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Old Shiloh Road Bridge

CLASS ENVIRONMENTAL ASSESSMENT PROJECT FILE REPORT

Town of Georgina

File 122279 | April 15, 2024

Document Control

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Issue	Date	Description
00	January 22, 2024	Draft Report
01	February 6, 2024	Revised Draft Report
02	March 8, 2024	Draft for MECP review
03	April 15, 2024	Final Report

Document Contents

Figures

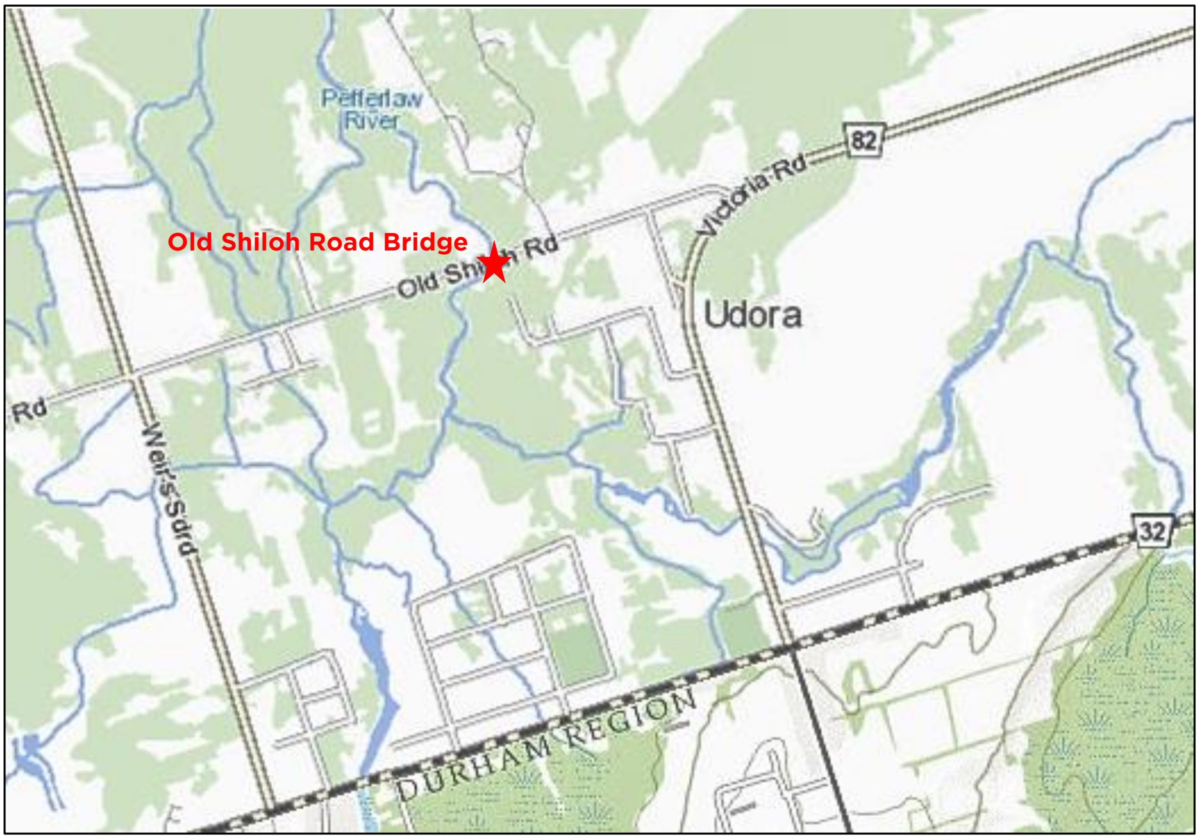
Tables

Appendices

1 Introduction & Background

The Town of Georgina (Town) is considering improvements to the Old Shiloh Road Bridge, located on Old Shiloh Road spanning the Pefferlaw River. A key map showing the site location can be seen in Figure 1.

Figure 1: Key Map



Tatham Engineering Limited (Tatham) was retained by the Town to undertake a Municipal Class Environmental Assessment Study (Class EA) in accordance with the applicable guidelines (*Municipal Class Environmental Assessment*, Municipal Engineers Association, October 2000 as amended in 2007, 2011, 2015, & 2023). The objective of the Class EA Study is to confirm the need for improvements and consider the most appropriate manner in which they can be implemented.

1.1 CLASS ENVIRONMENTAL ASSESSMENT PROCESS

The Class EA process is defined in the *Municipal Class Environmental Assessment* document. Applying to all municipal road improvement projects, a number of Study categories or schedules have been established recognizing the range of environmental impacts. These are briefly described below, whereas the process corresponding to each is illustrated in Figure 2.

1.1.1 Class EA Schedules

Exempt (Previously Schedule A or A+)

Various maintenance, operation, rehabilitation, and other small projects that are limited in scale and have minimal adverse environmental effects. As the environmental effects of these activities are usually minimal, these projects are pre-approved and may proceed directly to implementation without the need to complete the design and planning process. No reports or Study documents need to be prepared.

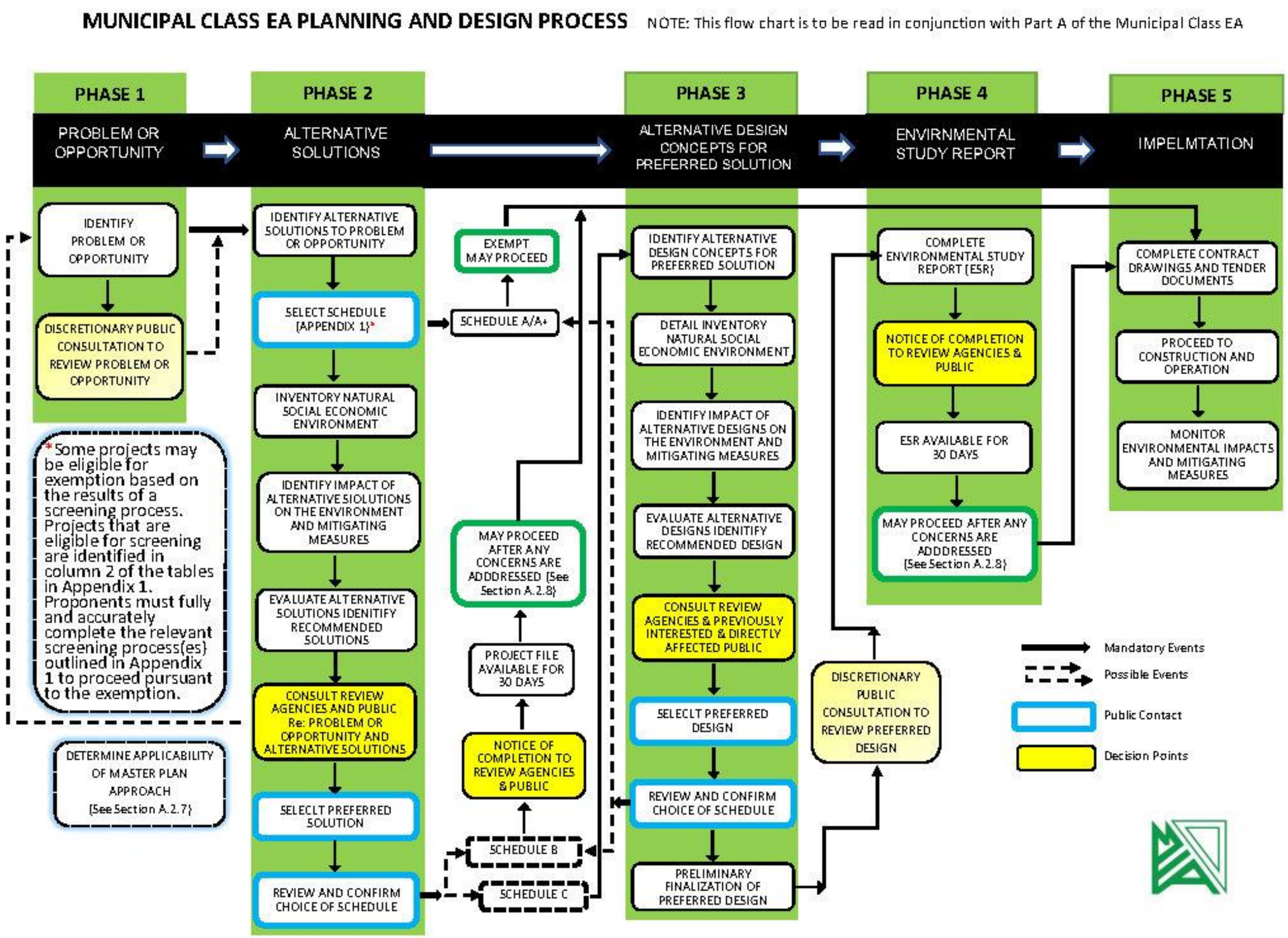
Schedule B

Schedule B projects generally include improvements and minor expansions to existing facilities. As there is the potential for some adverse environmental impacts, the municipality is required to conduct a screening process whereby members of the public and review agencies are informed of the project and given the opportunity to provide comment. Documentation of the planning and design process is required under a Schedule B Study. As these studies are generally straightforward and do not require detailed technical investigations to arrive at the preferred solution, a formal report is not required. Rather, a Project File shall be prepared to demonstrate that the appropriate steps have been followed. The Project File is to be made available for review by the public and review agencies.

Schedule C

Schedule C projects generally include the construction of new facilities and major expansions to existing facilities. As they have the potential for environmental impacts, they must proceed under the full planning and documentation procedures specified by the Municipal Class EA document. Schedule C projects require an Environmental Study Report (ESR) to be prepared and appropriately filed for review by the public and review agencies.

Figure 2: Class EA Guidelines Flow Chart



1.1.2 Class EA Terminology

Prior to determining the appropriate Class EA schedule, an understanding of the defining terminology is required as noted below:

Hydraulic Capacity

The volume of water that can be conveyed under or through a water crossing structure.

Road Capacity

The number of travelled lanes and does not differentiate between various lane widths to accommodate differing traffic volumes.

Same Purpose, Use, Capacity & Location

The replacement or upgrading of a structure or facility or its performance, where the objective and application remain unchanged, and the volume, size and capability do not exceed the minimum municipal standard, or the existing rated capacity, and there is no substantial change of location. Works carried out within an existing road allowance such that no land acquisition is required are considered to be in the same location. Conversely, it is thus inferred that should improvements extend beyond the existing road allowance and additional property is required; the location is considered to have changed.

Watercourse

Flowing water, though not necessarily continuous, within a defined channel and with a bed and banks which usually discharges itself into some other watercourse or body of water.

1.1.3 Selected Schedule

As per the Class EA guidelines and in consideration of the improvement works, the following apply:

- Exempt for the reconstruction of a water crossing for the same purpose, use, capacity (refers to either hydraulic capacity or road capacity) and at the same location;
- Exempt for the reconstruction or alteration of a structure or the grading adjacent to it when the structure is over 40 years old which after appropriate evaluation is found not to have cultural heritage value or interest;
- Exempt for retirement of existing roads and road related facilities;
- Exempt for installation of guide rail;

- Schedule B (Eligible for Screening for Exemption) for the reconstruction of, or alteration to a structure or the grading adjacent to it when the structure is over 40 years old, the structure is found to have cultural heritage value or interest, and the heritage attributes will be conserved in accordance with the recommendations of a Heritage Impact Assessment (no increase to travel lanes);
- Schedule B for the reconstruction of, or alteration to a structure or the grading adjacent to it when the structure is over 40 years old, the structure is found to have cultural heritage value or interest, and the heritage attributes will be conserved in accordance with the recommendations of a Heritage Impact Assessment (increase in travel lanes);
- Schedule B for the reconstruction of, or alteration to a structure or the grading adjacent to it, when the structure is over 40 years old the structure is found to have cultural heritage value or interest, but heritage attributes will not be conserved in accordance with the recommendations of a Heritage Impact Assessment; and
- Schedule B for the reconstruction of a water crossing where the reconstructed facility will not be for the same purpose, use, capacity or at the same location.

In consideration of the above Class EA guidelines, anticipated heritage value, the potential alternative solutions, and to ensure appropriate public consultation throughout the Study, the Schedule B Class EA process has been adopted. As illustrated in Figure 2, a Schedule B requires completion of Phases 1 and 2 of the Municipal Class EA planning and design process.

1.2 OBJECTIVES OF THE PROJECT FILE REPORT

The overall objective of this report is to document the planning process undertaken during the Class EA process related to the development and evaluation of alternative solutions and designs. Specifically, the objectives of this report are as follows:

- to prepare a detailed description of the existing conditions;
- to prepare a detailed description of the problem;
- to prepare detailed inventories of the affected/applicable environments (physical, natural, social, economic, cultural heritage, and climate change);
- to develop the design criteria to assess the potential solutions to the problem;
- to establish alternatives to address the problem;
- to outline the evaluation criteria;
- to complete a preliminary evaluation of the alternative solutions and identify a preliminary technically preferred alternative;

- to summarize the PIC;
- to summarize the public consultation;
- to complete a life cycle cost analysis of Alternatives B and C2;
- to report on consideration of stakeholder feedback in the evaluation of alternatives and selection of the preferred alternative;
- to identify the preferred alternative;
- to summarize the results of the amended Stage 1 archaeological assessment;
- to summarize the additional environmental investigations completed;
- to summarize the heritage impact assessment and mitigation measures recommended;
- to review the options for the existing bridge; and
- to outline the remaining steps involved to complete the Class EA Study.

1.3 FORMAT OF THE PROJECT FILE REPORT

This Report has been prepared in accordance with the chronological order of the Class EA process and is structured as follows:

- Chapter 2 presents the need and justification of the study and the preparation of a problem statement to guide the Municipal Class EA process;
- Chapter 3 addresses the first point of public consultation - Notice of Study Commencement;
- Chapter 4 details the alternative solutions developed to address the problem statement;
- Chapter 5 identifies the affected environments and provides an inventory of such to be considered in the subsequent evaluation;
- Section 6 details the evaluation of the alternative solutions and how they satisfy the problem statement and potential impacts to the environments;
- Section 7 outlines the Public Information Centre;
- Section 8 summarizes the additional traffic study;
- Section 9 summarizes the life cycle cost analysis;
- Section 10 summarizes the re-evaluation of the evaluation criteria and importance weighting of each criteria based on comments received;
- Section 11 summarizes the results of the Stage 2 archaeological assessment and heritage impact assessment;

- Section 12 summarizes the results of the additional environmental investigation;
- Section 13 details how and why the preferred solution was selected;
- Section 14 outlines the design criteria and conceptual design; and
- Section 15 outlines the remaining tasks in the Municipal Class EA process.

2 Need & Justification

The purpose of this Class EA Study is to identify the most appropriate improvement strategy to best address the needs of the Old Shiloh Road Bridge. In doing so, it is first necessary to establish/understand the existing conditions from which the needs are determined. Once these existing conditions and needs are identified, the overall problem statement can be defined. These tasks have been completed in accordance with Phase 1 of the Class EA process, which culminates with the creation of the problem statement.

The main areas of concern are:

- identifying, evaluating and selecting long-term cost-effective strategies to address the condition of the existing bridge;
- providing the necessary improvements to the roadway approaches to suit the bridge;
- minimizing and/or avoiding impacts to adjacent private property;
- provision of proven environmental protection and mitigation measures given the proximity of construction activities to the watercourse; and
- acquisition of necessary approvals, in a timely manner.

2.1 EXISTING CONDITIONS

The Old Shiloh Road Bridge is a 24 m single span concrete bowstring arch bridge spanning the Pefferlaw River, constructed in 1925. It has a clear roadway width of 5.18 m and an overall structure width of 6.7 m. It was rehabilitated in 1988 and 2011 and was resurfaced in 2014. It is generally in fair to poor condition with signs of concrete deterioration.

A Photographic Inventory of the site is included in Appendix A.

2.1.1 Roadway Geometry

The single lane bridge is a constriction along this section of two-lane roadway. The Town is not aware of any history of accidents occurring at the bridge within the past 10 years. The posted speed limit in the vicinity of the bridge is 60 km/hr. There is a turn-around area at the west approach. The road has an average annual daily traffic value of 919 vehicles per day (provided by the Town of Georgina).

The approach roadway signage includes Narrow Bridge ahead. With a roadway width of 5.2 m the bridge slightly exceeds the recommended maximum lane width for single lane structures on low volume roads of 4.9 m outlined in the MTO Structural Manual Guidelines for Bridges on Low

Volume Roads. This maximum is based on perception of motorists that the bridge is wide enough to pass two vehicles even if it is signed as a single lane. Single lane bridges can be acceptable on some low volume roads, generally for design speeds less than or equal to 60 km/hr and with traffic volumes less than or equal to 200 AADT.

It is noted that due to the rural nature of the bridge location, it is possible that farm equipment may be traversing the local roads. Often times, farm equipment or other special vehicles require wider lanes.

The roadway alignment is generally straight and flat across the bridge, with the grade increasing east of the bridge, and gradually increasing further west of the bridge.

2.1.2 Structure Condition

The bridge is 98 years old. It was rehabilitated in 1988 and again in 2011. The 1988 rehabilitation drawings indicate the work included concrete repairs, replacement of deck drains, installation of a latex modified concrete deck overlay, installation of steel beam guide rail over wingwall railing, and 10 m of approach road resurfacing to match the new top of deck. The OSIM reports indicate the 2011 rehabilitation work included superstructure rehabilitation, installation of approach guide rail, curb repair and replacement, and improvements to the railings.

Tatham reviewed existing OSIM reports from 2018 and 2020 provided by the Town and completed a supplementary visual inspection of the bridge on December 16, 2022. At the time of inspection, the deck curbs and other elements were covered in snow and ice. Select areas were cleared to inspect the element below. The following observations confirmed or supplemented the OSIM results:

- Spalling, delamination and scaling, narrow to medium cracks noted in concrete curbs, isolated honeycombing;
- Spalling, delamination and scaling, narrow to medium cracks with and without efflorescence noted in concrete arch top chords, isolated honeycombing;
- Spalling, and narrow to medium cracks with and without efflorescence noted in concrete arch bottom chords;
- Spalling, delamination, and narrow to medium cracks with and without efflorescence noted in concrete arch vertical chords;
- Existing railing is substandard;
- Spalling, delamination, scaling, and narrow to wide cracks, efflorescence noted in concrete railing;
- Severe corrosion of the existing deck drains;

- Narrow cracking, light scaling, and isolated medium cracks in top of exposed concrete deck;
- Narrow cracking with and without efflorescence and spalling in soffit of concrete deck;
- Scaling, delamination, spalls, and narrow to wide cracks with efflorescence in concrete floor beams;
- Narrow to wide cracks, scaling and spalling, and efflorescence in abutments, wingwalls, and ballast walls;
- There is evidence of older shotcrete repairs as well as more recent concrete patch repairs; and
- Light to medium concrete erosion is occurring at the base of the abutment walls.

The 2018 OSIM report indicates that a Detailed Deck Condition Survey was undertaken and supported a recommendation of replacement. A copy of this report was unavailable.

2.1.3 Load Capacity

The structure did not have a load posting, however through the collection of background data for this study it was found that the 1988 rehabilitation included a triple load posting of 20 tonnes, 21 tonnes, and 27 tonnes restricting the maximum permitted gross vehicle weights for a single vehicle unit (e.g., a cube truck), a combination of two vehicle units (e.g., a tractor and trailer), and a combination of three vehicle units (e.g., a tractor and two trailers) respectively. No evidence was found to support that any subsequent rehabilitation work has been completed to strengthen the bridge beyond this capacity. As such, in the spring of 2023 the Town erected load restriction signage at the bridge to reflect the posting recommended in 1988.

2.1.4 Hydrologic/Hydraulic Assessment

A hydraulic analysis of the bridge was completed to confirm the capacity of the existing structure. The Lake Simcoe Region Conservation Authority (LSRCA) provided 2008 hydrologic data and a HEC2 model of the Pefferlaw River. No topographic survey was completed at the bridge and as such the model is considered to be conservative. Additional survey data could be used to refine the model and the results.

Using Environment Canada hydrometric data from station 02EC018 located adjacent to the bridge, a statistical streamflow analysis was conducted using HEC-SSP to confirm the LSRCA flows. However, due to the limited available hydrometric data the statistical return frequency design flows were considered unrepresentative. As a result, the LSRCA flows were used in this analysis.

The HEC2 data was used to create a HEC-RAS model to confirm the capacity of the existing structure. The existing model results showed the downstream Pefferlaw Dam and Pefferlaw Road bridge were possibly affecting the water level at the Old Shiloh Road bridge, so additional survey data of the downstream structures was requested from the Town to confirm these results. After a review of the dam and downstream bridge, it was determined they had minimal impact on the model.

The MTO Highway Drainage Design Standard (2008) requires design flow return periods on collector roads for this span to satisfy or exceed the 1:50-year return frequency design storm peak flows. Based on modelling, the existing bridge conveys the 1:50-year return frequency design storm peak flow.

In addition to hydraulic capacity, the MTO Highway Drainage Design Standard requires a 1.0 m clearance between the High Water Level associated with the design flow and the lowest point of the soffit. The available clearance at the Old Shiloh Road Bridge for the 1:50-year flow is 0.17 m.

To satisfy both the hydraulic capacity and clearance requirements various scenarios were modelled to increase the span and/or raise the soffit. In addition, scenarios were also modelled to review the impact of widening the bridge to a two-lane structure. The water level at the bridge is governed by the low gradient downstream and therefore increasing the bridge span does not increase the clearance. With the relatively thin superstructure associated with the existing bridge structure, raising the soffit to achieve a 1.0 m clearance requires raising the road grade. Although raising the road was found to achieve the necessary clearance, it does increase the water level upstream of the bridge during larger storm events as the water is required to reach a higher elevation before overtopping the road. During the Regional Storm, the upstream water level was found to increase by 30 mm. Widening the bridge to two-lanes also results in an additional 20 mm increase to upstream water level during the Regional Storm.

The structure type modelled to obtain these results utilized a 900 mm superstructure thickness. This would not be representative of a deck on girder structure type, but rather a truss or similar arch style bridge. An additional scenario was also modelled using an adjacent box girder bridge configuration. The downstream Pefferlaw dam and the flat river profile downstream provide the majority of the control at the bridge, and the resulting impacts to the upstream water levels are similar whether the soffit is lowered to maintain a similar road profile as the truss option, or the soffit elevation is maintained.

Water level elevations and clearances are summarized for each scenario, and cross sections are provided for the existing and replacement scenarios in Appendix B.

2.1.5 Barrier Protection

The barrier across the structure is substandard and is generally in poor condition. It has spalled sections with exposed corroded reinforcing steel.

2.1.6 Utilities

Visible utilities on Old Shiloh Road include utility poles along the both the north and south sides with overhead wires. These overhead utilities should not be in conflict for rehabilitation options, however for some of the removal and replacement options they could require temporary deenergizing or permanent relocation to permit lifting and movement of the bridge elements to avoid encroaching on the required clearance envelopes.

Bell Canada has been identified as potentially having infrastructure in the area and have been contacted to confirm the presence of any buried utilities. Vianet has confirmed they do not have infrastructure in the vicinity of the bridge. HydroOne has confirmed they have primary and secondary single phase overhead wires in the area.

2.1.7 Road Use

The bridge is a single lane structure along a two-lane collector road. Old Shiloh Road is not designated as a cycling route or shared roadway on the York Region GIS.

2.2 PROBLEM/OPPORTUNITY STATEMENT

In consideration of the existing conditions, the Problem/Opportunity Statement, which sets the framework for the remainder of the Study, is as follows:

“Old Shiloh Road Bridge has exceeded its design service life, is deteriorating, and has been posted with a 20, 21, 27 tonne triple load posting limit. The Town of Georgina has identified the need to assess alternative solutions at this crossing to address the deteriorating condition and best meet current standards while minimizing impacts to the surrounding residents and environments.”

3 Consultation - Study Commencement

As per the Class EA process (refer to Figure 2), there are a number of points of stakeholder contact. The first point of contact, as discussed in this chapter, is the Notice of Study Commencement, which is used to inform the general public and stakeholders of the start of the Study.

3.1 NOTIFICATION

3.1.1 Direct Notices

A Notice of Study Commencement, which is a discretionary point of contact, was mailed to all property owners (as determined from Town of Georgina records) on Old Shiloh Road between Weirs Sideroad and Victoria Road on March 30, 2023. Additional notices were sent to residents of Victoria Street and Wier Street on April 5, 2023, as well as additional first nations communities identified by the MECP on April 13, 2023. The notice identified the Study area, the Study methodology and EA guidelines to be followed. In addition, it invited public input and comments early in the process such that they could be considered in the overall Study design and completion. A copy of the Notice of Study Commencement is provided in Appendix C.

These notices were also submitted to the appropriate review agencies, stakeholder groups and special interest groups, a listing of which is provided in Appendix C.

3.1.2 Website

The Town of Georgina posted a copy of the notice on the project website.

https://www.georgina.ca/municipal-government/building-georgina/old-shiloh-bridge-environmental-assessment

3.1.3 Signage

A project sign was installed at each approach to the bridge identifying the commencement of the Study and directing interested parties to visit the project website for more information.

4 Alternative Solutions

A number of reasonable and feasible solutions to addressing the Problem/Opportunity Statement were developed and are otherwise presented in this chapter.

4.1 ALTERNATIVE A – DO NOTHING

Under this alternative, only basic improvements and maintenance needs of the bridge are to be addressed, which will essentially maintain the status quo. No structural improvements or changes to the bridge would be made to solve the problem/opportunity statement.

While costs will be negligible for this alternative in the short-term, long-term maintenance costs will become substantial, especially as the bridge ages. The structure is approaching 100 years old and has exceeded its expected service life.

The bridge will remain as a single lane constriction, the barriers will remain substandard, and the load restriction will remain in place.

Traffic will continue to be restricted by the load limit, and eventually the load restriction will increase until full closure of the structure is required which will further impact traffic movement. The 20-tonne limit for single unit vehicles restricts the use of the bridge for vehicles such as gravel trucks and concrete trucks, but does not restrict the use by school buses or emergency vehicles.

4.2 ALTERNATIVE B – REHABILITATE THE EXISTING BRIDGE

Under this alternative, some structural deficiencies will be addressed. Considering the age of the bridge, it is likely that additional structural concerns will become apparent in the near future. In order to significantly extend the lifespan of the bridge, rehabilitation works will need to be extensive.

Concrete repairs would be completed on all structure elements, the railing would be replaced, and erosion protection would be installed.

Existing drawings are available and indicate that the initial design load was lower than the current standards. Minor improvements to the load restriction may be possible with strengthening of the existing members, but it is unlikely that it would be economical to complete the required improvements to remove the load restriction altogether.

Roadside safety can be improved by the installation of new roadside barriers both along the bridge and on the approaches.

Due to the single-lane configuration, construction work is expected to require a temporary road closure at the bridge with traffic detours.

4.3 ALTERNATIVE C – REMOVE AND REPLACE THE BRIDGE

Under this alternative, the existing bridge would be removed and replaced with a new bridge. Based on the existing traffic volumes and posted speed limit, replacement with another single lane bridge would not meet current standards. A two-lane bridge would be required to meet current standards.

The new two-lane structure will have a larger footprint than the existing to accommodate the two-lane configuration.

Roadside safety will be improved by the installation of new roadside barriers, and the load posting will be removed.

Replacement of the structure will require temporary full road closure, which can be managed with detour routes.

4.4 ALTERNATIVE D – CONSTRUCT A NEW BRIDGE ADJACENT TO THE EXISTING BRIDGE

In consideration of the expected heritage value of the bridge, this alternative involves the installation of a new bridge along a new alignment while leaving the existing bridge in place.

The existing municipal right-of-way is noted to be approximately 28.75 m wide at the bridge in the York Region GIS Mapping utility. It reduces to 23 m in width approximately 68 m from the west end of the bridge. The road appears to generally be centred within the right-of-way. The current road alignment is straight and relatively flat, introducing a second bridge will require the introduction of a horizontal curve to move traffic onto the new bridge. A new two-lane bridge will not fit within the current right-of-way and will require the purchase of additional property. A new single lane bridge could possible be installed but would not meet current geometric standards unless traffic was to continue to use the existing bridge for one direction.

The new structure will have a larger footprint than the existing to accommodate a two-lane configuration, assuming the current bridge is closed to vehicular traffic.

Roadside safety will be improved by the installation of new roadside barriers. There would be no load posting for the new bridge.

Traffic could continue to use the existing bridge throughout construction of the new bridge negating the need for a road closure and detour. The existing bridge would remain triple load posted at 20 tonnes, 21 tonnes, and 27 tonnes.

5 Environment Inventories

A description of the Study area has been developed considering the following environments:

- Physical Environment;
- Natural Environment;
- Social Environment;
- Economic Environment; and
- Climate Change.

Detailed investigations and analyses with respect to the environmental inventories were completed as a part of this study. Brief descriptions of the various environments investigated are provided below.

5.1 PHYSICAL ENVIRONMENT

Several elements of the physical environment were presented in Section 2.1, particularly with respect to the structural condition of the bridge. Additional elements of the physical environment are presented below.

A copy of the Existing Site Plan is provided in Appendix D.

5.1.1 Existing Bridge Structure

As described in Section 2.1, the age and condition of the bridge, and the triple load posting of 20, 21, 27 tonnes, has resulted in recommendations for replacement. Without repair or replacement, the bridge will continue to deteriorate until such time as the load posting becomes more restrictive, ultimately needing to be closed to traffic. Original construction drawings, and some of the rehabilitation drawings are available, with limited details.

The bridge is approaching 100 years old and has exceeded its expected lifespan. Rehabilitation works are only expected to provide minimal extension to service life. The original design loads are lower than current standards, and the extensive strengthening required to enable the capacity to be increased to meet current standards would not be economical. The current load capacity does permit crossing of emergency services vehicles such as fire trucks. Snow removal vehicle loads would need to be reviewed to ensure they do not exceed 20 tonnes fully loaded with sand/salt mixtures.

5.1.2 Existing Approaches

The approach roadway signage includes Narrow Bridge ahead and legal speed posting of 60 km/hr. The signage does not include a single lane bridge tab, however, one is warranted as the clear width between curbs is less than 5.5 m. The Town has recently reinstated load posting signage confirming the triple load posting of 20, 21, 27 tonnes.

The horizontal and vertical alignment of the road is generally straight and flat across the bridge. Existing roadside protection consisting of steel beam guide rail is in generally good condition. The approach roadway is a two-lane configuration transitioning to a single lane over the bridge. The wearing surface consists of a bituminous surface and is in generally fair to good condition.

5.1.3 Hydraulics

As noted in Section 2.1.4, the hydraulic capacity of the bridge passes the 1:50 year storm design flow requirement but does not achieve the standard 1 m clearance to the soffit from high-water level. The water level is largely controlled by the downstream river gradient, and any increase in clear span has little to no effect on the water levels. To achieve a 1 m clearance to the high-water level, the bridge and road would need to be raised, which will negatively affect the upstream water levels under larger storm events.

Further review with the conservation authority during the design phase is recommended to confirm the preferred design criteria at this structure.

5.1.4 Traffic Operations

Old Shiloh Road is classified as a collector road in the Town of Georgina's Official Plan and has a rural cross section. The Town's most recent traffic data indicates the road has an average annual daily traffic count of 919 vehicles per day.

Traffic volumes and road speed limits do not fall within the low volume road bridge criteria under the MTO Structural Manual. Low volume road bridge guidelines are applied to bridges on roads with average annual daily traffic volumes of 400 vehicles or less. There are no reports of accidents related to this restriction.

Typically, peak hour volumes account for 10% of the daily volumes and thus 90 vehicles per hour are expected during the peak hours (total of both directions). For planning purposes, collector roads are assumed to have hourly capacities in the order of 700-800 vehicles per hour per lane.

As the anticipated future traffic volumes are well below these levels, no operational improvements are required to increase the road capacity beyond two lanes. Traffic volumes are not expected to increase significantly in the context of reserve capacity remaining on the road system.

5.1.5 Geotechnical Considerations

A geotechnical investigation was not completed as part of this study. However, one will be required during detail design under alternate solutions C and D. The original design drawings indicate the bridge is currently supported on piles.

5.2 NATURAL ENVIRONMENT

The bridge is located in the planning jurisdictions of the provincial Greenbelt Plan and Lake Simcoe Protection Plan, as administered by the Town and the Lake Simcoe Region Conservation Authority (LSRCA).

An Environmental Impact Study was completed by Riverstone Environmental Solutions Inc., and a site investigation was undertaken on December 7, 2022. The primary tasks associated with the site investigation included: ecological land classification, wetland and drainage feature assessment, fish habitat assessment, vegetation inventory, and general wildlife habitat assessment.

Most of the study area was found to be in a naturalized state, composed of mixed successional forest communities and low-lying riparian zones. There are no signs of active land use in the study area, although the bridge area may be used for fishing or launching of watercraft.

The immediately adjacent lands to Pefferlaw River are composed of a complex of sandy loams. Pefferlaw River was identified as the single drainage feature within the study area. Areas up gradient from the watercourse were noted to appear to be imperfect to poorly draining.

The study area was identified to have potential habitat for primarily generic wildlife species (White tailed deer, Raccoon, Grey Squirrel, Chipmunk etc.) and common generalist bird species (Black capped chickadee, American crow, Mourning dove, and Downy woodpecker, were observed).

The following observations and assumptions related to habitat were also made:

- One inactive bird nest was found under the bridge, likely to be last utilized by either a barn swallow or eastern phoebe;
- Suitable habitat features are assumed to be present for certain reptile and amphibian species (i.e. turtles);
- Floodplain pools may be present to support amphibian breeding habitat; and
- Fish habitat is assumed to be present.

The LSRCA's Pefferlaw River/Brook Subwatershed Plan indicates that 45 species of fish have been recorded in the system over the last 80 years. It is expected that fisheries timing windows will need to address both warmwater and coldwater habitat considerations.

Initial screening for habitat for endangered and threatened species identified the potential for the following species to be present:

- Butternut – NHIC contains no records of element occurrence in the 1 km grid, and none were observed on site.
- Black Ash - NHIC contains no records of element occurrence in the 1 km grid, and none were observed on site.
- Endangered Bat Species – there is no expectation that the study area supports highly functional habitat for bats, however the area may be amenable to supporting foraging habitat for bats.

Various mitigation measures are summarized below. Fully tabulated impacts and mitigation measures related to the various alternate solutions can be found in the Environmental Impact Study report.

- Restore natural bed substrates within and adjacent to replaced crossing structures following construction.
- In-water works (if required) and diversion of flows should avoid relevant fisheries timing windows, which may include both cold water and warm water migration/spawning windows. Timing windows should be confirmed with MNRF and/or LSRCA.
- Implement sediment and erosion control measures as per applicable best management practices to isolate the development footprint.
  - Sediment fencing must be constructed of heavy material and solid posts and be properly installed (trenched in) to maintain its integrity during inclement weather events.
  - Additional sediment fencing and appropriate control measures must be available on site so that any breach can be immediately repaired.
  - Regular inspection and monitoring will be necessary to ensure that the structural integrity and continued functioning of the sediment control measures is maintained (i.e., proper installation is not the only action necessary to satisfy the mitigation requirements).

  - An on-site supervisor should be responsible for daily inspections of the sediment and erosion control measures and record the time and date of inspections, the status of the mitigation measures, and any repairs undertaken.
  - Removal of non-biodegradable erosion and sediment control materials should occur once construction is complete, and the site is stabilized.
- Best Management practices should be utilized with all machinery and fill being imported to the subject property to ensure that material and tracks are free from invasive species (*Phragmites australis*, etc.).
- Machinery should arrive on site in clean condition and is to be checked and maintained free of fluid leaks.
- Machinery must be refueled, washed, and serviced within the area isolated by sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.
- Locate all fuel and other potentially deleterious substances within the area isolated by sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.
- Temporary storage locations of aggregate/fill material (where required) should be located within the area isolated by sediment fencing. Storage areas should be sited to the west of Pefferlaw River. This material is to be contained by heavy-duty sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.
- Offloading of construction and aggregate/fill materials (where required) should be completed during fair weather conditions, a minimum of 30 m from wetlands and the top of watercourse bank.
- All stockpiled topsoil/overburden (where required) should be piled in low piles and stabilized as quickly as possible (e.g., erosion-prone areas covered with textile) to minimize the potential for runoff and wind erosion.
- Minimize vegetation removal and disturbance to the extent possible, particularly adjacent to the watercourse.
- Prepare a Tree Inventory and Preservation Plan (TIPP) to determine the extent of potential tree removals following selection of preferred alternative. Construction exclusion, staging, and tree protection measures should be included in the TIPP for mitigation planning.
- Following preparation of the TIPP, review opportunities for re-planting of trees that require removal.
- Any minor tree removals required to accommodate the selected alternative must be completed outside of the season in which endangered bats may be active, *i.e.*, April – Oct,

inclusive. If substantial tree removals are determined to be required (*i.e.*, beyond the ROW), additional assessment of habitat usage and significance may be warranted.

- Work site isolation must utilize sediment and erosion control that represents suitable wildlife exclusion fencing as per best management practices endorsed by the MECP.
- If any individual turtles are encountered within the works area, activities that have the potential to harm such individuals should stop immediately. A qualified biologist or MECP should then be contacted to determine the most appropriate mitigation measure.
- Grading and other activities that cause disturbance outside of the development envelope should be minimized to the extent possible during the construction period.
- In the spring prior to construction, install temporary bird exclusion mesh underneath bridges to prevent establishment of nests within the season of construction.
- Clearing of vegetation must be restricted to times outside of the period April 15 to October 30. If development and site alteration must occur within the period of April 1 to Aug 30, a nest survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests of migratory bird species covered by the MBCA. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season. If any clearing of mature trees must occur within the period April 15 to Oct 30, further measures may need to be taken with respect to mitigating harm to endangered bats which have the potential occur on site.

