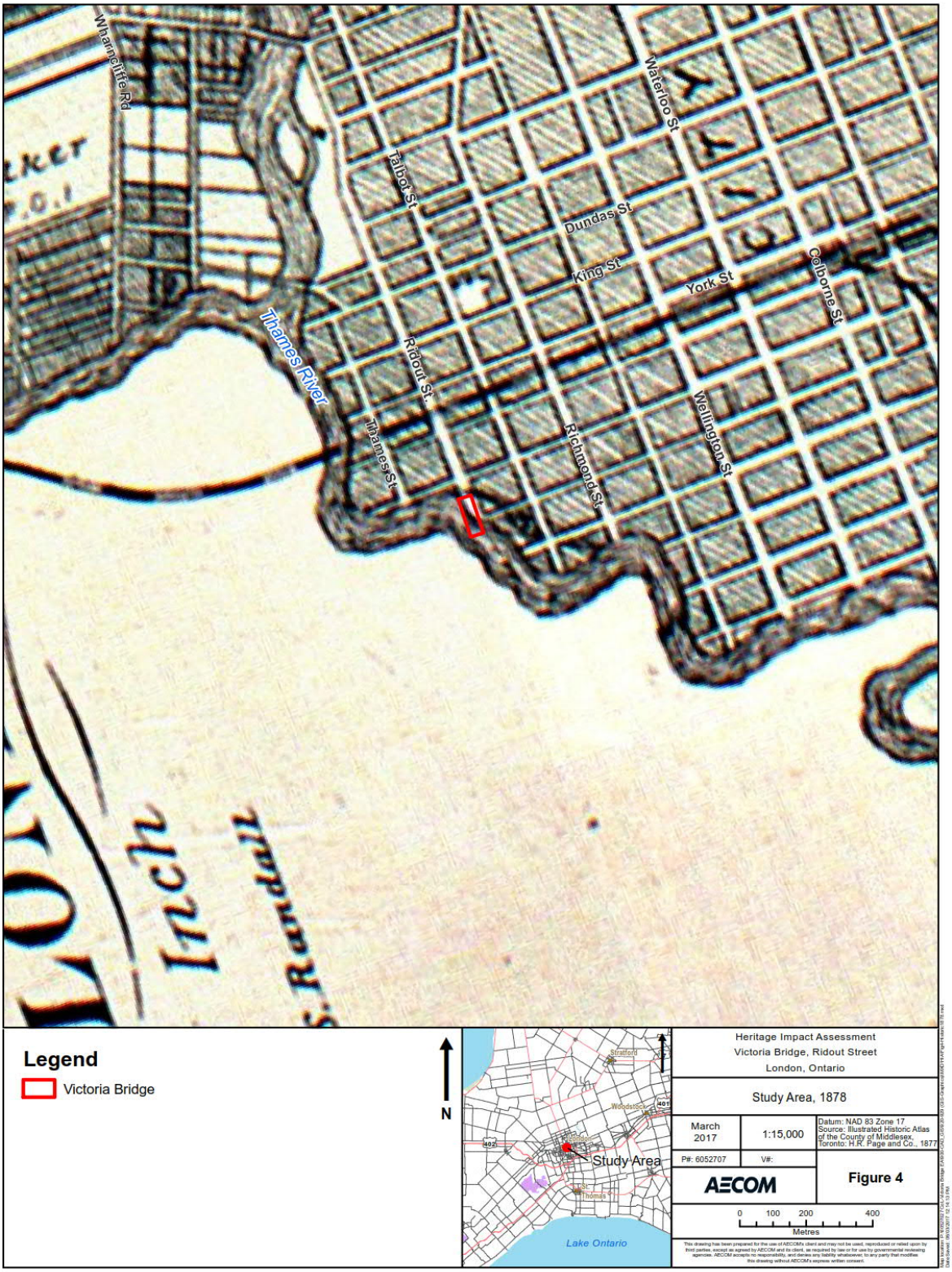


Figure 4: Study Area, 1878

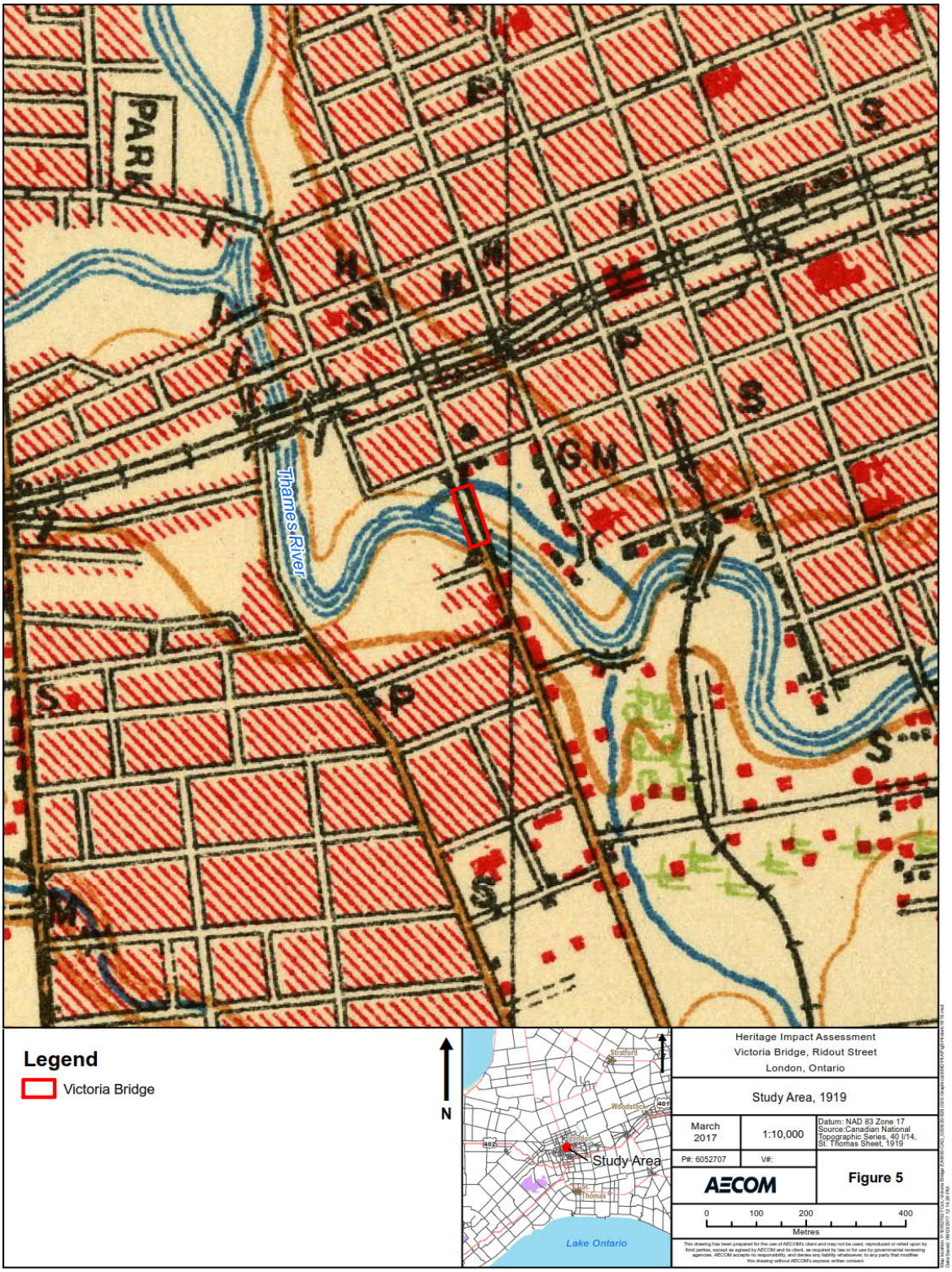


Figure 5: Study Area, 1919

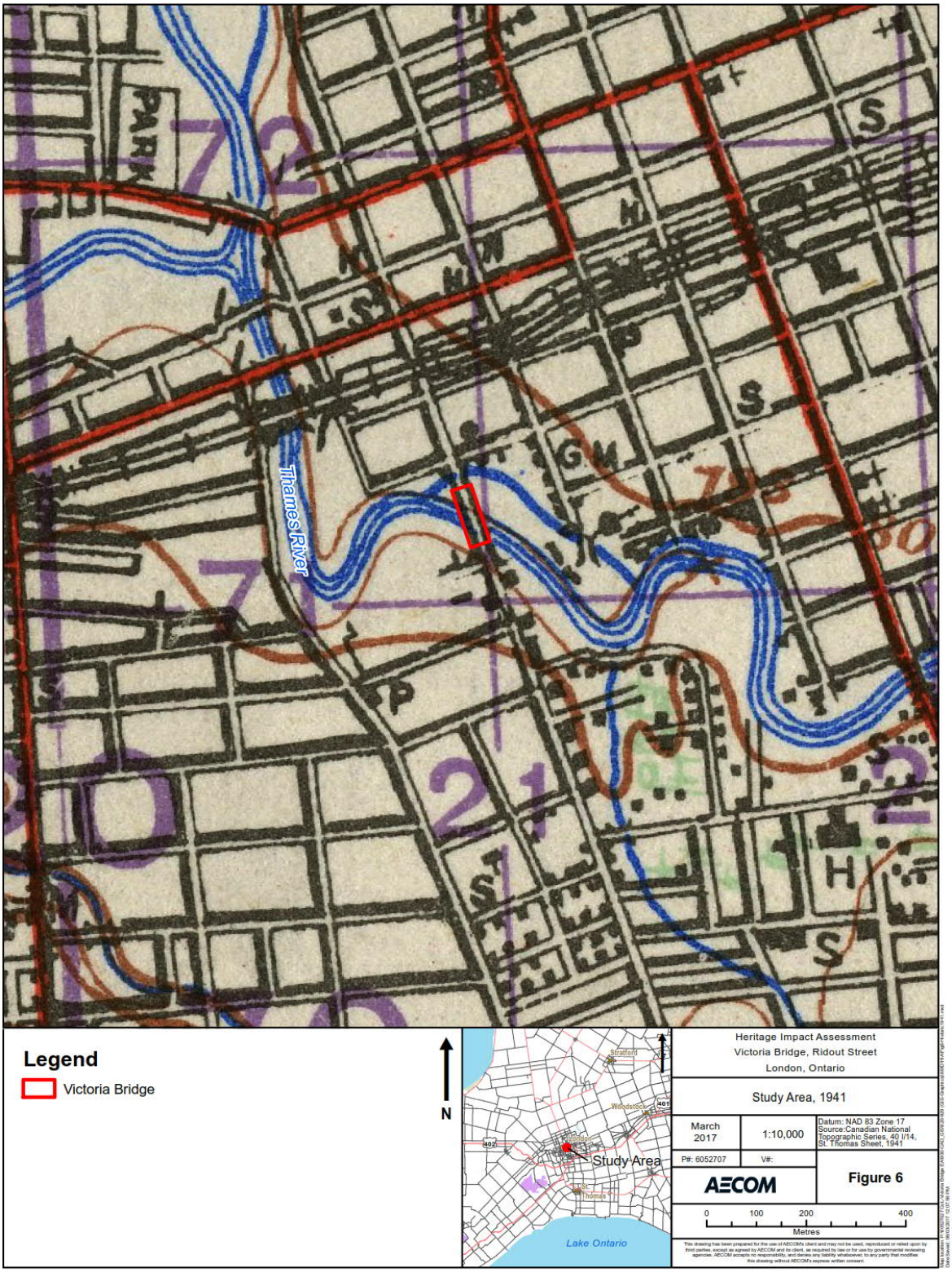


Figure 6: Study Area, 1941

Photograph 10: West side of Victoria Bridge showing Warren truss, identified as a Heritage Attribute

Photograph 11: Riveted truss panels, identified as a Heritage Attribute

Photograph 12: Riveted gusset plate, part of Warren truss, identified as a Heritage Attribute

Photograph 13: View of remnant concrete and stone endpost at the north approach to the bridge, identified as a Heritage Attribute

Photograph 14: Decorative base of lamp post located in the middle of the bridge on each side, identified as a Heritage Attribute

Photograph 15: West truss. The skew of the bridge is not highly visible from photographs; however the skew is identified as a Heritage Attribute. The skew is most visible from aerial imagery or historic mapping.

