VOLUME 2: HERITAGE IMPACT ASSESSMENT

BLACK RIVER ROAD/VICTORIA FALLS BRIDGE (STRUCTURE ID 400019)
BLACK RIVER ROAD OVER THE BLACK RIVER

CITY OF KAWARTHA LAKES, ONTARIO

DRAFT REPORT

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CITY OF KAWARTHA LAKES, ONTARIO

EXECUTIVE SUMMARY

ASI was contracted by D. M. Wills Associates Limited, on behalf of the City of Kawartha Lakes, to conduct a Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment (HIA) for the Black River Road Bridge, also known locally as the Victoria Falls Bridge (Structure ID 400019). This report, Volume 2, provides the HIA and is structured to provide an assessment of the proposed impacts to the identified cultural heritage value of the subject bridge in accordance with the City of Kawartha Lakes HIA Terms of Reference (City of Kawartha Lakes n.d.). The proposed undertaking involves the replacement of the bridge. The Black River Road Bridge features a half-through Warren truss main span with a deck girder approach span that carries one lane of vehicular traffic over the Black River in an east-west orientation. The bridge was constructed c. 1924 and is thought to have been relocated to its currently location, likely in 1937, at which time the approach span, abutment, and pier were constructed. The subject bridge measures 21.7 metres in overall length with a width of 4 metres.

Volume 1 of this report (CHER, prepared by ASI in July 2020) determined that the Black River Road Bridge, in the City of Kawartha Lakes retains cultural heritage value following the application of O. Reg. 9/06 of the *Ontario Heritage Act*. In particular, the structure retains contextual value given the importance of the bridge in supporting the character of the area, the physical, functional, and visual links to its surroundings, and the bridge's role as a landmark. Given that it meets O. Reg. 9/06, the Draft Statement of Cultural Heritage Value or Interest and the list of heritage attributes prepared during the CHER have been included in this report.

Given the identified cultural heritage value of the Black River Road Bridge and the preferred option being carried forward as part of the project involving the complete removal and replacement of the substructure and superstructure of the subject bridge, the following recommendations and mitigation measures should be considered and implemented:

1. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridge. In this respect, the subject bridge should be retained and rehabilitated, where feasible. Should retention of the subject bridge be determined to be infeasible following the structural assessment and life cycle cost analysis, a clear rationale stating the specific constraints to retention should be provided. At the time of report submission, rehabilitation of the subject bridge was not selected as the preferred option for the project as it would not allow for the necessary increase in load capacity.

2. If the preferred option being carried forward as part of the project involves the removal and replacement of the subject bridge is to be selected, the following mitigation measures should be considered:

    a. The bridge and setting should be professionally documented prior to construction-related disturbance. A heritage documentation report should be completed by a qualified heritage professional with experience in evaluating and documenting heritage road bridges. This heritage documentation report should be completed only once COVID-19-related library and archive closures have been lifted and additional historical research can be conducted to supplement the research conducted in the CHER (ASI 2020) to fulfill the requirements for a Statement of Cultural Heritage Value or Interest.

    b. The replacement structure should be designed in a manner that is sympathetic to the identified cultural heritage attributes of the subject bridge. In this respect, if the existing east abutment and central pier are determined to be structurally sound then their retention should be considered. If retention of the extant substructure is determined to be infeasible, consideration should be given to incorporating sympathetic heritage elements, such as the incorporation of natural and local materials (i.e. stone) as well as a truss and barrier system that allows for minimal visual intrusion and unobstructed views of the surrounding landscape.

    c. Should it not be feasible to retain the substructure, consideration should be given to a commemoration strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information and images and of the subject bridge. Heritage staff at the City of Kawartha Lakes and Ontario Parks should be consulted for input regarding this commemoration.

3. This report should be updated with more detailed justifications for the evaluation of the alternative options once further structural assessments and lifecycle cost analysis has been prepared and a preferred design is selected.

4. This report should be submitted by the proponent to heritage staff at the City of Kawartha Lakes and with the Ministry of Heritage, Sport, Tourism and Culture Industries for review. This report should also be submitted to any other relevant stakeholder with an interest in this project.

PROJECT PERSONNEL

Senior Project Manager:	Annie Veilleux, MA, CAHP Senior Cultural Heritage Specialist | Manager - Cultural Heritage Division
Project Coordinator	Katrina Thach, Hon. BA Archaeologist | Project Coordinator - Environmental Assessment Division
Project Manager:	Johanna Kelly, MSc Cultural Heritage Associate | Project Manager - Cultural Heritage Division
Field Review:	Johanna Kelly
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Graphics Production:	Andrew Clish, BES Senior Archaeologist - Planning Assessment Division
Report Reviewer(s):	John Sleath, MA Cultural Heritage Specialist | Project Manager - Cultural Heritage Division
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1.0 INTRODUCTION

ASI was contracted by D. M. Wills Associates Limited, on behalf of the City of Kawartha Lakes, to conduct a Cultural Heritage Evaluation Report (CHER) and Heritage Impact Assessment (HIA) for the Black River Road Bridge, also known locally as the Victoria Falls Bridge (Structure ID 400019). The subject bridge carries Black River Road over the Black River in the City of Kawartha Lakes, Ontario. This report, Volume 2, provides the HIA. Volume 1 provides the CHER as a separate, stand-alone report. This HIA is structured to provide an assessment of the proposed impacts to any identified cultural heritage value within the subject property in accordance with the City of Kawartha Lakes HIA Terms of Reference (City of Kawartha Lakes n.d.).