Additional investigation was undertaken following the identification of the preliminary preferred alternative and recommendations were refined. The results of which are discussed further in section 12. The Environmental Impact Study report can be found in Appendix J.

5.2.1 Provincial Policy Statement (PPS)

To fulfill the requirement under the PPS, natural features were inventoried and assessed for potential and actual impacts from the proposed bridge construction. The study area includes a 120 m radius as measured from the center of the bridge on 2nd Concession, consistent with direction in the Natural Heritage Reference Manual (NHRM) under the PPS.

5.2.2 Federal Fisheries Act

The Pefferlaw River is considered a fish-bearing water, and the area and fish are protected under the Federal Fisheries Act. Work must avoid causing serious harm to fish and fish habitat unless authorized to do so by the Department of Fisheries and Oceans Canada (DFO). A DFO self-assessment or DFO request for review of the proposed work at Old Shiloh Road Bridge will be needed to ensure compliance under the Fisheries Act. If it is determined that proposed actions may cause serious harm to fish that cannot be mitigated for, then a Fisheries Act Authorization would be required.

5.2.3 Lake Simcoe Region Conservation Authority

The structure is located entirely within the Lake Simcoe Region Conservation Authority (LSRCA) regulatory area. A permit or other authorization is expected to be required from the Conservation Authority. Pre-consultation will be requested.

Watercourse crossings are preferred to have an open footing, an alignment compatible with stream morphology, size and location such that there is no increase in upstream or downstream erosion or flooding, and consideration of fish and wildlife passage.

Hydrological impacts to the watercourse and changes to flood capacity should be minimized through detailed design, and appropriate mitigation measures should be applied through design and construction planning and disturbed areas restored or enhanced where appropriate.

5.2.4 Town of Georgina Official Plan

The Town has zoned the study area as an Environmental Protection Area and Greenlands System, with a Hamlet area noted to the southeast. Infrastructure projects where the need has been demonstrated through an Environmental Assessment or other similar environmental approval where there is no reasonable alternative is an approved use within this zone.

5.2.5 Source Water Protection

The project location was reviewed using the MECP Source Protection Information Atlas mapping. The project is not located within an intake protection zone, an area of a highly vulnerable aquifer, a well head protection area, or a significant groundwater recharge area.

5.2.6 Air Quality, Dust, & Noise

Permanent impacts to air quality, dust and noise, vary based on the various alternatives. Closure or removal of the existing bridge, which is the potential result for Alternatives A, B, and C found in Section 6 Evaluation of Alternatives, would result in local traffic requiring to detour. The additional travel time will result in slightly increased vehicle emissions, however, the traffic volumes are relatively low. Rehabilitation under alternative B or replacement in Alternative C or D with a two-lane bridge will reduce the incidents of queuing thus reducing vehicle emissions.

Temporary impacts during construction will result from all alternatives other than A, do nothing. Dust and noise control measures will be addressed and included in the construction plans during detail design. Mitigation measures could include limiting working hours to correspond with local noise by-laws, and application of non-chloride dust-suppressants between asphalt removal and repaving operations.

5.3 SOCIAL ENVIRONMENT

The social environment includes any matters related to existing residents and area tenants, as well as the general public. Several matters for consideration in relation to the social environment include the following:

- Noise impacts to area residents. This will have the greatest impact to adjacent properties during construction;
- The safety of the crossing is of utmost importance;
- The structure does not meet current geometric standards, and although the Town has not reported any operational issues (collisions or traffic delays) or concerns, a single lane bridge is not recommended. As previously noted, an expansion of the right-of-way and property acquisition is likely to be required under Alternative D only.

Traffic management will be an important aspect of both alternatives B & C. The nearest alternate crossing of the Pefferlaw River is Ravenshoe Road to the south, providing approximately a 6 km or 7-minute detour.

5.3.1 Municipal, Provincial, and Federal Planning Policies

The municipal and provincial goals that are applicable to the bridge improvement project and should be considered in the evaluation of alternatives are:

- Provincial Policy Statement, 2020
  - Provide transportation systems which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs. (1.6.7.1)
  - Support active transportation (1.8.1, 1.1.3.2)
  - Protect natural features and functions (2.1.1)
  - Avoid disruption to cultural and built heritage (1.7.1)
  - Account for impacts of climate change (1.1.3.2)
  - Minimize impacts to air quality (1.1.3.2)
  - Be financially viable over the life cycle of the asset (1.6.1)

  - Optimize the use of existing infrastructure (1.6.3)
- Regional Municipality of York, 2022 Regional Official Plan
  - Enhance York Region's urban structure through a comprehensive integrated growth management process that provides for healthy, sustainable, complete communities with a strong economic base (Goal 2)
  - To protect and enhance the natural environment for current and future generations so that it will sustain life, maintain health, and provide a high quality of life (Goal 3)
  - To provide the services required to support York Region's Residents and businesses to 2051 and beyond, in a financially and environmentally sustainable manner (Goal 6)
  - To ensure resiliency and the ability to adapt to changing economic and environmental conditions and increasing social diversity (Goal 7)
- Town of Georgina Official Plan
  - To be responsible and efficient in the use of land, resources, services and infrastructure in order to meet the needs of the present without compromising the ability of future generations to meet their own needs. (2.2.1.1)
  - To ensure Georgina's growth and development is carried out in a compact and efficient manner, in order to make efficient use of land and existing and future infrastructure. (2.2.2.1)
  - To maintain the financial stability and integrity of the Town by managing its financial resources and by undertaking its public works and other development decision making in a fiscally responsible and prudent manner. (2.2.2.2)
  - To ensure that all land use decisions consider the impact of future development on air, water, soil and climate including the availability of clean drinking water, agricultural lands and products, and natural resources (2.2.2.4)
  - To develop and promote climate change mitigation and adaption strategies. (2.2.2.5)
  - To encourage and actively promote the use of sustainable design principles or technologies and climate change resilient design in community development, site design and buildings. Such design principles may be further expressed in the Town's Development Design Criteria (2.2.2.6)
  - To conserve, protect and enhance the Town's cultural heritage resources and promote cultural expression in the Town. (2.2.2.9)

- To provide for safe and accessible active transportation linkages between, workplaces, homes, shopping, services, schools, public facilities, points of interest and areas of scenic agriculture or environmental significance, by incorporating appropriate urban design measures such as the provision of walkways, sidewalks, more direct street patterns, and adequate illumination of such facilities in communities to be served by transit. (2.2.2.11)
- The preservation, protection, enhancement and support of the natural heritage and hydrologic features, functions, attributes and interconnections of the natural environment is essential in order to maintain a sustainable ecosystem, not only to provide a healthy environment, but also as an important component of the Town's economic and community health; and to preserve the visual landscape in Georgina, for this and future generations. (2.2.3.1)
- To utilize an ecosystem approach to planning to ensure that environmental matters are balanced with economic and social considerations in the decision-making process. (2.2.4.1)
- To recognize and establish a permanent Greenlands System in the Official Plan. (2.2.4.2)
- To protect key natural heritage features and key hydrologic features from land uses and activities that may adversely affect those features and their associated ecological functions. (2.2.4.3)
- To protect the natural environment and its functions by providing appropriate buffers around features and linkages between them. (2.2.4.4)
- To manage the placement and removal of fill and other site alteration activities in order to minimize the impact of those activities on the environment and residents of the Town. (2.2.4.8)
- To implement the Lake Simcoe Protection Plan, 2009 in order to protect and restore the ecological health of Lake Simcoe and its watershed, which includes contributing to the achievement of healthy phosphorus levels in Lake Simcoe. (2.2.6.1)
- To promote the establishment of a natural vegetation buffer along the Lake Simcoe shoreline and its tributaries to maintain cold water temperatures, reduce erosion and enhance fish habitat and wildlife habitat. (2.2.6.5)
- To recognize, conserve and promote cultural heritage resources and to perpetuate their value and benefit to the community as outlined in the Town's Municipal Cultural Plan. (2.2.12.6)

The Environmental Protection Act requires that for any soils that are moved off-site during construction, testing shall be conducted to determine contaminant levels and appropriate disposal options, consistent with Part XV.1 of the Act and O.Reg. 153/04.

5.3.2 Archaeological Investigation

A Stage 1 Archaeological Assessment was carried out by AMICK Consultants Limited.

The entirety of the study area was subject to a desktop Stage 1 Archaeological Background Study on 11 January 2023. All records, documentation, field notes, photographs, and artifacts (as applicable) related to the conduct and findings of these investigations are held at the corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the MCM on behalf of the government and citizens of Ontario.

The study area has been identified as a property that exhibits potential to yield archaeological deposits of cultural heritage value or interest (CHVI). The objectives of the Stage 1 Background Study have therefore been met and in accordance with the results of this investigation, the following recommendations are made:

- The proposed undertaking has potential for archaeological resources and a Stage 2 Archaeological Property Assessment is recommended.

No soil disturbances or removal of vegetation shall take place within the study area prior to the MCM acceptance of a report into the Provincial Registry of Archaeological Reports that recommends all archaeological concerns for the proposed undertaking have been addressed and no further archaeological investigations are required.

A copy of the Archaeological Assessment Report is included in Appendix E.

5.3.3 Cultural Heritage Evaluation

A Cultural Heritage Evaluation was carried out by AMICK Consultants Limited, and a Cultural Heritage Evaluation Report (CHER) has been prepared.

The Old Shiloh Road Bridge is an early and idiosyncratic example of a very common built form throughout the province. This bridge does meet the criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest. The primary reasons for this determination are that it is a rare or unique example of a bridge structure, and it may express or reflect the work or ideas of a specific designer that has been executed in an idiosyncratic fashion by another builder. In addition, this bridge has previously been identified as a structure of cultural heritage value and significance within Arch, Truss and Beam: The Grand River Watershed Heritage Bridge Inventory (Benjamin et al. 2013).

Given that the bridge has surpassed its serviceable life, and replacement of the structure is being considered, the following recommendations should be considered and implemented:

- The CHER should be filed with the Township of Georgina.
- The CHER should be filed with the Ministry of Tourism, Culture, and Sport for review and comment.
- Due to the significance of this bridge a Heritage Impact Assessment (HIA) is recommended.

The concrete arch design of the structure does not easily allow for superstructure relocation, and the unknown factors associated with the structure's original design, and its current condition, do not easily allow for lifting and moving of the superstructure to an alternate location.

A copy of the CHER is included in Appendix F.

5.4 ECONOMIC ENVIRONMENT

With respect to the economic environment, the costs associated with each alternative will be considered including construction costs and/or maintenance costs. For the purposes of preliminary assessments, the costs will be considered on a qualitative basis only, e.g., least costly, most costly. In addition, impacts to abutting lands will be considered as part of the economic environment given the associated costs to acquire land.

5.5 CLIMATE CHANGE

With respect to Climate Change, two factors are considered: The increase in greenhouse gas emissions by fabrication of components and construction, or by the completion of the project; and the alternative's resiliency to climate change. Road and bridge construction projects can incorporate the use of new and recycled materials to reduce emissions related to manufacture and fabrication of materials and components. Once constructed the structure would not contribute to further emissions, other than through normal activities such as maintenance, repairs, and future works. Bridges are primarily impacted by climate change due to increased strength of storms and flooding from climate change. Their resiliency to this is based on structural integrity and hydraulic capacity.

6 Evaluation of Alternatives

This section will discuss the initial evaluation of the alternative solutions as previously described in Technical Memorandum No. 1. The results of the evaluation are preliminary given the need to solicit agency and public input. The evaluation took into consideration agency and public input received prior to May 1, 2023, in order to be presented at the PIC and solicit further input. The evaluation is descriptive or qualitative in nature allowing for a comparative evaluation of the pros and cons associated with each option.

Section 7 provides a re-evaluation of alternatives based on feedback from the Public Information Centre.

6.1 EVALUATION CRITERIA

In completing the evaluation, several criteria were considered as outlined below.

Physical Environment

- Road geometry and alignment
- Structural stability and load restrictions
- Roadside protection
- Traffic operations
- Maintenance and Snow Removal

Natural Environment

- Fisheries/aquatic impacts
- Wildlife/terrestrial impacts
- Hydrology & hydraulics
- Vegetation impacts
- Water quality

Social Environment

- Noise/construction impacts
- Emergency services
- Community impacts

Cultural Heritage Environment

- Archaeological impacts
- Heritage impacts
- First Nations Impacts

Economic Environment

- Construction costs
- Future maintenance costs
- Property acquisition costs

Climate Change

- Impact on the climate change
- Resiliency to climate change

The key evaluation criteria will focus on issues such as cost (including initial capital costs, and long-term life cycle maintenance and operational costs), structural performance, public safety, environmental impacts, and use and justification.

6.2 ENVIRONMENTAL IMPACTS

The potential effects and impacts associated with each alternative are noted in Table 1 and the weighted scoring of each alternative against the evaluation criteria is noted in Table 2.

Table 1: Preliminary Qualitative Evaluation of Alternative Solutions

Assessment Criteria	Alternative A	Alternative B	Alternative C1	Alternative C2	Alternative D
	Do Nothing	**Rehabilitate the Existing Bridge**	**Remove and Replace with Single Lane Bridge**	**Remove and Replace with Two Lane Bridge**	**Construct a New Single Lane Bridge Adjacent to the Existing Bridge**
Physical Environment	✗ safety of bridge will decrease over time and will need to be closed or replaced ✗ continuing decline to load carrying capacity ✗ remains a single lane constriction ✗ no improvement to barrier protection	✓ safety of bridge can be improved but will decrease over time ✓ barrier protection can be upgraded ✓ no improvement to load carrying capacity ✗ shortest extension of service life ✗ remains a single lane constriction	✓ increased load capacity to current standard ✓ barrier protection upgraded to current standard ✓ roadside safety improved ✓ longest extension of service life ✗ remains a single lane constriction	✓ increased load capacity to current standard ✓ barrier protection upgraded ✓ roadside safety improved ✓ longest extension of service life ✓ removes traffic constriction ✗ larger disturbance to land and surroundings than single lane	✓ increased load capacity to current standard on new bridge ✓ barrier protection upgraded ✓ roadside safety improved ✓ longest extension of service life ✓ removes traffic constriction ✗ largest disturbance to land and surroundings than single lane ✗ existing bridge safety can be improved but will decrease over time
Natural Environment	✓ no impacts to environment or habitat	✓ no significant impacts to environment or habitat ✓ potential impacts can be mitigated with best practices	✓ potential for impacts in areas adjacent to existing substructure during construction	✗ increased impacts in areas widened beyond existing substructure and road layout ✓ potential impacts can be mitigated with best practices	✗ greatest impacts in areas widened beyond existing substructure and road layout
Social Environment	✓ no impacts to existing abutting lands ✓ no construction delays or road closures ✗ high likelihood of near-term additional load restrictions requiring alternate traffic rerouting	✓ no impacts to existing abutting lands ✓ shortest construction time and road closure ✓ potential additional load restrictions or closure will be delayed	✓ no impacts to existing abutting lands ✗ longer construction time and length of road closure	✓ no impacts to existing abutting lands ✗ longer construction time and length of road closure	✗ potential for impacts to abutting lands ✗ longest construction time and length of road closure ✗ high likelihood of near-term additional load restrictions on existing bridge resulting in need for replacement
Legend	✓ reflects a positive impact to the noted environment				
	✗ reflects a negative impact to the noted environment				

Assessment Criteria	Alternative A	Alternative B	Alternative C1	Alternative C2	Alternative D
	Do Nothing	**Rehabilitate the Existing Bridge**	**Remove and Replace with Single Lane Bridge**	**Remove and Replace with Two Lane Bridge**	**Construct a New Bridge Adjacent to the Existing Bridge**
Cultural Heritage Environment	✓ no archaeological or cultural heritage impacts	✓ no archaeological or cultural heritage impacts	✗ cultural heritage impact by removing existing bridge ✗ some potential for archaeological impacts should works extend beyond existing ROW /constructed areas ✓ Stage 2 archaeological assessment to be completed to mitigate impacts ✗ Heritage impact assessment to be completed to provide recommendations to mitigate cultural heritage impact	✗ cultural heritage impact by removing existing bridge ✗ greatest potential for archaeological impacts as works will extend beyond existing ROW or previously disturbed/constructed areas ✓ Stage 2 archaeological assessment to be completed to mitigate impacts ✗ Heritage impact assessment to be completed to provide recommendations to mitigate cultural heritage impact	✓ No cultural heritage impacts ✗ greatest potential for archaeological impacts as works will extend beyond existing ROW or previously disturbed/constructed areas ✗ Stage 2 archaeological assessment to be completed to mitigate impacts
Economic Environment	✓ lowest overall construction cost ✓ greater maintenance costs	✓ low construction cost ✓ greater maintenance costs	✗ greater construction cost ✓ lesser maintenance costs	✗ greater construction cost ✓ lesser maintenance costs	✗ greatest construction cost ✓ greatest maintenance costs
Climate Change	✓ no effect on the environment ✓ no improvements to hydraulic capacity or resistance to the effects of climate change	✓ no effect on the environment ✓ no improvements to hydraulic capacity or resistance to the effects of climate change	✓ no long-term effect on the environment ✓ potential to improve hydraulic capacity and resistance to the effects of climate change	✓ no long-term effect on the environment ✓ potential to improve hydraulic capacity and resistance to the effects of climate change	✓ no long-term effect on the environment ✗ no improvements to hydraulic capacity or resistance to the effects of climate change
Legend	✓ reflects a positive impact to the noted environment				
	✗ reflects a negative impact to the noted environment				

Table 2: Preliminary Evaluation of Alternative Solutions with Weighted Scoring

	Assessment Criteria	Weight	Alternative A: Do Nothing		Alternative B: Rehabilitate the Existing Bridge		Alternative C1: Remove and Replace with Single Lane Bridge		Alternative C2: Remove and Replace with Two Lane Bridge		Alternative D: Construct a New Bridge Adjacent to the Existing Bridge	
			Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Physical Environment	road geometry and alignment	6	0.0	0.0	0.0	0.0	0.0	0.0	2.0	12.0	1.0	6.0
	structural stability and load restrictions	10	0.0	0.0	1.0	10.0	2.0	20.0	2.0	20.0	1.5	15.0
	roadside protection	6	0.0	0.0	1.0	6.0	2.0	12.0	2.0	12.0	1.5	9.0
	traffic operations	7	0.0	0.0	0.0	0.0	0.0	0.0	2.0	14.0	1.5	10.5
	maintenance and snow removal	6	0.0	0.0	0.0	0.0	0.5	3.0	2.0	12.0	0.5	3.0
	Sub-Total	**35**		**0.0**		**16.0**		**35.0**		**70.0**		**43.5**
Natural Environment	fisheries/aquatic impacts	6	0.0	0.0	-0.5	-3.0	-1.0	-6.0	-1.5	-9.0	-1.0	-6.0
	wildlife/terrestrial impacts	6	0.0	0.0	-0.5	-3.0	-1.0	-6.0	-1.5	-9.0	-1.0	-6.0
	hydrology & hydraulics	6	0.0	0.0	0.0	0.0	0.5	3.0	0.5	3.0	0.0	0.0
	vegetation impacts	3	0.0	0.0	0.0	0.0	-0.5	-1.5	-1.0	-3.0	-2.0	-6.0
	water quality	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	**25**		**0.0**		**-6.0**		**-10.5**		**-18.0**		**-18.0**
Social Environment	noise/construction impacts	5	0.0	0.0	-0.5	-2.5	-1.0	-5.0	-1.0	-5.0	-1.0	-5.0
	emergency services	5	0.0	0.0	0.5	2.5	1.0	5.0	2.0	10.0	1.5	7.5
	community impacts	5	0.0	0.0	0.5	2.5	1.0	5.0	1.5	7.5	-1.0	-5.0
	Sub-Total	**15**		**0.0**		**2.5**		**5.0**		**12.5**		**-2.5**
Cultural Heritage Environment	archaeological impacts	4	0.0	0.0	-0.5	-2.0	-1.0	-4.0	-1.5	-6.0	-2.0	-8.0
	heritage impacts	6	0.0	0.0	2.0	12.0	1.0	6.0	0.5	3.0	1.5	9.0
	first nations impacts	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	**15**		**0.0**		**10.0**		**2.0**		**-3.0**		**1.0**

Weight	reflects the relative importance of each evaluation criteria within each project environment, and the relative importance of each project environment in relation to one another
Score	reflects the effect of each alternative as it relates to the evaluation criteria in comparison to Do Nothing (status quo); -2 denotes a significant negative impact, 0 denotes no impacts and +2 denotes a significant positive impact
Weighted Score	product of weight x score

	Assessment Criteria	Weight	Alternative A: Do Nothing — Score	Alternative A: Do Nothing — Weighted Score	Alternative B: Rehabilitate the Existing Bridge — Score	Alternative B: Rehabilitate the Existing Bridge — Weighted Score	Alternative C1: Remove and Replace with Single Lane Bridge — Score	Alternative C1: Remove and Replace with Single Lane Bridge — Weighted Score	Alternative C2: Remove and Replace with Two Lane Bridge — Score	Alternative C2: Remove and Replace with Two Lane Bridge — Weighted Score	Alternative D: Construct a New Bridge Adjacent to the Existing Bridge — Score	Alternative D: Construct a New Bridge Adjacent to the Existing Bridge — Weighted Score
Economic Environment	construction costs	10	0.0	0.0	-0.5	-5.0	-1.0	-10.0	-1.5	-15.0	-2.0	-20.0
	future maintenance costs	10	0.0	0.0	-1.5	-15.0	-1.5	-15.0	-1.0	-10.0	-2.0	-20.0
	property acquisition costs	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-5.0
	Sub-Total	**25**		**0.0**		**-20.0**		**-25.0**		**-25.0**		**-45.0**
Climate Change	impact on climate change	2	0.0	0.0	-0.5	-1.0	-1.0	-2.0	-1.5	-3.0	-1.0	-2.0
	resiliency to climate change	3	0.0	0.0	0.0	0.0	1.0	3.0	1.0	3.0	0.5	1.5
	Sub-Total	**5**		**0.0**		**-1.0**		**1.0**		**0.0**		**-0.5**
	Total	**120**		**0.00**		**1.50**		**7.50**		**36.50**		**-21.50**
	Overall Ranking			**4**		**3**		**2**		**1**		**5**

Weight	reflects the relative importance of each evaluation criteria within each project environment, and the relative importance of each project environment in relation to one another
Score	reflects the effect of each alternative as it relates to the evaluation criteria in comparison to Do Nothing (baseline); -2 denotes a significant negative impact, 0 denotes no impacts and +2 denotes a significant positive impact
Weighted Score	product of weight x score

6.2.1 Alternative A – Do Nothing

Under this alternative, only basic improvements and maintenance needs of the bridge are to be addressed, which will essentially maintain the status quo. No structural improvements or changes to the bridge would be made to solve the problem/opportunity statement.

The bridge will remain as a single lane constriction, the barriers will remain substandard, and the load restriction will remain in place.

Traffic will continue to be restricted by the load limit, and eventually the load restriction will increase until full closure of the structure is required which will impact traffic movement. The current 20 tonne limit for single unit vehicles restricts the use of the bridge for vehicles such as gravel trucks, larger fire trucks, and concrete trucks, but does not restrict the use by school buses or smaller emergency vehicles, and as this load limit is reduced further school buses and smaller fire trucks would be restricted from using the bridge. Snow ploughs may be restricted under the 20-tonne posting depending on gross vehicle weight, and as the load restriction becomes more restrictive snow removal options will become limited to a pickup truck with a blade. This will require modifications to the snow removal operations of the Town.

The Do Nothing alternative does not adequately address the problem statement. While costs will be negligible for this alternative in the short-term, long-term maintenance costs will become substantial, especially as the bridge ages. The structure is approaching 100 years old and has exceeded its expected service life. A benefit to this alternative is that no negative impacts will be endured by the natural environment (although such impacts are expected to be minimal with the other alternative solutions when appropriately mitigated). This alternative does not address public safety, or structural inadequacy issues, and thus does not consider the problem statement and does not achieve the goals of the study.

6.2.2 Alternative B – Rehabilitate the Existing Bridge

Under this alternative, some structural deficiencies will be addressed. Considering the age of the bridge, it is likely that additional structural concerns will become apparent in the near future. In order to extend the lifespan of the bridge, rehabilitation works will be extensive, and are expected to be limited in terms of the overall extension of service life. The bridge has previously undergone at least two major rehabilitations in the past 30 years, with the last repair occurring just under 10 years ago and showing signs of required maintenance.

Concrete repairs would be completed on all structure elements, the railing would be replaced with an upgraded barrier.

Existing drawings are available and indicate that the initial design load was lower than the current standards. Minor improvements to the load restriction may be possible with strengthening of the existing members, but it is unlikely that it would be economical to complete the required improvements to significantly improve or remove the load restriction altogether.

Due to the single-lane configuration, construction work is expected to require a temporary road closure at the bridge with traffic detours.

Other than the Do Nothing alternative, this option is the least costly from a capital perspective, but it is most costly from a maintenance cost perspective with the exception of maintaining the existing bridge and constructing a new bridge adjacent to the existing. While some structural deficiencies will be addressed with this alternative, considering the age of the bridge, it is likely that additional structural problems will become apparent in the near future. To extend the lifespan of the bridge, rehabilitation works will need to be extensive and ongoing maintenance effort will be required, increasing the economic impact.

This alternative does however best maintain the local heritage value of the bridge asset identified by the cultural heritage evaluation report.

6.2.3 Alternative C1 – Remove and Replace with Single Lane Bridge

Under this alternative, the existing bridge would be removed and replaced with a new bridge. Based on the existing traffic volumes and posted speed limit, replacement with another single lane bridge will not meet current standards. The existing speed limit and Average Annual Daily Traffic (AADT) exceed the standards for a single-lane bridge according to the MTO Structural Manual's guidelines for low-volume roads.

Roadside safety will be improved by the installation of new roadside barriers, and the load posting will be removed.

Replacement of the structure will require temporary full road closure, which can be managed with detour routes.

Replacement of the existing structures is more expensive and intrusive than the do nothing or rehabilitation alternatives. Impacts to the environment are increased, since work will occur within and adjacent to the watercourse. However, these impacts can be mitigated through best management practices. Considering the condition of the bridge, replacement will fully address the problem statement, including safety, structural condition, performance, and compliance with current design standards.

The removal of the existing bridge will result in the removal of an asset identified as having local heritage value. This impact can be mitigated through various methods to document the original asset and incorporation of aesthetic features or plaques to commemorate the heritage value provided by the bridge. A heritage impact assessment will be completed to provide recommendations.

This alternative does not fully consider the problem statement, as the new bridge would not meet current standards.

6.2.4 Alternative C2 – Remove and Replace with Two Lane Bridge

Alternative C2 has similar impacts and constraints to Alternative C1, with a higher initial capital cost than Alternative C1.

Under this alternative, the existing bridge would be removed and replaced with a new bridge. A two-lane bridge to match the geometry of the approach road would be installed to meet current design standards.

The new structure will have a larger footprint than the existing to accommodate the two-lane configuration. The impacts to the environment are increased with a two-lane structure, as it will require more extensive excavation, however it is not expected to require property acquisition.

Roadside safety will be improved by the installation of new roadside barriers, and the load posting will be removed.

Construction of a two-lane bridge will improve the safety of the crossing and bring the asset up to current standards. This alternative fully addresses the problem statement.

6.2.5 Alternative D – Construct a New Single Lane Bridge Adjacent to The Existing Bridge

In consideration of the expected heritage value of the bridge, this alternative involves the installation of a new bridge along a new alignment while leaving the existing bridge in place.

The existing municipal right-of-way is noted to be approximately 28.75 m wide at the bridge in the York Region GIS Mapping utility. It reduces to 23 m in width approximately 68 m from the west end of the bridge. The road appears to generally be centred within the right-of-way. The current road alignment is straight and relatively flat, introducing a second bridge will require the introduction of a horizontal curve to move traffic onto the new bridge. A new two-lane bridge will not fit within the current right-of-way and will require the purchase of additional property. A new single lane bridge could be installed but would not meet current geometric standards due to traffic volumes requiring two lanes, therefore the continued use of the existing bridge for one direction would be required.

The new structure configuration will have a larger footprint than the existing to accommodate a new bridge and maintaining the existing bridge.

Roadside safety will be improved by the installation of new roadside barriers, and the load posting will be removed for one direction only.

Traffic would continue to use the existing bridge throughout construction of the new bridge negating the need for a road closure and detour. The existing bridge would remain triple load posted at 20 tonnes, 21 tonnes, and 27 tonnes. The bridge will continue to deteriorate, and the load limit will in time need to be reduced. At one point, the bridge would need to be replaced with a new single lane bridge.

Construction of a new single lane bridge will improve the safety of the crossing, however, it does not fully address the problem statement as it does not minimize the impacts to the environment.

6.3 PRELIMINARY PREFERRED ALTERNATIVE

In consideration of the above, Alternative A is not considered suitable as it does not address the problem statement. Existing deficiencies will persist and continue to worsen over time if the structure is left alone, resulting in eventual road closure.

Alternative B is expected to have positive benefits such as increasing the service life of the existing bridge, and improving roadside protection, but it will not allow elimination of the load posting across the bridge. The bridge will remain as a single lane constriction on a two-lane collector road, and although the roadway width across the bridge could be reduced to suit the maximum recommended single lane width, it will remain substandard for the traffic volumes, posted speed, and road class. The future maintenance costs will also continue to be very high. For these reasons, the extent of the improvements is not considered sufficient to fully address the problem statement.

Alternatives C1 and C2 will both address the issues within the problem statement, as the safety and condition of the existing crossing will be improved. Both alternatives allow for elimination of load posting and improvement of roadside and approach safety. However, the design traffic volumes, road class, and design speed exceed the standards for a single lane bridge. For this reason, Alternative C2 fully addresses the problem statement whereas Alternative C1 does not.

Alternative D also addresses the problem statement; however, it will require a significant increase to the footprint of the bridge site resulting in greater environmental impacts and will continue to require ongoing maintenance of the original structure until it eventually needs to be closed or replaced.

Based on the evaluation of the above-noted alternatives, Alternative C2, removing the existing bridge and replacing with a two-lane bridge, best resolves the problem statement.

This preliminary preferred solution is based on an evaluation completed with information received prior to May 1, 2023, and does not reflect the comments received following the Public Information Centre.

7 Public Information Centre (PIC)

Under a Schedule B Class EA Study there are two points of mandatory stakeholder contact – notification of the public at commencement of the study to invite comment, and notification at the completion of the study to advise of the results. Based on the anticipated interest in this project, the Town opted to proceed with the non-mandatory Public Information Centre (PIC) in order to acquire more in-depth public feedback and determine the solution that best meets the needs of the community, Town, and environment. For this reason, a non-mandatory Public Information Centre (PIC) was held inviting stakeholder comment and input at the end of Phase 2.

7.1 NOTIFICATION

In accordance with the Class EA guidelines, notification of the PIC was issued on April 27, 2023, to all property owners (as determined from Town of Georgina records) on Old Shiloh Road between Weir's Sideroad and Victoria Road and residents of Victoria Road and Weir's Sideroad. Stakeholders include review agencies and the public and thus notices were directed to each, in the same manner in which the Notice of Commencement was circulated (copies of the notice are provided in Appendix C).

These notices were also submitted to the appropriate review agencies, stakeholder groups and special interest groups, a listing of which is provided in Appendix C.

Notices were posted on the Town website, starting on April 26th, 2023. Notices were published in the local newspaper, the Georgina Advocate on May 11, 2023, preceding the PIC.

In addition, the date of the public meeting was advertised on the project signs installed at each approach to the bridge and directing interested parties to visit the project website for more information.

7.2 PUBLIC INFORMATION CENTRE

The purpose of the PIC was to provide information to the public and agencies and seek their input with respect to the following:

- Identification of the problem;
- Development and evaluation of alternative solutions to the problem;
- General inventory of the affected environments in order to determine the possible impacts; and
- Identification of the preliminary recommended alternative.

The PIC was held on Wednesday May 17, 2023, from 5:00 PM to 7:00 PM at the Udora Community Hall. No formal presentation was made; people were invited to drop by to review the display boards of the presentation material, which were displayed around the room's perimeter, and ask questions. Representatives from the Town and Tatham Engineering Limited were in attendance to answer any questions and provide assistance as necessary.

Fourteen people signed in as attending the PIC.

Various display boards were prepared for viewing by the public (as provided in Appendix G), which addressed the following:

- The Municipal Class EA process and those tasks relevant to this study;
- Existing conditions;
- Existing concerns;
- Hydraulic conditions;
- Alternative solutions for improvements to the bridge;
- Replacement criteria and options;
- The remaining steps to completion; and
- Contact details for additional information.

7.3 PUBLIC COMMENT

Comments were received from 49 stakeholders either at the PIC or shortly thereafter via the comment sheets and by email.

The comment period following the PIC was extended to June 14, 2023, following a request from interested residents for more time to review the presented material.

Table 3 summarizes all comments that were received throughout the study process, including comments received prior to the PIC.

Table 3: Public Comment Summary

# OF TIMES RECEIVED	COMMENT
21	Expressed concerns regarding increased traffic volumes and speeds on road
13	Heritage value should be maintained through the rehabilitation of the existing bridge
11	Expressed interest in increased pedestrian safety measures
4	New structure should accommodate wider farm equipment and eliminate load restriction
3	Heritage value could be maintained through sympathetic design elements & documentation
3	Expressed concerns with environmental impacts of widened bridge footprint
3	Would like to maintain the load restriction
2	Expressed need to maintain or increase hydraulic capacity and clearance to water for canoeists
2	Concern with duration of construction and associated detours
1	Would like trail access maintained
1	Expressed concerns with construction costs

Some of the respondents further included their preferred alternatives, as noted in Table 4 below.

Table 4: Public Preferences

Alternative A – Do Nothing	5
Alternative B – Rehabilitate the Existing Bridge	21
Alternative C1 – Remove and Replace with Single Lane Bridge	4
Alternative C2 – Remove and Replace with Two-Lane Bridge	10
Alternative D – Construct a New Bridge Adjacent to the Existing Bridge	3

The review of the feedback following the Public Information Centre resulted in an adjustment of the weighting of a number of assessment criteria to better represent the importance and impact of each criterion in assessing the alternatives. Section 7 of this document summarizes the adjustments that were made. Some specific points of feedback that most impacted the weight of the criteria are as follows:

- Heritage value of the bridge is important to the community; and
- Farm equipment is currently needing to detour due to the narrow structure and load restrictions.

Although there were a number of comments related to the traffic operations, this criteria has a significant weighting which was not adjusted.

A copy of the letter response and FAQ sheet distributed to those that submitted comments can be found in Appendix G.

7.4 AGENCY COMMENT

In follow-up to the Notice of Study Commencement and Notice of Public Information Centre, comments were received from the Lake Simcoe Region Conservation Authority (LSRCA), and the Ministry of Environment Conservation and Parks.

7.4.1 LSRCA

This site is located within an area that is entirely regulated by the LSRCA under Ontario Regulation 179/06 made pursuant to the *Conservation Authorities Act (CA Act)*. The site includes the following hazards:

- Regulatory floodplain hazard of the Pefferlaw River.
- Meanderbelt hazard of the Pefferlaw River.
- Unevaluated Wetland and lands adjacent.
- Significant woodland (map attached only as reference as the Town will be reviewing natural heritage related policies associated with the bridge works).

They confirmed that the bridge works will require a permit under the CA Act.

The LSRCA provides the following suggestions to avoid or mitigate impacts associated with the potential bridge rehab/replacement:

- Existing drainage and conveyance be maintained and or improved with no change to upstream or downstream flows to avoid impacts to control of flooding and erosion.
- No increase in velocities that result in increased erosion.
- Quantity control/peak flow controls be applied to avoid impacting erosion and floodplains in accordance with LSRCA Stormwater Management Guidelines (on LSRCA website).

- Any fill placement in the floodplain be avoided or compensated for with an incremental cut.
- Maintain existing grades within the regulated area.
- Proper erosion and sediment control measures be undertaken to prevent sediment migration and impact to watercourses.
- Any interference with wetlands be avoided or supported with a supporting Environmental Impact Study.

A copy of the LSRCA HEC-RAS model was obtained and utilized for the completion of the hydrologic and hydraulic analysis.

It was also recommended that further consultation through the detailed design or environmental discipline studies be undertaken.

7.4.2 MECP

The MECP advised that where the Crown's duty to consult with Aboriginal communities is triggered in relation to the proposed project, they are delegating the procedural aspects of rights-based consultation to the Town.

They also provided a list of communities identified as potentially affected by the proposed project:

- Chippewas of Rama First Nation
- Chippewas of Georgina Island First Nation
- Beausoleil First Nation
- Alderville First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation

If any archaeological studies have been undertaken or work-related archaeological resources are required, communication shall also include:

- Huron-Wendat

They also advised that the Director of Environmental Assessment Branch is to be contacted under the following circumstances after initial discussions with the communities identified above:

- Aboriginal or treaty rights impacts are identified to you by the communities;

- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation with Indigenous communities or other stakeholders has reached an impasse; or
- A Section 16 Order request is expected based on impacts to Aboriginal or treaty rights.

In addition, they requested that a draft copy of the project file report be sent to them for review prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments.

Copies of the following documents were also provided:

- Areas of Interest Mapping:
  - Regulated Area.
  - Floodplain.
  - Meanderbelt.
  - Wetland.
  - York Significant Woodland.
- Client's Guide to Preliminary Screening for Species and Risk.
- A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities.

8 Traffic Volumes

During the PIC, some residents noted that the traffic volumes used in the initial evaluation of alternatives appeared to be higher than what they have observed. In response, following the PIC the Town undertook a 14-day study to provide updated traffic counts along Old Shiloh Road in the vicinity of the bridge.