Photograph 16: Railing on west side of the bridge, identified as a Heritage Attribute

5. Proposed Undertaking and Potential Impacts

The Class EA for the Victoria Bridge is being undertaken to evaluate alternatives associated with either the rehabilitation or replacement of the bridge. Phase 1 of the five-phase Municipal Class EA planning process requires the proponent of an undertaking (i.e. the City) to first document factors leading to the conclusion that the improvement is needed, and to develop a clear statement of the identified problems or opportunities to be addressed. As such, the Problem/Opportunity Statement is the main starting point in the undertaking of a Municipal Class EA and becomes the central theme and integrating element of the project. It also assists in setting the scope of the project. The Problem/Opportunity Statement for this Class EA is:

> *Constructed in 1926, Victoria Bridge is located on Ridout Street over the south branch of the Thames River in the City of London. Ridout Street is an important link to downtown and a designated north-south bicycle route. However, Victoria Bridge does not have sufficient width to accommodate dedicated bicycle lanes which is a safety concern. Recent bridge inspections also identified ongoing issues of deterioration which may reduce the structural capacity of the bridge. Given the age of the bridge, existing conditions, functional deck width, structural capacity, potential heritage value and other considerations, the Class EA study should identify a solution to address structural deficiencies and accommodate all users through bridge rehabilitation or replacement.*

Typically, as part of a Class EA a “do-nothing” approach in which no changes to the existing environment or resource(s) is evaluated as part of the alternatives for a particular undertaking. As part of the Class EA for the Victoria Bridge, a “do-nothing” approach was screened out at an early stage as a result of structural and functional deficiencies. In 2015, the biennial structure inventory inspection program identified a number of deficiencies with the structure, thereby placing it on the City’s 0 to 5 Year Work program for rehabilitation. In addition, structural evaluations indicated that the bridge requires major structural repairs given the age of the bridge, existing conditions, functional deck width and potential capacity related issues associated with the deck stringers. Ultimately, a “do-nothing” approach would eventually require the permanent closure to vehicular traffic as condition further deteriorates, which is a loss of a critical transportation linkage between downtown and south London.

For the purposes of this HIA, replacement and rehabilitation alternatives have been considered. As part of the large EA for the project the following five alternatives are being evaluated in Table 5-1 (below):

- Alternative A: Major Rehabilitation of the Bridge with Improved Accommodations for Pedestrians and Cyclists;
- Alternative B: Keep the Bridge, Re-Purpose for Active Transportation and Build New Bridge Downstream (West Side);
- Alternative C: Eliminate the Bridge and Build New Bridge on Existing Alignment;
- Alternative D: Eliminate the Bridge and Build New Bridge on New Alignment Downstream (West Side); and
- Alternative E: Minimal Rehabilitation of the Bridge and Eliminate at end of Projected Service Life and Build New Bridge.

The Class EA evaluates alternatives for their varying impacts to the socio-economic as well as the natural and cultural environment, including business impacts, property acquisition, impacts to the terrestrial/aquatic environment, drainage/hydrology, as well as the cultural heritage and the potential archaeological resource in the area.

Table 5-1: Potential Impacts of Each EA Alternative for Victoria Bridge

Alternative	Replacement /Rehabilitation	Description of Alternative	Potential Impacts to Heritage Value
Alternative A: Major Rehabilitation with Improved Accommodation for Pedestrians and	Rehabilitation	This alternative would result in a rehabilitation of the Victoria Bridge with major efforts to stabilize the substructure and rehabilitate existing structural deficiencies with partial truss replacement, complete deck	Impacts to cultural heritage value would be relatively low as the Victoria Bridge would be retained and rehabilitated. However, rehabilitation would likely require reconstruction efforts including deck replacement, replacement of truss

Cyclists		replacement, and the installation of a widened cantilevered sidewalk system in order to accommodate the widening of the bridge for the functional width of dedicated bicycle lanes. Structural evaluations of the bridge indicate that in order to facilitate this alternative, the deck, barrier systems (railings), stringers, cross beams, bottom chords, and the steel roller bearings would require replacement. In addition, some vertical and diagonal truss members would require reinforcement/repairs, and the piers and abutments would require strengthening measures to ensure the safety transfer of traffic loads on the structure.	components (stringers, cross beams, bottom chords) in order to accommodate pedestrians and cyclists. In addition, the widening of the cantilevered sidewalk would ultimately result in a change of visual appearance to the sidewalk components of the bridge. Some heritage attributes may be impacted by rehabilitation efforts, and the appearance of the bridge may ultimately be altered.
Alternative B: Keep Bridge, Re-Purpose for Active Transportation and Build New Bridge Downstream	Partial Rehabilitation	This alternative would result in the partial rehabilitation of the Victoria Bridge for its re-purposing as a pedestrian and bicycle bridge, and the construction of a new bridge immediately downstream, just west of the existing bridge.	Impacts to cultural heritage value would be low as the bridge would be retained in its existing location. Rehabilitation may require impacts to the substructure or truss components in order to retain the bridge for active transportation. Some heritage attributes may be impacted by rehabilitation efforts and/or obstruction of the view of the existing bridge if a new bridge is constructed immediately adjacent to the existing bridge. In addition, construction of a new bridge downstream would also result in a partial re-alignment of Ridout Street on the north and south sides of the river, which may result in property impacts to 37 Ridout Street South, and 39 Ridout Street South, both of which are designated under Part V of the *Ontario Heritage Act* as part of the Wortley Village-Old South Heritage Conservation District.
Alternative C: Eliminate Bridge, Build New Bridge on Existing Alignment	Replacement	This alternative would result in the demolition of the existing Victoria Bridge and the construction of a new bridge on the existing alignment.	Impacts to cultural heritage value would be high as a result of the complete replacement of the bridge. This alternative would result in the complete loss of the heritage attributes of the bridge as they are now.