The Black River Road Bridge is a two-span bridge featuring a half-through Warren truss structure as the main span, crossing the river channel, with a deck girder approach span on the east bridging the rocks and slope to the east of the waterway. The bridge is oriented in an east-west direction and carries one lane of vehicular traffic over the Black River. Communications with the City of Kawartha Lakes indicated that the bridge was likely relocated to its currently location, most likely in 1937 based on the date stamp on the pier. Given the modular nature of truss bridges it is likely that only the main span was relocated. Once in place, the deck girder approach span along with the east abutment and pier were constructed.[1] The subject bridge measures 21.7 metres in overall length with a width of 4 metres.

This report is being undertaken in advance of rehabilitation or replacement work being prepared for the Black River Road Bridge. At the time of this report, the preferred option being carried forward as part of the project is the complete removal of the substructure and superstructure of the subject bridge and replacement with a single-span steel modular truss system. This report will assess impacts of the preferred alternative in consideration of the determined cultural heritage value of the subject bridge.

[1] The information available for the bridge at the time of report writing could not confirm this statement. For the purposes of this assessment it is surmised that only the main truss structure was relocated in 1937.

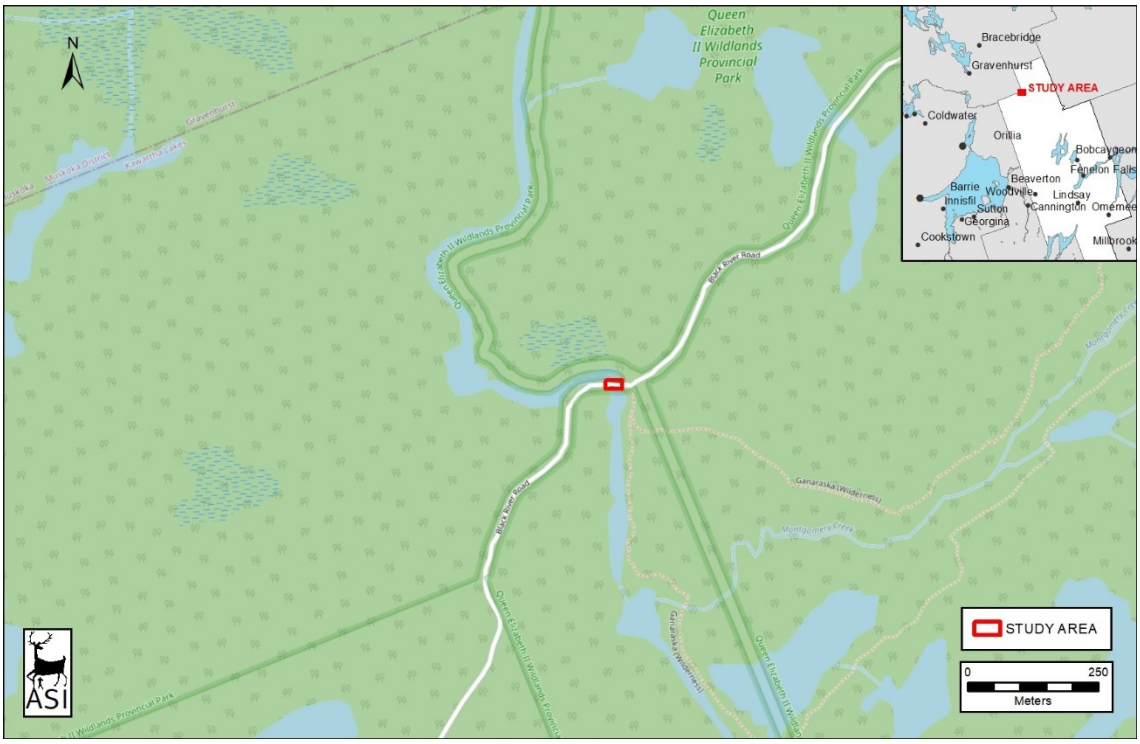

Figure 1: Location of the study area

Base Map: ©OpenStreetMap and contributors, Creative Commons-Share Alike License (CC-BY-SA)

The research, analysis, and fieldwork were conducted by Johanna Kelly, under the senior project direction of Annie Veilleux, ASI. This HIA follows the Ministry of Tourism, Culture and Sports' (now administered by the Ministry of Heritage, Tourism, Sport and Culture Industries [MHTSCI]) *Ontario Heritage Toolkit* (MHSTCI 2006), the City of Kawartha Lake's Heritage Impact Assessment Terms of Reference (City of Kawartha Lakes n.d.); and the *Standards and Guidelines for the Conservation of Historic Places in Canada* (2010). Research was completed to investigate, document, and evaluate the cultural heritage resources within and adjacent to the study area.