An armadillo tracker unit was installed on May 20, 2023, and collected traffic speed and volume data until June 3, 2023.

During this period, a total of 8,847 vehicles were counted, with 96% noted to be of medium size such as a sedan. The average daily traffic volumes over a 7-day period being 556. Using the data collected, the AADT volumes were calculated at 554. This value is lower than the 919 previously recorded in the Town's files.

The road is posted with a regulatory speed limit of 60 km/hr. Over the course of the study, the average recorded speed was 56.42 km/hr, and the 85th percentile speed was noted to be 68 km/hr.

The two criteria for determining suitability for the installation of a single lane bridge under current standards relate to the design speed and the traffic volumes. On roads designed for speeds less than or equal to 60 km/hr and AADT values of 200 or less, a single lane bridge can be considered as the probability of 2 vehicles meeting on the bridge is low. If the volumes are between 200 and 400 AADT and the design speeds are 40 km/hr or less, a single lane bridge can also be considered.

Although it is within the Town's authority to override the criteria noted above to install a single lane bridge where no operational or safety issues have been noted to date, in review of the updated traffic volumes, it is noted that these 2023 volumes are currently 38.5% higher than the limit of 400 on roads designed for speeds less than 40 km/hr.

New bridges are to be designed to last 75 years with appropriate maintenance over the course of their life cycle. As such, the design needs to account for not only current traffic volumes but also projected traffic volumes for the future in order to ensure the Town is not committed to a condition that becomes unsafe in the future due to growth. Using a 0.5% to 2% annual growth rate, the projected AADT will be between 805 and 2446 in 75 years, and between 582 and 675 in the next 10 years. As such, over the life of a new structure, the traffic volumes could far exceed the capacity of a single lane bridge resulting in the need for the Town to consider early replacement to accommodate the traffic and improve safety.

Review of the recorded average speeds encountered on the roadway indicate speeding is not currently an issue as many motorists are slowing down at the bridge. The settlement on the approaches has resulted in a bump at each end, and the roadway constriction and potential to have to yield to oncoming traffic could be contributing to this.

Some residents have expressed an interest in maintaining a single lane bridge at this location in order to provide traffic calming. With a 75-year design life and a significant capital cost associated with a new bridge, it is recommended that alternate measures such as enforcement be considered should speeding at this location become an issue.

9 Life Cycle Cost Analysis

It is rarely the case that the capital cost of a structure is a one-time cost. A structure requires periodic maintenance, rehabilitation, replacement of various components and, eventually, replacement of the structure itself throughout its life cycle. A comparison of the net present values of projects can give an indication of which one will be most economical overall. The net present value is the value of the rehabilitation and replacement alternative expended at future dates throughout the life cycle of the alternative converted back to today's dollars. A discount rate is used to obtain the net present value of each alternative. This discount rate is the rate of interest, expected rate of return on investment, or cost of borrowing, used to discount future cash flows of an investment such as the bridge rehabilitation or replacement and continued maintenance costs.

Following the review of public comments received with respect to this project, two of the alternatives were identified as being preferred by the community: Alternative B - rehabilitation of the existing bridge, and the Alternative C2 - replacement with a two-lane bridge. To better understand the overall financial impacts of these alternatives over the life of the bridge, the Town has expanded the study to include a life cycle cost analysis of these two alternatives.

All costs are estimated in 2023 dollars in the analysis, and annual costs are computed over a long-term planning horizon and summarized through life cycle cost analysis. The life cycle for the analysis is taken as 75 years, based on the required design life of new bridges noted in the Canadian Highway Bridge Design Code (CHBDC).

Costs include capital construction costs and operating and maintenance (O&M) costs for the bridge. The alternative capital cost estimates as well as the life cycle costs and the years at which they were applied for each alternative are summarized in Appendix H. Residual values for all alternatives are based on all rehabilitation and replacement requirements for the individual alternative. The residual value of Alternative B assumes the structure would be replaced in year 10. The residual value of Alternative C2 assumes that full structure replacement would not be required until year 76.

The Structural Financial Analysis Manual (SFAM) prepared by the MTO recommends a discount rate of 6%. However, a sensitivity analysis was completed by completing the analysis using various discount rates of 4%, 6% and 8%. The results are summarized in Table 5.

Table 5: Summary of Net Present Values (NPV) with Various Discount Rates (DR)

	Alternative	Initial Cost	Costs Years 1-75	Total Cost	NPV (4% DR)	NPV (6% DR)	NPV (8% DR)
B	Rehabilitate Existing Bridge	$1,877,000	$9,342,000	$11,219,000	$6,637,000	$5,733,000	$5,088,000
C2	Remove and Replace with Two Lane Bridge	$4,883,000	$3,175,000	$8,058,000	$5,534,000	$5,202,000	$5,046,000

Notes

1. costs rounded to nearest $1,000

The life-cycle cost analysis using a 4%, 6%, or 8% discount rate indicates the more economical alternative over the life of the structure is to replace the bridge with a two-lane structure versus rehabilitation. However, as the discount rate is increased to 8% the NPV values become closer and could be considered equivalent. The overall cost to the Town over the 75-year life remains lower when replacement is completed sooner.

10 Re-Evaluation of Alternatives

Following the Public Information Centre, the preliminary assessment was revisited to consider comments and input received from the various stakeholders.

In consideration of the above, Alternative A Do Nothing is not considered suitable as it does not address the problem statement. Existing deficiencies will persist and continue to worsen over time if the structure is left alone, resulting in eventual road closure.

Alternative B Rehabilitate the Existing Bridge is expected to have positive benefits such as increasing the service life of the existing bridge, and improving roadside protection, but it will not allow elimination of the load restrictions on the bridge. The bridge will remain as a single lane constriction on a two-lane collector road, and although the roadway width across the bridge could be reduced to suit the maximum recommended single lane width, it will remain substandard for the traffic volumes, posted speed, and road class. The future maintenance costs will also continue to be very high. For these reasons, the extent of the improvements is not considered sufficient to fully address the problem statement.

Alternatives C1 Remove and Replace with Single Lane Bridge and C2 Remove and Replace with Two-Lane Bridge will both address the issues within the problem statement, as the safety and condition of the existing crossing will be improved. Both alternatives allow for elimination of the load posting and improvement of roadside and approach safety. However, the design traffic volumes, road class, and design speed exceed the standards for a single lane bridge. For this reason, Alternative C2 fully addresses the problem statement whereas Alternative C1 does not.

Alternative D Construct a New Bridge Adjacent to the Existing Bridge also addresses the problem statement; however, it will require a significant increase to the footprint of the bridge site resulting in greater environmental impacts and will continue to require ongoing maintenance of the original structure until it eventually needs to be closed or replaced. As such, this alternative is less desirable than Alternative C2.

10.1 CONSIDERATION OF STAKEHOLDER INPUT

During the PIC, some residents noted that the traffic volumes used in the initial evaluation of alternatives appeared to be higher than what they have observed. In response, following the PIC the Town undertook a 14-day study to provide updated traffic counts along Old Shiloh Road in the vicinity of the bridge. Using the data collected, the AADT volumes were calculated at 554. This value is lower than the 919 previously recorded in the Town's files, however it is greater than recommended for a single lane structure with a design speed of 60 km/hr (200 AADT). Using a 0.5% to 2% annual growth rate, the projected AADT will be between 805 and 2446 in 75 years, and between 582 and 675 in the next 10 years. As such, over the 75-year design life of a new structure, the traffic volumes could far exceed the capacity of a single lane bridge resulting in the need for the Town to consider early replacement to accommodate the traffic and improve safety.

Old Shiloh Road has an AADT of 554, which is greater than recommended for a single lane structure and is expected to increase over time. As such alternatives A, B, C1 would not meet current geometric design standards and would result in a reduced level of service and safety for users. Alternative C2, Remove and replace with a Two-Lane Bridge will meet current design standards and remove the constriction to traffic. Alternative D will also provide two lanes of traffic and meet the minimum design standards.

Some residents also expressed the opinion that the heritage value of the bridge should be maintained through the rehabilitation of the existing bridge. In response, the Town reviewed the weighting and importance applied to the associated evaluation criteria. In addition, as discussed in section 9, a life cycle cost analysis was completed to further evaluate the impact of delaying the replacement and maintaining the existing structure for as long as possible. Ultimately over a 75-year life cycle, the overall cost to the Town was reduced by completing the replacement sooner. In addition, the level of service to the community is improved sooner.

With regards to maintaining the heritage value of the bridge Alternatives A, B and D would best address this comment, however they will only limit the impact over a short term and will result in eventual replacement or closure of the bridge. While Alternatives C1 and C2 result in immediate removal of the heritage bridge, there are options available to mitigate the impact to the heritage value which are discussed further in sections 14 of this report.

There were also comments received in relation to improving the safety for pedestrians as well as accommodating wider farm equipment as well as eliminating the load restrictions. Bridge replacement with a structure that meets the current geometric design standards will provide a much wider bridge and side clearances from the edge of lane to the curb that would match a minimum shoulder width. This will improve pedestrian safety to match the level of the approach road, and permit farm equipment to pass. There is also an opportunity to consider the implementation of additional pedestrian safety measures such as a sidewalk or multi-use path.

With respect to increased safety of pedestrians and the use of the bridge by farm equipment, Alternatives A and B do not provide any opportunity to incorporate safer conditions for pedestrians or widening or significant strengthening of the structure to permit use by large farm equipment. Alternatives C1 and D provide opportunity to incorporate pedestrian considerations, of which some may provide the required side clearance for wider farm equipment to utilize the bridge when pedestrians are not crossing. Alternative C2 provides the most opportunity for pedestrian consideration and use by large farm equipment simultaneously.

Following the revised weighting and scoring of all alternatives, ***the technically preferred alternative remains alternative C2, replacement of the bridge with a new two-lane*** bridge. Although it is noted that Alternative B's overall score improved, and the spread between Alternative B and C2 decreased, the overall ranking of the alternatives remains unchanged.

Table 6 summarizes the updated evaluation, and details of the changes in the assessment presented are detailed in Section 7.1.

10.2 ASSESSMENT OF ALTERNATIVE SOLUTIONS

In consultation with the Town, the evaluation matrix scoring was updated to better reflect the positive and negative impacts of the baseline Alternative A, do nothing rather than remaining as 0.0 across all environments for consideration as a neutral baseline, with the impact scores of the other alternatives being set relative to that baseline of 0.0. As such, the scoring of the other alternatives was also updated accordingly to reflect this change.

10.2.1 Score

Traffic Operations – the scores associated with Alternative C2 were reduced for consideration of the comments received regarding the current operations at the bridge and the reduced traffic volumes confirmed during the traffic counts. Although there will still be a significant improvement in traffic operations in terms of meeting standards, the improvement relative to the existing operations was considered to be less.

Maintenance and Snow Removal – the scores associated with Alternative C2 was reduced for consideration of the score assigned to Alternatives C1 and D and the relative impact of improved access for snow removal equipment as well as the minor increase in maintenance requirements for the larger bridge.

Future Maintenance Costs – the scores associated with Alternatives C1 and C2 were reduced for consideration of the larger negative impact on future maintenance costs associated with maintaining the existing bridge under Alternatives B and D.

10.2.2 Weight

The most significant modifications to the assessment of the alternatives, which addressed public comments, related to the weighting factors employed, particularly for the social environment and the cultural heritage environment. The weight of noise/construction impacts, archaeological impacts, and First Nations impacts was decreased while emergency services, community impacts (such as farm equipment access), and heritage impacts were increased to reflect a greater emphasis on these impacts.

10.2.3 Results

Following the revised weighting and scoring of all alternatives, ***the technically preferred alternative remains Alternative C2, replacement of the bridge with a new two-lane bridge***. Although it is noted that Alternative B's overall score improved, and the spread between Alternative B and C2 decreased, the overall ranking of the alternatives remains unchanged.

Table 6: Revised Evaluation of Alternative Solutions with Weighted Scoring (red text indicates a variation from the initial scoring)

	Assessment Criteria	Weight	Alternative A: Do Nothing – Score	Alternative A: Do Nothing – Weighted Score	Alternative B: Rehabilitate the Existing Bridge – Score	Alternative B: Rehabilitate the Existing Bridge – Weighted Score	Alternative C1: Remove and Replace with Single Lane Bridge – Score	Alternative C1: Remove and Replace with Single Lane Bridge – Weighted Score	Alternative C2: Remove and Replace with Two Lane Bridge – Score	Alternative C2: Remove and Replace with Two Lane Bridge – Weighted Score	Alternative D: Construct a New Bridge Adjacent to the Existing Bridge – Score	Alternative D: Construct a New Bridge Adjacent to the Existing Bridge – Weighted Score
Physical Environment	road geometry and alignment	6	-2.0	-12.0	-2.0	-12.0	-2.0	-12.0	2.0	12.0	1.0	6.0
	structural stability and load restrictions	10	-2.0	-20.0	-1.0	-10.0	2.0	20.0	2.0	20.0	1.5	15.0
	roadside protection	6	-1.0	-6.0	1.0	6.0	2.0	12.0	2.0	12.0	1.5	9.0
	traffic operations	7	0.0	0.0	0.0	0.0	0.0	0.0	2.0	14.0	1.5	10.5
	maintenance and snow removal	6	-2.0	-12.0	-1.0	-6.0	0.5	3.0	2.0	12.0	0.5	3.0
	Sub-Total	**35**		**-50.0**		**-22.0**		**23.0**		**70.0**		**43.5**
Natural Environment	fisheries/aquatic impacts	6	0.0	0.0	-0.5	-3.0	-1.0	-6.0	-1.5	-9.0	-1.0	-6.0
	wildlife/terrestrial impacts	6	0.0	0.0	-0.5	-3.0	-1.0	-6.0	-1.5	-9.0	-1.0	-6.0
	hydrology & hydraulics	6	0.0	0.0	0.0	0.0	0.5	3.0	0.5	3.0	0.0	0.0
	vegetation impacts	3	0.0	0.0	0.0	0.0	-0.5	-1.5	-1.0	-3.0	-2.0	-6.0
	water quality	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	**25**		**0.0**		**-6.0**		**-10.5**		**-18.0**		**-18.0**
Social Environment	noise/construction impacts	3	0.0	0.0	-0.5	-1.5	-1.0	-3.0	-1.0	-3.0	-1.0	-3.0
	emergency services	6	-1.0	-6.0	-1.0	-6.0	1.0	6.0	2.0	12.0	1.5	9.0
	community impacts	6	0.0	0.0	0.5	3.0	1.0	6.0	1.5	9.0	-1.0	-6.0
	Sub-Total	**15**		**-6.0**		**4.5**		**9.0**		**18.0**		**0.0**
Cultural Heritage Environment	archaeological impacts	4	0.0	0.0	-0.5	-2.0	-1.0	-4.0	-1.5	-6.0	-2.0	-8.0
	heritage impacts	6	0.0	0.0	2.0	12.0	1.0	6.0	0.5	3.0	1.5	9.0
	first nations impacts	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	**15**		**0.0**		**10.0**		**2.0**		**-3.0**		**1.0**

Weight	reflects the relative importance of each evaluation criteria within each project environment, and the relative importance of each project environment in relation to one another
Score	reflects the effect of each alternative as it relates to the evaluation criteria in comparison to Do Nothing (baseline); -2 denotes a significant negative impact, 0 denotes no impacts and +2 denotes a significant positive impact
Weighted Score	product of weight x score

	Assessment Criteria	Weight	Alternative A		Alternative B		Alternative C1		Alternative C2		Alternative D	
			Do Nothing		Rehabilitate the Existing Bridge		Remove and Replace with Single Lane Bridge		Remove and Replace with Two Lane Bridge		Construct a New Bridge Adjacent to the Existing Bridge	
			Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Economic Environment	construction costs	10	0.0	0.0	-0.5	-5.0	-1.0	-10.0	-1.5	-15.0	-2.0	-20.0
	future maintenance costs	10	0.0	0.0	-1.5	-15.0	-1.0	-10.0	-0.5	-5.0	-2.0	-20.0
	property acquisition costs	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-5.0
	Sub-Total	**25**		**0.0**		**-20.0**		**-20.0**		**-20.0**		**-45.0**
Climate Change	impact on climate change	2	0.0	0.0	-0.5	-1.0	-1.0	-2.0	-1.5	-3.0	-1.0	-2.0
	resiliency to climate change	3	0.0	0.0	0.0	0.0	1.0	3.0	1.0	3.0	0.0	1.5
	Sub-Total	**5**		**0.0**		**-1.0**		**1.0**		**0.0**		**-2.0**
	Total	**120**		**-56.0**		**-34.5**		**4.5**		**47.0**		**-20.50**
	Overall Ranking			**5**		**4**		**2**		**1**		**3**
	Weight	reflects the relative importance of each evaluation criteria within each project environment, and the relative importance of each project environment in relation to one another										
	Score	reflects the effect of each alternative as it relates to the evaluation criteria in comparison to Do Nothing (status quo); -2 denotes a significant negative impact, 0 denotes no impacts and +2 denotes a significant positive impact										
	Weighted Score	product of weight x score										

11 Stage 2 Archaeological Assessment & Heritage Impact Assessment

Following the completion of the Stage 1 Archaeological Assessment and the Cultural Heritage Evaluation Report (CHER), which were completed and documented under Technical Memorandum No. 1, further studies were completed. This section will discuss the results of the Archaeological Assessment and Heritage Impact Assessment that were completed.

11.1 AMENDED ARCHAEOLOGICAL ASSESSMENT

The previously completed Stage 1 archaeological assessment that was completed as a desktop background study in January 2023 recommended the completion of a Stage 2 assessment. AMICK Consultants Ltd. completed a property inspection at the project site in November 2023 with the intention of completing a Stage 2 Archaeological Assessment. During the course of the inspection, it was noted that the area no longer retains potential for archaeological resources due to the previous extensive subsurface disturbances and presence of steep slopes throughout the study area.

The following are the results summarized in the archaeological assessment executive summary:

> *"The study area has been identified as a property that exhibits potential to yield archaeological deposits of cultural heritage value or interest (CHVI). The objectives of the Stage 1 Background Study have therefore been met and in accordance with the results of this investigation, the following recommendations are made:*
>
> 1. *Due to previous extensive subsurface disturbances and presence of steep slopes throughout the entirety of the study area, the proposed undertaking no longer retains potential for archaeological resources.*
> 2. *No further archaeological assessment of the study area is warranted.*
> 3. *The Provincial interest with respect to archaeological resources within the limits of the study area has been addressed."*
>
> *AMICK Consultants Ltd., December 12, 2023*
> *MCM# P058-2273-2022*

The amended Stage 1 archaeological assessment report is included in Appendix E. A copy of the report has been submitted to the Ministry of Citizenship and Multiculturalism (MCM).

11.2 HERITAGE IMPACT ASSESSMENT

Based on the results of research, site investigation and application of the criteria from Ontario Regulation 9/06, the Old Shiloh Road bridge was determined to have elements of moderate Cultural Heritage Value or Interest (CHVI). The results of the Cultural Heritage Evaluation Report (CHER) are documented in Technical Memorandum No. 1.

Based on the conclusions of the CHER and that the existing bridge does not meet current road or bridge safety standards and is operating beyond its expected lifespan, the following recommendations were made by the heritage consultant for consideration by the Municipality during detailed design of the replacement structure:

1. *If the existing bridge is to be replaced, it is recommended that the Town undertake full recording and documentation of the existing structure in situ prior to removal of the existing bridge structure.*
2. *If the existing bridge is to be replaced, it should be reinstated in the same general location to preserve the historic crossing.*
3. *The Cultural Heritage Value of the Bridge could be commemorated through reflection of the architectural form of the existing bridge in the design of the replacement bridge.*
4. *The Cultural Heritage Value of the Bridge could be remembered with a commemorative monument, memorial, or art installation.*
5. *The Old Shiloh Road Bridge HIA should be consulted when considering viable alternatives to maintain the function of this bridge while respecting its CHVI.*
6. *This report should be filed with the Town of Georgina as part of the documentation for the EA.*
7. *This report should be filed with the Ministry of Citizenship and Multiculturalism (MCM) for review and comment as supporting documentation for the EA.*

AMICK Consultants Ltd., January 22, 2024

The practicality and affordability of the alternative recommendations 2 and 3 related to the commemoration of the heritage value are further discussed in Section 14.5.

12 Natural Environment Impact Study

Riverstone Environmental completed an additional field investigation and prepared an Environmental Impact Study Report. The report was prepared as an update to the preliminary assessment of site-specific natural heritage features and functions that may be present proximate to the bridge, which was presented in Technical Memorandum No. 1. The updated assessment refines the impact assessment focusing on potential impacts of the preferred solution selected through the Environmental Assessment. Several preliminary mitigation planning measures are recommended to ensure that works do not result in a net negative impact to the natural environment. The recommended measures are listed below.

Prepare and submit a request for project review to the Department of Fisheries and Oceans (DFO) and adhere to all requirements of DFO in project planning and implementation.

Prepare a post-construction stabilization and restoration plan for any new surfaces, embankments, or areas otherwise directly disturbed by construction staging. Apply a restoration seed mix composed of native species only (except for stabilizing cover crop).

Minimize riverbank and bed hardening to the extent possible (if replacement structures are required, these should be designed to maintain the existing natural substrates and gradients and allow continued fish passage, i.e., open bottom).

Minimize removal of overhanging vegetation to the extent possible.

In-water works (if required) and diversion of flows should avoid relevant fisheries timing windows, which has been confirmed with MNRF as March 15 to July 15 of any given year.

Implement sediment and erosion control measures as per applicable best management practices to isolate the development footprint.

Sediment fencing must be constructed of heavy material and solid posts and be properly installed (trenched in) to maintain its integrity during inclement weather events.

Additional sediment fencing and appropriate control measures must be available on site so that any breach can be immediately repaired.

Regular inspection and monitoring will be necessary to ensure that the structural integrity and continued functioning of the sediment control measures is maintained (i.e., proper installation is not the only action necessary to satisfy the mitigation requirements).

When construction activities are occurring, and before a precipitation event, an on-site supervisor should be responsible for daily inspections of the sediment and erosion control measures and record the time and date of inspections, the status of the mitigation measures, and any repairs undertaken.

Removal of non-biodegradable erosion and sediment control materials should occur once construction is complete, and the site is stabilized.

Best Management practices should be utilized with all machinery and fill being imported to the subject property to ensure that material and tracks are free from invasive species (Phragmites australis, etc.).

Machinery should arrive on site in clean condition and is to be checked and maintained free of fluid leaks.

Machinery must be refueled, washed, and serviced within the area isolated by sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.

Locate all fuel and other potentially deleterious substances within the area isolated by sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.

Minimize vegetation removal and disturbance to the extent possible, particularly adjacent to the watercourse.

Prepare a Tree Inventory and Planting Plan (TIPP) to determine the extent of potential tree removals following bridge design. Construction exclusion, staging, and tree protection measures should be included in the TIPP for mitigation planning.

Work site isolation must utilize sediment and erosion control that represents suitable wildlife exclusion fencing as per best management practices endorsed by the MECP.

If any individual turtles are encountered within the work area, activities that have the potential to harm such individuals should stop immediately. A qualified biologist or MECP should then be contacted to determine the most appropriate mitigation measure.

Grading and other activities that cause disturbance outside of the development envelope should be minimized to the extent possible during the construction period.

In the spring prior to construction, install temporary bird exclusion mesh underneath bridges to prevent establishment of nests within the season of construction.

In addition, recommended best practice mitigation measures were also provided to be applied as applicable based on the final design to be implemented:

- Consult with LSRCA regarding any requirements for regulated feature offsetting/compensation related to minor encroachment into wetlands. (as applicable)

- Activities and works in water must be designed and planned such that loss or disturbance to aquatic habitat is minimized. (as applicable)
- All in-water work must be isolated and completed in 'dry' conditions, with the work area dewatered. (as applicable)
- Fish salvage must be undertaken prior to any de-watering of stream areas and following any work area flooding. Permits must be obtained from MNRF prior to fish salvage. (as applicable)
- Avoid disturbance to submerged boulders and woody debris material outside of the bridge development footprint and consider opportunities to replace in-stream fish habitat structure post-construction. (as applicable)
- Restore natural bed substrates within and adjacent to replaced crossing structures following construction. (as applicable)
- Temporary storage locations of aggregate/fill material (where required) should be located within the area isolated by sediment fencing. Storage areas should be sited to the west of Pefferlaw Brook. This material is to be contained by heavy-duty sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank. (as applicable)
- Offloading of construction and aggregate/fill materials (where required) should be completed during fair weather conditions, a minimum of 30 m from wetlands and the top of watercourse bank. (as applicable)
- All stockpiled topsoil/overburden (where required) should be piled in low piles and stabilized as quickly as possible (e.g., erosion-prone areas covered with textile) to minimize the potential for runoff and wind erosion. (as applicable)
- Following preparation of the TIPP, review opportunities for re-planting of trees that require removal. (as applicable)
- Any minor tree removals required to accommodate the bridge replacement design must be completed outside of the season in which endangered bats may be active, i.e., April – Oct, inclusive. If substantial tree removals are determined to be required (i.e., beyond the ROW), additional assessment of habitat usage and significance may be warranted. (as applicable)
- Clearing of vegetation must be restricted to times outside of the period April 15 to October 30. If development and site alteration must occur within the period of April 1 to Aug 30, a nest survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests of migratory bird species covered by the MBCA. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active

nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season. If any clearing of mature trees must occur within the period April 15 to Oct 30, further measures may need to be taken with respect to mitigating harm to endangered bats which have the potential occur on site. (as applicable)

13 Preferred Alternative Solution

In consideration of the above, Alternative A Do Nothing is not considered suitable as it does not address the problem statement. Existing deficiencies will persist and continue to worsen over time if the structure is left alone, resulting in eventual road closure.

Alternative B Rehabilitate the Existing Bridge is expected to have positive benefits such as increasing the service life of the existing bridge, and improving roadside protection, but it will not allow elimination of the load restrictions on the bridge. The bridge will remain as a single lane constriction on a two-lane collector road, and although the roadway width across the bridge could be reduced to suit the maximum recommended single lane width, it will remain substandard for the traffic volumes, posted speed, and road class. The future maintenance costs will also continue to be very high. For these reasons, the extent of the improvements is not considered sufficient to fully address the problem statement.

Alternatives C1 Remove and Replace with Single Lane Bridge and C2 Remove and Replace with Two-Lane Bridge will both address the issues within the problem statement, as the safety and condition of the existing crossing will be improved. Both alternatives allow for elimination of the load posting and improvement of roadside and approach safety. However, the design traffic volumes, road class, and design speed exceed the standards for a single lane bridge. For this reason, Alternative C2 fully addresses the problem statement whereas Alternative C1 does not.

Alternative D Construct a New Bridge Adjacent to the Existing Bridge also addresses the problem statement; however, it will require a significant increase to the footprint of the bridge site resulting in greater environmental impacts and will continue to require ongoing maintenance of the original structure until it eventually needs to be closed or replaced. As such, this alternative is less desirable than Alternative C2.

13.1 CONSIDERATION OF STAKEHOLDER INPUT

Further to the discussions in section 2.6, the stakeholder concerns related to single- or two-lane bridge configurations and traffic volumes, pedestrian safety and farm equipment access, and the heritage value of the structure were reviewed in relation to each alternative solution.

Old Shiloh Road has an AADT of 554, which is greater than recommended for a single lane structure and is expected to increase over time. As such alternatives A, B, C1 would not meet current geometric design standards and would result in a reduced level of service and safety for users. Alternative C2, Remove and replace with a Two-Lane Bridge will meet current design standards and remove the constriction to traffic. Alternative D will also provide two lanes of traffic and meet the minimum design standards.

With regards to maintaining the heritage value of the bridge Alternatives A, B and D would best address this comment, however they will only limit the impact over a short term and will result in eventual replacement or closure of the bridge. While Alternatives C1 and C2 result in immediate removal of the heritage bridge, there are options available to mitigate the impact to the heritage value which are discussed further in sections 6 and 7 of this report.

With respect to increased safety of pedestrians and the use of the bridge by farm equipment, Alternatives A and B do not provide any opportunity to incorporate safer conditions for pedestrians or widening or significant strengthening of the structure to permit use by large farm equipment. Alternatives C1 and D provide opportunity to incorporate pedestrian considerations, of which some may provide the required side clearance for wider farm equipment to utilize the bridge when pedestrians are not crossing. Alternative C2 provides the most opportunity for pedestrian consideration and use by large farm equipment simultaneously.

13.2 PREFERRED SOLUTION

Based on the evaluation of the alternative solutions, which considered several technical and ancillary criteria and stakeholder consultation feedback received, the following alternative has been identified as the recommended solution.

- Alternative C2, removing the existing bridge and replacing with a two-lane bridge.

This preferred solution best resolves the problem statement.

13.3 CONFIRMATION OF CLASS EA SCHEDULE

In accordance with the Municipal Class Environmental Assessment Guidelines 2023, the Schedule B guidelines are applicable to both:

- Reconstruction of, or alteration to a structure or the grading adjacent to it when the structure is over 40 years old, the structure is found to have cultural heritage value or interest, and the heritage attributes will be conserved in accordance with the recommendations of a Heritage Impact Assessment.
- Reconstruction of, or alteration to a structure or the grading adjacent to it, when the structure is over 40 years old the structure is found to have cultural heritage value or interest, but heritage attributes will not be conserved in accordance with the recommendations of a Heritage Impact Assessment.

As such, the Schedule B guidelines that have been adopted are appropriate.

14 Conceptual Design

There are various alternative structure types that could be considered for the replacement of the Old Shiloh Road Bridge with a two-lane bridge. To confirm the most appropriate structure to select for the replacement various criteria and constraints need to be considered.

14.1 DESIGN CRITERIA

The existing bridge is founded on piles. With no information on the condition or capacity of these piles, and the cost associated with removing them, it is proposed that the replacement bridge be designed to a slightly longer span to allow a new pile foundation to be installed without conflicting with the existing piles.

As previously discussed in Technical Memorandum No. 1, the existing bridge opening is sufficient to pass the required design storm event flows but does not fully achieve a recommended 1.0 m clearance between the soffit and the design storm high water level. The water levels are largely controlled by backwatering from the nearby downstream dam, and an increase in span does not significantly impact the clearance. To improve the clearance the soffit of the bridge would need to be raised, however raising the road has a negative effect on the upstream water levels during higher design storm events due to increased backwatering from the road embankments prior to overtopping. As such it is important that the new bridge structure type has a shallow depth of superstructure.

In addition to these two constraints, design criteria have been developed based on Town standards, the Canadian Highway Bridge Design Code, MTO Structural Manual, and MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads.

- Road Classification – Collector Rural (Town Official Plan)
- Posted speed – 60 km/hr, design speed 60 km/hr (Town Development Standards)
- AADT – 554, with expectation to increase over a 75-year design life
- $AADT_{10}$ – 675 (2%/yr growth assumed)
- $AADT_{75}$ – 2450 (2%/yr growth assumed)
- Existing Span – 23.5 m clear
- Proposed Span – 26.0 m (25.0 m clear)
- Minimum soffit elevation – 230.29 m
- Minimum Road Width – 3.0 m lanes, 1.0 m shoulders (TAC Geometric Design Guide)

- Existing Pavement Width – 6.0 m
- Minimum Pavement Width – 6.7 m (Town development standards – Rural Road)
- Min longitudinal grade – 0.5%, Max longitudinal grade – 6% (Town development standards)
- Pavement design: 40 mm HL3, 90 mm HL8, 150 mm 19 mm crusher run limestone, 300 mm 50 mm crusher run limestone (Town development standards)
- Minimum Sidewalk Width – 1.5 m

Although there are no existing pedestrian sidewalks or multiuse trails along Old Shiloh Road, there is potential for future active transportation accommodations to be considered for this roadway. Consideration during detailed design to accommodate a future sidewalk or multiuse trail on one side of the bridge should be given to mitigate the risk of the bridge being too narrow to accommodate the future considerations.

14.2 PERMIT REQUIREMENTS

The following permits have been identified as required for proceeding with the bridge replacement:

- A request for project review to the Department of Fisheries and Oceans (DFO)
- Lake Simcoe Region Conservation Authority permit, and regulated feature offsetting/compensation related to minor encroachment into wetlands
- MNRF fish salvage permit will be required prior to any de-watering of stream areas and following any work area flooding
- Town of Georgina Road Occupancy Permit

14.3 ADDITIONAL STUDIES

Prior to finalizing the detailed design and proceeding with construction the following additional studies have been identified for completion:

- Geotechnical investigation
- Heritage Recording and Documentation of Structure
- Tree inventory and Planting Plan
- Bat Habitat Investigation (if tree removal is planned)
- Turtle mitigation (if encountered during construction)
- Nest survey (if vegetation removal between April 1 to Aug 30)

14.4 TWO-LANE BRIDGE REPLACEMENT

Based on the above constraints and criteria, the proposed span exceeds the normal range for a concrete rigid frame structure. To minimize the structure depth to meet the above constraints, an adjacent concrete box girder bridge or truss bridge are considered the most appropriate for this site.

A conceptual plan of an adjacent box girder bridge, PGA-01, is included in Appendix K.

14.5 OPTIONS FOR MITIGATING LOSS OF HERITAGE ATTRIBUTES

The cultural heritage evaluation identified the Old Shiloh Bridge as having heritage value. The heritage impact assessment provided recommendations for consideration to mitigate the impact to the loss of heritage value by removal of the bridge.

14.5.1 Reflection of Bridge Form

One of those options was to commemorate the existing bridge through reflection of the architectural form of the existing bridge in the design of the replacement bridge.

In order to reflect the bridge form, two additional design concepts were considered:

1. Install a new bowstring arch truss. (wood or steel).
2. Install a deck on girder bridge, with a façade of a bowstring arch truss.

Both options will result in additional costs to the project. Conceptual plans for each of these options, PGA-02 and PGA-03, are included in Appendix K.

Both of these options can be implemented with no additional environmental impacts beyond the base replacement option. However, there will be increased financial impact for both, which is discussed further in section 6.6. There will however be some impacts to the road profile related to the installation of a new bowstring arch style structure. The overall structure thickness will be greater than that of the precast box girder design and will require a greater increase to the road profile elevation, introducing a vertical cure and opportunity for negative impacts to upstream water levels during large storm events. The façade option will have no additional impact to the geometry.

14.5.2 Reuse at Alternate Location

An alternate option for retaining the existing bridge and its heritage value that was considered is to reuse the bridge at an alternate site.

The nature of the design, construction, and weight of this cast-in-place concrete structure is not conducive to transporting it to another nearby site. There are risks of damaging the structure associated with lifting and moving it off the waterway, transportation, then installation at its final location. These operations require heavy lift and heavy transportation equipment.

The existing bridge superstructure is approximately 3.9 m high, 6.65 m wide, and 24.4 m long. It weighs approximately 120,300 kg. These dimensions in addition to the weight exceed the limits for single trip permits for oversized loads. Superload permits are required for loads wider than 5 m as well as for gross vehicle weights exceeding 120,000 kg.

To be considered for relocation, a detailed structural evaluation and design for the support and lifting of the bridge would be required, as well as a detailed submission for a superload permit. These are not considered routine and require a thorough project justification submission to be reviewed by the MTO for necessity. In addition, rehabilitation to ensure stability and integrity of the deteriorated structure would be required prior to transportation. There will be an associated cost to rehabilitate the bridge in addition to transport costs. Consideration will also need to be given to the required route and any overhead constraints such as overpasses or hydro lines. Some overhead wires may need to be raised in order to accommodate the load. There is also a risk that once the design is reviewed a permit may not be granted.

Alternatively, a portion of the bridge could be removed from the rest of the structure to reduce the complexity and overall weight and size of the relocation. Two possible locations were considered by the Town for the location:

- Pioneer Village
- Local Park

Pioneer Village is run by the Georgina Historical Society, and is dedicated to the collection, preservation, and promotion of the heritage associated with the early pioneer times of Upper Canada. Although this would be a good location for the public to view the bridge or parts of the bridge as a heritage piece, the bridge was built in 1925 and does not align with the pioneer times heritage promoted by the Pioneer Village.

Udora Hall and Park is located in the general area of the bridge and would be a good place to preserve the memory of the bridge for the local residents of Udora who have expressed their love for the bridge. It is also quite close to the bridge site and would reduce the transportation route and associated potential fees to move parts of the bridge. The area is small and there is no need for a 24 m long bridge crossing. A portion of the bridge could however be commemorated in the park.

There will also be environmental impacts associated with any new site where the bridge would be installed. Many of these impacts would be temporary and are expected to be able to be mitigated with best construction practices, but a detailed review would be required once a site was chosen to confirm the specific impacts and mitigation measures required.

14.5.3 Heritage Commemoration

An alternate option provided in the Heritage Impact Assessment is to remember the existing bridge and heritage with a commemorative monument, memorial, or art installation.

This would be a more economical approach, as well as eliminate the introduction of additional environmental impacts. As there are many options that could be considered for an appropriate commemoration, a local committee could be created with a mandate to review and evaluate commemoration options and locations. This will allow the opportunity for further consultation with members of the public who have expressed their love for the existing bridge to contribute their ideas. It will also provide the Town the opportunity to set a budget for the heritage commemoration that is appropriate to the site, community, and does not impose as great an impact to the taxpayers of the Town of Georgina as the other options.

14.6 CLASS ‘C’ COST ESTIMATE

Based on the recommended replacement option of a concrete deck on adjacent box girder bridge, the estimated probable construction cost is $4.9M. The estimated costs are considered preliminary and do not include any allowances for inclusion of heritage attributes, and without geotechnical information some assumptions have been made regarding the foundations.