			Some retention of the historic elements of the bridge could be incorporated into a new sympathetic design in order to retain some of the heritage attributes of the existing bridge.
Alternative D: Eliminate Bridge, Build New Bridge on New Alignment Downstream (West Side)	Replacement	This alternative would result in the demolition of the existing Victoria Bridge and the construction of a new bridge on the a new alignment downstream, west of the existing bridge.	Impacts to cultural heritage value would be high as a result of the complete replacement of the bridge. This alternative would result in the complete loss of the heritage attributes of the bridge as they are now. Some retention of the historic elements of the bridge could be incorporated into a new sympathetic design in order to retain some of the heritage attributes of the existing bridge. In addition, construction of a new bridge downstream would also result in a re-alignment of Ridout Street on the north and south sides of the river, which may result in property impacts to 37 Ridout Street South, and 39 Ridout Street South, both of which are designated under Part V of the *Ontario Heritage Act* as part of the Wortley Village-Old South Heritage Conservation District.
Alternative E: Minimal Rehabilitation, Eliminate at end of Projected Service Life	Partial Rehabilitation, Eventual Replacement	This alternative would result in a minimal rehabilitation of the bridge for its immediate continual use. However, the alternative would be relatively short-lived as the projected service life of the bridge would only be extended for another 15 years, which would then result in the eventual replacement of the bridge at that time.	Impacts to cultural heritage value would be temporarily low in the immediate future, as the bridge would be retained and minimally rehabilitated. However, the projected service life of the bridge would likely only be another 15 years, so the bridge would then need complete replacement resulting in high impacts to the cultural heritage value at that time. As such, the impacts to the cultural heritage value of this bridge would ultimately be delayed.

6. Conservation Options

6.1 *Ontario Heritage Bridge Guidelines*

The MTO *Ontario Heritage Bridge Guidelines* conservation options were used to evaluate the replacement or rehabilitation alternatives of the Victoria Bridge. The eight conservation options are applied in a hierarchical sequence in which Option 1 is the most preferred and Option 8 is the least preferred (Table 6-1).

Table 6-1: Eight Conservation Options and Application for Victoria Bridge

Conservation Option	Associated EA Alternative for Victoria Bridge	Analysis for Conservation of Victoria Bridge
1. Retention of existing bridge with no major modifications undertaken (Do Nothing)	N/A	Option 1 is not feasible for the long-term retention and operation as it does not resolve the functional and structural constraints of the existing bridge. As part of the Class EA for the Victoria Bridge, a "do-nothing" approach was screened out at an early stage as a result of structural and functional deficiencies. Previous structural evaluations indicated that the bridge requires major structural repairs given the age of the bridge, existing conditions, functional deck width and potential capacity related issues associated with the deck stringers. Ultimately, a "do-nothing" approach would eventually require the permanent closure to vehicular traffic as condition further deteriorates, which is a loss of a critical transportation linkage between downtown and south London. This conservation option would ultimately conserve the cultural heritage value of the Victoria Bridge and its associated heritage attributes, however, this would only be temporary, as no major modifications would eventually lead to permanent closure and likely the eventual demolition of the bridge.
2. Restoration of missing or deteriorated elements where physical or documentary evidence exists for their design.	N/A	Option 2 is not feasible for the long-term functional operation of the Victoria Bridge as it does not fully address the problem/opportunity statement of the Victoria Bridge Class EA. A full restoration of the Victoria Bridge, based on physical and documentary evidence would be achievable from a heritage perspective as documentary evidence – drawings and photographs – are readily available to ensure a restoration effort could be undertaken to conserve the cultural heritage value of the bridge. However, a purely restoration approach would not address the functional constraints of the minimal deck width to accommodate all users, which is one of the key elements of the Victoria Bridge EA.
3. Retention of existing bridge with sympathetic modification.	Alternative A	Alternative A would result in the retention of the existing bridge with major modifications, which would result in a wider deck and improved functionality. In this alternative, modifications to the Victoria Bridge would be undertaken in a sympathetic manner to ensure the heritage attributes of the bridge were conserved. This approach would not only achieve the goal of improved functionality but it would also conserve the cultural heritage value of the Victoria Bridge, and its associated heritage attributes.