1.1. Policy Framework and Heritage Impact Assessment Scope

The authority to request this Heritage Impact Assessment arises from the Ontario Heritage Act (1990), Section 2(d) of the Planning Act (1990), the Provincial Policy Statement (2020), and the City of Kawartha Lake's Official Plan (2012) and Heritage Impact Assessment Terms of Reference (n.d.).

The below list includes the legislation reviewed in the preparation of this HIA:

- Ontario Heritage Act and O. Reg. 9/06 Criteria (1990);
- Planning Act (1990);
- Environmental Assessment Act (1990);
- Provincial Policy Statement (PPS) (2020);

The scope of a HIA is provided by the *Ontario Heritage Tool Kit, Info Sheet #5: Heritage Impact Assessments and Conservation Plans* (MHSTCI 2006). An HIA is a useful tool to help identify cultural heritage value and provide guidance in supporting Environmental Assessment work. As part of a heritage impact assessment, proposed site alterations and project alternatives are analysed to identify impacts of the undertaking on the heritage resource and its heritage attributes. The impact of the proposed development on the cultural heritage resource is assessed, with attention paid to identifying potential negative impacts, which may include, but not limited to:

- Destruction of any, or part of any, significant heritage attributes or features;
- Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance;
- Shadows created that alter the appearance of a heritage attribute or change the viability of an associated natural feature or plantings, such as a garden;
- Isolation of a heritage attribute from its surrounding environment, context or a significant relationship;
- Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features;
- A change in land use (such as rezoning a church to a multi-unit residence) where the change in use negates the property's cultural heritage value;
- Land disturbances such as a change in grade that alters soils, and drainage patterns that adversely affect a cultural heritage resource, including archaeological resources.

Where negative impacts of the development on the cultural heritage resource and/or attributes are identified, mitigative or avoidance measures or alternative development or site alteration approaches are considered. Conservation options as outlined in the *Ontario Heritage Bridge Program* (Ministry of Culture and Communications 1991) which is regarded as current best practice for conserving heritage bridges in Ontario and ensures that heritage concerns, and appropriate mitigation options are considered.

ASI's *Cultural Heritage Evaluation Report: Black River Road Bridge, City of Kawartha Lakes* (draft, ASI 2020), concluded that the subject bridge has cultural heritage value as it meets the criteria outlined in O. Reg. 9/06 of the *Ontario Heritage Act*, and that a resource-specific HIA would be required. The present report satisfies this requirement.

1.2. Location and Study Area Description

The Black River Road Bridge is a two-span steel structure featuring a half-through Warren truss main span, on the west, and a deck girder approach span on the east, resting on a single stone and concrete pier and stone abutments. The bridge is 21.7 metres in length, 4 metres in width, and carries one lane of vehicular traffic in an east-west direction over the Black River approximately 10 kilometres east of Lawishan Road, in the Queen Elizabeth II Wildlands Provincial Park, in the City of Kawartha Lakes. Historically, the subject bridge is located in the former Dalton Township, Victoria County in part of Lot 1, Concession 13. Detailed photographs showing the bridge and surrounding area are available in Appendix A of Volume 1 of this report (ASI 2020).

Figure 2: Aerial photo. The subject bridge is depicted in red

Base Map: Google

Figure 3: South elevation of the subject bridge showing the half-through Warren truss main span on the left and deck girder approach span on the right (ASI 2020)

1.3. Bridge Ownership

The bridge is owned and maintained by the City of Kawartha Lakes.

1.4. Project Consultation

Consultation with staff at the City of Kawartha Lakes, Kawartha Lakes Library and Archives, Archives of Ontario, the MHSTCI, and the Ontario Heritage Trust regarding the subject bridge was undertaken as part of the Volume 1: Cultural Heritage Evaluation Report by ASI in 2020 (ASI 2020). Responses from the various organizations provided little additional historical information on the bridge's history.

1.5. Adjacent Heritage Properties

There are no previously identified cultural heritage resources adjacent to the Black River Road Bridge, in the City of Kawartha Lakes.

2.0 CULTURAL HERITAGE VALUE

The following draft Statement of Cultural Heritage Value is taken from the Volume 1 (CHER) of this report prepared by ASI in 2020.

2.1. Draft Statement of Significance

Description of Property

The Black River Road Bridge was constructed in c. 1924 and relocated to its current site in 1937, where it is situated in an east-west orientation over the Black River in the former Township of Dalton, former County of Victoria. It is unknown who designed or constructed the bridge. The bridge is a steel structure consisting of a half-through Warren truss main span and a deck girder approach span on the east with an overall deck length of 21.7 metres and an overall width of 4 metres.

Draft Statement of Cultural Heritage Value or Interest

The Black River Road Bridge was determined to retain physical value as its substructure is a representative example of early twentieth-century construction techniques. The bridge also retains contextual value as it is important in maintaining or supporting the character of the area; is physically functionally, and visually linked to its surroundings; and is a landmark.

The bridge is a representative example of early twentieth-century construction techniques. Stone was a common construction material prior to the introduction of concrete, and in remote locations was useful as a material that could be locally sourced. The substructure consists of stone abutments and a central stone and concrete pier. The west abutment utilizes the natural rock of the western riverbank. The east abutment is made of dry laid stone, most likely locally sourced. The substructure is considered to be a representative example of early twentieth century construction techniques.