To install a new steel arched truss bridge, it is estimated that it will increase the construction cost by $1.5M. It will also have a slightly increased maintenance cost over the life of the bridge as it will require periodic cleaning and recoating of the structural steel to achieve the full design service life. Although weathering steel could be considered to reduce the need for recoating, it is not ideal for colour matching the existing bridge to best recreate the aesthetic and is more prone to deterioration due to salt spray.

Installation of a façade of a truss on a deck on girder bridge is expected to increase costs in the order of $0.75M and will also require periodic cleaning and recoating to maintain the façade. Deterioration of the façade would not affect the structural integrity of the bridge, however, it would still require maintenance.

These costs are based on historical tender pricing, and it is recommended that a 15-30% contingency value be carried in the budget to account for the preliminary nature of the conceptual design and the recent volatility in construction pricing and inflation.

For budgeting purposes, it is also recommended that an additional 10-15% be budgeted to cover the costs for detailed design as well as contract administration and construction inspection.

Table 7: Probable Costs of Various Options

ALTERNATIVE	COST OF HERITAGE COMMEMORATION	ESTIMATED COST
Deck on Precast Concrete Girder Configuration (Base Option – PGA-01)	N/A	$4,900,000
Arched Truss Structure (PGA-02)	$1,500,000	$6,400,000
Truss Façade added to Deck on Girder Bridge (PGA-03)	$750,000	$5,650,000
Reuse of the Existing Bridge at an Alternate Site	$500,000[1]	$5,400,000
Relocation of a Portion of the Existing Bridge to an Alternate Site	$100,000[1]	$5,050,000
Heritage Commemoration	TBD	$4,900,000+

1. Actual costs will vary based on required rehabilitation to suit the moving company's requirements, permit fees, temporary work along the chosen route, distance to the final chosen location.

In addition to the capital costs noted above, there will also be increased maintenance costs associated with the arched truss, truss façade, and reuse of the existing bridge options. The highest of these costs will be associated with reuse of the existing bridge.

The cost of a new arched truss bridge resulting in an almost 25% increase in the capital cost as well as an increase in maintenance costs. The installation of an arched truss façade mounted to the sides results in an increase of 15% to the capital cost as well as increased maintenance costs.

Relocation costs of reusing the truss or portions of the truss are very high level and will change based on the final relocation design and where the bridge is relocated to. They carry the highest risk having the greatest potential for the costs to increase significantly during the planning as well as following the move if any repairs are required to the structure or to an infrastructure that may be damaged along the route.

14.7 RECOMMENDATION

The preferred alternative is to remove and replace the existing bridge with a two-lane bridge. To minimize the structure depth to best suit the hydraulics, and in consideration of the economic impacts, an adjacent concrete box girder bridge is considered the most appropriate for this site.

Removal and replacement of the bridge will result in impacts to the identified heritage elements associated with the existing bridge. While there are various options to mitigate these impacts which have been discussed above, many of them result in significant financial impacts to the Town and ultimately the taxpayers. Construction of a bridge which reflects the architectural form of the existing bridge carries a significant cost with ongoing maintenance requirements imposed on the Town and while it will provide visual similarity, the historic charm of the single lane concrete bowstring bridge cannot be fully replicated while meeting current design standards and providing increased safety needs for pedestrians.

There is a significant risk to the Town associated with moving the existing structure both in liability for damages to other infrastructure as well as financial risk associated with permitting and design of the relocation. As the need for this large of a bridge at another locale within the Town has not been specifically identified, the cost and risk is not offset in savings against the acquisition of a new purpose built structure. It will also require a location with significant space to accommodate the installation.

Based on the options reviewed for mitigating the loss of heritage value through replacement of the bridge, it is recommended that the Town form a committee to develop a heritage commemoration monument, memorial, or art installation, including the type and location for the installation which will provide the best value to the community.

15 Next Steps

In order to complete the Municipal Class Environmental Assessment process, the following steps remain to be completed:

TASK	TIMING
Finalize Project File	February 2024
Issue Notice of Study Completion and make the Project File available for public and agency review and comment for a 30-day period	March - April 2024

Following the completion of the Municipal Class Environmental Assessment, the following steps remain to complete the project.

TASK	TIMING
Procurement	May - June 2024
Additional Investigations	Summer 2024
Detailed Design	Fall / Winter 2024
Obtaining Permits	Winter 2024
Tendering	February 2025
Constructing the Chosen Alternative	Summer / Fall 2025

Appendix A: Photo Inventory

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PRIVATE PROPERTY
NO TRESPASSING
VIOLATORS WILL BE PROSECUTED

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THESE PREMISES
UNDER VIDEO
SURVEILLANCE
10064
Cedar Park
PRIVATE
PRIVATE PROPERTY
NO
TRESPASSING

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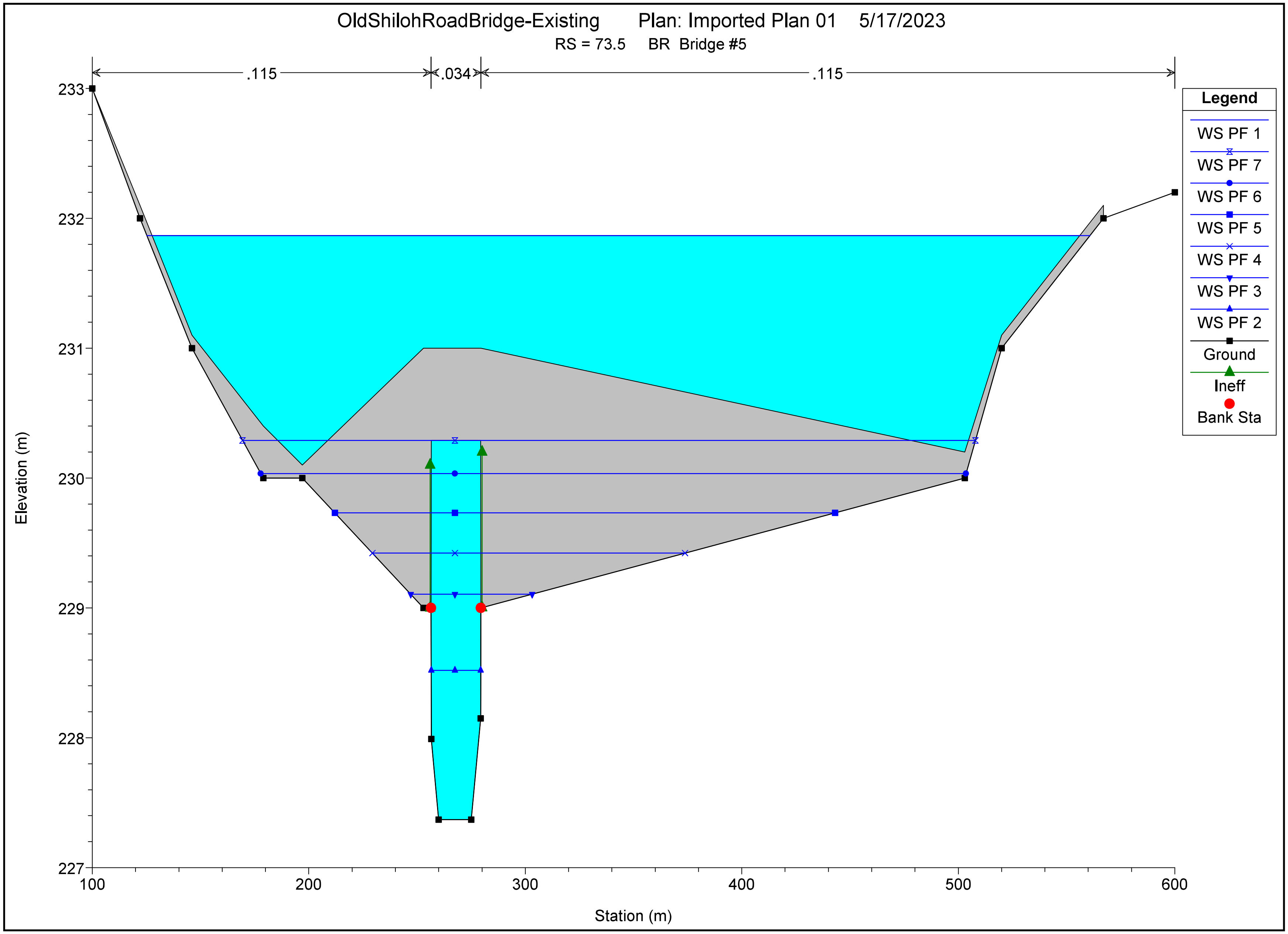
Appendix B:
Hydraulic Assessment Data

	Bridge Attributes				Results					
Scenario	Bridge Thickness (mm)	Span (m)	Road Width (m)	Lowest Bridge Soffit Elevation	Design Flood Frequency	1:50-Year WL at Bridge	Regional WL at Bridge	Regional WL 170 m Upstream	Regional WL 500 m Upstream	1:50-year Storm Clearance (m)
Existing Conditions	700	23.5	6.3	230.29 m	1:50	230.03 m	231.86 m	231.92 m	232.03 m	0.26
Keep bridge, widen span	700	36	6.3	230.29 m	1:50		231.9 m	231.93 m	232.04 m	0.17
Replace bridge with **one lane** truss, same soffit elevation	900	23.5	6.3	230.29 m	1:50	230.03 m	231.86 m	231.92 m	232.03 m	0.26
Replace bridge with **two lane** truss, same soffit elevation	900	23.5	12	230.29 m	1:50	230.04 m	231.87 m	231.93 m	232.04 m	0.25
Replace bridge with **one lane** truss, raise soffit to achieve clearance	900	23.5	6.3	231.03 m	1:50	230.03 m	231.89 m	231.95 m	232.06 m	1.00
Replace bridge with **two lane** truss, raise soffit to achieve clearance	900	23.5	12	231.04 m	1:50	230.04 m	231.91 m	231.96 m	232.07 m	1.00
Replace bridge with **one lane** truss, raise soffit to achieve clearance, widen the span	900	33	6.3	231.04 m	1:50	230.04 m	231.90 m	231.95 m	232.06 m	1.00
Replace bridge with **two lane** truss, raise soffit to achieve clearance, widen the span	900	33	12	231.04 m	1:50	230.04 m	231.91 m	231.96 m	232.07 m	1.00
Replace bridge with **two lane** adjacent box girder bridge, same soffit elevation	1050	26	12	230.29	1:50	230.04 m	231.87 m	231.93 m	232.04 m	0.25
Replace bridge with **two lane** adjacent box girder bridge, lower soffit elevation	1050	26	12	230.14	1:50	230.04 m	231.87 m	231.93 m	232.04 m	0.10

represents change from existing



OldShilohRoadBridge-Existing Plan: Imported Plan 01 5/17/2023
RS = 73.5 BR Bridge #5
.115
.034
.115
Legend
WS PF 1
WS PF 7
WS PF 6
WS PF 5
WS PF 4
WS PF 3
WS PF 2
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
233
232
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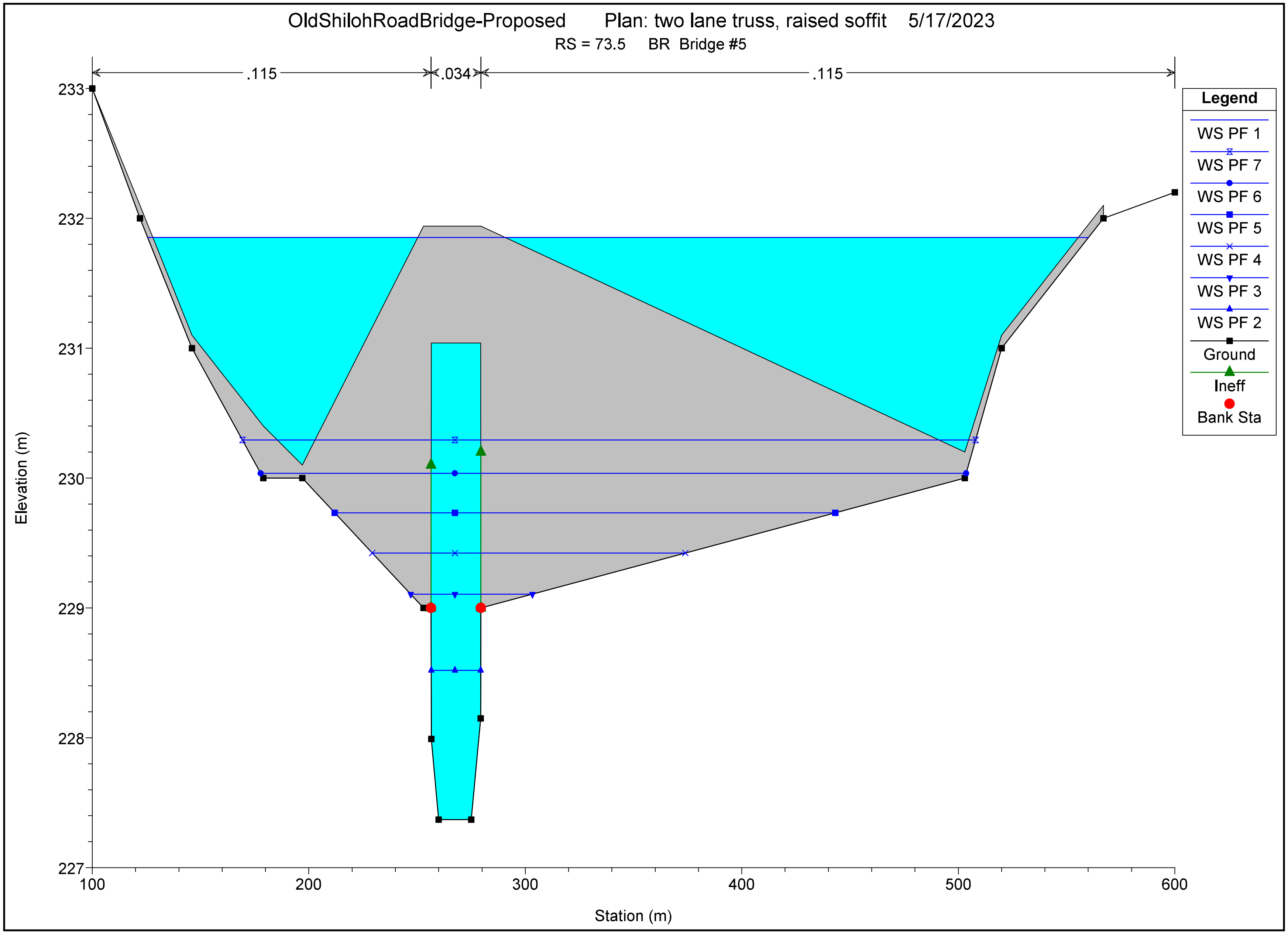

OldShilohRoadBridge-Proposed Plan: two lane truss, raised soffit 5/17/2023
RS = 73.5 BR Bridge #5
.115
.034
.115
Legend
WS PF 1
WS PF 7
WS PF 6
WS PF 5
WS PF 4
WS PF 3
WS PF 2
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Elevation (m)
233
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200
300
400
500
600
Station (m)

Appendix C: Notice of Study Commencement

26557 Civic Centre Rd.
Keswick, Ontario L4P 3G1
905-476-4301

GEORGINA

Operations and Infrastructure

Old Shiloh Bridge Assessment
Municipal Class Environmental Assessment Study
Notice of study commencement

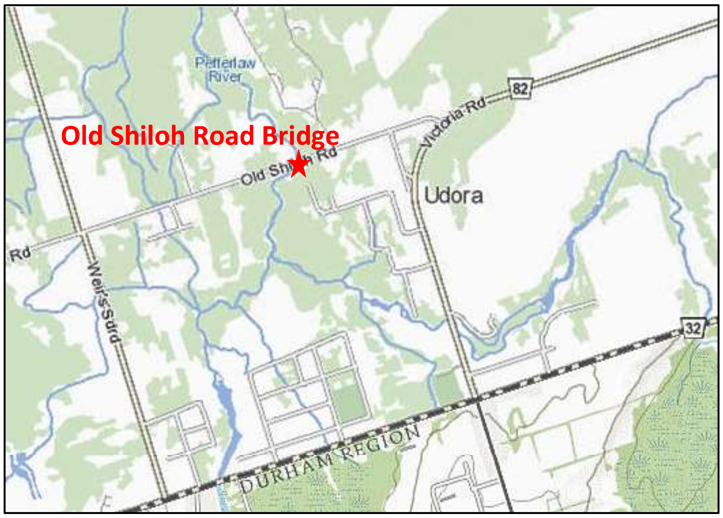
Background

The Town of Georgina has retained Tatham Engineering Limited to complete a Municipal Class Environmental Assessment (Class EA Study) under the Environmental Assessment Act (R.S.O. 1990, c. E.18) to determine the preferred method of improvement to Old Shiloh Bridge East. The goal is to determine the recommended alternative for the future of the structure and alternatives for the water crossing at Old Shiloh Road. The bridge is located on Old Shiloh Road approximately 750 m west of Victoria Road, in the Hamlet of Udora.

Study Process

This study is being completed as a Schedule 'B' project as outlined in the Municipal Engineers Association Municipal Class Environmental Assessment document. The Class EA Study will address the following:

- The ability to convey water flow at the bridge.
- The location, extent and sensitivity of the existing environments within the area.
- Alternative solutions to address the bridge needs.
- Potential impacts of each alternative to the noted environments and possible mitigation measures.
- Public and agency consultation and participation.
- An assessment and evaluation of the alternatives culminating in a preferred solution.



Consultation

Members of the public, agencies, Indigenous communities and other interested persons are encouraged to actively participate in the planning of this study by contacting staff directly with information, comments or questions. There will be a Public Information Centre (PIC) at a later date once further information is available. Details regarding the date and format of the PIC will be forwarded to those on the project mailing list, and posted on the Town's website at georgina.ca/**OldShilohBridge**

Project Contacts

If you would like to be added to or removed from our project mailing list or have project-related questions, contact the Town and/or consultant as noted below:

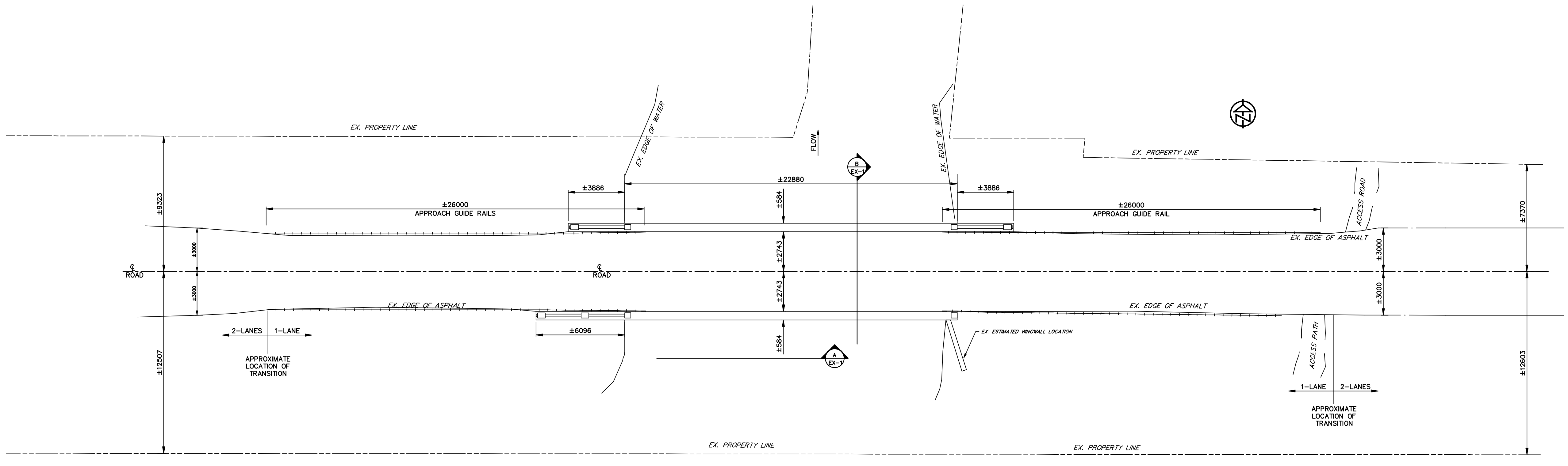
Town
Ryan Post
Project Manager
Operations and Infrastructure
rpost@georgina.ca
905-476-4305, ext. 2429

Consultant
Emma Wilkinson, H.B.A., B.E.Sc., P.Eng.
Project Manager
Tatham Engineering Limited
ewilkinson@tathameng.com
705-444-2565, ext. 2101

All personal information included in a submission, such as name, address, telephone number and property location, is collected, maintained and disclosed for the purpose of transparency and consultation. The information is collected under the authority of the Environmental Assessment Act or is collected and maintained for the purpose of creating a record that is available to the general public as described in s.37 of the Freedom of Information and Protection of Privacy Act. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

TYPE	COMPANY	DEPARTMENT
Agency	Ministry of the Environment Conservation & Parks	Central Region
Agency	Ministry of the Environment Conservation & Parks	York Durham District Office
Agency	Ministry of Tourism, Culture & Sport	401 Bay Street
Agency	Ministry of Natural Resources & Forestry	Aurora District Office
Agency	Ministry of Municipal Affairs and Housing	Central Municipal Services Office
Agency	Ministry of Agriculture, Food and Rural Affairs	Environmental Management
Agency	Ministry of Agriculture, Food and Rural Affairs	Land Use Policy & Stewardship
Agency	Lake Simcoe Region Conservation Authority	120 Bayview Parkway
Agency (Federal)	Environment & Climate Change Canada	
Agency (Federal)	Fisheries & Oceans Canada	Canada Centre for Inland Waters
Municipal	Police	York Regional Police Services
Municipal	Fire and Emergency Services	Keswick Fire Hall
Municipal	Town of Georgina	Georgina Heritage Advisory Committee
Regional	York Region Administrative Centre	Transportation Department
School Board	York Region District School Board	The Education Centre -Aurora
School Board	York Catholic District School Board	
Utility	Bell Canada	
Utility	Rogers Cable Systems	
Utility	Hydro One	Subdivision Group
Utility	Enbridge Gas Distribution Inc.	
First Nations Community	Métis Nation of Ontario	Head Office
First Nations Community	Métis Nation of Ontario	Great Lakes Métis Council
First Nations Community	Chippewas of Nawash Unceded First Nation	
First Nations Community	Saugeen First Nation	
First Nations Community	Saugeen Ojibway Nation	Environment Office
First Nations Community	Historic Saugeen Métis	
First Nations Community	Chippewas of Georgina Island	Georgina Island Administration Office
First Nations Community	Beausoliel First Nation (Christian Island)	
First Nations Community	Georgian Bay Metis Council	
First Nations Community	Chippewas of Rama First Nation	Lands and Membership Department
First Nations Community	Metis Nation of Ontario	Lands and Resources Dept
First Nations Community	Metis Nation of Ontario	
First Nations Community	Alderville First Nation	
First Nations Community	Curve Lake First Nation	
First Nations Community	Hiawatha First Nation	
First Nations Community	Mississaugas of Scugog Island First Nation	
First Nations Community	Huronne-Wendat	

Appendix D: Existing Site Plan



PLAN
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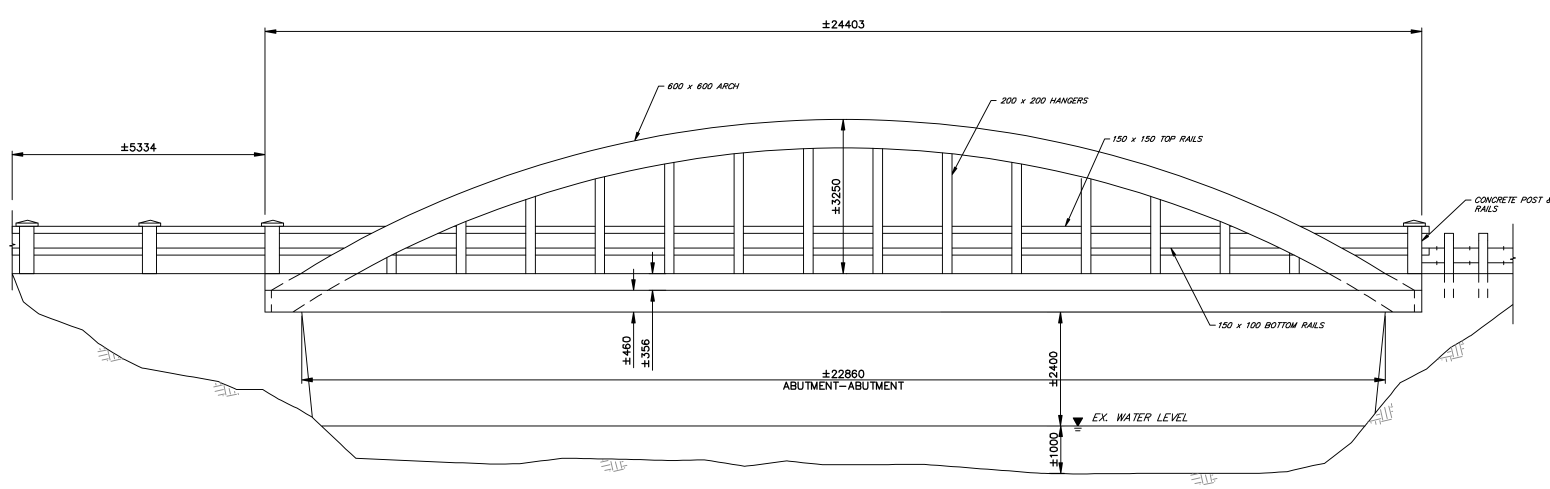

A EX-1 ELEVATION
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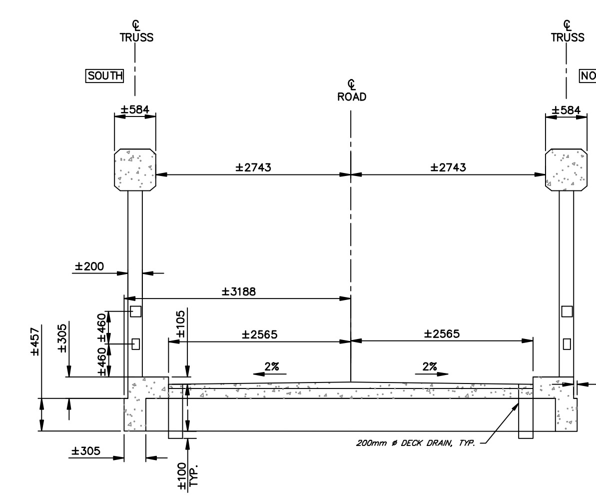

B EX-1 DECK SECTION
1:50

NOTES:

1. THIS DRAWING WAS PREPARED BASED ON THE ORIGINAL DRAWINGS (JUNE–1925) AND REHABILITATION DRAWINGS (JULY–1988), PROVIDED BY THE TOWN OF GEORGINA.
2. THE PROPERTY LINES WERE OBTAINED FROM YORK REGION–GIS MAPS AND ARE REPRESENTATIVE ONLY.
3. THE ROADWAY TRANSITIONS FROM 2–LANE ON THE APPROACHES TO 1–LANE ACROSS THE BRIDGE.

BENCHMARKS

TBM–1: NAIL SPIKE IN HYDRO POLE ON NW CORNER OF TOWN WATER PUMPING PROPERTY (181.70M)

TBM–2: TOP OF NORTHWESTERN BOLT ON "MEAFORD FACTORY OUTLET" SIGN AT INTERSECTION OF N SYKES ST & COOK ST. (182.37M)

TBM–3: UNCLASSIFIED BENCHMARK TABLET IN SIDE OF NORTH FACE, WEST END OF CULVERT BRIDGE – UNKNOWN ON THE COSINE NETWORK DATABASE (181.53M)

NOTES

No.	REVISION DESCRIPTION	DATE
1.	BASE PLAN	JAN./23

ENGINEER STAMP

GEORGINA OLD SHILOH BRIDGE
TOWN OF GEORGINA

EXISTING SITE PLAN

TATHAM ENGINEERING

DESIGN: BJW	FILE: 122279	DWG:
DRAWN: ASM	DATE: JAN. 2023	EX-1
CHECK: BJW	SCALE: AS SHOWN	

Drawing Name: 122279-EX01.dwg, Plotted: Jan 10, 2023

Appendix E:
Stage 1 Archaeological Assessment

DRAFT: 12 DECEMBER 2023

STAGE 1 ARCHAEOLOGICAL BACKGROUND STUDY

1925 Concrete Single Span Bowstring Arch Bridge B4, a.k.a. Old Shiloh Bridge East, carrying Old Shiloh Road over Pefferlaw Brook, 750 meters west of Victoria Road in the Hamlet of Udora, Part of Lot 20, Concession 1 & 2 (Geographic Township of Georgina, County of York), Town of Georgina, Regional Municipality of York (AMICK Corporate File #: 2022-984/ MCM File #: P058-2273-2022)

SUBMITTED TO:
Ontario Ministry of Citizenship and Multiculturalism
(MCM)

SUBMITTED BY:
AMICK Consultants Limited
Phone: (519) 432-4435
Email: mhenry@amick.ca
www.amick.ca

LICENSEE:
Michael B. Henry CD BA FRAI FRSA (P058)

MCM NUMBER: P058-2273-2022

CORPORATE PROJECT NUMBER: 2022-984

DRAFT: 12 DECEMBER 2023

TABLE OF CONTENTS

PROJECT PERSONNEL

AMICK CONSULTANTS LIMITED PARTNERS
Michael Henry (MCM Professional Archaeologist Licence #P058)
Marilyn Cornies (MCM Professional Archaeologist Licence #P038)

AMICK CONSULTANTS LIMITED BUSINESS MANAGER
Melissa Maclean BBA

PROJECT COORDINATOR
Marilyn Cornies (MCM Professional Archaeologist Licence #P038)

PROJECT LICENSEE ARCHAEOLOGIST
Michael Henry (MCM Professional Archaeologist Licence #P058)

PROJECT REPORT PREPARATION & GRAPHICS
Olivia Vieira

EXECUTIVE SUMMARY

This report describes the results of the 2023 Stage 1 Archaeological Background Study of 1925 Concrete Single Span Bowstring Arch Bridge B4, a.k.a. Old Shiloh Bridge East, carrying Old Shiloh Road over Pefferlaw Brook, 750 meters west of Victoria Road in the Hamlet of Udora, Part of Lot 20, Concession 1 & 2 (Geographic Township of Georgina, County of York), Town of Georgina, Regional Municipality of York, conducted by AMICK Consultants Limited. This assessment was undertaken as a requirement under the Environmental Assessment Act (RSO 1990) and was conducted under Professional Archaeologist License #P058 issued to Michael Henry by the Minister of Citizenship and Multiculturalism (MCM) for the Province of Ontario. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011) and the Ontario Heritage Act (RSO 1990a).

The entirety of the study area is approximately 0.06 hectares (ha) in area and includes within it 1925 Old Shiloh Bridge and Old Shiloh Road. The study area is bounded on the north by the Pefferlaw Brook and meadow, on the east by Old Shiloh Road, on the south by the Pefferlaw Brook and wetland, and on the west by Old Shiloh Road. AMICK Consultants Limited was engaged by the proponent to undertake a Stage 1 Background Study of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological fieldwork. Following the criteria outlined by MTC (2011) for determining archaeological potential, portions of the study area were determined as having archaeological potential for Pre-contact and Post-contact archaeological resources. Consequently, this report is being prepared in advance of the planning process for this property.

The entirety of the study area was subject to a desktop Stage 1 Archaeological Background Study on 11 January 2023. A property inspection and photographic documentation of the study area was completed on 27 November 2023. All records, documentation, field notes, photographs, and artifacts (as applicable) related to the conduct and findings of these investigations are held at the corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the MCM on behalf of the government and citizens of Ontario.

The study area has been identified as a property that exhibits potential to yield archaeological deposits of cultural heritage value or interest (CHVI). The objectives of the Stage 1 Background Study have therefore been met and in accordance with the results of this investigation, the following recommendations are made:

1. *Due to previous extensive subsurface disturbances and presence of steep slope throughout the entirety of the study area, the proposed undertaking no longer retains potential for archaeological resources.*
2. *No further archaeological assessment of the study area is warranted.*
3. *The Provincial interest with respect to archaeological resources within the limits of the study area has been addressed.*

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

This report describes the results of the 2023 Stage 1 Archaeological Background Study of 1925 Concrete Single Span Bowstring Arch Bridge B4, a.k.a. Old Shiloh Bridge East, carrying Old Shiloh Road over Pefferlaw Brook, 750 meters west of Victoria Road in the Hamlet of Udora, Part of Lot 20, Concession 1 & 2 (Geographic Township of Georgina, County of York), Town of Georgina, Regional Municipality of York, conducted by AMICK Consultants Limited. This assessment was undertaken as a requirement under the Environmental Assessment Act (RSO 1990) and was conducted under Professional Archaeologist License #P058 issued to Michael Henry by the Minister of Citizenship and Multiculturalism (MCM) for the Province of Ontario. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011) and the Ontario Heritage Act (RSO 1990a).

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The proposed development of the study area includes the replacement of the 1925 concrete single span bowstring arch bridge B4, a.k.a. Old Shiloh Bridge East. Three draft concepts for the replacement has been submitted with this report for MCM to review and appended to this report as Maps 4 – 6.

1.2 Historical Context

1.2.1 Pre-Contact Land-Use Outline

Table 1 illustrates the chronological development of cultures within southern Ontario prior to the arrival of European cultures to the area at the beginning of the 17th century. This general cultural outline is based on archaeological data and represents a synthesis and summary of research over a long period of time. It is necessarily generalizing and is not necessarily representative of the point of view of all researchers or stakeholders. It is offered here as a rough guideline and as a very broad outline to illustrate the relationships of broad cultural groups and time periods.

Table 1 Pre-contact Cultural Chronology for Southern Ontario

Years Ago	Period	Southern Ontario
250	Terminal Woodland	Ontario and St. Lawrence Iroquois Cultures
1000 2000	Initial Woodland	Princess Point, Saugeen, Point Peninsula, and Meadowood Cultures
3000 4000 5000 6000	Archaic	Laurentian Culture
7000 8000 9000 10000 11000	Palaeo-Indian	Plano and Clovis Cultures
		(Wright 1972)

What follows is an outline of Aboriginal occupation in the area during the Pre-Contact Era from the earliest known period, about 9000 B.C. up to approximately 1650 AD.

1.2.1.1 Paleo-Indian Period (approximately 9000-7500 B.C.)

North of Lake Ontario, evidence suggests that early occupation began around 9000 B.C. People probably began to move into this area as the glaciers retreated and glacial lake levels began to recede. The early occupation of the area probably occurred in conjunction with environmental conditions that would be comparable to modern Sub-Arctic conditions. Due to the great antiquity of these sites, and the relatively small populations likely involved, evidence of these early inhabitants is sparse and generally limited to tools produced from stone or to by-products of the manufacture of these implements.

1.2.1.2 Archaic Period (approximately 8000-1000 B.C.)

By about 8000 B.C. the gradual transition from a post glacial tundra-like environment to an essentially modern environment was largely complete. Prior to European clearance of the landscape for timber and cultivation, the area was characterized by forest. The Archaic Period is the longest and the most apparently stable of the cultural periods identified through archaeology. The Archaic Period is divided into the Early, Middle and Late Sub-Periods, each represented by specific styles in projectile point manufacture. Many more sites of this period are found throughout Ontario, than of the Palaeo-Indian Period. This is probably a reflection of two factors: the longer period of time reflected in these sites, and a greater population density. The greater population was likely the result of a more diversified subsistence strategy carried out in an environment offering a greater variety of abundant resources (Smith 2002:58-59).

Current interpretations suggest that the Archaic Period populations followed a seasonal cycle of resource exploitation. Although similar in concept to the practices speculated for the big game hunters of the Palaeo-Indian Period, the Archaic populations utilized a much broader range of resources, particularly with respect to plants. It is suggested that in the spring and early summer, bands would gather at the mouths of rivers and at rapids to take advantage of fish spawning runs. Later in the summer and into the fall season, smaller groups would move to areas of wetlands to harvest nuts and wild rice. During the winter, they would break into yet smaller groups probably based on the nuclear family and perhaps some additional relatives to move into the interior for hunting. The result of such practices would be to create a distribution of sites across much of the landscape (Smith 2002: 59-60).

The material culture of this period is much more extensive than that of the Palaeo-Indians. Stylistic changes between Sub-Periods and cultural groups are apparent, although the overall quality in production of chipped lithic tools seems to decline. This period sees the introduction of ground stone technology in the form of celts (axes and adzes), manos and metates for grinding nuts and fibres, and decorative items like gorgets, pendants, birdstones, and bannerstones. Bone tools are also evident from this time period. Their presence may be a result of better preservation from these more recent sites rather than a lack of such items in earlier occupations. In addition, copper and exotic chert types appear during the period and are indicative of extensive trading (Smith 2002: 58-59).

1.2.1.3 Woodland Period (approximately 1000 B.C.-1650 A.D.)

The primary difference in archaeological assemblages that differentiates the beginning of the Woodland Period from the Archaic Period is the introduction of ceramics to Ontario populations. This division is probably not a reflection of any substantive cultural changes, as the earliest sites of this period seem to be in all other respects a continuation of the Archaic mode of life with ceramics added as a novel technology. The seasonally based system of resource exploitation and associated population mobility persists for at least 1500 years into the Woodland Period (Smith 2002: 61-62).

The Early Woodland Sub-Period dates from about 1000-400 B.C. Many of the artifacts from this time are similar to the late Archaic and suggest a direct cultural continuity between these two temporal divisions. The introduction of pottery represents an entirely new technology that was probably acquired through contact with more southerly populations from which it likely originates (Smith 2002:62).