4. Retention of existing bridge with sympathetically designed new structure in proximity.	Alternative B	Alternative B would result in the retention of the existing bridge, however, its use would be altered for pedestrian and bicycle use and a new bridge would be built downstream. This option would conserve the cultural heritage value and the heritage attributes of the Victoria Bridge , however, the potential of retaining the existing bridge *and* designing a sympathetic new bridge may not be feasible. While it may be feasible to retain the existing bridge, extensive efforts would still be required to rehabilitate structural deficiencies for the bridge. As a result financial constraints may limit the design approach for an adjacent bridge crossing. Lastly, a new bridge crossing adjacent to the existing bridge may result in property impacts to 37 Ridout Street South, and 39 Ridout Street South, both of which are designated under Part V of the *Ontario Heritage Act* as part of the Wortley Village-Old South Heritage Conservation District.
5. Retention of existing bridge no longer in use for vehicular purposes but adapted for a new use. For example, prohibiting vehicle or restricting truck traffic or adapting for pedestrian walkways, cycle paths, scenic viewing, etc.	Alternative B	Alternative B would result in the retention of the existing bridge, however, its use would be altered for pedestrian and bicycle use and a new bridge would be built downstream. This option would conserve the cultural heritage value and the heritage attributes of the Victoria Bridge , however, the potential of retaining the existing bridge *and* designing a sympathetic new bridge may not be feasible. While it may be feasible to retain the existing bridge, extensive efforts would still be required to rehabilitate structural deficiencies for the bridge. As a result financial constraints may limit the design approach for an adjacent bridge crossing.
6. Retention of bridge as a heritage monument for viewing purposes only.	Alternative B	Given traffic volume and historic service along Ridout Street, this option is not desirable as part of the long-term planning for the Victoria Bridge or the road network. The retention of the bridge solely for viewing purposes would result in functional limitations as there would be no access to accommodate vehicular, cyclists, or pedestrian traffic. This option would conserve the cultural heritage value of the bridge and its associated heritage attributes. This option would also require the construction of a new bridge downstream. The potential of retaining the existing bridge *and* designing a sympathetic new bridge may not be feasible. While it may be feasible to retain the existing bridge, extensive efforts would still be required to rehabilitate structural deficiencies for the bridge. As a result financial constraints may limit the design approach for an adjacent bridge crossing.
7. Relocation of smaller, lighter single span bridges to an appropriate new site for continued use or	N/A	This option would not be feasible for the Victoria Bridge as a result of the existing bridge's size, site considerations, and constraints for relocation. In short, the Victoria Bridge is not a suitable candidate for relocation.

adaptive re-use.		
8. Bridge removal and replacement with a sympathetically designed structure.	Alternative C & D	Alternative C would result in the replacement of the existing bridge and the construction of a new bridge on the existing alignment. This would ultimately result in the loss of the cultural heritage value or interest and heritage attributes of the Victoria Bridge. Alternative D would result in the replacement of the existing bridge and the construction of a new bridge on a new alignment. This would ultimately result in the loss of the cultural heritage value or interest and heritage attributes of the Victoria Bridge. In both alternatives, sympathetic design considerations could be incorporated into the design of the new bridge in a manner in which the cultural heritage value of the bridge is conserved. The details of the sympathetic design would be determined at a later stage if this alternative is identified as the preferred alternative. A sympathetic design approach would encourage the incorporation of the heritage attributes of the bridge into the design of a new structure.