The bridge is important in maintaining or supporting the character of the area, which features bare rock and rocky soils. The use of the natural rock and local stone in the substructure supports the character of the surrounding wilderness. The truss style allows for minimal visual intrusion and provides unobscured views of the river, both from the bridge itself and when looking beyond the bridge from the river.

The bridge is physically, functionally, and visually linked to its surroundings. Functionally, the bridge is part of the transportation network that allows access to the Queen Elizabeth II Wildlands Provincial Park, carrying Black River Road over the Black River and Victoria Falls below. The bridge is physically integrated into the landscape, beyond simply being present, it uses local and natural materials for the substructure. The use of natural rock for the west abutment and local stone for the pier and east abutment creates a harmonious link with the landscape. The bridge is visually linked to its surroundings and is visible from several rocky outcrops along the waterway.

The bridge is a landmark. It is a well known structure within the Queen Elizabeth II Wildlands Provincial Park, serving as a local tourist attraction and marker. It is well known as a picturesque vantage point from which to observe the Victoria Falls and rapids of the river below. The area around the bridge is heavily used for camping by visitors to the park and, together with the falls, serves as a marker for canoe access to the Black River.

Description of Heritage Attributes:

Key heritage attributes that embody the design value of the subject bridge in the local context include:

- c. 1937 stone and concrete substructure.

Key attributes that express the contextual value of the bridge include:

- The continued use of the location as a crossing point;
- The use of local and natural materials in the substructure;
- The incorporation of natural stone elements of the surrounding landscape into the substructure; and
- The unobstructed views of the river and falls both from the bridge itself as well as through the bridge when viewed from the river and surrounding landscape.

3.0 ASSESSMENT OF EXISTING CONDITIONS

A field review was undertaken by Johanna Kelly, Cultural Heritage Associate, ASI, on June 8, 2020 to conduct photographic documentation of the bridge crossing from the exiting right-of-way and to collect data relevant for completing a heritage evaluation of the structure. Photographic plates of the subject bridge and surrounding area are available in Appendix A of the CHER.

The bridge is oriented in a roughly east-west direction and is surrounded by natural vegetation, bare rocks, and shallow soils. The Black River flows south beneath the bridge. The structure is owned and maintained by the City of Kawartha Lakes. Wooden posts line the approaches on both the east and west sides, although no barrier is currently attached. According to the 2017 inspection report, the bridge carries one lane of motor traffic with a total deck length of 21.7 metres (AUE Structural Inc. 2017). The deck has a travel width of 3 metres with an overall structure width of 4 metres. The OSIM Inspection Form indicates the posted speed limit is 80 km/hr and a current load limits of 3 tonnes (AUE Structural Inc. 2017).

The superstructure of Black River Road Bridge is a half-through (or pony) Warren truss structure with a deck girder approach span. The western, or main, span consists of a half-through Warren truss with riveted steel beams. The river channel flows beneath the main span. The eastern, or approach, span consists of a deck girder structure and connects the main span to the eastern bank, crossing rock and sloped land. Rolled steel I-beam stringers that extend the length of both spans, stamped with 'Jones & Laughlin', supporting a timber deck. Steel floor beams support the western truss span only. A timber deck surface extends the length of the bridge. The timber deck surface is protected further by longitudinal steel plates anchored to the wood deck at the wheel track locations. The gravel wearing surface of the road extends onto the bridge and an accumulation of gravel and dirt has resulted in grasses and vegetation growing along the curbs. A double steel pipe railing system spans the entire length of the bridge, providing the only barrier on the north and south sides on the eastern deck girder span. The substructure consists of stone abutments and a single concrete and stone pier. Stone abutments support the bridge at the east and west sides; natural rock is utilized on the west side and a dry fit stacked stone wall atop the natural rock outcrop forms the abutment on the east side. The single pier is constructed of stone and concrete and consists of a random-coursed stone footing with concrete mortar, two square cast-in-place concrete support columns, and a later stone and concrete addition to the centre, likely for additional reinforcement. The stone footing was likely originally parged with concrete, as remnants of this parging are evident on the top and the west side. Two square columns support the eastern most floor beam of the western truss span. The south column has '1937' stamped into the top, visible when looking down towards the pier from the bridge deck. The stone and concrete addition shows visible striations where the rough timber formwork was used during construction.

Original bridge drawings were requested but unavailable. The 2017 OSIM report and the municipal inventory both note that the bridge was constructed in 1924. Communications with the City of Kawartha Lakes indicate that the bridge was likely relocated to its present location at some point (E. Turner, City of Kawartha Lakes, email communication, 10 June 2020). Given the modular nature of truss bridges it is most likely that only the main span, the half-through Warren truss, was moved. The deck girder approach span was likely constructed in place to connect the main truss span to the eastern slope. It is surmised that the dry laid stone abutment (the east abutment) and the stone and concrete pier were constructed at the time the bridge was moved and the approach span was constructed. A date stamp on the top of the southmost column of the pier indicates the possible date of relocation, 1937. It is possible

that the bridge featured cantilevered sidewalks in its original location, evidenced by the raw edges of the floor beams, below the outriggers, which appear to have been cut off (Holth 2020).[2]

The use of stone in the substructure is representative of bridge construction techniques prior to the rise of concrete in the mid-twentieth century. Considering the remote location of the bridge and rocky nature of the environment it is likely that local stone was used for the construction of the central pier and east abutment. Utilizing local stone as well as existing natural stone, for the west abutment, were prudent decisions when constructing the substructure of the bridge.