The Middle Woodland Sub-Period dates from about 400 B.C.-800 A.D. Within the region including the study area, a complex emerged at this time termed “Point Peninsula.” Point Peninsula pottery reflects a greater sophistication in pottery manufacture compared with the earlier industry. The paste and temper of the new pottery is finer and new decorative techniques such as dentate and pseudo-scallop stamping appear. There is a noted Hopewellian influence in southern Ontario populations at this time. Hopewell influences from south of the Great Lakes include a widespread trade in exotic materials and the presence of distinct Hopewell style artifacts such as platform pipes, copper or silver panpipe covers and shark teeth. The populations of the Middle Woodland participated in a trade network that extended well beyond the Great Lakes Region.

The Late Woodland Sub-Period dates from about 500-1650 A.D. The Late Woodland includes four separate phases: Princess Point, Early Ontario Iroquoian, Middle Ontario Iroquoian, and Late Ontario Iroquoian.

The Princess Point phase dates to approximately 500-1000 A.D. Pottery of this phase is distinguished from earlier technology in that it is produced by the paddle method instead of coil and the decoration is characterized by the cord wrapped stick technique. Ceramic smoking pipes appear at this time in noticeable quantities. Princess Point sites cluster along major stream valleys and wetland areas. Maize cultivation is introduced by these people to Ontario. These people were not fully committed to horticulture and seemed to be experimenting with maize production. They generally adhere to the seasonal pattern of occupation practiced by earlier occupations, perhaps staying at certain locales repeatedly and for a larger portion of each year (Smith 2002: 65-66).

The Early Ontario Iroquoian stage dates to approximately 950-1050 A.D. This stage marks the beginning of a cultural development that led to the historically documented Ontario Iroquoian groups that were first contacted by Europeans during the early 1600s (Petun, Neutral, and Huron). At this stage formal semi-sedentary villages emerge. The Early stage of this cultural development is divided into two cultural groups in southern Ontario. The areas occupied by each being roughly divided by the Niagara Escarpment. To the west were located the Glen Meyer populations, and to the east were situated the Pickering people (Smith 2002: 67).

The Middle Ontario Iroquoian stage dates to approximately 1300-1400 A.D. This stage is divided into two sub-stages. The first is the Uren sub-stage lasting from approximately 1300-1350 A.D. The second of the two sub-stages is known as the Middleport sub-stage lasting from roughly 1350-1400 A.D. Villages tend to be larger throughout this stage than formerly (Smith 2002: 67).

The Late Ontario Iroquoian stage dates to approximately 1400-1650 A.D. During this time the cultural divisions identified by early European explorers are under development and the geographic distribution of these groups within southern Ontario begins to be defined.

1.2.2 Post-Contact Land Use Outline

York County's boundaries were originally from Lake Ontario to Lake Simcoe, until 1834. The County of York was originally comprised of ten townships and the Town of York (now Toronto) until Toronto separated and incorporated in 1834 (Town of Whitchurch-Stouffville 2010).

The present-day Town of Georgina was created through the amalgamation of the Township of Georgina and the Township of North Gwillimbury in 1971. The largest of the communities now within the Town of Georgina are Keswick and Sutton. Keswick was once known as Medina and is the largest urban community within the Town of Georgina. It was originally a village in the Township of North Gwillimbury before amalgamation with Sutton to form the Town of Georgina. Sutton was originally a mill site named Bouchier Mills in honour of the builder of the dam on the Black River which was constructed in 1831. In 1864 the village name was changed to Sutton (Town of Georgina 2012).

Map 2 is a facsimile segment from Tremaine's Map of the County of Peel (Tremaine 1860). Map 2 illustrates the location of the study area and environs as of 1860. The study area is shown to belong to Jacob Shier to the north as well as L. Thomas & J H Ferry to the south; structures are shown in the study area. In addition, this map illustrates a stream channel from a river named Black River as crossing through the study area from north to south and a settlement road is depicted as crossing through the study area from east to west. This road is the current Old Shiloh Road, and the stream channel is a tributary stream of the Pefferlaw River, named Pefferlaw Brook.

Map 3 is a facsimile segment from Illustrated Historical Atlas of the County of York and the Township of West Gwillimbury & Town of Bradford in the County of Simcoe, Ont. (Miles & Co. 1878). Map 3 illustrates the location of the study area and environs as of 1878. The study area is shown to belong to Tho. Sampley to the north as well as W. Graham; no structures are shown to be in the study area, though there are four houses and an orchard in close proximity. In addition, this map illustrates an unnamed stream channel crossing through the study area from north to south and a settlement road is depicted as crossing through the study area from east to west. This road is the current Old Shiloh Road, and the stream channel is a tributary stream of the Pefferlaw River, named Pefferlaw Brook.

Three draft concept plan options for the replacement of the bridge are included within this report as Maps 4 – 6. Current conditions encountered during the Stage 1 Background Study are illustrated in Maps 7 – 10.

1.2.3 Summary of Historical Context

The brief overview of readily available documentary evidence indicates that the study area is situated within an area that was close to historic transportation routes and in an area well populated during the nineteenth century and therefore has potential for sites relating to early Post-contact settlement in the region. However, it also appears that while the area was moving toward urban development by the fourth quarter of the 19th century, it was still predominantly rural in character and the likelihood of locating significant Post-contact archaeological deposits of cultural heritage value or interest (CHVI) on a very small parcel of the original township lot is not likely. Background research indicates the property has potential for significant archaeological resources of Native origins based on proximity to a natural source of potable water in the past.

1.3 ARCHAEOLOGICAL CONTEXT

The study area is located near Udora and York Regional Forest and is bounded on the north by the Pefferlaw Brook and meadow, on the east by Old Shiloh Road, on the south by the Pefferlaw Brook and wetland, and on the west by Old Shiloh Road.

The 1925 Old Shiloh Bridge is present within the study area, which heavily impacts the majority of the study area. The remainder of the study area consists of steep slope.

1.3.1 PHYSIOGRAPHIC REGION

The study area is situated within the Simcoe Lowlands physiographic region (Chapman and Putnam 1984:177-182). For the most part, at one time, this restricted basin was part of the floor of glacial Lake Algonquin, and its surface beds are deposits of deltaic and lacustrine origin, and not glacial outwash. As a small basin shut in by the Edenvale Moraine, the Minesing flats represent an annex of the glacial Lake Nipissing plains. (Chapman and Putnam 1984: 177-182).

The lowlands bordering Georgian Bay and Lake Simcoe may be termed the Simcoe lowlands. Together they cover an area of about 1,100 square miles. They fall naturally into two major divisions separated by the uplands of Simcoe County. To the west are the plains draining into Nottawasaga Bay mostly by way of the Nottawasaga River. This area is called the Nottawasaga basin. To the east is the lowland surrounding Lake Simcoe, referred to as the Lake Simcoe basin. These two basins are connected at Barrie by a flat-floored valley and by similar valleys among the upland plateaux farther north. Both the lowlands and transverse valleys were flooded by Lake Algonquin and are bordered by shorecliffs, beaches, and bouldery terraces. Thus, they are floored by sand, silt, and clay.

The study area is on Trenton-Black River bedrock, which is a limestone and dolostone formation. The soils are characterized by mainly imperfectly drained Tecumseth sandy loam. It is a sandy soil with good drainage. (Hoffman and Richards 1955).

1.3.2 SURFACE WATER & VEGETATION

The Pefferlaw Brook passes from north to south through the center of the study area. The Pefferlaw River comes from Simcoe Lake and has many tributary stream channels. The river can be seen in Map 1. The vegetation that can be seen in this area is typical of low-lying wetlands, which can be seen around the study area.

1.3.3 Lithic Sources

The study area is located near the Upper Bobcaygeon Formation which has outcrops of Balsam Lake chert. Balsam Lake is a member of the Middle Ordovician Upper Bobcaygeon and is found in beds in central Ontario near the Trent-Severn waterway (Armstrong 2018: 74). Balsam Lake chert is distinguished by its bluish grey colour wherein fossils are more visible due to quartz replacement (Eley and von Bitter 1989: 24), although its appearance varies between outcroppings to include light to medium grey tones and finer textures.

The closest known outcrops of Balsam Lake are located approximately 45 kilometers northeast of the study area. There are unknown outcrops located approximately 40 kilometers northeast of the study area as well.

1.3.4 Registered Archaeological Sites

The Archaeological Sites Database administered by the MCM indicates that there are two (2) previously documented sites within one kilometre of the study area. However, it must be noted that this assumes the accuracy of information compiled from numerous researchers using different methodologies over many years. AMICK Consultants Limited assumes no responsibility for the accuracy of site descriptions, interpretations such as cultural affiliation, or location information derived from the Archaeological Sites Database administered by MCM. In addition, it must also be noted that a lack of formerly documented sites does not indicate that there are no sites present as the documentation of any archaeological site is contingent upon prior research having been conducted within the study area.

1.3.4.1 Pre-contact Registered Sites

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MCM. As a result, it was determined that two (2) archaeological sites relating directly to Pre-contact habitation/activity had been formally registered within the immediate vicinity of the study area. However, the lack of formally documented archaeological sites does not mean that Pre-contact people did not use the area; it more likely reflects a lack of systematic archaeological research in the immediate vicinity. Even in cases where one or more assessments may have been conducted in close proximity to a proposed landscape alteration, an extensive area of physical archaeological assessment coverage is required throughout the region to produce a representative sample of all potentially available archaeological data in order to provide any meaningful evidence to construct a pattern of land use and settlement in the past. All previously registered Pre-contact sites are briefly described below in Table 2:

TABLE 2 PRE-CONTACT SITES WITHIN 1KM

Borden #	Site Name	Time Period	Affinity	Site Type
BbGt-4	Udora S/E field site	Paleo-Indian		
BbGt-12	Mehl Site	Archaic, Paleo-Indian		

None of the above noted archaeological sites are situated within 300 metres of the study area. Therefore, they have no impact on determinations of archaeological potential for further archaeological resources related to Pre-contact activity and occupation with respect to the archaeological assessment of the proposed undertaking.

1.3.4.2 POST-CONTACT REGISTERED SITES

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MCM. As a result, it was determined that zero (0) archaeological sites relating directly to Post-contact habitation/activity had been formally registered within the immediate vicinity of the study area.

1.3.4.3 REGISTERED SITES OF UNKNOWN CULTURAL AFFILIATION

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MCM. As a result, it was determined that zero (0) archaeological sites of unknown cultural affiliation have been formally registered within the immediate vicinity of the study area.

1.3.5 PREVIOUS ARCHAEOLOGICAL ASSESSMENTS

On the basis of information supplied by MCM, no archaeological assessments have been conducted within 50 metres of the study area. AMICK Consultants Limited assumes no responsibility for the accuracy of previous assessments, interpretations such as cultural affiliation, or location information derived from the Archaeological Sites Database administered by MCM. In addition, it must also be noted that the lack of formerly documented previous assessments does not indicate that no assessments have been conducted.

1.3.5.1 PREVIOUS REGIONAL ARCHAEOLOGICAL POTENTIAL MODELLING

The study area is situated within an area subject to an archaeological master plan or a similar regional overview study. Amongst other initiatives, the York Region Archaeological Management Plan was compiled to reduce the risk of unforeseen development impacts on archaeological sites by creating an archaeological potential model of the Region. Various potential layers comparing, and documenting known archaeological sites, soil types, proximity to water, and the effects of modern previous development were all buffered into a composite potential. For a detailed account of how these layers were developed, refer to the York Region Archaeological Plan (2019: 44-52). Based on the composite potential modeling weighed against a potential integrity model, the current study area was found to be within an area of archaeological potential. The archaeological potential map has been produced in Map 11.

1.3.6 Historic Plaques

There are no relevant plaques associated with the study area, which would suggest an activity or occupation within, or near, the study area that may indicate potential for associated archaeological resources of significant CHVI.

1.3.7 Summary of Archaeological Context

The 1925 Old Shiloh Bridge East and Old Shiloh Road is present within the study area, which heavily impacts the majority of the study area. The remainder of the study area consists of steep slope.

Current conditions within the study area indicate that the property may have no or low archaeological potential and does not require Stage 2 Property Assessment. These areas would include the Old Shiloh Bridge East and areas of steep slope. Therefore, a Stage 2 Property Assessment is not required.

Background research also indicates that the study area is situated in the Simcoe Lowlands physiographic region, which is characterized by Tecumseth sandy loam with good drainage. In addition, the study area is located near the Upper Bobcaygeon Formation which has outcrops of Balsam Lake chert.

Two previously registered archaeological sites have been documented within 1km of the study area. They are Pre-contact; none are Post-contact or of unknown cultural affiliation. None of these sites are located within 300m of the study area and, therefore, do not demonstrate archaeological potential for further archaeological resources of Pre-contact and Post-contact activity and occupation with respect to the archaeological assessment of the current study area.

The study area is situated within an area subject to an archaeological master plan or a similar regional overview study. There are no relevant plaques associated with the study area.

The study area has potential for archaeological resources of Native origins based on proximity to a source of potable water. Background research also suggests potential for archaeological resources of Post-contact origins based on proximity to a historic roadway, and proximity to areas of documented historic settlement.

2.0 PROPERTY INSPECTION

A property inspection was carried out in compliance with Standards and Guidelines for Consultant Archaeologists (MTC 2011) to document the existing conditions of the study area to facilitate the Stage 2 Property Assessment. All areas of the study area were visually inspected. Observations made of conditions within the study area at the time of the inspection were used to inform the requirement for Stage 2 Property Assessment for portions of the study area as well as to aid in the determination of appropriate Stage 2 Property Assessment strategies. The locations from which photographs were taken and the directions toward which the camera was aimed for each photograph are illustrated in Maps 7 – 10 of this report.

The documentation produced during the field investigation conducted in support of this report includes: one sketch map, one page of field notes, and 38 digital photographs.

3.0 ANALYSIS AND CONCLUSIONS

3.1 STAGE 1 ANALYSIS AND CONCLUSIONS

3.1.1 CHARACTERISTICS INDICATING ARCHAEOLOGICAL POTENTIAL

Section 1.3.1 of the Standards and Guidelines for Consultant Archaeologists specifies the property characteristics that indicate archaeological potential (MTC 2011). Factors that indicate archaeological potential are features of the local landscape and environment that may have attracted people to either occupy the land or to conduct activities within the study area. One or more of these characteristics found to apply to a study area would necessitate a Stage 2 Property Assessment to determine if archaeological resources are present. These characteristics include:

1) Within 300m of Previously Identified Archaeological Sites

2) Within 300m of Primary Water Sources (e.g., lakes, rivers, streams, and creeks)

3) Within 300m of Secondary Water Sources (e.g., intermittent streams and creeks, springs, marshes, and swamps)

4) Within 300m of Features Indicating Past Water Sources (e.g., glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, and cobble beaches)

5) Within 300m of an Accessible or Inaccessible Shoreline (e.g., high bluffs, swamp, or marsh fields by the edge of a lake, sandbars stretching into marsh)

6) Elevated Topography (e.g., eskers, drumlins, large knolls, and plateaux)

7) Pockets of Well-drained Sandy Soil, especially near areas of heavy soil or rocky ground.

8) Distinctive Land Formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings.

9) Resource Areas, including:
   - food or medicinal plants (e.g., migratory routes, spawning areas, and prairie)
   - scarce raw materials (e.g., quartz, copper, ochre, or outcrops of chert)
   - resources of importance to early Post-contact industry (e.g., logging, prospecting, and mining)

10) Within 300m of Areas of Early Post-contact Settlement, including:
    - military or pioneer settlement (e.g., pioneer homesteads, isolated cabins, and farmstead complexes)
    - early wharf or dock complexes, pioneer churches and early cemeteries

11) Within 100m of Early Historical Transportation Routes (e.g., trails, passes, roads, railways, portage routes)

12) Heritage Property – A property listed on a municipal register or designated under the <u>Ontario Heritage Act</u> or is a federal, provincial, or municipal historic landmark or site.

13) Documented Historical or Archaeological Sites – property that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations. These are properties which have not necessarily been formally recognized or for which there is additional evidence identifying possible archaeological resources associated with historic properties in addition to the rationale for formal recognition.

The study area is situated on top of the Pefferlaw River which is a primary water source and a navigable waterway. The study area is situated within 100m of an early settlement road that appears on the historic atlas maps of 1860 and 1878. This historic road corresponds to the road presently known as Old Shiloh Road which is directly adjacent to the study area on its eastern and western edge.

3.1.2 Characteristics Indicating Removal of Archaeological Potential

Section 1.3.2 of the <u>Standards and Guidelines for Consultant Archaeologists</u> specifies the property characteristics which indicate no archaeological potential or for which archaeological potential has been removed (MTC 2011). These characteristics include:

1) Quarrying

2) Major Landscaping Involving Grading Below Topsoil
3) Building Footprints
4) Sewage and Infrastructure Development

The study area contains the Old Shiloh Bridge East.

3.1.3 Summary of Archaeological Potential

Table 3 below summarizes the evaluation criteria of the Ministry of Citizenship and Multiculturalism (MCM) together with the results of the Stage 1 Background Study for the proposed undertaking. Based on the criteria, the property is deemed to have archaeological potential on the basis of proximity to water, proximity to historic settlement structures, and the location of early historic settlement roads adjacent to the study area.

TABLE 3 EVALUATION OF ARCHAEOLOGICAL POTENTIAL

FEATURE OF ARCHAEOLOGICAL POTENTIAL		YES	NO	N/A	COMMENT
1	Known archaeological sites within 300m		**N**		If Yes, potential determined
PHYSICAL FEATURES					
2	Is there water on or near the property?	**Y**			If Yes, what kind of water?
2a	Primary water source within 300 m. (lakeshore, river, large creek, etc.)	**Y**			If Yes, potential determined
2b	Secondary water source within 300 m. (stream, spring, marsh, swamp, etc.)		**N**		If Yes, potential determined
2c	Past water source within 300 m. (beach ridge, riverbed, relic creek, etc.)		**N**		If Yes, potential determined
2d	Accessible or Inaccessible shoreline within 300 m. (high bluffs, marsh, swamp, sand bar, etc.)		**N**		If Yes, potential determined
3	Elevated topography (knolls, drumlins, eskers, plateaus, etc.)		**N**		If Yes, and Yes for any of 4-9, potential determined
4	Pockets of sandy soil in a clay or rocky area		**N**		If Yes and Yes for any of 3, 5-9, potential determined
5	Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)		**N**		If Yes and Yes for any of 3-4, 6-9, potential determined
HISTORIC/PREHISTORIC USE FEATURES					
6	Associated with food or scarce resource harvest areas (traditional fishing locations, agricultural/berry extraction areas, etc.)		**N**		If Yes, and Yes for any of 3-5, 7-9, potential determined.
7	Early Post-contact settlement area within 300 m.	**Y**			If Yes, and Yes for any of 3-6, 8-9, potential determined
8	Historic Transportation route within 100 m. (historic road, trail, portage, rail corridors, etc.)	**Y**			If Yes, and Yes for any 3-7 or 9, potential determined
9	Contains property designated and/or listed under the Ontario Heritage Act (municipal heritage committee, municipal register, etc.)		**N**		If Yes and, Yes to any of 3-8, potential determined
APPLICATION-SPECIFIC INFORMATION					
10	Local knowledge (local heritage organizations, Pre-contact, etc.)		**N**		If Yes, potential determined
11	Recent disturbance not including agricultural cultivation (post-1960-confirmed extensive and intensive including industrial sites, aggregate areas, etc.)		**N**		If Yes, no potential or low potential in affected part (s) of the study area.

If **YES** to any of 1, 2a-c, or 10 Archaeological Potential is **confirmed**
If **YES** to 2 or more of 3-9, Archaeological Potential is **confirmed**
If **YES** to 11 or No to 1-10 Low Archaeological Potential is **confirmed** for at least a portion of the study area.

4.0 RECOMMENDATIONS

4.1 STAGE 1 RECOMMENDATIONS

The study area has been identified as a property that exhibits potential to yield archaeological deposits of cultural heritage value or interest (CHVI). The objectives of the Stage 1 Background Study have therefore been met and in accordance with the results of this investigation, the following recommendations are made:

1. *Due to previous extensive subsurface disturbances and presence of steep slope throughout the entirety of the study area, the proposed undertaking no longer retains potential for archaeological resources.*
2. *No further archaeological assessment of the study area is warranted.*
3. *The Provincial interest with respect to archaeological resources within the limits of the study area has been addressed.*

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

While not part of the archaeological record, this report must include the following standard advisory statements for the benefit of the proponent and the approval authority in the land use planning and development process:

a. *This report is submitted to the Minister of [Citizenship and Multiculturalism] as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c. 0.18. The report is reviewed to ensure that it complies with the standards and guidelines issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection, and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.*

b. *It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the Ontario Heritage Act.*

c. *Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to* *carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.*

d. *The Cemeteries Act, R.S.O. 1990, c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.*

e. *Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.*

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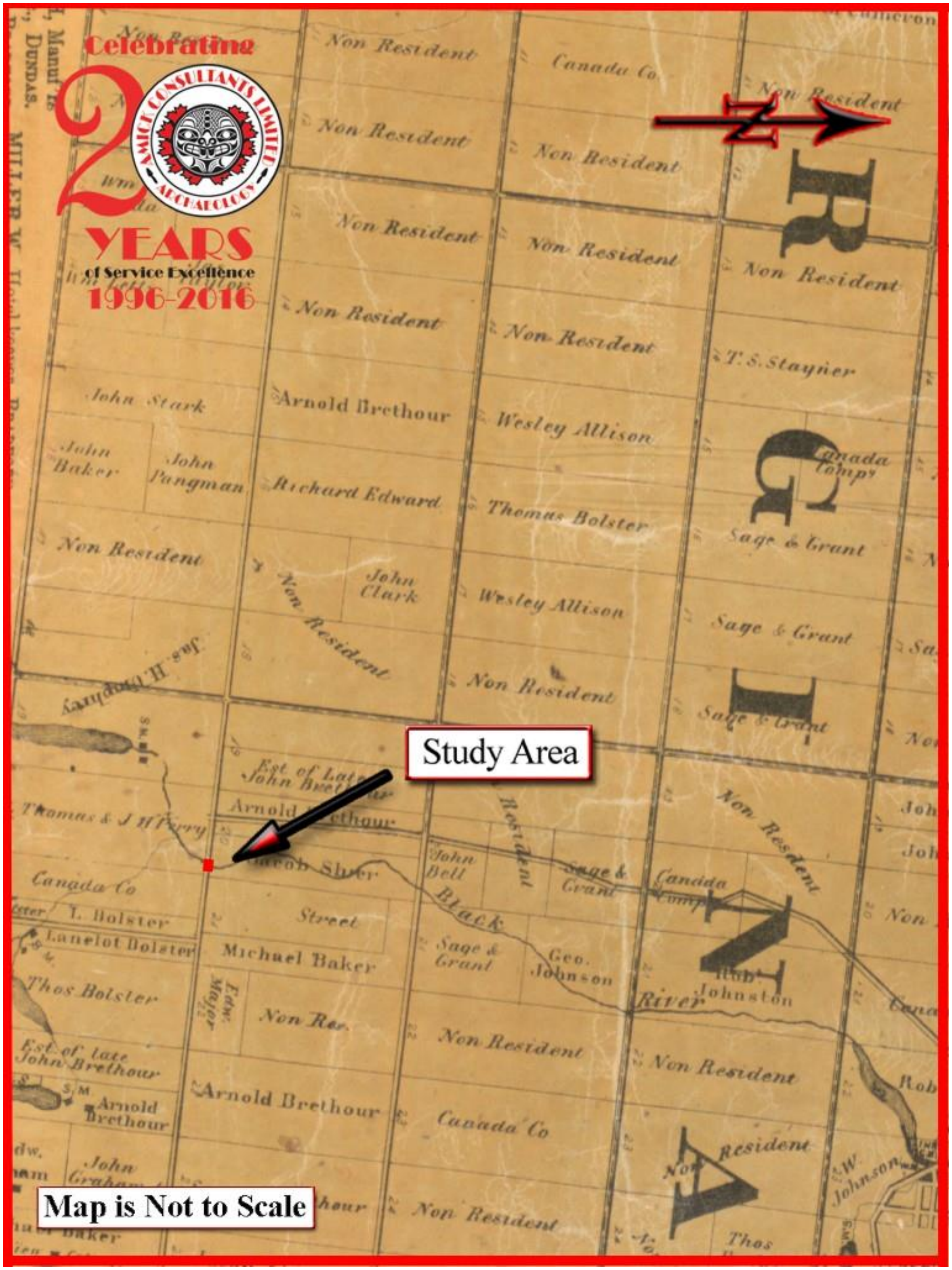
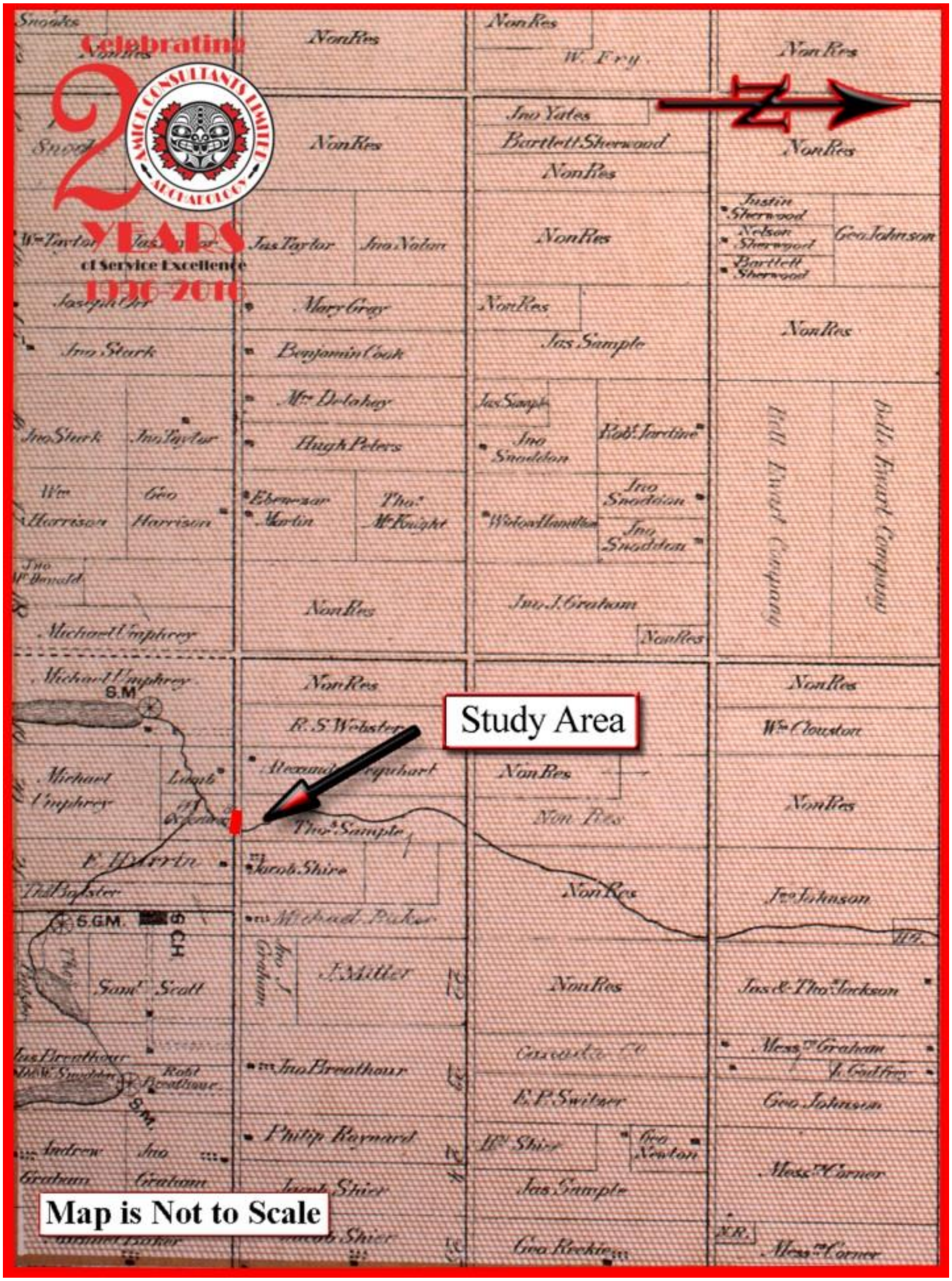
MAPS

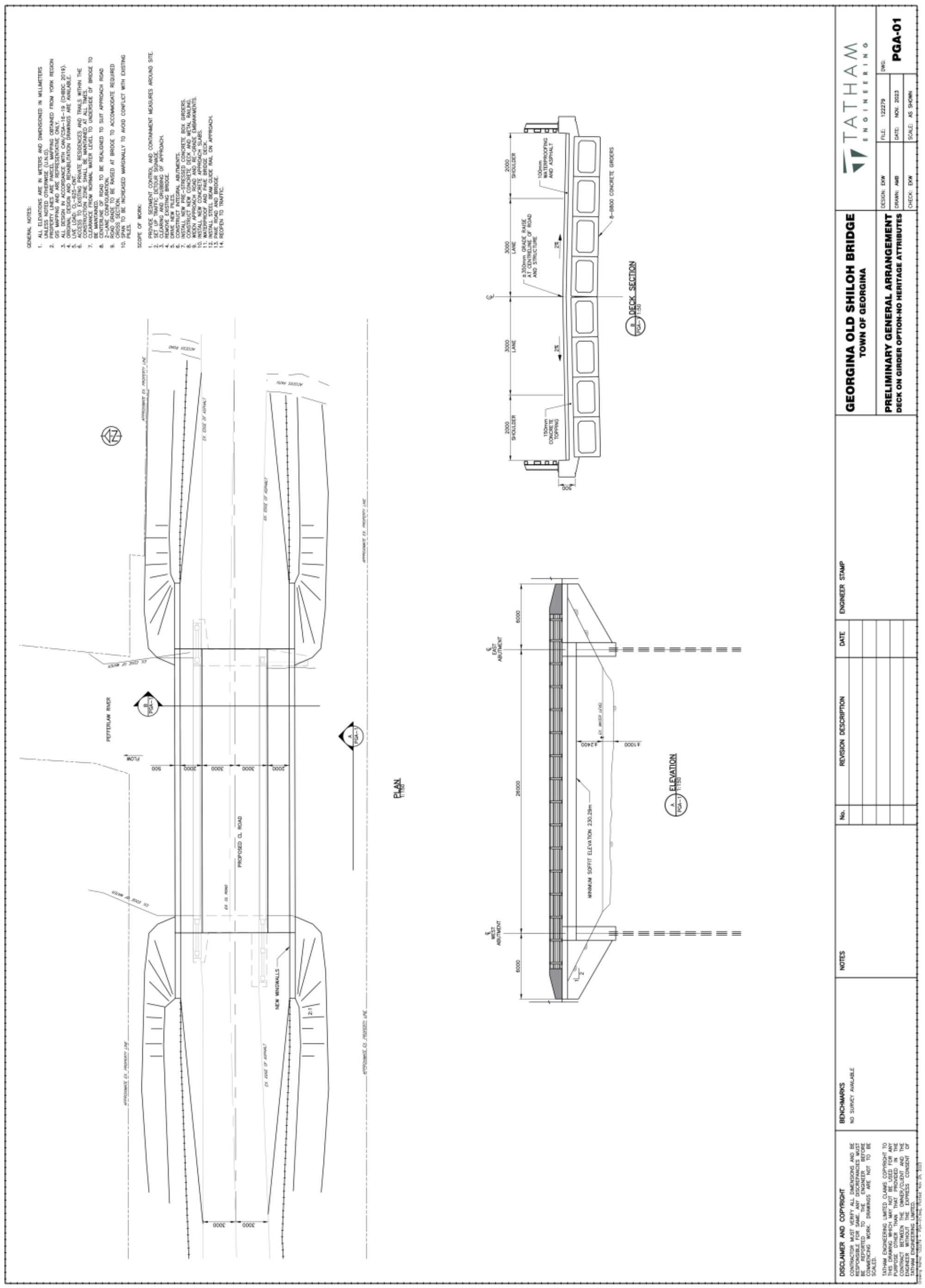
MAP 1 LOCATION OF THE STUDY AREA (ESRI 2019)



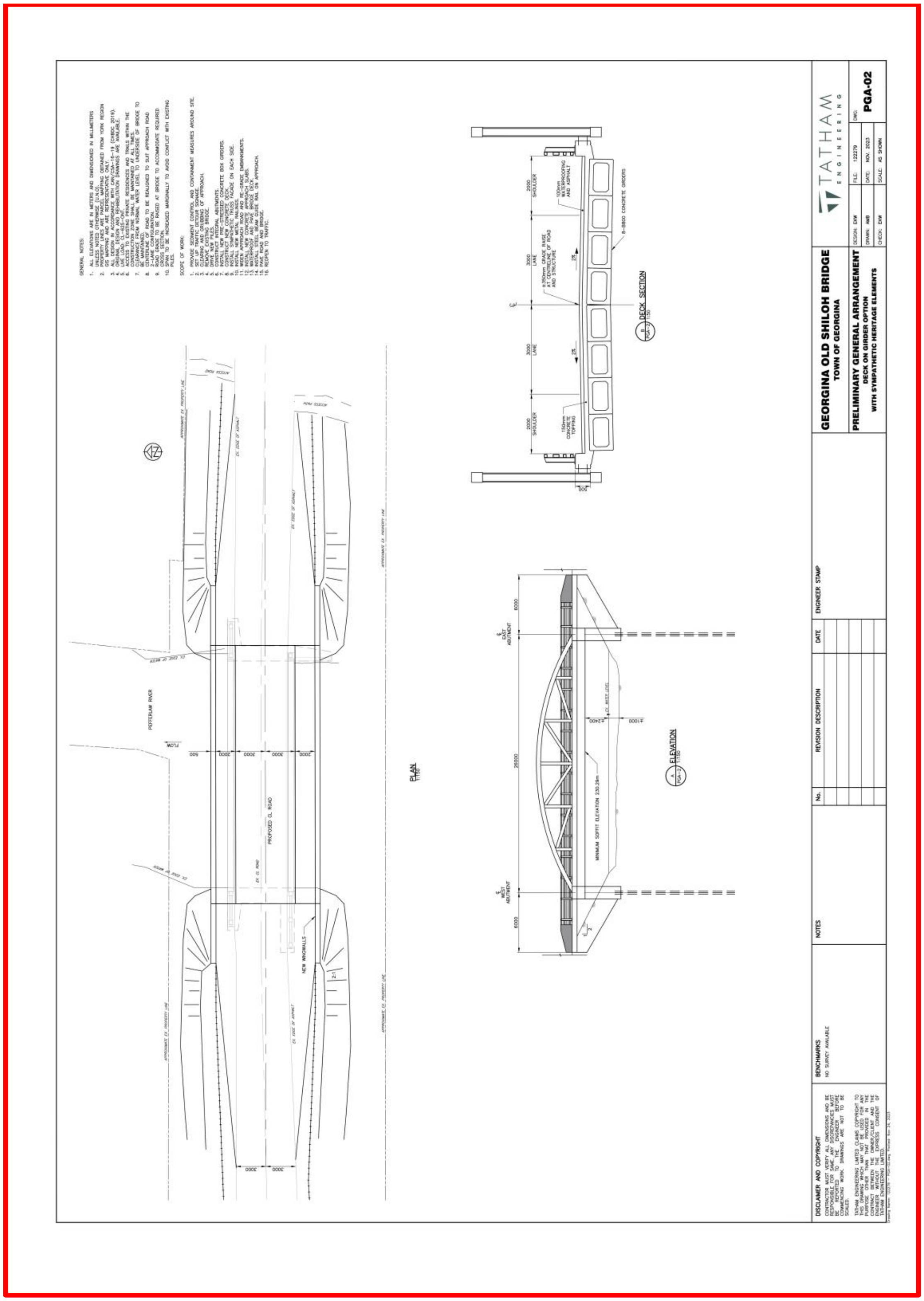
MAP 2 FACSIMILE SEGMENT OF TREMAINE'S MAP OF THE COUNTY OF YORK, CANADA WEST (TREMAINE 1860)