The evaluation and analysis of each conservation option has indicated that conservation options 2, 3, 4, 5, and 8 are conceptually feasible for the rehabilitation or replacement of the Victoria Bridge. However, as a result of technical and site constraints, the most feasible conservation options for the Class EA for the Victoria Bridge are:

- Option 3 – Retention of the existing bridge with sympathetic modifications; or
- Option 8 – Bridge removal and replacement with a sympathetically designed structure.

From a heritage perspective, “Option 3 – Retention of the existing bridge with sympathetic modifications” is the most appropriate to achieve the goals of the Class EA as well as conserve the cultural heritage value and heritage attributes of the Victoria Bridge.

Conservation options that included construction of a new bridge on a new-alignment have been considered less feasible as a result of extensive property and traffic impacts that would be required in order to construct a new structure on a new alignment. With regards to the Class EA alternatives, the conservations options indicate that Alternative A (major rehabilitation), or Alternative C (replacement on existing alignment) would be the preferred alternatives. Both alternatives would require careful sympathetic design in order to ensure sympathetic conservation of cultural heritage value.

In integrating the MTO Conservation Options identified in the *Ontario Heritage Bridge Guidelines* with the EA Alternatives developed for the Victoria Bridge Class EA, conceptually Alternative A (Rehabilitation) is connected with Option 3 (Retention with sympathetic modifications), while Alternative C (Replacement on Existing Alignment) is connected with Option 8 (Replacement with sympathetically designed structure).

6.2 Potential Mitigation

Mitigation strategies are developed in order to mitigate the negative impacts of an undertaking on a cultural heritage resource. Typically, several mitigation options are available, depending on the outcome of the undertaking and the resource(s) impacted by the project. There is no, one, correct way to mitigate the adverse impacts of new construction on or adjacent to heritage properties or resources. Strictly from the perspective of best practice for heritage conservation, the preferred option is one that conserves a property’s cultural heritage value. The Provincial Policy Statement, 2014, identifies the requirement to conserve cultural heritage, specifically in Section 2.6.1 stating “Significant built heritage resources and significant cultural heritage landscapes shall be conserved.”[8] Typically this

[8] The term “conserved” is defined in the Provincial Policy Statement, 2014 as “the identification, protection, management and use of built heritage resources, cultural heritage landscapes and archaeological resources in a manner that ensures their cultural heritage

involves maintaining a heritage resource *in situ*. In reality, economic, technical, and/or environmental site considerations may require some form of compromise and/or alternate means of heritage conservation.

Appropriate mitigation strategies for the Victoria Bridge will be fully developed during Phase 3 of the Class EA, when a preferred undertaking for the rehabilitation or replacement of the structure is identified. The rehabilitation or the replacement of the Victoria Bridge will have differing mitigation strategies. However it is most likely that a mitigation strategy that includes sympathetic design considerations will be required for the bridge, whether the bridge is rehabilitated or replaced. Potential mitigation strategies for the Victoria Bridge, have been developed for each tentatively developed for each alternative, below.

6.2.1 Mitigation for Rehabilitation

If the Class EA identifies that the rehabilitation of the Victoria Bridge is the preferred alternative, specific mitigation strategies will be developed in Phase 3 of the Class EA in order to ensure that all rehabilitation efforts will be undertaken in a manner which conserves the cultural heritage value and the heritage attributes of the bridge. As indicated above, a rehabilitation of the bridge would require the complete replacement of the deck, replacement of barrier systems, stringers, cross beams, bottom chords, and steel roller bearings. In addition, some vertical and diagonal truss members would require reinforcements/repairs and the piers and abutments would require strengthening measures.

A number of the heritage attributes, namely the truss, the hand railings, and the decorative lamp posts on the deck would likely be impacted by rehabilitation activities. As such, if identified as the preferred alternative, a design strategy will be developed in order to ensure replacement components will be designed and integrated sensitively into the historic structure in order to conserve the cultural heritage value of the bridge. Likewise, any modifications that be undertaken to repair the vertical or diagonal truss components, as well as the substructure components will be designed in manner that conserves the cultural heritage value of the bridge.