No rehabilitation drawings were available for review. A visual inspection of the bridge indicates that it is unlikely that any major rehabilitation has occurred. Original riveted connections are intact, all exposed steel has consistent corrosion, and the wooden deck appears to be unaltered.

The OSIM Inspection Form recommended repairs and rehabilitation for the approaches, barriers, coatings, and abutments to extend the useful life of the structure. The following deficiencies were documented in 2017 (AUE Structural Inc. 2017):

- Dry stone abutment walls with concrete top – deterioration of concrete at corners, light spall under the deck at northeast and southeast bearings, efflorescence stains;
- Load posting signs – sign at south is vandalized;
- Gravel wearing surface – light to severe wheel track rutting (re-grade approaches);
- Steel posts – existing barrier is substandard and should be replaced with a code compliant barrier, two posts are severely bent, light corrosion throughout;
- Double pipe steel rail - existing barrier is substandard and should be replaced with a code compliant barrier, severe sections are bent due to impact, light corrosion throughout;
- Steel floor beam; light corrosion throughout;
- Steel stringer – light corrosion throughout;
- Steel pipe bracing – light corrosion throughout;
- Structural steel coating – coating loss noted throughout structural steel members;
- Timber deck – longitudinal steel plates have been anchored to the deck at wheel track locations, steel plates are loose and are a hazard (anchor steel plates), underside of timber deck is generally in good condition;
- Embankment – code compliant approach guiderail is required;
- Reinforced concrete pier shaft – light to medium honeycombing was noted;
- Steel bottom chord of truss – light corrosion throughout;
- Steel connection plate of truss – light corrosion throughout;
- Steel top chord of truss – light corrosion throughout; and
- Steel diagonal of truss – two diagonals with local buckling or impact damage, light corrosion throughout.

[2] Original bridge drawings, rehabilitation or relocation drawings, or possibly even council minutes from either 1924 or 1937 would confirm the bridges construction date, the date it was moved, as well as those elements of the bridge which are original to the structure and those that were constructed or modified during its relocation.

4.0 PROPOSED UNDERTAKING

4.1. Description of Proposed Undertaking

Based on a structural assessment and life cycle cost analysis, yet to be completed, the City of Kawartha Lakes will determine the future of the Black River Road Bridge. At the time of report preparation, D.M. Wills outlined preliminary options for the future of the subject bridge that can generally be categorized as:

- Option 1: Do Nothing
- Option 2: Rehabilitate the Bridge
- Option 3: Replace the Bridge
- Option 4: Retire or Repurpose the Bridge

Option 1: Do Nothing is included in the evaluation to establish baseline conditions for the proposed undertaking and is not considered a viable option as it does not address the safety issues with the current non-code compliant barrier system, the deficiencies identified in the 2017 OSIM inspection, and the operational requirements of the park entrance.

Option 2: Rehabilitate the Bridge would involve the rehabilitation of all deteriorated elements of the approaches, barriers, coatings, and abutments in need of repair, as well as installation of code-compliant barriers and approach guardrails, as noted in the 2017 structural assessment (AUE Structural Inc. 2017).

Option 3: Replace the Bridge would involve the complete removal of the extant half-through Warren truss and deck girder structure and replacement with a new structure at the subject crossing. Following construction of the replacement bridge, Black River Road would resume normal vehicular operations.

Option 4: Retire or Repurpose the Bridge would result in restrictions prohibiting vehicular access and installation of vehicle turn-arounds. Vehicle turn-arounds would be constructed on Black River Road to the east and west of the bridge crossing, and all vehicular traffic would be re-routed to another bridge crossing.

At the time of report preparation, Option 3: Replace the Bridge was preferred option being carried forward as part of the project. The replacement structure is anticipated to be a single-span steel modular truss system. Retention of the existing south abutment and the lower portions of the central pier is being considered as it is the possible that a new abutment may be able to be constructed behind the existing south abutment. A structural assessment and life cycle cost analysis have yet to be completed. Preliminary designs for the replacement bridge were unavailable at the time of report submission [Z. Staples, D.M. Wills, email communication, 2 July 2020).

5.0 IMPACT ASSESSMENT AND ALTERNATIVES CONSIDERED

Each of the four options under consideration for the subject bridge has the potential to result in impacts to the heritage attributes identified in Section 2.0.

Option 1: Do Nothing is included in the evaluation to establish baseline conditions for the undertaking, but is not considered a viable option as it does not address the safety issues with the current non-code compliant barrier system, the deficiencies identified in the 2017 OSIM inspection, and the operational requirements of the park entrance. This option would result continued safety concerns resulting from the non-compliant barrier system and the current posted load (3 tonnes) as well as the gradual but continual deterioration of the structure and necessitate a future Black River Road closure to ensure public safety. Option 1 is not considered a viable option as it would not result in the continuation of the subject bridge as a safe roadway crossing.