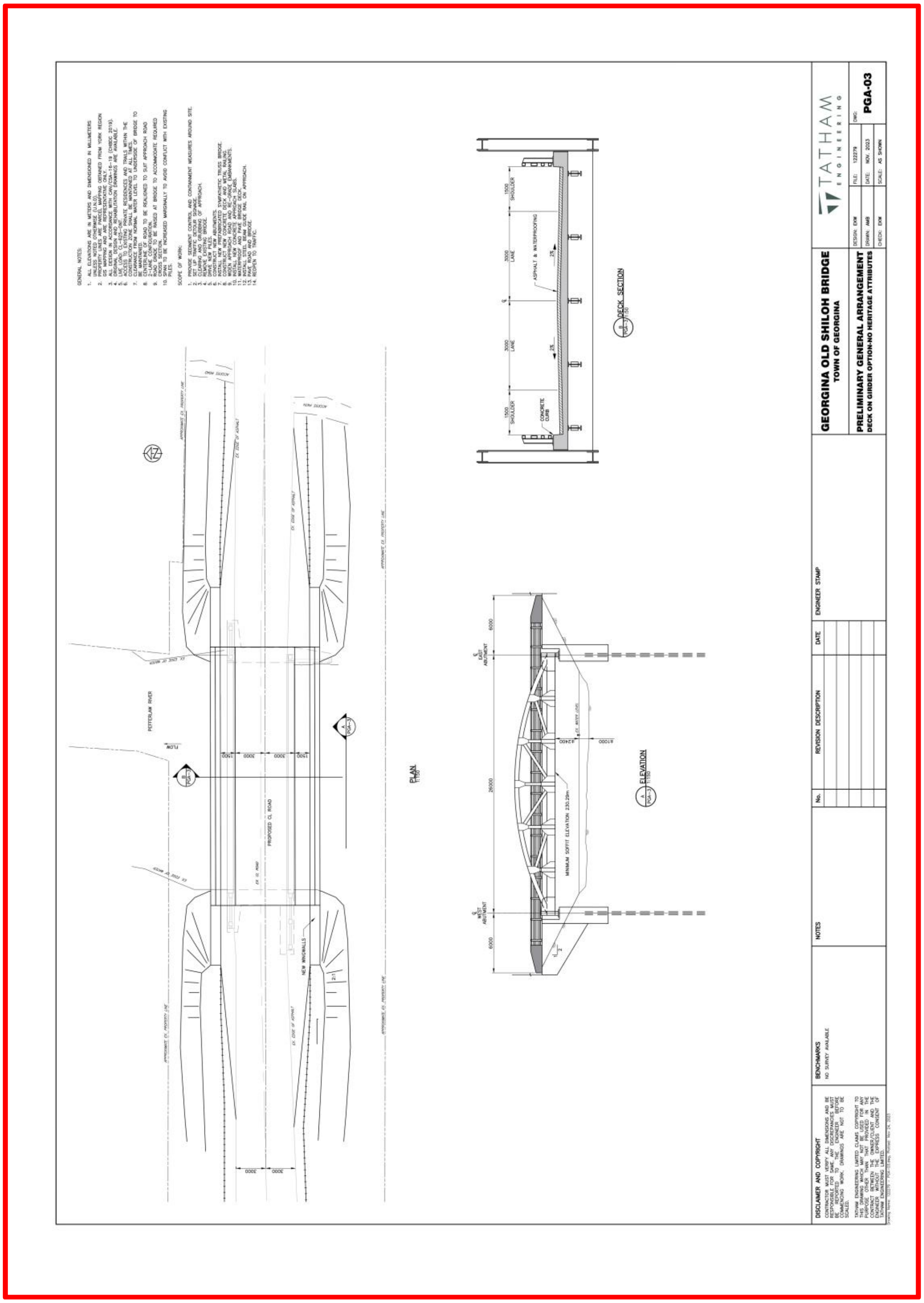
MAP 3 FACSIMILE SEGMENT OF THE ILLUSTRATED HISTORICAL ATLAS OF THE COUNTY OF YORK AND THE TOWNSHIP OF WEST GWILLIMBURY & TOWN OF BRADFORD IN THE COUNTY OF SIMCOE, ONT. (MILES & CO. 1878)



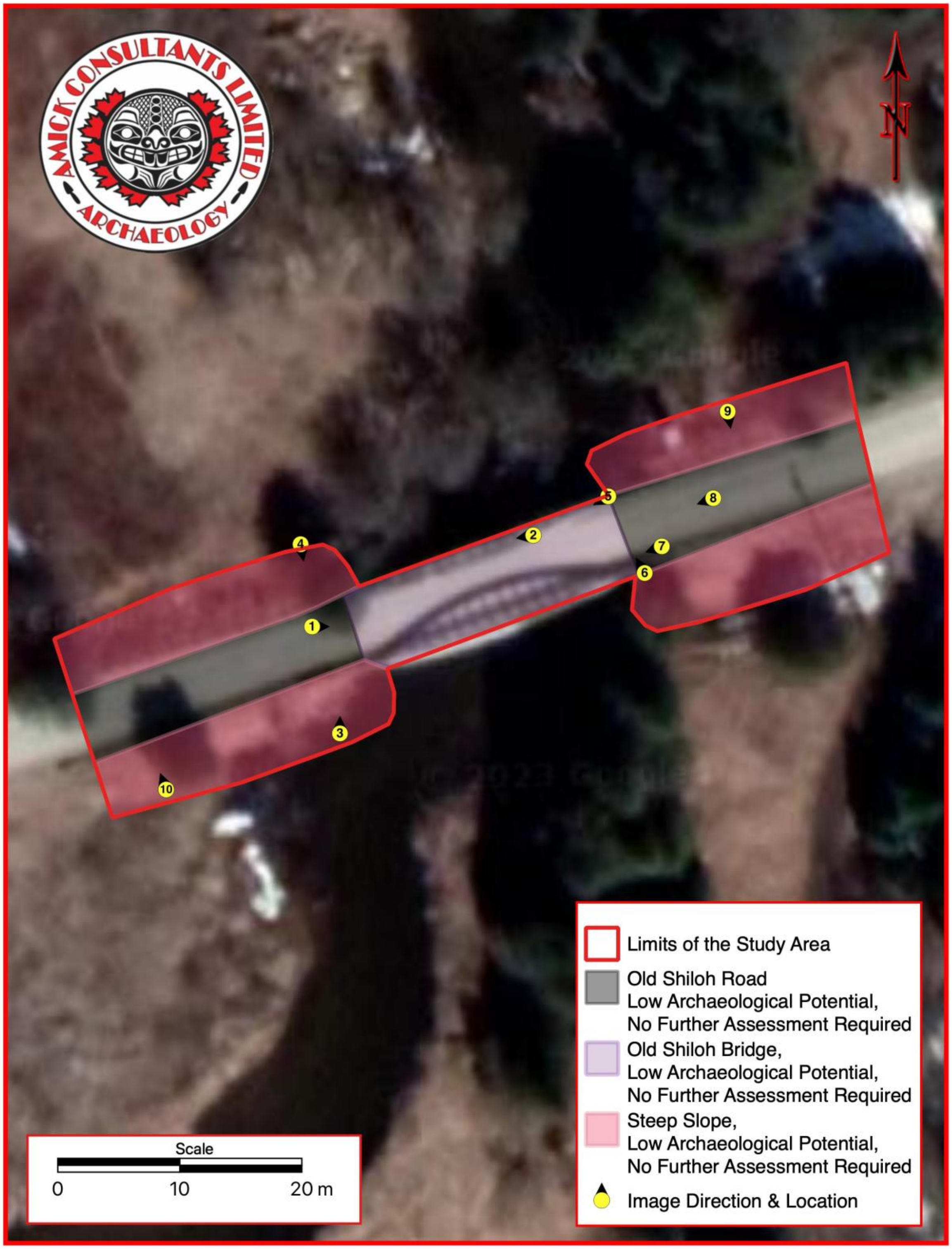
MAP 4 PRELIMINARY GENERAL ARRANGEMENT OPTION 1 (TATHAM ENGINEERING 2023)



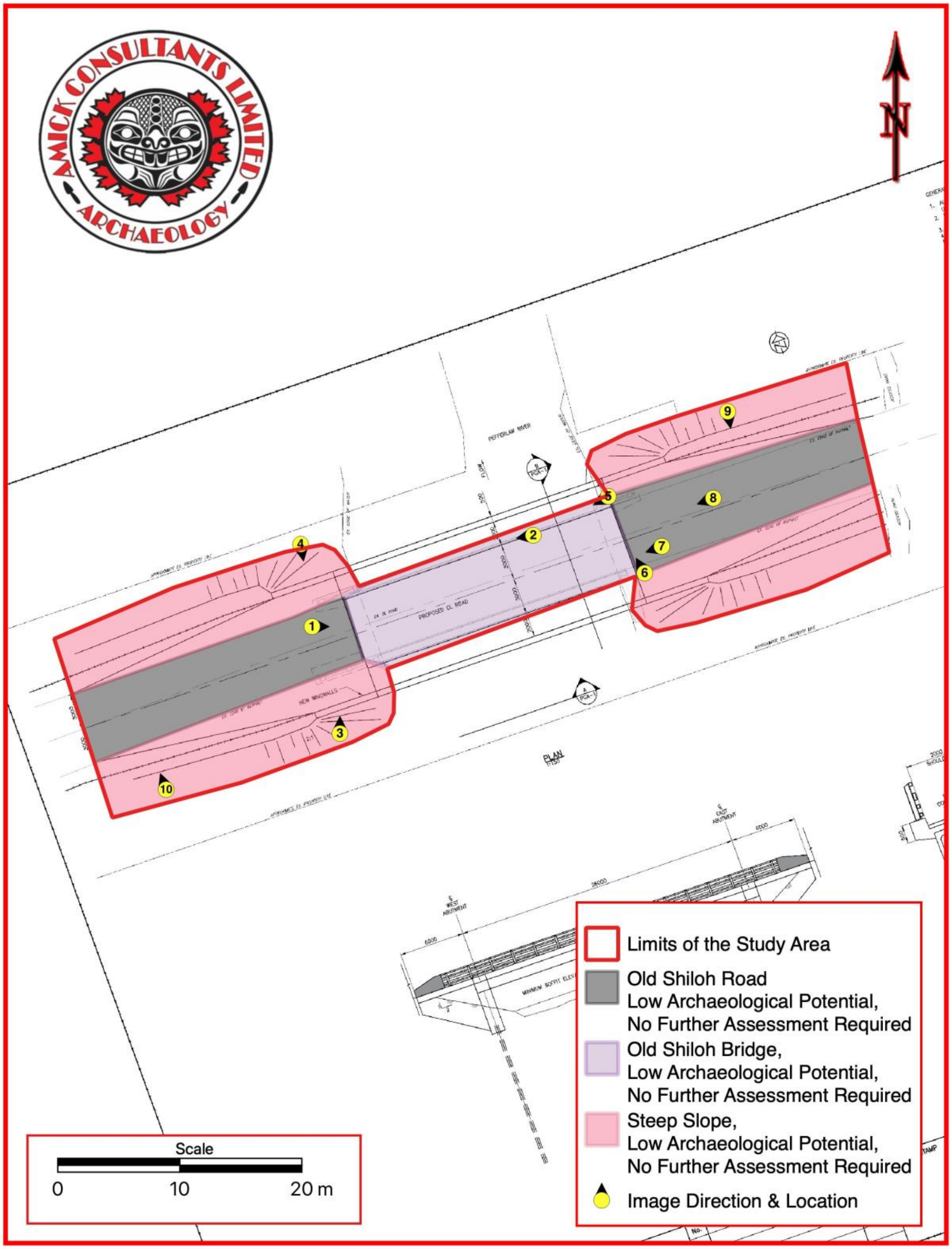
MAP 5 PRELIMINARY GENERAL ARRANGEMENT OPTION 2 (TATHAM ENGINEERING 2023)



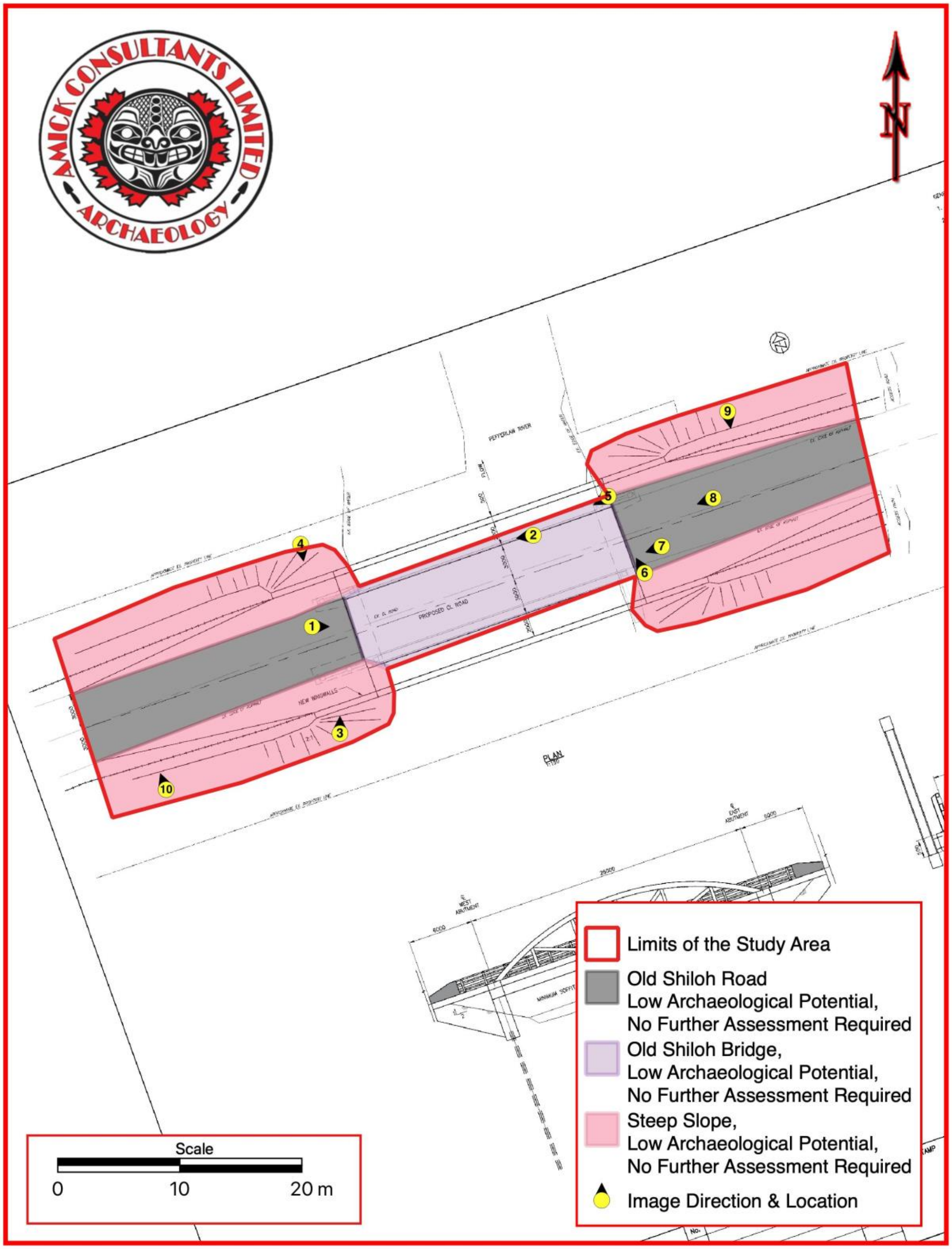
MAP 6 PRELIMINARY GENERAL ARRANGEMENT OPTION 3 (TATHAM ENGINEERING 2023)



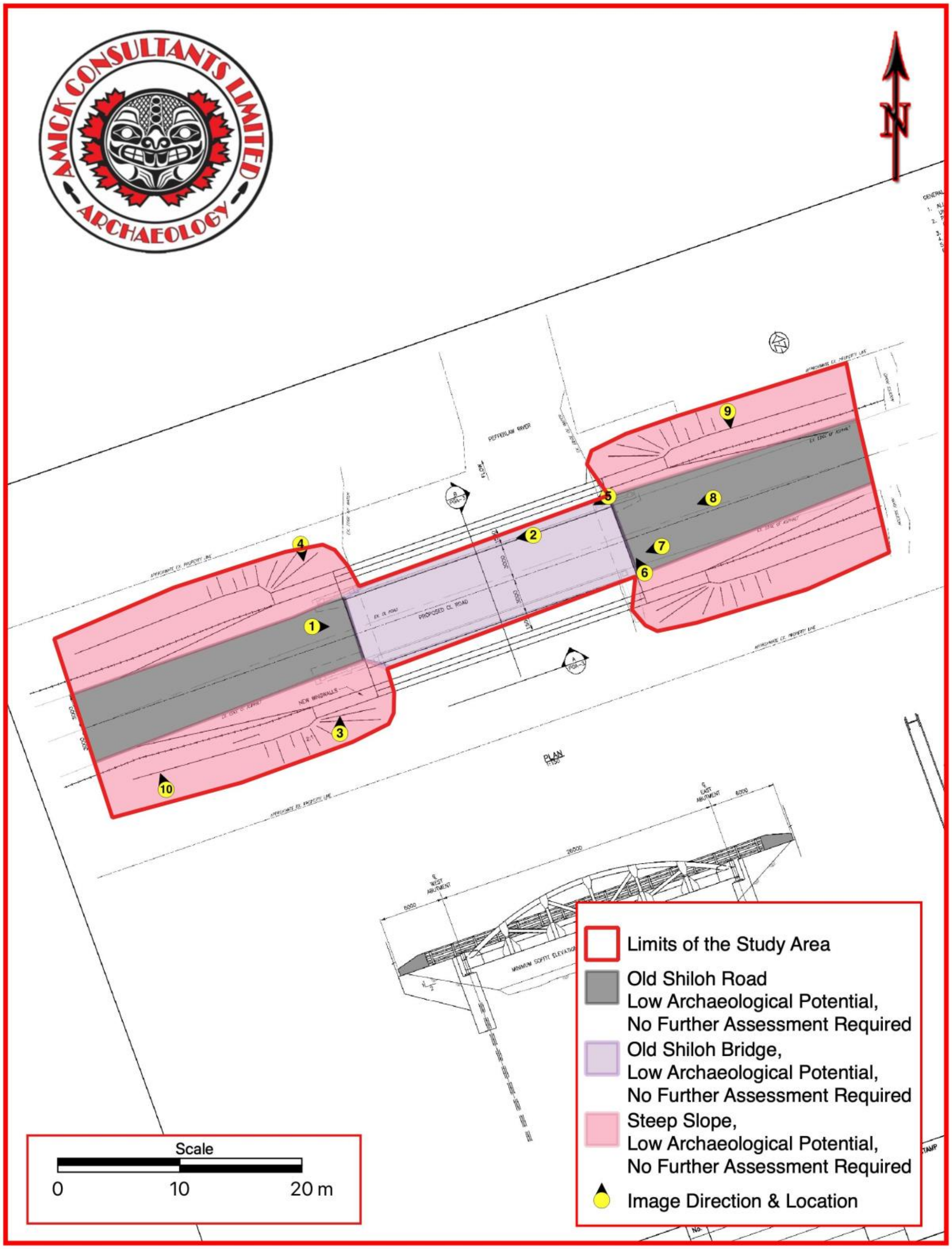
MAP 7 AERIAL OF THE STUDY AREA (GOOGLE EARTH 2016)



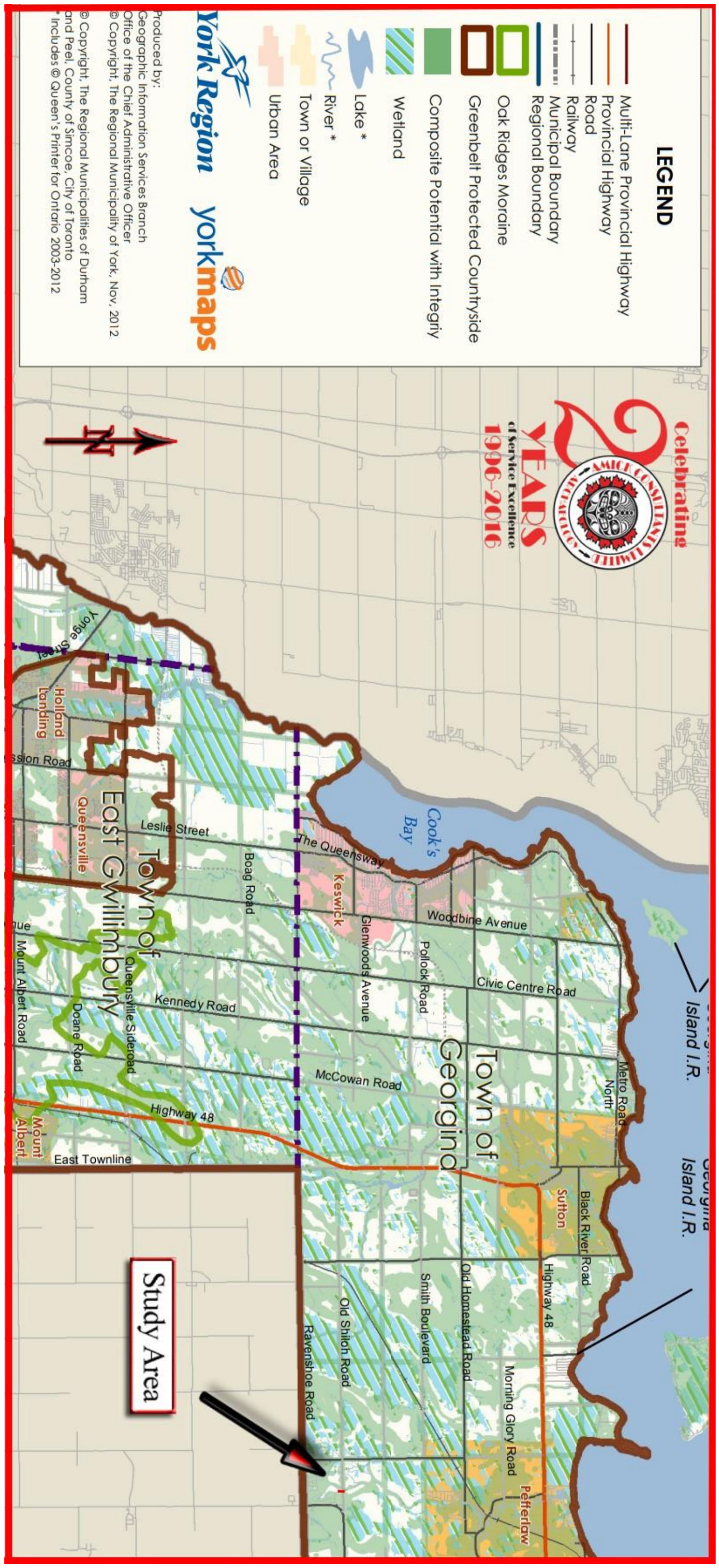
MAP 8 DETAILED PRELIMINARY GENERAL ARRANGEMENT OPTION 1 (TATHAM ENGINEERING 2023)



MAP 9 DETAILED PRELIMINARY GENERAL ARRANGEMENT OPTION 2 (TATHAM ENGINEERING 2023)



MAP 10 DETAILED PRELIMINARY GENERAL ARRANGEMENT OPTION 2 (TATHAM ENGINEERING 2023)



MAP 11 YORK REGION ARCHAEOLOGICAL POTENTIAL

MAP 12 ARCHAEOLOGICAL POTENTIAL (GOOGLE EARTH 2016)

IMAGES

IMAGE 1 VIEW OF OLD SHILOH BRIDGE EAST

IMAGE 2 VIEW OF CONCRETE BOWSTRING ARCH OF OLD SHILOH BRIDGE EAST

IMAGE 3 STEEP SLOPE

IMAGE 4 STEEP SLOPE

IMAGE 5 UNDERSIDE OF OLD SHILOH BRIDGE EAST

IMAGE 6 CONCRETE PILASTER OF OLD SHILOH BRIDGE EAST

IMAGE 7 VIEW OF CONCRETE BOWSTRING ARCH OF OLD SHILOH BRIDGE EAST

IMAGE 8 OVERVIEW OF OLD SHILOH BRIDGE EAST

IMAGE 9 STEEP SLOPE

IMAGE 10 STEEP SLOPE

Appendix F: Cultural Heritage Evaluation Report

Cultural Heritage Evaluation Report (CHER)
Old Shiloh Bridge on Old Shiloh Road (Concession Road 2)
(Geographic Township of Georgina)
York Region

Submitted to

Town of Georgina
26557 Civic Centre Road
Keswick, ON, L4P 3G1
905-476-4301

Prepared by

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Archaeological Consulting License # P058
Corporate Project # 2022-985

28 June 2023

Table of Contents

Project Personnel

Heritage Consultant	Michael Henry CAPH
Field Reconnaissance	Michael Henry CAPH
Report Preparation	Alysia Gillham, Michael Henry CAPH
Photography	Michael Henry CAPH

EXECUTIVE SUMMARY

This report describes the results of the 2023 Cultural Heritage Evaluation Report (CHER) of Old Shiloh Road bridge carrying Old Shiloh Road over Pefferlaw Brook, Concession 2 (Geographic Township of Georgina), County of York, conducted by AMICK Consultants Limited. This investigation was undertaken as part of an Environmental Assessment process with respect to proposed improvements to the crossing at this location. All work was conducted in conformity with the Ontario Heritage Act (OHA) (RSO 2005). Old Shiloh Road bridge was evaluated using the Act's Regulation 9/06: Criteria for Determining Cultural Heritage Value or Interest.

The existing Town of Georgina's Old Shiloh Road Bridge is an early and idiosyncratic example of a very common built form throughout the province. This bridge does meet the criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest. The primary reasons for this determination are that it is a rare or unique example of a bridge structure, and it may express or reflect the work or ideas of a specific designer that has been executed in an idiosyncratic fashion by another builder. In addition, this bridge has previously been identified as a structure of cultural heritage value and significance within Arch, Truss, and Beam: The Grand River Watershed Heritage Bridge Inventory (Benjamin et al. 2013). Accordingly, a Heritage Impact Assessment (HIA) was completed. As the bridge is a reinforced concrete structure that has surpassed the serviceable life of concrete as a viable engineering material, there is little option but to replace the bridge.

Given this evaluation of the structure, the following recommendations should be considered and implemented:

1) This report should be filed with the Town of Georgina.
2) This report should be filed with the Ministry of Citizenship and Multiculturalism for review and comment.
3) Due to the significance of this bridge an HIA is recommended.

1.0 INTRODUCTION

This report describes the results of the 2023 Cultural Heritage Evaluation Report (CHER) of Old Shiloh Road bridge carrying Old Shiloh Road over Pefferlaw Brook, Concession 2 (Geographic Township of Georgina), County of York, conducted by AMICK Consultants Limited. This investigation was undertaken as part of an Environmental Assessment process with respect to proposed improvements to the crossing at this location. All work was conducted in conformity with the Ontario Heritage Act (OHA) (RSO 2005). Old Shiloh Road bridge was evaluated using the Act's Regulation 9/06: Criteria for Determining Cultural Heritage Value or Interest.

Under the municipal Class EA criteria Old Shiloh Road bridge meets the criterion of being over 40 years old and as such, the Ontario Ministry of Citizenship and Multiculturalism (MCM) considers that the bridge may have cultural heritage value. Therefore, a cultural heritage evaluation prepared by a qualified heritage consultant is required for this project. This report has been prepared to address this requirement. The proponent is advised that they should file this report with the MCM for the purpose of review by MCM Heritage Planning Staff. AMICK Consultants Limited was engaged by the proponent to undertake this study on 18 January 2022.

2.0 LOCATION AND DESCRIPTION

The Old Shiloh Road bridge is located over the Pefferlaw Brook and is located approximately 750 meters west of the Town of Udora, (Geographic Township of Georgina) York Region. The location of the bridge is illustrated in Figure 1 of this report. This report consists of a CHER for the Old Shiloh Road bridge over Pefferlaw Brook as part of a bridge replacement and rehabilitation project. The bridge is located within the Lake Simcoe Region Conservation Authority (LSRCA) regulated area.

The existing bridge is a single span cast-in-place concrete bowstring arch structure which carries Old Shiloh Road over a Pefferlaw Brook and was constructed in 1925.

In 2020, a bridge condition survey was undertaken as per the Ontario Structural Inspection Manual (OSIM) that indicated the bridge was approaching the end of its lifecycle and recommended that planning should commence for its replacement (Georgina.ca, 2022b).

The Bridge is a single-lane, concrete bowstring arch structure on conventional closed abutments. There are four wing walls extending beyond the bridge to provide roadside stability. There are four concrete pilasters located at each of the four corners of the structure. The structure was built in 1925 and has a deck length of 24 metres. The travel width is 5.2 metres between barriers and the overall structure width is 6.5 m. Concrete barriers are located on each side of the structure and form part of the overall arch system. Each of the two arches is tied to the deck at each end and through the use of four evenly spaced vertical columns. This configuration classifies the structure as a single load path structure, which means that if the railings were significantly damaged it, could result in total bridge failure. The existing bridge may not meet current road or bridge safety standards and may be operating beyond its expected lifespan.

In order to address the deteriorating condition of the bridge a number of alternatives are being considered. The Town, at a minimum, sees the list below as potential alternatives:
1. Do nothing;
2. Rehabilitate the existing bridge;
3. Remove and replace the bridge; and
4. Construct a new bridge adjacent to the existing bridge.

The Town of Georgina is commencing a Municipal Class Environmental Assessment under the Environmental Assessment Act to determine the preferred method of improvement to Old Shiloh Road bridge. The goal is to determine the recommended alternative for the future of the structure and alternatives for the water crossing on Old Shiloh Road (Georgina.ca, 2022).

3.0 CULTURAL HERITAGE EVALUATION

3.1 Overview of Local Historical Context

3.1.1 Euro-Canadian Settlement

North of Lake Ontario, evidence suggests that early occupation began around 9000 B.C. People probably began to move into this area as the glaciers retreated and glacial lake levels began to recede. The early occupation of the area probably occurred in conjunction with environmental conditions that would be comparable to modern Sub-Arctic conditions. Due to the great antiquity of these sites, and the relatively small populations likely involved, evidence of these early inhabitants is sparse and generally limited to tools produced from stone or to by-products of the manufacture of these implements.

York County’s boundaries were originally from Lake Ontario to Lake Simcoe, until 1834. The County of York was originally comprised of ten townships and the Town of York (now Toronto) until Toronto separated and incorporated in 1834 (Town of Whitchurch-Stouffville, 2010).

The present-day Town of Georgina was created through the amalgamation of the Township of Georgina and the Township of North Gwillimbury in 1971. The largest of the communities now within the Town of Georgina were Keswick and Sutton. Keswick was once known as Medina and is the largest urban community within the Town of Georgina. Keswick was originally a village in the Township of North Gwillimbury before amalgamation with Sutton to form the Town of Georgina. Sutton was originally a mill site named Bouchier Mills in honour of the builder of the dam on the Black River which was constructed in 1831. In 1864 the village name was changed to Sutton (Town of Georgina 2012).

3.1.2 The Old Shiloh Road Bridge over Pefferlaw Brook

The existing bridge is a single span cast-in-place concrete bowstring arch structure which carries Old Shiloh Road over Pefferlaw Brook. This bridge is an increasingly rare example of a concrete rainbow (through) arch bridge, often called a concrete bowstring bridge. A very beautiful and graceful structure type, a number of these bridges were built throughout Ontario. This one retains good historic integrity including original railings.

A field review was undertaken by Michael Henry on 17 January 2023 to conduct photographic documentation of the bridge crossing and to collect data relevant for completing a heritage evaluation of the structure. Results of the field review were then utilized to describe the existing conditions of the bridge crossing. This section provides a general description of the bridge crossing and associated cultural heritage features.

The rural context of the bridge suggests that the erection of this bridge was likely in response to the proliferation of automotive traffic and mechanized farm machinery in the early 20th century. The selection of a concrete arch construction in preference to a steel truss bridge was probably made on the basis of a perceived need for added strength.

Historically, the bridge is situated along an early settlement road. Given the settlement history of the area and that this bridge was constructed in 1925, there was likely at least one previous crossing at this location. Figure 2 shows the bridge location today superimposed on a Historic County map of 1860. Figure 3 shows the bridge location today superimposed on a Historic Atlas map of 1878. Research into this likelihood has not resulted in the location of further information on the history of the crossing itself.

3.1.3 Overview of Ontario Bridge Construction History

The history of settlement in Ontario is inextricably tied to the history or the development of overland transportation. As David Cuming notes in his Discovering Heritage Bridges on Ontario Roads (n.d.: 31), “Ontario with its myriad of rivers, creeks, streams and lakes has resulted in a substantial number of minor barriers to communication”. As a result, bridges have always formed a significant component of overland transportation and communication routes. The first major roads in Ontario followed settlement by the United Empire Loyalists after the American War of Independence. These early roads were built for strategic military purposes but soon attracted settlement along these routes. Subsequent road construction, whether built by government agencies or private concerns also served to attract settlement and initial settlement promoted construction of further roadways as settlement moved inland from the Great Lakes and the initial transportation corridors (Cuming n.d.: 32).

Bridges were a necessity from the earliest days of road construction. The earliest bridges consisted of nothing more than two parallel logs stretching from one bank to the other with logs overlying these at a right angle. These bridges could be easily and quickly replaced as they rotted or should they be swept away by floodwaters or ice flows (Cuming n.d.: 32).

Bridges needed to cover larger spans were constructed by early settlers based on principles employed in the construction of early houses and barns. Truss systems used in the framing of structures were employed. Two such standard bridge types emerged fairly early on: the King Truss Bridge and the Queen Truss Bridge. The King Truss was built by setting a vertical beam supported by two inclined beams midway along a horizontal beam. The King Truss Bridge could span a gap of up to sixty (60) feet. The Queen truss system was employed for wider spans. This bridge was constructed with two vertical beams supported by one inclined beam for each and joined by a horizontal top beam. The Queen Truss Bridge could span a gap of up to one hundred and twenty (120) feet (Cuming n.d.: 35).

In the years between 1841 and 1849, the Department of Public Works spent $1,300,564 on roads in Canada West, including the construction of forty-three major bridges at a total cost of $206,928. A full third of these bridges were timber-built Queen Truss Bridges. During this same period numerous bridge designs were patented in the United States under fierce competition to increase the length and strength of bridges. As a result, bridge construction in North America began a period of transition from wood to metal structures (Cuming n.d.: 36).

Many road bridge designs that evolved were based on principles derived from railroad construction. Other designs that had a major impact on bridge engineering evolved independently. The Whipple Truss was first built in 1841. This new design consisted of a totally metal bowstring arch bridge. The arch of the bridge and the vertical supporting members were manufactured of cast iron while the diagonal bracing used wrought iron. The typical bridge built in the middle of the 19th century in the United States was entirely made of wrought iron (Cuming n.d.: 37). In Ontario the timber bridge dominated the landscape in rural areas from 1780-1880 and persisted into the early twentieth century. Wrought iron bridges were built in areas with higher population densities such as the thriving market towns of Brantford, Peterborough, London, and Paris. These communities all had wrought iron bridges that were constructed during the 1870s (Cuming n.d.: 38).

Metal bridges were sold in separate components produced in factories and shipped to the location of construction and assembled on site. Bridge components were ordered through catalogues. To simplify construction, the first metal bridges were assembled using “pin connections,” which were essentially threaded bolts that obviated the need for specialists or specialized equipment such as rivets required. Construction of such bridges could be completed with unskilled local labour in two to three weeks. These bridges were ideally suited to bridge construction in small communities or rural contexts (Cuming n.d.: 38).

Beginning in the 1880s, designers began to replace wrought iron elements in bridges with steel. This marked the beginning of a transition from wrought iron to steel bridges (Cuming n.d.: 41). Several factors contributed to the rapid development and proliferation of steel bridges at the beginning of the twentieth century. Portable pneumatic tools allowed for the use of rivets on even rural sites of bridge construction and pin connections rapidly disappeared. Rivets allowed for longer and sturdier construction. New production methods made steel as cheap as wrought iron. The concurrent developments in heavier vehicle and agricultural machinery required bridges capable of taking heavier loads which made construction of timber bridges impractical even in rural areas. "Through truss" style construction was employed over larger spans or in locations where traffic loads were heavy. Steel bridges were erected in quantity throughout Ontario following 1900 (Cuming n.d.: 42). The improvement in highway and bridge construction was particularly notable following the end of the First World War, with massive increases in automobile traffic and the development of heavy construction machinery (Cuming n.d.: 51-53).

Experimentation with reinforced concrete bridge construction began in the 1880s in France, followed by the United States. The first concrete arch bridge was constructed in Ontario in 1905 and was comprised of mass concrete. The first steel reinforced bridge was constructed in 1906. The appeal of reinforced concrete as a construction technology stemmed from its great strength, length of use and low maintenance requirements compared to steel or iron which required regular painting and rust removal (Cuming n.d.: 44). The strength of a reinforced tied concrete arch above the deck was early recognized as a design suitable for almost any location, particularly in crossings with low banks where arched construction below the deck was unsuitable (Cuming n.d.: 47). By 1914 it was clear that concrete would dominate the construction of bridges for the future (Cuming n.d.: 49). Concrete bridge construction of two types, the tied arch and the concrete beam, boomed in the 1920s (Cuming n.d.: 51).

In the 1930s a new innovation in bridge design challenged more traditional arched designs. The rigid frame reinforced concrete bridge employed a shallow arch below the deck and could be easily widened to accommodate demands of growing traffic pressures. This was a major advantage over earlier bridge designs such as the tied arch for which such an alteration was impossible (Cuming n.d.: 52).

Conde McCullough achieved his reputation in bridge engineering largely due to his facility for recognizing cost-effective designs based on long-term maintenance costs. His Economics of Bridge Design was a well-received treatise on this subject when published in 1929. This promoted the rise of composite bridge construction during the Depression years of the 1930s. Composite design using steel, wood, and concrete arose; each material has individual strengths and weaknesses for use in bridge design. These range from weight capacity, durability, and, of course, cost.

The nature of materials often leads to their combination in bridge construction, where steel deck girders support a concrete floor or a timber bridge that rests upon a steel or concrete series of piers or abutments. These structures are referred to as "composite" design and by and large most bridges utilize more than a single material, if only for the wearing surface of the roadbed. For purposes of categorization their primary material, usually in reference to the structural support system, classifies bridges. As a result, a steel beam bridge with laminated wood deck and concrete piers is deemed a steel beam bridge.

Slab, beam, and girder bridges are essentially similar and related designs, building upon the same basic structural principle, with a single member in tension that spans a void between two fixed points. Structurally a "slab" is the simplest, relying solely upon the inherent strength of a single member for both structure and road surface. A beam bridge is, in essence, a slab (the road deck) that is additionally strengthened by some number of longitudinal members. A girder bridge is a beam bridge with additional transverse supports between the beams (Kramer 2004: 7). Beam and Girder bridge types introduced in the 1930s remained in use throughout the post WWII period (Kramer 2004: 25).

Steel as used in composite bridge construction can be divided into two basic categories that reflect temporal advances in construction technology — rolled section beams versus the later use of welded members. Rolled sections refer to "H" or "I" or other shapes that are manufactured whole (the earlier of the technologies). Welded section beams are made of flat plates, welded into various shapes.