6.2.2 Mitigation for Replacement

If the Class EA identifies that replacement of the Victoria Bridge is the preferred alternative, specific mitigation strategies will be developed in Phase 3 of the Class EA in order to ensure that the adverse impacts of the loss of the cultural heritage value of the bridge will be mitigated through sympathetic design of a replacement structure. While it is unlikely that a new bridge can completely mitigate the loss of cultural heritage value of a structure, a sympathetic design framework will be developed as a part of the detailed design process in order to design a new structure that may integrate some of the historic elements of the existing Victoria Bridge into a new structure. While this strategy is not ideal for the conservation of heritage attributes, it would present an opportunity to design a new structure that could integrate some of the elements of the historic bridge design into the new design.

In addition, a new, well-designed structure could take into consideration could enhance the gateway-like atmosphere of the crossing as a key link to both downtown and south London. Specific design strategies will be developed in Phase 3, if this is identified as the preferred alternative.

value or interest is retained under the *Ontario Heritage Act*. This may be achieved by the implementation of recommendations set out in a conservation plan, archaeological assessment and/or heritage impact assessment. Mitigative measures and/or alternative development approaches can be included in these plans and assessments.

7. Recommendations

It is understood that a planning solution has yet to be determined for the Victoria Bridge Class EA, however, for the purposes of this HIA, AECOM considers Alternative A (major rehabilitation) and Alternative C (replacement on existing alignment) as the most feasible Class EA alternatives for the bridge. Alternatives A and C are also consistent with the Ontario Heritage Bridge Guidelines (Section 6.1) in which Option 3 (Retention of the existing bridge with sympathetic modifications) and Option 8 (Bridge removal and replacement with a sympathetically designed structure) are the most feasible conservation options for the Victoria Bridge.

With regards to the conservation of cultural heritage value and heritage attributes Alternative A, a major rehabilitation with improved accommodation for pedestrians and cyclists would be the preferred alternative in order to conserve the heritage attributes for the Victoria Bridge.

7.1 Alternative A – Major Rehabilitation with Improved Accommodation for Pedestrians and Cyclists

If feasible, this HIA recommends a planning solution that would result in Alternative A - rehabilitation of the Victoria Bridge. This alternative would have the least impact of the five alternatives on the cultural heritage value of the bridge. This alternative would preserve the majority of the heritage attributes identified for the Victoria Bridge. Nonetheless, the rehabilitation efforts for the bridge would be extensive in nature and would likely require significant modifications or replacement of the substructure as well as some truss components in order to accommodate a functional deck widening. This would require the complete replacement of the deck, replacement of barrier systems, stringers, cross beams, bottom chords, and steel roller bearings. In addition, some vertical and diagonal truss members would require reinforcements/repairs and the piers and abutments would require strengthening measures.

Design of the rehabilitation should be undertaken in a manner which conserves the heritage attributes and results in minimal impacts to the heritage value of the structure. If rehabilitation is identified as the preferred planning solution for the Class EA, a detailed design strategy should be developed that rehabilitates the bridge in a manner that conserves the cultural heritage value of the bridge, and is sympathetic in its rehabilitation.

7.2 Alternative C – Eliminate the Bridge and Build New Bridge on Existing Alignment

If Alternative A is not technically feasible, Alternative C should be considered in connection with Option 8 of the conservation options. Although this alternative would result in the removal of the existing bridge, a new bridge design constructed on the existing alignment could provide an opportunity for a sympathetic bridge design. If this alternative if identified as the preferred planning solution for the EA, a detailed design strategy should be developed that identifies key sympathetic design considerations that are sensitive and appropriate for a replacement structure. In particular, the incorporation of the following heritage attributes should be considered when undertaking a sympathetic design:

- Riveted, modified Warren truss structure with seven panels;
- Remnants of decorative stone and concrete end post at north abutment;
- Decorative lamp posts in centre of the bridge spans;
- Bridge skew evident in abutments, pier and truss alignments; and
- Hand railings original to the design of the bridge.

A sympathetic design is one that pays attention to bridge aesthetics as a technique for incorporating historic features of a structure into a replacement structure. While incorporation of historic elements into a new design can be complimentary, the design should not be a mere replica of the historic structure. For instance, with regards to the Victoria Bridge, this approach would not encourage a replica reconstruction of a Warren truss bridge. Rather, the

approach would encourage a design that may incorporate some of the elements of historic bridge into the new design to create a new structure that historically connects with the previous bridge(s) at this crossing. A conceptual design framework for the sympathetic design of the Victoria Bridge should be developed prior to detailed design in order to identify potential constraints and opportunities of sympathetic design.

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