Option 2: Rehabilitate the Bridge is considered to be the preferred option from a heritage perspective as it would continue the historical function of the subject bridge as a crossing for Black River Road motorists and pedestrians over the tributary of the Black River. However, this option is not preferred from an overall project perspective as it does not allow for a safe way to increase the load limit of the structure. Given the age of the bridge, this option also raises concerns about the integrity of the structure[3].

Option 3: Replace the Bridge would result in the complete removal of the 1924 half-through Warren truss and deck girder structure, moved to this location in 1937, and all identified heritage attributes described in Section 2.0. The proposed replacement bridge would be a single-span steel modular truss system. A sympathetically designed replacement structure would continue to support the contextual association of the crossing as a structure that maintains or supports the character of the area, is physically, functionally, and visually linked to its surroundings, and is a landmark.

Option 4: Retire or Repurpose the Bridge would entail retention of the bridge with restrictions in place prohibiting vehicular access and installation of vehicle turn-arounds, severing the functional association of Black River Road as a watercourse crossing in this location.

The following table presents the results of ASI's impact assessment of the proposed undertaking, based on the *Ontario Heritage Bridge Guidelines* (OHBG) Conservation Options (Ministry of Transportation 2008). The Conservation Options are also considered appropriate project alternatives for the proposed undertaking. It considers possible direct adverse impacts, indirect adverse impacts, positive impacts, and the viability of this option in relation to the overall project.

[3] To be confirmed through a structural assessment and life cycle cost analysis.

Table 1: OHBG Impact Assessment of the Black River Road Bridge, City of Kawartha Lakes

Conservation Options (Ministry of Transportation 2008)	Analysis[4]	Viable Option
1) Retention of existing bridge with no major modifications undertaken	This option would result in the lowest degree of intervention and fewest impacts to the subject bridge. However, this is not considered a viable option as it would not address the safety issues with the current non-code compliant barrier system, the deficiencies identified in the 2017 OSIM inspection, and the operational requirements of the park entrance. This conservation option is being considered as Option 1: Do Nothing.	No
2) Retention of existing bridge and restoration of missing or deteriorated elements where physical or documentary evidence (e.g. photographs or drawings) can be used for their design	This option would result in a lesser degree of intervention and fewer impacts to the subject bridge. However, this option is not considered viable as there are currently no drawings or historical photographs of the subject bridge available. Restoration of the current non-code compliant barrier system would not address the safety issues the system currently presents. This conservation option is being considered as Option 2: Rehabilitation.	No
3) Retention of existing bridge with sympathetic modification	This option would result in a lesser degree of intervention and fewer impacts to the subject bridge. This option would allow for the rehabilitation of deteriorated elements of the sub and superstructures, for the installation of a code-complaint barrier, and ensure a safe vehicular crossing while continuing the contextual associations of the subject bridge over the Black River. The proponent should investigate if sympathetic modifications to the bridge can be made to increase the load capacity. Following investigations, this option should be re-evaluated to determine if retention of the existing sub and superstructure of the bridge with sympathetic modifications is viable. Should it be determined that increasing the load capacity through sympathetic modifications is not a viable option, a clear rationale justifying this conclusion should be provided. This option would not allow for the upgrades required to increase the load capacity, which is a safety concern. This conservation option is being considered as Option 2: Rehabilitation.	TBD

[4] This report will be updated with a more detailed analysis once a structural assessment, life cycle cost analysis, and preferred designs are available.

Table 1: OHBG Impact Assessment of the Black River Road Bridge, City of Kawartha Lakes

Conservation Options (Ministry of Transportation 2008)	Analysis[4]	Viable Option
4) Retention of existing bridge with sympathetically-designed new structure in proximity	This option is not considered viable as it would not ensure the preservation of the contextual value of the bridge is retained. An additional bridge in close proximity would obstruct the views of the watershed both to and from the Black River Road Bridge. This conservation option is being considered as Option 4: Retirement or Repurpose.	No
5) Retention of existing bridge no longer in use for vehicle purposes but adapted for pedestrian walkways, cycle paths, scenic viewing etc.	This option would involve the retention of the existing bridge with restrictions in place prohibiting vehicular access, which is not viable as the City of Kawartha Lakes has indicated that maintaining full traffic access across the bridge is preferred. The bridge provides access to the Queen Elizabeth II Wildlands Provincial Park and this access would be lost if the bridge were retired and used for viewing purposes or non-vehicular loading only. This conservation option is being considered as Option 4: Retirement or Repurpose.	No
6) Retention of bridge as heritage monument for viewing purposes only	This option would involve the retention of the existing bridge with restrictions in place prohibiting vehicular access, which is not viable as the City of Kawartha Lakes has indicated that maintaining full traffic access across the bridge is preferred. The bridge provides access to the Queen Elizabeth II Wildlands Provincial Park and this access would be lost if the bridge were retired and used for viewing purposes only. This conservation option is being considered as Option 4: Retirement or Repurpose.	No
7) Relocation of bridge to appropriate new site for continued use or adaptive re-use	Relocation of the subject bridge is not considered a viable option. Although as the modular nature of the half through truss span would facilitate disassembly and relocation for use in another crossing or for adaptive reuse, the identified heritage attributes that embody the design value of the bridge lie in the c.1937 stone and concrete substructure. Relocation of the substructure would be prohibitively difficult to undertake. Adaptive re-use of the substructure by incorporating the elements into the new bridge is a viable option, provided it is structurally sound. A structural assessment, life cycle cost analysis, and preferred designs are needed to determine the viability of retaining the substructure and to further evaluate this conservation option. Adaptive re-use of the substructure is being considered under Option 3: Replacement of the Bridge.	TBD