3.2 Heritage Legislative Requirements

Within the Province of Ontario there are a number of legislative requirements which necessitate the consideration of potential heritage features during the planning process.

1. The provincial interest in cultural heritage and the conservation of heritage resources is articulated in the Ontario Heritage Act (RSO 2005). This legislation provides the legislative framework for the conservation of Ontario's heritage.
2. Heritage resource conservation is also identified as a provincial interest within the Provincial Policy Statement (2014).
3. Heritage resource conservation is also identified as a provincial interest within the Planning Act (RSO 1990a).
4. Heritage resource conservation is also identified as a provincial interest within the Environmental Assessment Act (RSO 1990b). This legislation considers cultural and built components to be integral elements of the environment. The impact of proposed undertakings to cultural heritage resources must be addressed as part of the standard environmental assessment process in the Province of Ontario.
5. The Public Transportation and Highway Improvement Act (RSO 1990c) and Ontario Regulation 104/97 address the design, construction, and maintenance of bridges.

In partnership with other provinces, territories and the federal government, Ontario is also a participant in the Historic Places Initiative, which is a national program to encourage heritage conservation across Canada.

3.3 Municipal Planning Policy Context

The Town of Georgina and York Region encourages the protection and conservation of cultural heritage features.

3.3.2 Municipal Consultation

Community engagement and consultation was undertaken as a standard procedure within the Environmental Assessment (EA) process.

3.4 Criteria for Determining Cultural Heritage Value or Interest

The pace of development over the past two decades and projected ongoing development, places many potential heritage bridges under threat. Although most evidence of landscape changes can be seen in the expansion of established communities, the increase in population and commercial activities in these centres results in a greater volume of traffic on regional roads which necessitates improvements to the overall road network. The need for improvements in overland communication and shipping routes has required, and will continue to require, improvements to roadways and associated water crossings.

O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest establishes the criteria by which all types of cultural heritage resources are evaluated:

> "1. The property has design value or physical value because it,
> i. is a rare, unique, representative, or early example of a style, type, expression, material, or construction method,
> ii. displays a high degree of craftsmanship or artistic merit, or
> iii. demonstrates a high degree of technical or scientific achievement.
>
> 2. The property has historical value or associative value because it,
> i. has direct associations with a theme, event, belief, person, activity, organization, or institution that is significant to a community,
> ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or
> iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.
>
> 3. The property has contextual value because it,
> i. is important in defining, maintaining, or supporting the character of an area,
> ii. is physically, functionally, visually, or historically linked to its surroundings, or
> iii. is a landmark. O. Reg. 9/06, s. 1 (2)."

3.5 Cultural Heritage Evaluation of Town of Georgina Old Shiloh Bridge Road

A property is generally considered to be of cultural heritage value or interest if it meets one or more of the criteria set forth under O. Reg. 9/06. The Old Shiloh Road bridge over Pefferlaw Brook has been evaluated against the three main criteria and their various subsets. The results are described in the following table and descriptive sections:

Design or Physical Value	
is a rare, unique, representative, or early example of a style, type, expression, material, or construction method	Yes
displays a high degree of craftsmanship or artistic merit	No
demonstrates a high degree of technical or scientific achievement	No
Historical or Associative Value	
has direct associations with a theme, event, belief, person, activity, organization, or institution that is significant to a community,	No
yields, or has the potential to yield information that contributes to an understanding of a community or culture, or	No
demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to a community.	Yes
Contextual Value	
is important in defining, maintaining, or supporting the character of an area,	No
is physically, functionally, visually, or historically linked to its surroundings, or	No
is a landmark.	Yes

3.5.1 Design or Physical Value

The Old Shiloh Road bridge is a simple single span reinforced concrete bowstring arch bridge, constructed in 1925. The structure is typical of the cast in place concrete bowstring arch type. It has not undergone any significant modifications since construction and shows signs of age through weathering and accumulated damage through time. It does not demonstrate a high degree of either craftsmanship or of scientific achievement. It is the only bridge of its kind in York Region.

3.5.2 Historical or Associative Value

As above, the Old Shiloh Road bridge is a simple single span reinforced concrete bowstring arch bridge, constructed in 1925. The structure is typical of the cast in place concrete bowstring arch type. It has not undergone any significant modifications since construction and shows signs of age through weathering and accumulated damage through time. It does not demonstrate a high degree of either craftsmanship or of scientific achievement. It is the only bridge of its kind in York Region.

3.5.3 Contextual Value

The bridge is physically linked to its surroundings as a bridge that was constructed in-situ at this location at a long-established brook crossing. The bridge is functionally linked to its surroundings as a component of the rural road system and road network that has existed since at least the middle of the 19th century. This does suggest that this location and the associated crossing represents a landmark feature. However, as a rare example of a once common built form, this bridge has become a landmark feature owing to its distinctive character in contrast with other local and regional bridges.

3.5.4 Cultural Heritage Value

The revised procedures set out in the Municipal Class Environmental Assessment, October 2007 and in the amendment approved on August 17, 2011, by the Ontario Minister of the Environment and described in Section 1.2 advise that if the property meets the criteria in Ontario Regulation 9/06, pursuant to the Ontario Heritage Act, it is considered to be a cultural heritage resource.

Town of Georgina Old Shiloh Road bridge meets some of the criteria outlined in Regulation 9/06 of the Ontario Heritage Act. The bridge is a representative early example of concrete bowstring arch design. This built form was once common throughout Waterloo and Wellington Counties. However, this bridge is now a rare survivor of this once common form. The design is also associated with an early concrete bridge design firm known for constructing numerous bridges within the Grand River watershed.

The bridge meets criteria for associative and contextual value but meets them in ways that are not specific to the design or materials of the bridge itself or of the specific community's history. Any bridge structure at the site could contribute to the theme of rural transportation and be physically, functionally, historically, or visually linked to its surroundings. In this respect, a newly constructed bridge at this location would serve the precise function as does the existing bridge since in some respects, the location and not the nature of the bridge addresses these criteria at least in a partial way.

Given that the bridge is now a quite rare example of an early and introductory design in the use of reinforced concrete as the primary construction material for bridges, this bridge does have cultural heritage value or interest and a Heritage Impact Assessment must be completed.

3.6 Statement of Cultural Heritage Value or Interest

The above evaluation confirms that the Old Shiloh Road bridge meets at least one of the criteria contained in Regulation 9/06 of the Ontario Heritage Act. It has historic value as a local landmark that commemorates the establishment and growth of several prominent industries and the transportation networks that served population growth and commerce on land and water.

Accordingly, the Old Shiloh Road bridge is found to have further cultural heritage value based on criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest.

4.0 HERITAGE IMPACT ASSESSMENT

Under the criteria set forth in O. Reg. 9/06, the Old Shiloh Road bridge is considered to represent a cultural heritage resource with cultural heritage value or interest (CHVI). Therefore, a Heritage Impact Assessment is required.

5.0 CONCLUSIONS & RECOMMENDATIONS

The existing Town of Georgina Old Shiloh Road bridge is an early and idiosyncratic example of a very common built form throughout the province. This bridge does meet the criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest. The primary reasons for this determination are that it is a rare or unique example of a bridge structure, and it may express or reflect the work or ideas of a specific designer that has been executed in an idiosyncratic fashion by another builder. As the bridge is a reinforced concrete structure that has surpassed the serviceable life of concrete as a viable engineering material, there is little option but to replace the bridge.

Given this evaluation of the structure, the following recommendations should be considered and implemented:

1) This report should be filed with the Town of Georgina.

2) This report should be filed with the Ministry of Citizenship and Multiculturalism for review and comment.

3) Due to the significance of this bridge an HIA is recommended.

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Figure 1 Location of the Subject Property (Google Maps 2020)

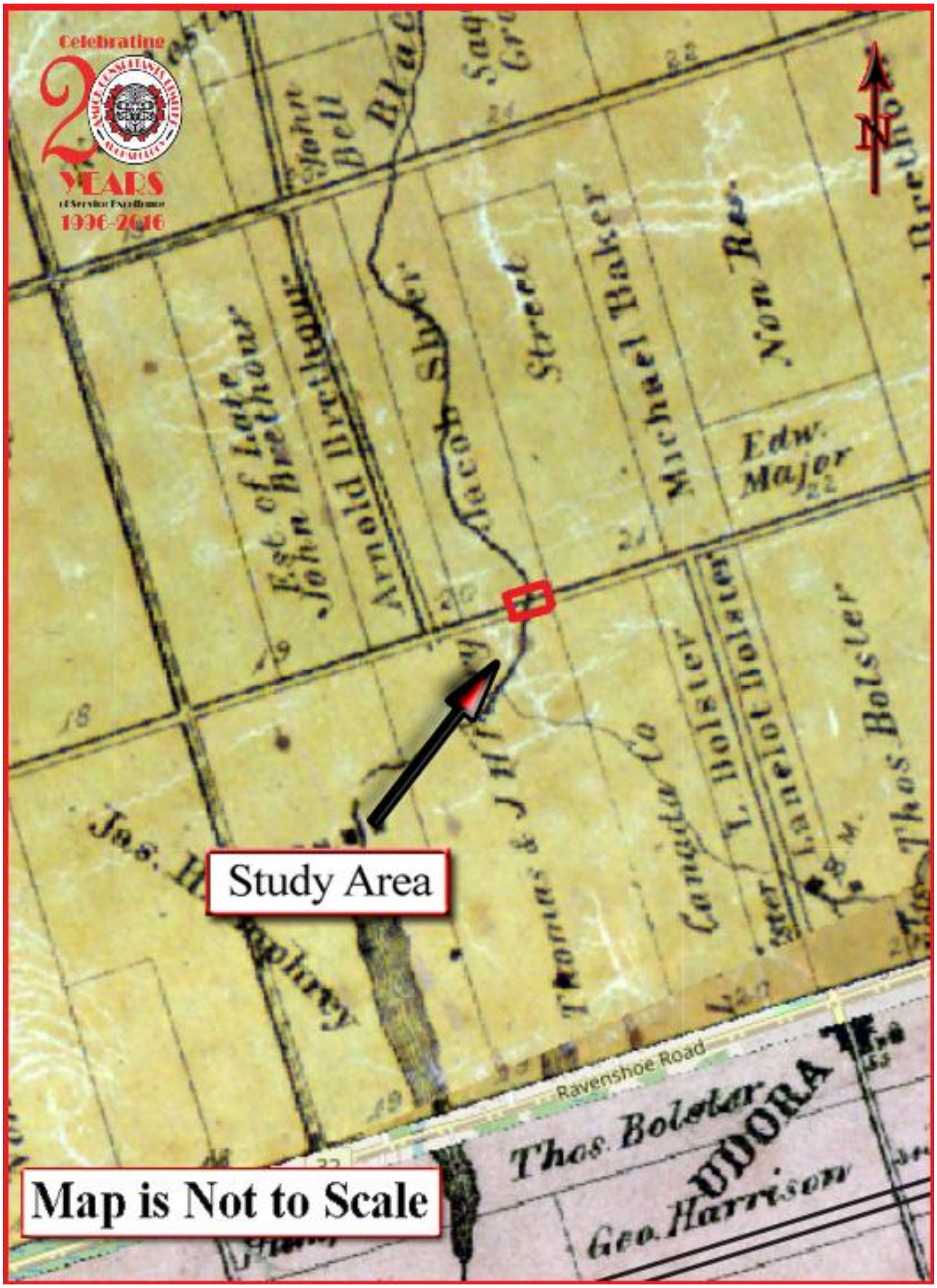


Figure 2 Segment of Ontario Historical County Maps (Tremaine 1860.)

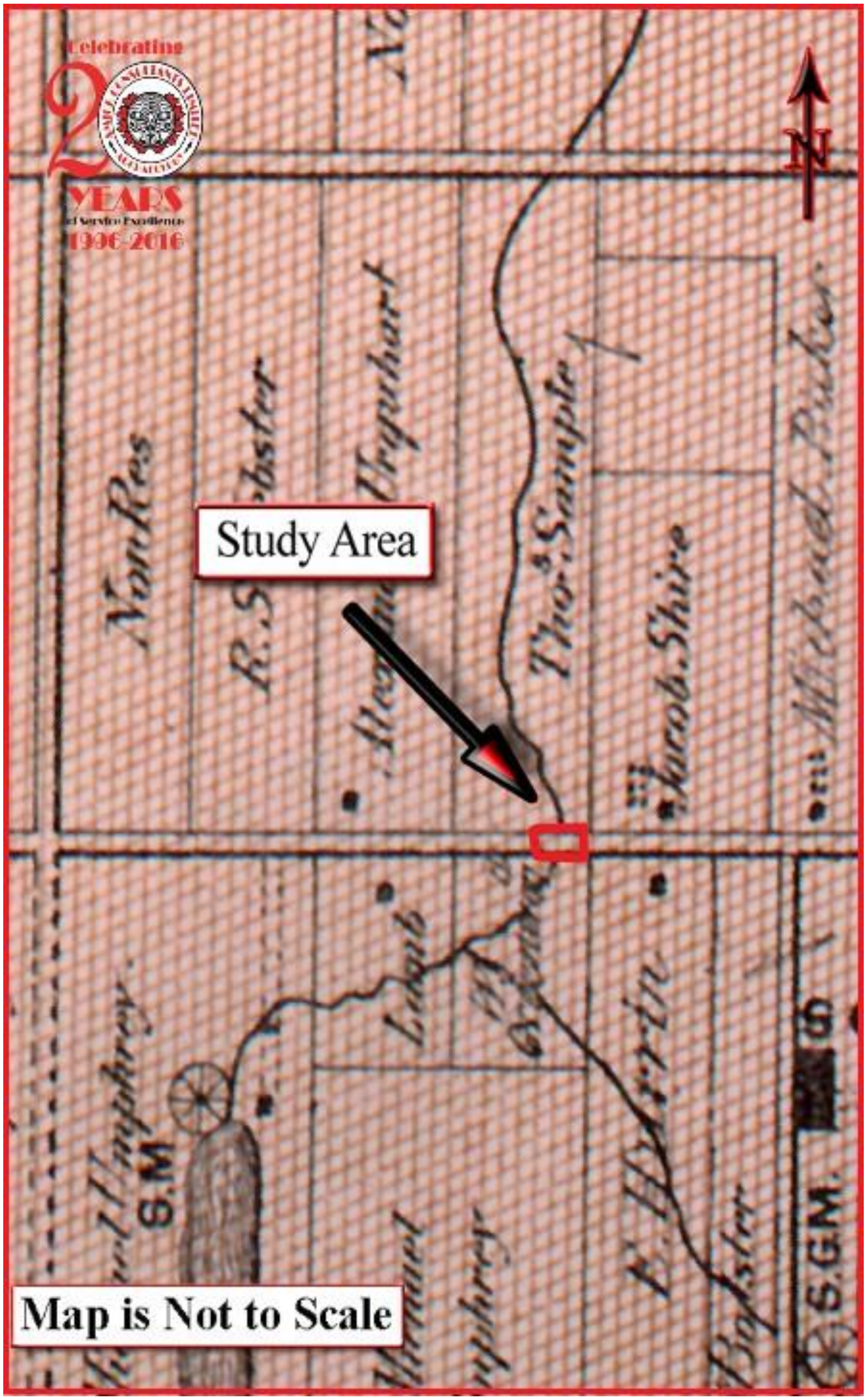


Figure 3 Segment of Historic Atlas Map (Miles & Co 1878.)

Plate 1 View of West Approach (Facing East)

Plate 2 View of East Approach (Facing West)

Plate 3 View of Deck (Facing Northwest)

Plate 4 View of the Eastern Side (Facing Southwest)

Plate 5 View of Deck (Facing West)

Plate 6 View of Pefferlaw Brook (Facing South)

Plate 7 View of Eastern Approach (Facing West)

Plate 8 View of Western Approach (Facing East)

Plate 9 View of Pefferlaw Brook (Facing North)

Appendix G:
Public Information Centre

26557 Civic Centre Rd.
Keswick, Ontario L4P 3G1
905-476-4301

GEORGINA

Operations & Infrastructure

Old Shiloh Bridge Assessment
Municipal Class Environmental Assessment Study
Notice of Public Information Centre

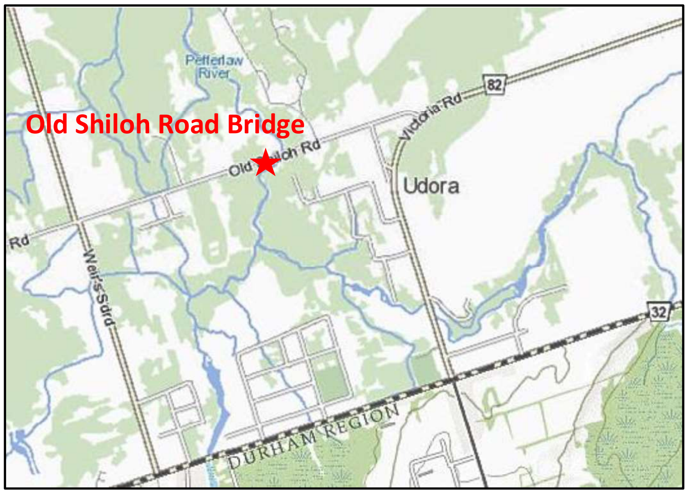
Background

The Town of Georgina has retained Tatham Engineering Limited to complete a Municipal Class Environmental Assessment (Class EA Study) under the Environmental Assessment Act (R.S.O. 1990, c. E.18) to determine the preferred method of improvement to Old Shiloh Bridge East. The goal is to determine the recommended alternative for the future of the structure and alternatives for the water crossing at Old Shiloh Road. The bridge is located on Old Shiloh Road approximately 750 m west of Victoria Road, in the Hamlet of Udora.

Study Process

The Town is proceeding with a Schedule B Municipal Class Environmental Assessment (EA) to consider the impacts associated with the proposed project. Alternatives being considered include:

- Do nothing
- Rehabilitate the existing bridge.
- Remove and replace existing bridge.
- Construct a new bridge adjacent to the existing bridge.



Purpose of Notice

Members of the public, agencies, Indigenous communities and other interested persons are invited to provide input via a Public Information Centre (PIC) to be held on Wednesday, May 17, 2023 from 5:00pm to 7:00pm at the Udora Community Hall, 24 Victoria Road, Udora, Georgina. The purpose of the PIC is to present the study, the development and assessment of improvement options, and identify the recommended solution. Following completion of the PIC and in consideration of concerns raised through agency reviews and public comment, the preferred solution will be identified for further study.

Project Contacts

If you would like to be added to or removed from our project mailing list or have project-related questions, contact the Town and/or consultant as noted below:

Town
Ryan Post
Project Manager
Operations and Infrastructure
rpost@georgina.ca
905-476-4305, ext. 2429

Consultant
Emma Wilkinson, H.B.A., B.E.Sc., P.Eng.
Project Manager
Tatham Engineering Limited
ewilkinson@tathameng.com
705-444-2565, ext. 2101

All personal information included in a submission, such as name, address, telephone number and property location, is collected, maintained and disclosed for the purpose of transparency and consultation. The information is collected under the authority of the Environmental Assessment Act or is collected and maintained for the purpose of creating a record that is available to the general public as described in s.37 of the Freedom of Information and Protection of Privacy Act. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

GEORGINA

Old Shiloh Road Bridge
Municipal Class Environmental Assessment Study
Public Information Centre
May 17, 2023

GEORGINA

WELCOME

This engagement presentation will:

- Establish channels of communication with public & stakeholders
- Detail the study area, study purpose & objectives
- Present the need & justification for the study and issues to be resolved
- Identify alternative solutions & potential environmental impacts
- Seek input & comments for consideration in the selection of the final preferred solution

Public and stakeholders should:

- Review the presentation material
- Ask questions of the Town and/or consultant
- Submit comments & indicate if you would like to be kept informed of the process
- A digital comment form is available through the Town of Georgina website and hard copies are available at the sign in desk

LAND ACKNOWLEDGEMENT

The Town of Georgina recognizes and acknowledges that we are on lands originally used and occupied by the First Peoples of the Williams Treaties First Nations and other Indigenous Peoples, and we would like to thank them for sharing this land. We would also like to acknowledge the Chippewas of Georgina Island First Nation as our close neighbour and friend, one with which we strive to build a cooperative and respectful relationship.

We also recognize the unique relationship the Chippewas have with the lands and waters of this territory. They are the water protectors and environmental stewards of these lands, and we join them in these responsibilities.

STUDY AREA

The Town of Georgina has retained Tatham Engineering Limited to complete a Schedule B Municipal Class Environmental Assessment (Class EA Study) under the Environmental Assessment Act (R.S.O. 1990, c. E.18) to determine the preferred method of improvement to Old Shiloh Road Bridge. The bridge is located on Old Shiloh Road approximately 750 m west of Victoria Road, in the Hamlet of Udora.

STUDY PURPOSE

The **PURPOSE** of study is to:

- Develop alternative solutions to improve safety at the bridge
- Identify the location, extent and sensitivity of affected environments
- Assess the alternatives given potential environmental impacts
- Identify the preferred solution
- Establish measures to mitigate impacts
- Satisfy the Municipal Class EA requirements

STUDY OBJECTIVE

The **OBJECTIVE** of the study is to identify the preferred solution to improve the Old Shiloh Road Bridge considering:

- The transportation network
- The long term asset management
- The natural environment and climate change
- The socio-economic environment
- The heritage environment
- The needs of motorists

BACKGROUND

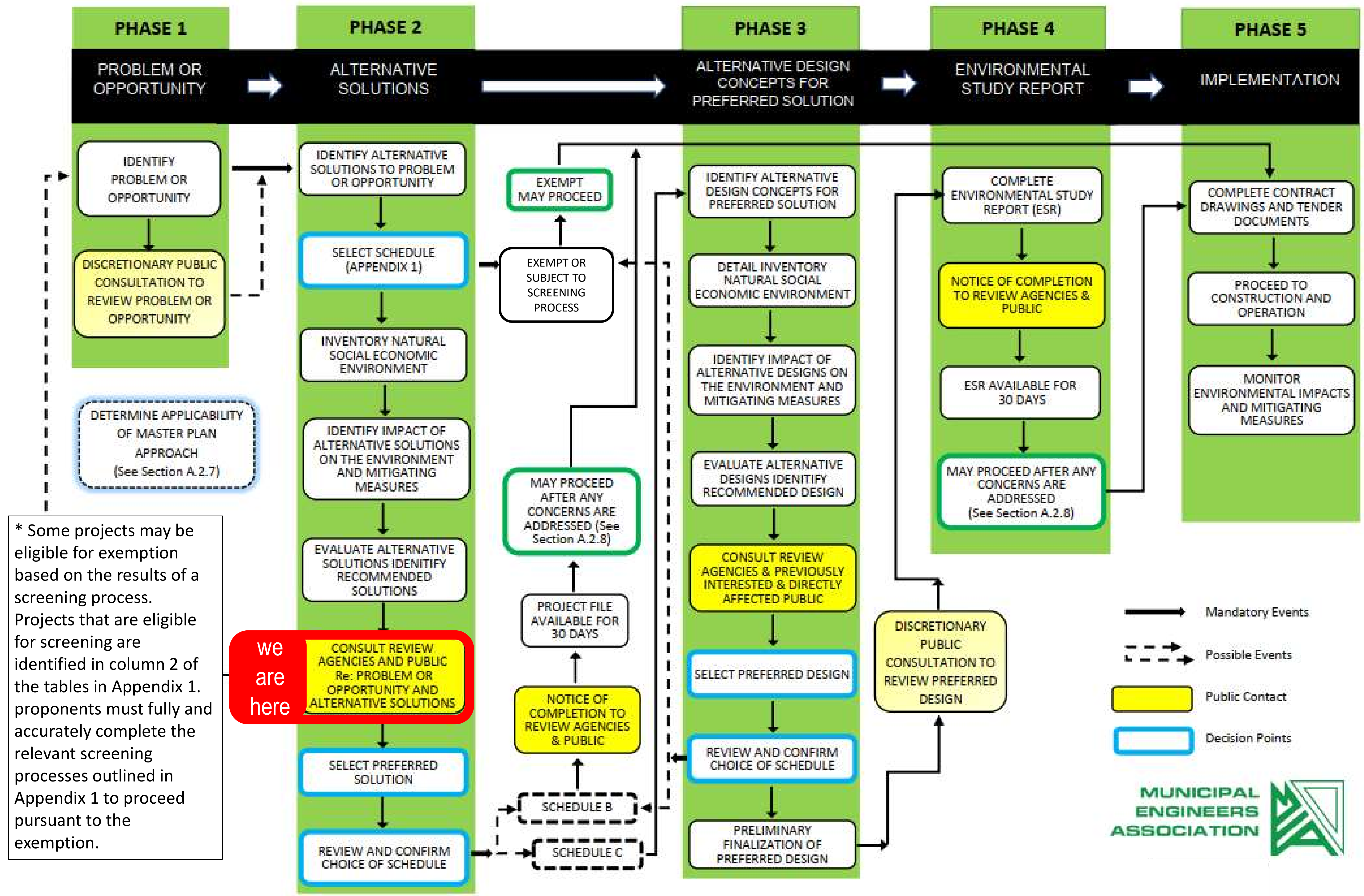
The Old Shiloh Road Bridge is 98 years old, it was rehabilitated in 1988 and again in 2011. It is currently posted with a triple load restriction of 20, 21, 27 tonnes. The 2018 and 2020 visual inspections identified the bridge is in need of replacement and included the following observations:

- Spalling, delamination and scaling, and cracking noted in concrete curbs, concrete arch top, bottom and vertical chords, concrete railing, floor beams and deck
- Existing railing is substandard
- Severe corrosion of the existing deck drains

BACKGROUND

- Narrow to wide cracks, scaling and spalling, and efflorescence in abutments, wingwalls, and ballast walls
- There is evidence of older shotcrete repairs as well as more recent concrete patch repairs
- Light to medium concrete erosion is occurring at the base of the abutment walls

MUNICIPAL CLASS EA PROCESS



PROBLEM IDENTIFICATION

Existing conditions:

- Single-lane bridge on a two-lane road
- Ditches on either side of road
- Bridge has a load capacity restriction of 20, 21, & 27 tonnes for single unit vehicles, vehicle combinations with one trailer or semi-trailer, and vehicle trains with more than one trailer respectively
- Constructed circa 1925, the bridge is 98 years old and has exceeded its design service life
- The right-of-way (ROW) is approximately 20 metres wide
- Serves approximately 919 vehicle crossings per day
- Has a posted speed limit of 60 km/hr
- Has the hydraulic capacity to pass the minimum design flows (1:50 year) with less than 1.0 m clearance from water level to underside of bridge
- Substandard bridge barrier
- Deterioration of several bridge elements

PROBLEM STATEMENT: "Old Shiloh Road Bridge has exceeded its design service life, is deteriorating, and has been posted with a 20, 21, 27 tonne triple load posting limit. The Town of Georgina has identified the need to assess alternative solutions at this crossing to address the deteriorating condition and best meet current standards while minimizing impacts to the surrounding residents and environments"

GEORGINA

ALTERNATIVE SOLUTIONS

ALTERNATIVE A: DO NOTHING

- maintain existing conditions with no improvements
- bridge will eventually be closed

ALTERNATIVE B: REHABILITATE EXISTING BRIDGE

- reduces safety issues
- extends lifespan of bridge
- load posting remains
- no improvement to geometry and capacity

ALTERNATIVE C: REMOVE & REPLACE BRIDGE

- eliminates load posting
- improves roadside safety
- opportunity to improve geometry and capacity

ALTERNATIVE D: CONSTRUCT NEW BRIDGE ADJACENT TO EXISTING BRIDGE

- eliminates load posting on new bridge
- improves roadside safety
- opportunity to improve geometry and capacity

PRE-SCREEN ALTERNATIVES

Can the alternatives fully address the problem statement?

× Alt A – no improvements and continued deterioration will lead to eventual closure

✓ Alt B – reduces safety issues, extends structure lifespan, no improvement to geometry

✓ Alt C – improves safety, extends lifespan, improves geometry, eliminates load posting

✓ Alt D – eliminates load posting, improves safety, improves geometry

NATURAL ENVIRONMENT

EXISTING CONDITIONS

- One inactive bird nest was found under the bridge.
- Suitable habitat features present for certain reptile and amphibian species
- Floodplain pools may be present to support amphibian breeding habitat
- Fish habitat assumed to be present
- Area may be amenable to supporting foraging habitat for bats
- Area is potential habitat for generic wildlife species
- No endangered species were recorded during the site review
- Maintenance and repair activities on the existing bridge have normal impacts to greenhouse gas emissions
- Bridge hydraulic capacity meets current capacity requirements with limited clearance available to the underside of bridge during larger storm events.

POTENTIAL IMPACTS

- The most significant risk is related to water quality and downstream fish habitat;
- All minor impacts can be mitigated with reasonable construction practices
- Increase in span or raising the bridge will improve clearance to underside of bridge, however there is risk of negative impacts to road geometry and upstream water levels during regional storm events

SOCIAL ENVIRONMENT

- Land use is primarily residential
- Alternate access across the watercourse is available via Regional Road 32 (Ravenshoe Road)
- Detour length of 4.5 km (+/- 5 min)
- Structure does not meet current geometric standards
- Existing right-of-way is approximately 28m at the bridge, and narrows to 26 east of the bridge and 24 m west of the bridge
- Safety is of the utmost importance

POTENTIAL IMPACTS TO SOCIAL ENVIRONMENT

- potential property impacts under Alternative D
- potential impacts to travel during construction
- potential noise impacts during construction

ARCHAEOLOGICAL ENVIRONMENT

- Stage 1 Archaeological Assessment (desktop review) concluded that the study area has been identified as a property that exhibits potential to yield archaeological deposits of cultural heritage value or interest
- Stage 2 Archaeological Assessment (test pits) of the study area is warranted
- To be completed in areas identified as having archaeological potential which will be impacted by the preferred alternative once identified

POTENTIAL IMPACTS TO ARCHAEOLOGICAL ENVIRONMENT

- Stage 2 archaeological assessment is required in areas of archaeological potential

CULTURAL HERITAGE ENVIRONMENT

- The bridge is considered a rare or unique example of a bridge structure, and the bridge type has been identified as a structure of cultural heritage value and significance in the Grand River Watershed Heritage Bridge Inventory in 2013
- The bridge meets the criteria set forth in O.Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest (under Historical or Associated Value and Contextual Value categories), and a Heritage Impact Assessment (HIA) was deemed appropriate
- A cultural heritage evaluation report has been completed and will be filed with the Town as well as the Ministry of Tourism, Culture and Sport
- Relocating the existing bridge for use in an alternate location may be considered if removal is a preferred alternative, however due to the structure type this is likely to be impractical
- A Heritage Impact Assessment is recommended to identify the impacts to heritage value associated with the preferred alternative and provide recommended mitigation measures.

POTENTIAL IMPACTS TO CULTURAL HERITAGE ENVIRONMENT

- potential impact to cultural heritage depending on alternative chosen
- a Heritage Impact Assessment will be completed to identify impacts and recommended mitigation measures once a preferred solution is identified

GEORGINA

PRELIMINARY ASSESSMENT OF ALTERNATIVES

Assessment Criteria		Weight	Alternative A		Alternative B		Alternative C1		Alternative C2		Alternative D	
			Do Nothing		Rehabilitate the Existing Bridge		Remove and Replace with Single Lane Bridge		Remove and Replace with Two Lane Bridge		Construct a New Bridge Adjacent to the Existing Bridge	
			score	weighted score	score	weighted score	score	weighted score	score	weighted score	score	weighted score
Physical Environment	road geometry and alignment	6	0.0	0.0	0.0	0.0	0.0	0.0	2.0	12.0	1.0	6.0
	structural stability and load restrictions	10	0.0	0.0	1.0	10.0	2.0	20.0	2.0	20.0	1.5	15.0
	roadside protection	6	0.0	0.0	1.0	6.0	2.0	12.0	2.0	12.0	1.5	9.0
	traffic operations	7	0.0	0.0	0.0	0.0	0.0	0.0	2.0	14.0	1.5	10.5
	maintenance and snow removal	6	0.0	0.0	0.0	0.0	0.5	3.0	2.0	12.0	0.5	3.0
	Sub-Total	**35**		**0.0**		**16.0**		**35.0**		**70.0**		**43.5**
Natural Environment	fisheries/aquatic impacts	6	0.0	0.0	-0.5	-3.0	-1.0	-6.0	-1.5	-9.0	-1.0	-6.0
	wildlife/terrestrial impacts	6	0.0	0.0	-0.5	-3.0	-1.0	-6.0	-1.5	-9.0	-1.0	-6.0
	hydrology & hydraulics	6	0.0	0.0	0.0	0.0	0.5	3.0	0.5	3.0	0.0	0.0
	vegetation impacts	3	0.0	0.0	0.0	0.0	-0.5	-1.5	-1.0	-3.0	-2.0	-6.0
	water quality	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	**25**		**0.0**		**-6.0**		**-10.5**		**-18.0**		**-18.0**
Social Environment	noise/construction impacts	5	0.0	0.0	-0.5	-2.5	-1.0	-5.0	-1.0	-5.0	-1.0	-5.0
	emergency services	5	0.0	0.0	0.5	2.5	1.0	5.0	2.0	10.0	1.5	7.5
	community impacts	5	0.0	0.0	0.5	2.5	1.0	5.0	1.5	7.5	-1.0	-5.0
	Sub-Total	**15**		**0.0**		**2.5**		**5.0**		**12.5**		**-2.5**

PRELIMINARY ASSESSMENT OF ALTERNATIVES

Assessment Criteria		Weight	Alternative A		Alternative B		Alternative C1		Alternative C2		Alternative D	
			Do Nothing		Rehabilitate the Existing Bridge		Remove and Replace with Single Lane Bridge		Remove and Replace with Two Lane Bridge		Construct a New Bridge Adjacent to the Existing Bridge	
			score	weighted score	score	weighted score	score	weighted score	score	weighted score	score	weighted score
Cultural Heritage Environment	archaeological impacts	4	0.0	0.0	-0.5	-2.0	-1.0	-4.0	-1.5	-6.0	-2.0	-8.0
	heritage impacts	6	0.0	0.0	2.0	12.0	1.0	6.0	0.5	3.0	1.5	9.0
	First Nations impacts	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sub-Total	**15**		**0.0**		**10.0**		**2.0**		**-3.0**		**1.0**
Economic Environment	construction costs	10	0.0	0.0	-0.5	-5.0	-1.0	-10.0	-1.5	-15.0	-2.0	-20.0
	future maintenance costs	10	0.0	0.0	-1.5	-15.0	-1.5	-15.0	-1.0	-10.0	-2.0	-20.0
	property acquisition costs	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-5.0
	Sub-Total	**25**		**0.0**		**-20.0**		**-25.0**		**-25.0**		**-45.0**
Climate Change	impact on climate change	2	0.0	0.0	-0.5	-1.0	-1.0	-2.0	-1.5	-3.0	-1.0	-2.0
	resiliency to climate change	3	0.0	0.0	0.0	0.0	1.0	3.0	1.0	3.0	0.5	1.5
	Sub-Total	**5**		**0.0**		**-1.0**		**1.0**		**0.0**		**-0.5**
	TOTAL	**120**		**0.00**		**1.50**		**7.50**		**36.50**		**-21.50**
	OVERALL RANKING			**4**		**3**		**2**		**1**		**5**

Weight: reflects the relative importance of each evaluation criteria within each project environment, and the relative importance of each project environment in relation to one another

Score: reflects the effect of each alternative as it relates to the evaluation criteria in comparison to Do Nothing (status quo); -2 denotes a significant negative impact, 0 denotes no impacts and +2 denotes a significant positive impact

Weighted Score: product of weight x score

NEXT STEPS

Bridge Improvements:

- review and address stakeholder comments
- identify the preferred solution
- further develop the preferred solution with details for implementation & mitigation
- address natural environment and water crossing requirements & mitigation
- design 2024
- implementation 2025

Stakeholders:

The following are available on the Town of Georgina Website :

- presentation (PDF of slides)
- comment sheets

https://www.georgina.ca/municipal-government/building-georgina/old-shiloh-bridge-environmental-assessment

SUBMIT YOUR COMMENTS BY MAY 31, 2023

SUBMIT COMMENTS VIA E-MAIL OR MAIL TO THE PROJECT CONTACTS BELOW

RYAN POST, P.Geo, C.E.T.
Project Manager
Town of Georgina
26557 Civic Centre. Rd.,
Keswick, ON L4P 3G1
t: (905) 476-4305 x 2904
e: rpost@georgina.ca

EMMA WILKINSON, H.B.A., B.E.Sc., P. Eng.
Project Manager, Senior Engineer
Tatham Engineering Limited
115 Sanford Fleming Drive, Suite 200
Collingwood, ON L9Y 5A6
t: (705) 444-2565 x 2101
e: ewilkinson@tathameng.com

Emma Wilkinson

From: Regina Hodgins
Sent: Tuesday, May 2, 2023 8:44 AM
To: Emma Wilkinson
Subject: FW: LSRCA preliminary comments for Old Shiloh Road Bridge Class EA
Attachments: Old Shiloh Bridge - regulated area.pdf; Old Shiloh Bridge - floodplain.pdf; Old Shiloh Bridge - meanderbelt.pdf; Old Shiloh Bridge - wetland.pdf; Old Shiloh Bridge - YR Sig Woodland.pdf

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From: Taylor Stevenson <T.Stevenson@lsrca.on.ca>
Sent: Monday, May 1, 2023 1:19 PM
To: Regina Hodgins <rhodgins@tathameng.com>
Cc: Kalpesh Nagrani <K.Nagrani@lsrca.on.ca>
Subject: LSRCA preliminary comments for Old Shiloh Road Bridge Class EA

CAUTION: This email originated from outside of Tatham Engineering or Envision-Tatham. Do not click on links or open attachments unless you know the sender and have verified the sender's email address and know the content is safe.