Table 1: OHBG Impact Assessment of the Black River Road Bridge, City of Kawartha Lakes

Conservation Options (Ministry of Transportation 2008)	Analysis[4]	Viable Option
8) Bridge removal and replacement with a sympathetically designed structure:	Direct impacts to the cultural heritage values of the Black River Road Bridge in the City of Kawartha Lakes are expected through the complete removal of the substructure and superstructure of the bridge. All cultural heritage attributes of the subject bridge identified in Section 2.0 would potentially be removed. Retention of the substructure and a sympathetically designed replacement superstructure would ensure that the contextual associations of the subject bridge would be maintained. The proposed single-span steel modular truss system would allow for viewscapes of the watershed and natural environment to persevere unobstructed while retaining the design value of the substructure. The replacement superstructure has potential to continue to support the contextual association of the crossing as a structure that maintains or supports the character of the area, is physically, functionally, and visually linked to its surroundings, and is a landmark. A structural assessment, life cycle cost analysis, and preferred designs are needed to determine the viability of retaining the substructure and to further evaluate this conservation option. This conservation option is being considered as Option 3: Replacement of the Bridge.	TBD
a) Where possible, salvage elements/ members of heritage bridge for incorporation into new structure or for future conservation work or displays	Direct impacts to the cultural heritage value of the Black River Road Bridge in the City of Kawartha Lakes are expected through the complete removal of the substructure and superstructure of the bridge. Complete removal would result in the destruction of the stone and concrete substructure, identified in Section 2.0 as heritage attributes. The use of salvage elements in a replacement structure or for future conservation works or displays is a viable option. Where possible, salvaged elements from the pier or east abutment of the subject bridge should be retained for incorporation into the new structure to reduce impacts to the identified heritage attributes outlined in Section 2.0. A structural assessment, life cycle cost analysis, and preferred designs are needed to further evaluate this conservation option. If incorporation of salvage elements in the replacement structure is deemed to be infeasible, salvaged elements should be retained for inclusion in future conservation work or commemorative displays, where feasible.	TBD

Table 1: OHBG Impact Assessment of the Black River Road Bridge, City of Kawartha Lakes

Conservation Options (Ministry of Transportation 2008)	Analysis[4]	Viable Option
b) Replacement/removal of existing bridge with full recording and documentation of the heritage bridge	Direct impacts to the cultural heritage values of the Black River Road Bridge in the City of Kawartha Lakes are expected through the complete removal of the bridge. Full recording with an appropriate commemoration strategy would ensure proper documentation for archival purposes. This option is considered viable and is should be under consideration as part of Option 3.	Yes

Where feasible, the preferred alternative should be selected to result in the minimum impacts to the heritage resource as possible while still achieving the scope of the project as identified in the in Section 3.0. In this respect, Option 2: Rehabilitation of the Bridge is preferred from the heritage perspective as it will ensure the continued function of the subject bridge as a watercourse crossing. Impacts related to Option 2 are considered minor if the interventions are suitably planned and executed. Option 2 will also result in the long-term preservation and continued use of the subject bridge as a safe, code-compliant structure.

The proponents preferred option (Option 3: Replace the Bridge) involving the complete removal and replacement of the 1924 substructure (the stone and concrete abutments and piers) and superstructure (the half-through Warren truss and deck girder structure) may result in disruption to the design and contextual value of the structure. Where feasible, the existing abutments and the lower portions of the central pier should be retained and incorporated into the replacement bridge. If the retention of these elments is determined to be infeasible, a clear rationale for their replacement should be provided. The heritage value of the Black River Road Bridge lies in its incorporation of natural rock and local stone to the substructure, supporting the character of the surrounding wilderness and creating a harmonious link with the landscape. The truss style allows for minimal visual intrusion and provides unobstructed views of the river. A sympathetically-designed replacement structure has the potential to continue to support the contextual association of the crossing as a structure that maintains or supports the character of the area, is physically, functionally, and visually linked to its surroundings, and is a landmark.

The replacement structure is anticipated to be a single-span steel modular truss system. This is considered an appropriate replacement structure given the remote location of the study area and the low traffic volumes. Preliminary designs for the replacement bridge were unavailable at the time of report submission. Retention of the existing south abutment and the lower portions of the central pier is being considered. There is the possibility that a new abutment may be able to be constructed behind the existing south abutment (Z. Staples, D.M. Wills, email communication, 2 July 2020). The replacement structure should be designed in a manner that is sympathetic to the identified cultural heritage attributes of the subject bridge. If the existing east abutment and central pier are determined to be structurally sound then their retention should be considered, as they would maintain the crossing's design and contextual value. Continued use of the extant locally-source stone substructure would continue the unique physical and functional links between the substructure and the surrounding

landscape. If retention of the extant substructure is determined to be infeasible, consideration should be given to incorporating sympathetic heritage elements, such as natural and local materials (i.e. stone) in the replacement structure. Further, a sympathetically-designed truss with code-compliant barrier system that allows for minimal visual intrusion and unobstructed views of the surrounding landscape should be considered if replacement is carried over as the preferred project alternative.

6.0 CONCLUSION AND RECOMMENDATIONS

This report provides the HIA based on the recommendations of the CHER for the Black River Bridge prepared by ASI in July 2020 (ASI 2020). The CHER (Volume 1 of this report) determined that the Black River Road Bridge, in the City of Kawartha Lakes retains cultural heritage value following the application of O. Reg. 9/06 of the *Ontario Heritage Act*. In particular, the structure retains design and contextual value given the locally sourced stone substructure as well as the importance of the bridge in supporting the character of the area, the physical, functional, and visual links to its surroundings, and the bridge's role as a landmark. Given that it meets O. Reg. 9/06, the Draft Statement of Cultural Heritage Value or Interest and the list of heritage attributes prepared during the CHER have been included in this report (Section 2.0).

At the time of this report, the preferred option being carried forward as part of the project was Option 3: Replace the Bridge. The analysis of OHBG Conservation Options (Section 5.0, Table 1) determined that Conservation Option 8b is viable given the identified heritage value of the bridge and the scope of the work. A structural assessment, life cycle cost analysis, and preferred designs are needed to further evaluate Conservation Options 3, 7, 8, and 8a. This report should be updated with more detailed justifications for these Conservation Options once these investigations are complete. Where feasible, the preferred alternative should be selected to result in the minimum impacts to the heritage resource as possible while still achieving the scope of the project as identified in the in Section 3.0. In this respect, Option 2: Rehabilitation of the Bridge (Section 4.0) is preferred from the heritage perspective as it will ensure the continued function of the subject bridge as a watercourse crossing. Impacts related to Option 2 are considered minor if the interventions are suitably planned and executed. Option 2 will also result in the long-term preservation and continued use of the subject bridge as a safe, code-compliant structure. If Option 2: Rehabilitation of the Bridge is demonstrated to be infeasible following the structural review and life cycle cost analysis, a clear rationale outlining the specific constraints should be documented. Options 3 and 4 are considered more impactful, and as such, are less preferred.

7.1 Mitigation Measures and Recommendations

Given the identified cultural heritage value of the Black River Road Bridge and the preferred option being carried forward as part of the project involving the complete removal and replacement of the substructure and superstructure of the subject bridge, the following recommendations and mitigation measures should be considered and implemented:

1. Where feasible, the preferred alternative should be selected to ensure the fewest direct and permanent impacts to the identified heritage attributes of the subject bridge. In this respect, the subject bridge should be retained and rehabilitated, where feasible. Should retention of the subject bridge be determined to be infeasible following the structural assessment and life cycle cost analysis, a clear rationale stating the specific constraints to retention should be provided. At the time of report submission, rehabilitation of the subject bridge was not selected as the preferred option for the project as it would not allow for the necessary increase in load capacity.

2. If the preferred option being carried forward as part of the project involves the removal and replacement of the subject bridge is to be selected, the following mitigation measures should be considered:

    a. The bridge and setting should be professionally documented prior to construction-related disturbance. A heritage documentation report should be completed by a qualified heritage professional with experience in evaluating and documenting heritage road bridges. This heritage documentation report should be completed only once COVID-19-related library and archive closures have been lifted and additional historical research can be conducted to supplement the research conducted in the CHER (ASI 2020) to fulfill the requirements for a Statement of Cultural Heritage Value or Interest.

    b. The replacement structure should be designed in a manner that is sympathetic to the identified cultural heritage attributes of the subject bridge. In this respect, if the existing east abutment and central pier are determined to be structurally sound then their retention should be considered. If retention of the extant substructure is determined to be infeasible, consideration should be given to incorporating sympathetic heritage elements, such as the incorporation of natural and local materials (i.e. stone) as well as a truss and barrier system that allows for minimal visual intrusion and unobstructed views of the surrounding landscape.

    c. Should it not be feasible to retain the substructure, consideration should be given to a commemoration strategy, such as developing a plaque in the location of the bridge. In this respect, an interpretive historical plaque/commemoration could be prepared including historical information and images and of the subject bridge. Heritage staff at the City of Kawartha Lakes and Ontario Parks should be consulted for input regarding this commemoration.

3. This report should be updated with more detailed justifications for the evaluation of the alternative options once further structural assessments and lifecycle cost analysis has been prepared and a preferred design is selected.

4. This report should be submitted by the proponent to heritage staff at the City of Kawartha Lakes and with the Ministry of Heritage, Sport, Tourism and Culture Industries for review. This report should also be submitted to any other relevant stakeholder with an interest in this project.

7.0 REFERENCES

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