Good afternoon:

Thank you for circulating our office as part of the subject EA. Please see LSRCA comments below:

This site is located within an area that is entirely regulated by the LSRCA under Ontario Regulation 179/06 made pursuant to the *Conservation Authorities Act (CA Act)*. The site includes the following hazards:

- Regulatory floodplain hazard of the Pefferlaw River.
- Meanderbelt hazard of the Pefferlaw River.
- Unevaluated Wetland and lands adjacent.
- Significant woodland (map attached only as reference as the Town will be reviewing natural heritage related policies associated with the bridge works).

I have attached maps that show the hazards listed above. Please note that the bridge works will require a permit under the CA Act.

The LSRCA provides the following suggestions to avoid or mitigate impacts associated with the potential bridge rehab/replacement :

- Existing drainage and conveyance be maintained and or improved with no change to upstream or downstream flows to avoid impacts to control of flooding and erosion.
- No increase in velocities that result in increased erosion.
- Quantity control/peak flow controls be applied to avoid impacting erosion and floodplains in accordance with LSRCA Stormwater Management Guidelines (on LSRCA website).

- Any fill placement in the floodplain be avoided or compensated for with an incremental cut.
- Maintain existing grades within the regulated area.
- Any fill placement in the floodplain be avoided or minimized with a compensating incremental cut.
- Since the bridge is in the regulatory floodplain we recommend obtaining a copy of the HEC-RAS floodplain model from our office in order to update as part of the bridge works. You will need to demonstrate no impact to flooding and erosion. I have copied Kalpesh from our office who can help you with the data request.
- Proper erosion and sediment control measures be undertaken to prevent sediment migration and impact to watercourses.
- Any interference with wetlands be avoided or supported with a supporting Environmental Impact Study.

We recommend further consultation through the detailed design or environmental discipline studies which will be carried out through the design including:

- Drainage and Hydrology;
- Floodplain Studies;
- Erosion and Sediment Control;
- Fluvial Geomorphology;
- Geotechnical Investigation;
- Landscape Plan;
- Environmental Impact Studies;
- Engineered Drawings;
- Grading Plans;
- SWM.

In regards to the Lake Simcoe Protection Plan (LSPP), the settlement area policies 6.32 – 6.34. An application for development shall include the following:

- Landscaping and habitat restoration that increase the ability of native plans and animals to use valleyland or riparia areas as wildlife habitat and movement corridors;
- Seek to avoid, minimize and/or mitigate impacts associated with the quality and quantity of urban run-off into receiving streams, lake and wetland;

Please speak with the Town of Georgina in regards to meeting the natural heritage policies in the applicable Provincial plans. AS reference for the Town and Tatham, our Open Data Portal can be accessed in the link below, which contains a number of GIS datasets made publicly available.
(https://www.lsrca.on.ca/about-us/open-data -> https://data.lsrca.on.ca/navigo/home). If you encounter a blank screen when accessing the portal, please refresh your browser. I believe you can access Tributary Biological Minority (fish etc) and Tributary Water Monitoring (temperature, flow etc).

If you have any questions, do not hesitate to contact me.

Taylor Stevenson, B.A., CAN-CISEC
Coordinator, Infrastructure Permitting
Lake Simcoe Region Conservation Authority
120 Bayview Parkway,
Newmarket, Ontario L3Y 3W3
Office: 905-895-1281, ext. 483| 1-800-465-0437
Cell: 905-955-1954
t.stevenson@LSRCA.on.ca | www.LSRCA.on.ca

Twitter: @LSRCA
Facebook: LakeSimcoeConservation

From: Regina Hodgins <rhodgins@tathameng.com>
Sent: Thursday, April 27, 2023 2:12 PM
To: Regina Hodgins <rhodgins@tathameng.com>
Subject: Notice of Public Information Centre for Old Shiloh Road Bridge

You don't often get email from rhodgins@tathameng.com. Learn why this is important

CAUTION: This email originated outside of LSRCA. DO NOT click links or open attachments unless you recognize the sender and trusted content. If in doubt, contact the IT Helpdesk at ITHelpdesk@lsrca.on.ca

Please see attached Notice of Public Information Centre.

Thank you

TATHAM ENGINEERING

Regina Hodgins
Senior Administrative Assistant

rhodgins@tathameng.com **T** 705-444-2565 x2039
115 Sandford Fleming Drive, Suite 200, Collingwood, Onatrio L9Y 5A6

tathameng.com

Lake Simcoe Region conservation authority

Regulatory Floodplain Hazard

Scale 1: 3,246

165 0 82 165 Meters

Features

- LSRCA Watershed Boundary
- LSPP Watershed Boundary
- Cross Sections - Planning
- Floodplain
  - Floodplain
  - Spill
- Floodplain Setback
- Assessment Parcel
- Lot and Concession
- Watercourse
- Roads
  - Hwy 400 Series
  - Highway, Arterials
  - Local Road
- Railway
- Lower Tier Municipality

Printed On:
5/1/2023

WGS_1984_Web_Mercator_Auxiliary_Sphere

Mapped By:

Regulatory Meanderbelt Hazard

Lake Simcoe Region conservation authority

Scale 1: 3,246

165 0 82 165 Meters

Features

- LSRCA Watershed Boundary
- LSPP Watershed Boundary
- Meanderbelt
- Meanderbelt Setback
- Assessment Parcel
- Lot and Concession
- Watercourse
- Roads
  - Hwy 400 Series
  - Highway, Arterials
  - Local Road
- Railway
- Lower Tier Municipality

Printed On:
5/1/2023

WGS_1984_Web_Mercator_Auxiliary_Sphere

Mapped By:

Lake Simcoe Region
conservation authority

LSRCA Regulated Area

Scale 1: 3,246

165 0 82 165 Meters

Features

- LSRCA Watershed Boundary
- LSPP Watershed Boundary
- Regulation Boundary
- Regulation Area
- Assessment Parcel
- Lot and Concession
- Watercourse
- Roads
  - Hwy 400 Series
  - Highway, Arterials
  - Local Road
- Railway
- Lower Tier Municipality

Printed On:
5/1/2023

WGS_1984_Web_Mercator_Auxiliary_Sphere

Mapped By:

Lake Simcoe Region conservation authority

Unevaluated Wetland and lands adjacent (30m)

Scale 1: 3,246

165 0 82 165 Meters

Features

- LSRCA Watershed Boundary
- LSPP Watershed Boundary
- Regulated Wetland
  - PSW
  - Non PSW
- Wetland With Adjacent Lands
- MNRF Evaluated Wetland
  - PSW
  - Other Evaluated
- MNRF Unevaluated Wetland
- Assessment Parcel
- Lot and Concession
- Watercourse
- Roads
  - Hwy 400 Series
  - Highway, Arterials
  - Local Road
- Railway
- Lower Tier Municipality

Printed On:
5/1/2023

WGS_1984_Web_Mercator_Auxiliary_Sphere

Mapped By:

Lake Simcoe Region conservation authority

YR Significant Woodland

Scale 1: 3,246

165 0 82 165 Meters

Features

- LSRCA Watershed Boundary
- LSPP Watershed Boundary
- York Signif Woodland
- Assessment Parcel
- Lot and Concession
- Watercourse
- Roads
  - Hwy 400 Series
  - Highway, Arterials
  - Local Road
- Railway
- Lower Tier Municipality

Printed On:
5/1/2023

WGS_1984_Web_Mercator_Auxiliary_Sphere

Mapped By:

Ontario

Ministry of the Environment, Conservation and Parks

Environmental Assessment Branch

1st Floor
135 St. Clair Avenue W
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax.: 416 314-8452

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations environnementales

Rez-de-chaussée
135, avenue St. Clair Ouest
Toronto ON M4V 1P5
Tél. : 416 314-8001
Téléc. : 416 314-8452

April 12, 2023

Ryan Post
Project Manager
Town of Georgina
Operations and Infrastructure
rpost@georgina.ca

BY EMAIL ONLY

Re: **Old Shiloh Road Bridge Replacement**
Town of Georgina
Municipal Class Environmental Assessment, Schedule B
Notice of Commencement

Dear Mr. Post,

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the Town of Georgina (proponent) has indicated that the study is following the approved environmental planning process for a Schedule B project under the Municipal Class Environmental Assessment (Class EA).

The **updated (August 2022)** attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document**

relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed project**, the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown`s preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed project:

- **Chippewas of Rama First Nation**
- **Chippewas of Georgina Island First Nation**
- **Beausoleil First Nation**
- **Alderville First Nation**
- **Curve Lake First Nation**
- **Hiawatha First Nation**
- **Mississaugas of Scugog Island First Nation**

For the above Williams Treaties communities, please cc Karry Sandy McKenzie, William Treaties First Nations Process Co-ordinator, inquiries@williamstreatiesfirstnations.ca

If the proponent has undertaken archeological studies and are required to undertake any work related to archeological resources, they should also include:

- **Huron-Wendat**

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "Code of Practice for Consultation in Ontario's Environmental Assessment Process". Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) under the following circumstances after initial discussions with the communities identified by the MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities;
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation with Indigenous communities or other stakeholders has reached an impasse; or
- A Section 16 Order request is expected based on impacts to Aboriginal or treaty rights

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play should additional steps and activities be required.

A draft copy of the report should be sent directly to me prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments.

Please also ensure a copy of the final notice is sent to the ministry's Central Region EA notification email account (eanotification.cregion@ontario.ca) after the draft report is reviewed and finalized.

Should you or any members of your project team have any questions regarding the material above, please contact me at trevor.bell@ontario.ca.

Sincerely,

Trevor Bell
Regional Environmental Planner – Central Region
Project Review Unit, Environmental Assessment Branch

Cc: Gavin Battarino, Supervisor, Project Review Unit, MECP
Celeste Dugas, Manager, York Durham District Office, MECP
Emma Wilkinson, Project Manager, Tatham Engineering Limited

Enclosed: Areas of Interest

Attached: Client's Guide to Preliminary Screening for Species at Risk

A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities

AREAS OF INTEREST (v. August 2022)

It is suggested that you check off each section after you have considered / addressed it.

☐ **Planning and Policy**

- Applicable plans and policies should be identified in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.
  - Projects located in MECP Central, Eastern or West Central Region may be subject to **A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020)**.
  - Projects located in MECP Central or Eastern Region may be subject to the **Oak Ridges Moraine Conservation Plan (2017)** or the **Lake Simcoe Protection Plan (2014)**.
  - Projects located in MECP Central, Southwest or West Central Region may be subject to the **Niagara Escarpment Plan (2017)**.
  - Projects located in MECP Central, Eastern, Southwest or West Central Region may be subject to the **Greenbelt Plan (2017)**.
  - Projects located in MECP Northern Region may be subject to the **Growth Plan for Northern Ontario (2011).**

- The **Provincial Policy Statement (2020)** contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.

- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

☐ **Source Water Protection**

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e.

systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- In October 2015, the MEA Parent Class EA document was amended to include reference to the Clean Water Act (Section A.2.10.6) and indicates that proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring with a vulnerable area. **Given this requirement, please include a section in the report on source water protection.**

    - The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.

    - If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.

- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.

- In order to determine if this project is occurring within a vulnerable area, proponents can use Source Protection Information Atlas, which is an online mapping tool available to the public. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the “Map Legend” bar on the left. The mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.

- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. Please document the results of that consultation within the report and include all communication documents/correspondence.**

More Information
For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to Conservation Ontario's website where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in section 1.1 of Ontario Regulation 287/07 made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

☐ **Climate Change**

The document "Considering Climate Change in the Environmental Assessment Process" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

- **The MECP expects proponents of Class EA projects to:**

  1. Consider during the assessment of alternative solutions and alternative designs, the following:
     a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
     b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
  2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "Community Emissions Reduction Planning: A Guide for Municipalities" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

Air Quality, Dust and Noise

- If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. **Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.**

- If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:

    - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
    - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
    - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
    - A discussion of potential mitigation measures.

- As a common practice, "air quality" should be used an evaluation criterion for all road projects.

- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.

- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from*

Construction and Demolition Activities report prepared for Environment Canada. March 2005.

- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

Ecosystem Protection and Restoration

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.

- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
    - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
    - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
    - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, for projects located in Central Region you may consider the provisions of the Rouge Park Management Plan if applicable.

Species at Risk

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario's Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at https://www.ontario.ca/page/species-risk.

- The Client's Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.

- For any questions related to subsequent permit requirements, please contact SAROntario@ontario.ca.

- **Surface Water**

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.

- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's Stormwater Management Planning and Design Manual (2003) should be referenced in the report and utilized when designing stormwater control methods. **A Stormwater Management Plan should be prepared as part of the Class EA process** that includes:

    - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
    - Watershed information, drainage conditions, and other relevant background information
    - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
    - Information on maintenance and monitoring commitments.

- Ontario Regulation 60/08 under the *Ontario Water Resources Act* (OWRA) applies to the Lake Simcoe Basin, which encompasses Lake Simcoe and the lands from which surface water drains into Lake Simcoe. If the proposed sewage treatment plant is listed in Table 1 of the regulation, the report should describe how the proposed project and its mitigation measures are consistent with the requirements of this regulation and the OWRA.

- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

☐ **Groundwater**

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.

- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.

- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.

- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the Water Taking User Guide for EASR for more information.

- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.

☐ **Excess Materials Management**

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled "On-Site and Excess Soil Management" (O. Reg. 406/19) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don't go to waste and to provide clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over time, with the first phase in effect on January 1, 2021. For more information, please visit https://www.ontario.ca/page/handling-excess-soil.

- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP's current guidance document titled "Management of Excess Soil – A Guide for Best Management Practices" (2014).

- All waste generated during construction must be disposed of in accordance with ministry requirements

- **Contaminated Sites**

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the MECP's D-4 guideline for land use considerations near landfills and dumps.
    - Resources available may include regional/local municipal official plans and data; provincial data on large landfill sites and small landfill sites; Environmental Compliance Approval information for waste disposal sites on Access Environment.

- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada's website).

- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.

- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

☐ **Servicing, Utilities and Facilities**

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.

- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the project.

- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP's Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.

- We recommend referring to the ministry's environmental land use planning guides to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

☐ **Mitigation and Monitoring**

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.

- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.

- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section A.2.5 and A.4.1 of the MEA Class EA parent document.

☐ **Consultation**

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout the planning process. The report should also include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments (as directed by the Class EA to include full documentation).

- Please include the full stakeholder distribution/consultation list in the documentation.

Class EA Process

- If this project is a Master Plan: there are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. **The Master Plan should clearly indicate the selected approach for conducting the plan**, by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to Part II Order Requests under the Environmental Assessment Act, although the plan itself would not be. **Please include a description of the approach being undertaken (use Appendix 4 as a reference).**

- If this project is a Master Plan: Any identified projects should also include information on the MCEA schedule associated with the project.

- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.

- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.

- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.

- Ministry guidelines and other information related to the issues above are available at http://www.ontario.ca/environment-and-energy/environment-and-energy. We encourage you to review all the available guides and to reference any relevant information in the report.

Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020

Once the EA Report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address.

The public can request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Section 16 Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Section 16 Order requests on those matters should be addressed in writing to:

Minister David Piccini
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

Ontario

A PROPONENT'S INTRODUCTION TO THE DELEGATION OF PROCEDURAL ASPECTS OF CONSULTATION WITH ABORIGINAL COMMUNITIES

DEFINITIONS

The following definitions are specific to this document and may not apply in other contexts:

Aboriginal communities – the First Nation or Métis communities identified by the Crown for the purpose of consultation.

Consultation – the Crown's legal obligation to consult when the Crown has knowledge of an established or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. This is the type of consultation required pursuant to s. 35 of the *Constitution Act, 1982*. Note that this definition does not include consultation with Aboriginal communities for other reasons, such as regulatory requirements.

Crown – the Ontario Crown, acting through a particular ministry or ministries.

Procedural aspects of consultation – those portions of consultation related to the process of consultation, such as notifying an Aboriginal community about a project, providing information about the potential impacts of a project, responding to concerns raised by an Aboriginal community and proposing changes to the project to avoid negative impacts.

Proponent – the person or entity that wants to undertake a project and requires an Ontario Crown decision or approval for the project.

I. PURPOSE

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that may adversely impact that right. In outlining a framework for the duty to consult, the Supreme Court of Canada has stated that the Crown may delegate procedural aspects of consultation to third parties. This document provides general information about the Ontario Crown's approach to delegation of the procedural aspects of consultation to proponents.

This document is not intended to instruct a proponent about an individual project, and it does not constitute legal advice.

II. WHY IS IT NECESSARY TO CONSULT WITH ABORIGINAL COMMUNITIES?

The objective of the modern law of Aboriginal and treaty rights is the *reconciliation* of Aboriginal peoples and non-Aboriginal peoples and their respective rights, claims and interests. Consultation is an important component of the reconciliation process.

The Crown has a legal duty to consult Aboriginal communities when it has knowledge of an existing or asserted Aboriginal or treaty right and contemplates conduct that might adversely impact that right. For example, the Crown's duty to consult is triggered when it considers issuing a permit, authorization or approval for a project which has the potential to adversely impact an Aboriginal right, such as the right to hunt, fish, or trap in a particular area.

The scope of consultation required in particular circumstances ranges across a spectrum depending on both the nature of the asserted or established right and the seriousness of the potential adverse impacts on that right.

Depending on the particular circumstances, the Crown may also need to take steps to accommodate the potentially impacted Aboriginal or treaty right. For example, the Crown may be required to avoid or minimize the potential adverse impacts of the project.

III. THE CROWN'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

The Crown has the responsibility for ensuring that the duty to consult, and accommodate where appropriate, is met. However, the Crown may delegate the procedural aspects of consultation to a proponent.

There are different ways in which the Crown may delegate the procedural aspects of consultation to a proponent, including through a letter, a memorandum of understanding, legislation, regulation, policy and codes of practice.

If the Crown decides to delegate procedural aspects of consultation, the Crown will generally:

- Ensure that the delegation of procedural aspects of consultation and the responsibilities of the proponent are clearly communicated to the proponent;
- Identify which Aboriginal communities must be consulted;
- Provide contact information for the Aboriginal communities;
- Revise, as necessary, the list of Aboriginal communities to be consulted as new information becomes available and is assessed by the Crown;
- Assess the scope of consultation owed to the Aboriginal communities;
- Maintain appropriate oversight of the actions taken by the proponent in fulfilling the procedural aspects of consultation;
- Assess the adequacy of consultation that is undertaken and any accommodation that may be required;
- Provide a contact within any responsible ministry in case issues arise that require direction from the Crown; and
- Participate in the consultation process as necessary and as determined by the Crown.

IV. THE PROPONENT'S ROLE AND RESPONSIBILITIES IN THE DELEGATED CONSULTATION PROCESS

Where aspects of the consultation process have been delegated to a proponent, the Crown, in meeting its duty to consult, will rely on the proponent's consultation activities and documentation of those activities. The consultation process informs the Crown's decision of whether or not to approve a proposed project or activity.

A proponent's role and responsibilities will vary depending on a variety of factors including the extent of consultation required in the circumstance and the procedural aspects of consultation the Crown has delegated to it. Proponents are often in a better position than the Crown to discuss a project and its potential impacts with Aboriginal communities and to determine ways to avoid or minimize the adverse impacts of a project.

A proponent can raise issues or questions with the Crown at any time during the consultation process. If issues or concerns arise during the consultation that cannot be addressed by the proponent, the proponent should contact the Crown.

a) What might a proponent be required to do in carrying out the procedural aspects of consultation?

Where the Crown delegates procedural aspects of consultation, it is often the proponent's responsibility to provide notice of the proposed project to the identified Aboriginal communities. The notice should indicate that the Crown has delegated the procedural aspects of consultation to the proponent and should include the following information:

- a description of the proposed project or activity;
- mapping;
- proposed timelines;
- details regarding anticipated environmental and other impacts;
- details regarding opportunities to comment; and
- any changes to the proposed project that have been made for seasonal conditions or other factors, where relevant.

Proponents should provide enough information and time to allow Aboriginal communities to provide meaningful feedback regarding the potential impacts of the project. Depending on the nature of consultation required for a project, a proponent also may be required to:

- provide the Crown with copies of any consultation plans prepared and an opportunity to review and comment;
- ensure that any necessary follow-up discussions with Aboriginal communities take place in a timely manner, including to confirm receipt of information, share and update information and to address questions or concerns that may arise;

- as appropriate, discuss with Aboriginal communities potential mitigation measures and/or changes to the project in response to concerns raised by Aboriginal communities;
- use language that is accessible and not overly technical, and translate material into Aboriginal languages where requested or appropriate;
- bear the reasonable costs associated with the consultation process such as, but not limited to, meeting hall rental, meal costs, document translation(s), or to address technical & capacity issues;
- provide the Crown with all the details about potential impacts on established or asserted Aboriginal or treaty rights, how these concerns have been considered and addressed by the proponent and the Aboriginal communities and any steps taken to mitigate the potential impacts;
- provide the Crown with complete and accurate documentation from these meetings and communications; and
- notify the Crown immediately if an Aboriginal community not identified by the Crown approaches the proponent seeking consultation opportunities.

b) What documentation and reporting does the Crown need from the proponent?

Proponents should keep records of all communications with the Aboriginal communities involved in the consultation process and any information provided to these Aboriginal communities.

As the Crown is required to assess the adequacy of consultation, it needs documentation to satisfy itself that the proponent has fulfilled the procedural aspects of consultation delegated to it. The documentation required would typically include:

- the date of meetings, the agendas, any materials distributed, those in attendance and copies of any minutes prepared;
- the description of the proposed project that was shared at the meeting;
- any and all concerns or other feedback provided by the communities;
- any information that was shared by a community in relation to its asserted or established Aboriginal or treaty rights and any potential adverse impacts of the proposed activity, approval or disposition on such rights;
- any proposed project changes or mitigation measures that were discussed, and feedback from Aboriginal communities about the proposed changes and measures;
- any commitments made by the proponent in response to any concerns raised, and feedback from Aboriginal communities on those commitments;
- copies of correspondence to or from Aboriginal communities, and any materials distributed electronically or by mail;

- information regarding any financial assistance provided by the proponent to enable participation by Aboriginal communities in the consultation;
- periodic consultation progress reports or copies of meeting notes if requested by the Crown;
- a summary of how the delegated aspects of consultation were carried out and the results; and
- a summary of issues raised by the Aboriginal communities, how the issues were addressed and any outstanding issues.

In certain circumstances, the Crown may share and discuss the proponent's consultation record with an Aboriginal community to ensure that it is an accurate reflection of the consultation process.

c) Will the Crown require a proponent to provide information about its commercial arrangements with Aboriginal communities?

The Crown may require a proponent to share information about aspects of commercial arrangements between the proponent and Aboriginal communities where the arrangements:

- include elements that are directed at mitigating or otherwise addressing impacts of the project;
- include securing an Aboriginal community's support for the project; or
- may potentially affect the obligations of the Crown to the Aboriginal communities.

The proponent should make every reasonable effort to exempt the Crown from confidentiality provisions in commercial arrangements with Aboriginal communities to the extent necessary to allow this information to be shared with the Crown.

The Crown cannot guarantee that information shared with the Crown will remain confidential. Confidential commercial information should not be provided to the Crown as part of the consultation record if it is not relevant to the duty to consult or otherwise required to be submitted to the Crown as part of the regulatory process.

V. WHAT ARE THE ROLES AND RESPONSIBILITIES OF ABORIGINAL COMMUNITIES' IN THE CONSULTATION PROCESS?

Like the Crown, Aboriginal communities are expected to engage in consultation in good faith. This includes:

- responding to the consultation notice;
- engaging in the proposed consultation process;
- providing relevant documentation;

- clearly articulating the potential impacts of the proposed project on Aboriginal or treaty rights; and
- discussing ways to mitigates any adverse impacts.

Some Aboriginal communities have developed tools, such as consultation protocols, policies or processes that provide guidance on how they would prefer to be consulted. Although not legally binding, proponents are encouraged to respect these community processes where it is reasonable to do so. Please note that there is no obligation for a proponent to pay a fee to an Aboriginal community in order to enter into a consultation process.

To ensure that the Crown is aware of existing community consultation protocols, proponents should contact the relevant Crown ministry when presented with a consultation protocol by an Aboriginal community or anyone purporting to be a representative of an Aboriginal community.

VI. WHAT IF MORE THAN ONE PROVINCIAL CROWN MINISTRY IS INVOLVED IN APPROVING A PROPONENT'S PROJECT?

Depending on the project and the required permits or approvals, one or more ministries may delegate procedural aspects of the Crown's duty to consult to the proponent. The proponent may contact individual ministries for guidance related to the delegation of procedural aspects of consultation for ministry-specific permits/approvals required for the project in question. Proponents are encouraged to seek input from all involved Crown ministries sooner rather than later.

Client's Guide to Preliminary Screening for Species at Risk

Ministry of the Environment, Conservation and Parks

Species at Risk Branch, Permissions and Compliance

DRAFT - May 2019

Table of Contents

1.0 Purpose, Scope, Background and Context

1.1 Purpose of this Guide

This guide has been created to:

- help clients better understand their obligation to gather information and complete a preliminary screening for species at risk before contacting the ministry,
- outline guidance and advice clients can expect to receive from the ministry at the preliminary screening stage,
- help clients understand how they can gather information about species at risk by accessing publicly available information housed by the Government of Ontario, and
- provide a list of other potential sources of species at risk information that exist outside the Government of Ontario.

It remains the client's responsibility to:

- carry out a preliminary screening for their projects,
- obtain best available information from all applicable information sources,
- conduct any necessary field studies or inventories to identify and confirm the presence or absence of species at risk or their habitat,
- consider any potential impacts to species at risk that a proposed activity might cause, and
- comply with the *Endangered Species Act* (ESA).

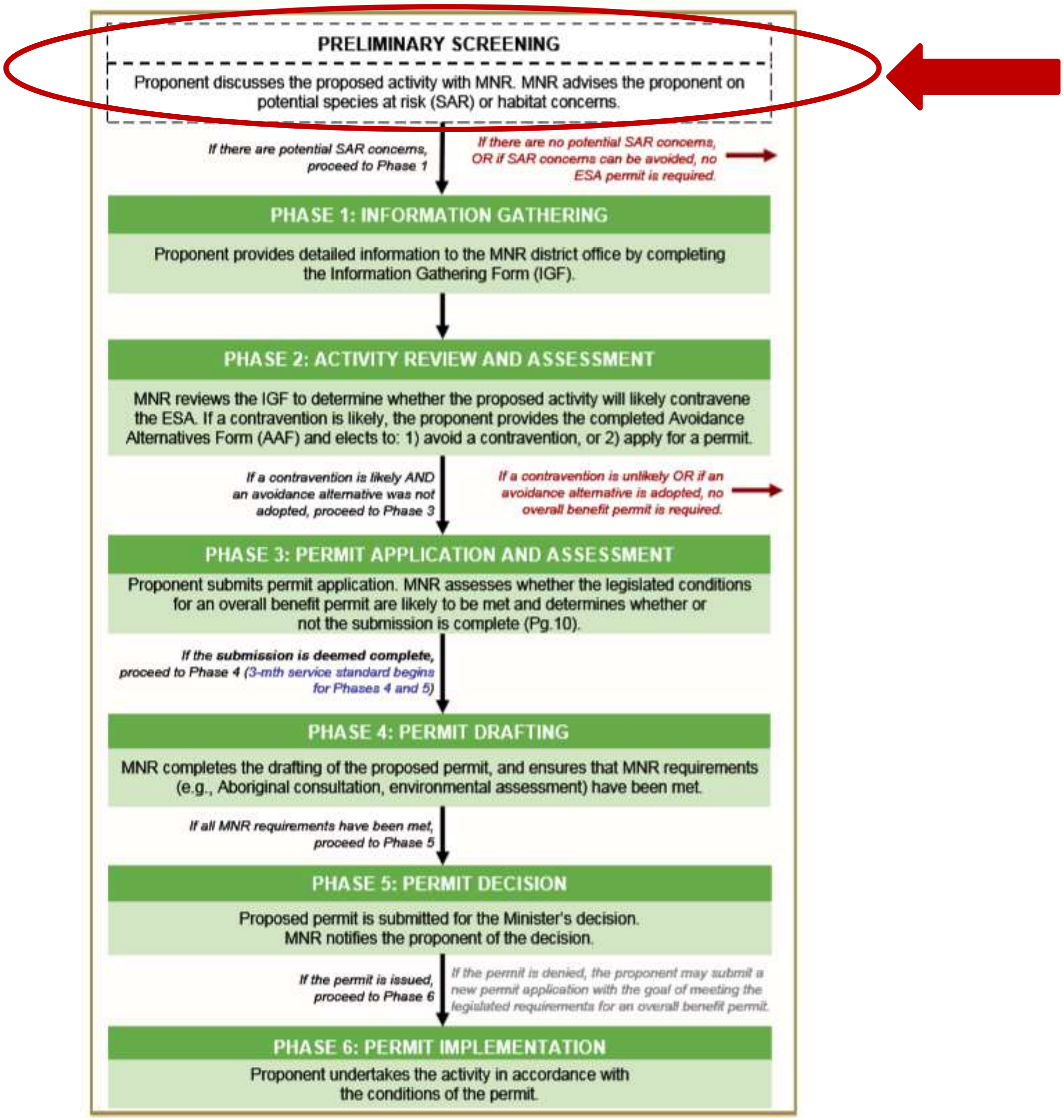
To provide the most efficient service, clients should initiate species at risk screenings and seek information from all applicable information sources identified in this guide, at a minimum, prior to contacting Government of Ontario ministry offices for further information or advice.

1.2 Scope

This guide is a resource for clients seeking to understand if their activity is likely to impact species at risk or if they are likely to trigger the need for an authorization under the ESA. It is not intended to circumvent any detailed site surveys that may be necessary to document species at risk or their habitat nor to circumvent the need to assess the impacts of a proposed activity on species at risk or their habitat. This guide is not an exhaustive list of available information sources for any given area as the availability of information on species at risk and their habitat varies across the province. This guide is intended to support projects and activities carried out on Crown and private land, by private landowners, businesses, other provincial ministries and agencies, or municipal government.

1.3 Background and Context

To receive advice on their proposed activity, clients must first determine whether any species at risk or their habitat exist or are likely to exist at or near their proposed activity, and whether their proposed activity is likely to contravene the ESA. Once this step is complete, clients may contact the ministry at SAROntario@ontario.ca to discuss the main purpose, general methods, timing and location of their proposed activity as well as information obtained about species at risk and their habitat at, or near, the site. At this stage, the ministry can provide advice and guidance to the client about potential species at risk or habitat concerns, measures that the client is considering to avoid adverse effects on species at risk or their habitat and whether additional field surveys are advisable. This is referred to as the "Preliminary Screening" stage. For more information on additional phases in the diagram below, please refer to the *Endangered Species Act Submission Standards for Activity Review and 17(2)(c) Overall Benefit Permits* policy available online at https://www.ontario.ca/page/species-risk-overall-benefit-permits



2.0 Roles and Responsibilities

To provide the most efficient service, clients should initiate species at risk screenings and seek information from all applicable information sources identified in this guide prior to contacting Government of Ontario ministry offices for further information or advice.

Step 1: Client seeks information regarding species at risk or their habitat that exist, or are likely to exist, at or near their proposed activity by referring to all applicable information sources identified in this guide.

Step 2: Client reviews and consider guidance on whether their proposed activity is likely to contravene the ESA (see section 3.4 of this guide for guidance on what to consider).

Step 3: Client gathers information identified in the checklist in section 4 of this guide.

Step 4: Client contacts the ministry at SAROntario@ontario.ca to discuss their preliminary screening. Ministry staff will ask the client questions about the main purpose, general methods, timing and location of their proposed activity as well as information obtained about species at risk and their habitat at, or near, the site. Ministry staff will also ask the client for their interpretation of the impacts of their activity on species at risk or their habitat as well as measures the client has considered to avoid any adverse impacts.

Step 5: Ministry staff will provide advice on next steps.

> **Option A:** Ministry staff may advise the client they can proceed with their activity without an authorization under the ESA where the ministry is confident that:
> - no protected species at risk or habitats are likely to be present at or near the proposed location of the activity; or
> - protected species at risk or habitats are known to be present but the activity is not likely to contravene the ESA; or
> - through the adoption of avoidance measures, the modified activity is not likely to contravene the ESA.
>
> **Option B:** Ministry staff may advise the client to proceed to Phase 1 of the overall benefit permitting process (i.e. Information Gathering in the previous diagram), where:
> - there is uncertainty as to whether any protected species at risk or habitats are present at or near the proposed location of the activity; or
> - the potential impacts of the proposed activity are uncertain; or
> - ministry staff anticipate the proposed activity is likely to contravene the ESA.

3.0 Information Sources

Land Information Ontario (LIO) and the Natural Heritage Information Centre (NHIC) maintain and provide information about species at risk, as well as related information about fisheries, wildlife, crown lands, protected lands and more. This information is made available to organizations, private individuals, consultants, and developers through online sources and is often considered under various pieces of legislation or as part of regulatory approvals and planning processes.

The information available from LIO or NHIC and the sources listed in this guide should not be considered as a substitute for site visits and appropriate field surveys. Generally, this information can be regarded as a starting point from which to conduct further field surveys, if needed. While this data represents best available current information, it is important to note that a lack of information for a site does not mean that species at risk or their habitat are not present. There are many areas where the Government of Ontario does not currently have information, especially in more remote parts of the province. The absence of species at risk location data at or near your site does not necessarily mean no species at risk are present at that location. On-site assessments can better verify site conditions, identify and confirm presence of species at risk and/or their habitats.

Information on the location (i.e. observations and occurrences) of species at risk is considered sensitive and therefore publicly available only on a 1km square grid as opposed to as a detailed point on a map. This generalized information can help you understand which species at risk are in the general vicinity of your proposed activity and can help inform field level studies you may want to undertake to confirm the presence, or absence of species at risk at or near your site.

Should you require specific and detailed information pertaining to species at risk observations and occurrences at or near your site on a finer geographic scale; you will be required to demonstrate your need to access this information, to complete data sensitivity training and to obtain a Sensitive Data Use License from the NHIC. Information on how to obtain a license can be found online at https://www.ontario.ca/page/get-natural-heritage-information.

Many organizations (e.g. other Ontario ministries, municipalities, conservation authorities) have ongoing licensing to access this data so be sure to check if your organization has this access and consult this data as part of your preliminary screening if your organization already has a license.

3.1 Make a Map: Natural Heritage Areas

The Make a Natural Heritage Area Map (available online at http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US provides public access to natural heritage information, including species at risk, without the user needing to have Geographic Information System (GIS) capability. It allows users to view and identify generalized species at risk information, mark areas of interest, and create and print a custom map directly from the web application. The tool also shows topographic information such as roads, rivers, contours and municipal boundaries.

Users are advised that sensitive information has been removed from the natural areas dataset and the occurrences of species at risk has been generalized to a 1-kilometre grid to mitigate the risks to the species (e.g. illegal harvest, habitat disturbance, poaching).

The web-based mapping tool displays natural heritage data, including:

- Generalized Species at risk occurrence data (based on a 1-km square grid),
- Natural Heritage Information Centre data.

Data cannot be downloaded directly from this web map; however, information included in this application is available digitally through Land Information Ontario (LIO) at https://www.ontario.ca/page/land-information-ontario.

3.2 Land Information Ontario (LIO)

Most natural heritage data is publicly available. This data is managed in a large provincial corporate database called the LIO Warehouse and can be accessed online through the LIO Metadata Management Tool at https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home. This tool provides descriptive information about the characteristics, quality and context of the data. Publicly available geospatial data can be downloaded directly from this site.

While most data are publicly available, some data may be considered highly sensitive (i.e. nursery areas for fish, species at risk observations) and as such, access to some data maybe restricted.

3.3 Additional Species at Risk Information Sources

- The Breeding Bird Atlas can be accessed online at http://www.birdsontario.org/atlas/index.jsp?lang=en
- eBird can be accessed online at https://ebird.org/home
- iNaturalist can be accessed online at https://www.inaturalist.org/
- The Ontario Reptile and Amphibian Atlas can be accessed online at https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas
- Your local Conservation Authority. Information to help you find your local Conservation Authority can be accessed online at https://conservationontario.ca/conservation-authorities/find-a-conservation-authority/

  Local naturalist groups or other similar community-based organizations
- Local Indigenous communities
- Local land trusts or other similar Environmental Non-Government Organizations
- Field level studies to identify if species at risk, or their habitat, are likely present or absent at or near the site.
- When an activity is proposed within one of the continuous caribou ranges, please be sure to consider the caribou Range Management Policy. This policy includes figures and maps of the continuous caribou range, can be found online at https://www.ontario.ca/page/range-management-policy-support-woodland-caribou-conservation-and-recovery

3.4 Information Sources to Support Impact Assessments

- Guidance to help you understand if your activity is likely to adversely impact species at risk or their habitat can be found online at https://www.ontario.ca/page/policy-guidance-harm-and-harass-under-endangered-species-act and https://www.ontario.ca/page/categorizing-and-protecting-habitat-under-endangered-species-act
- A list of species at risk in Ontario is available online at https://www.ontario.ca/page/species-risk-ontario. On this webpage, you can find out more about each species, including where is lives, what threatens it and any specific habitat protections that apply to it by clicking on the photo of the species.

4.0 Check-List

Please feel free to use the check list below to help you confirm you have explored all applicable information sources and to support your discussion with Ministry staff at the preliminary screening stage.

- ✓ Land Information Ontario (LIO)
- ✓ Natural Heritage Information Centre (NHIC)
- ✓ The Breeding Bird Atlas
- ✓ eBird
- ✓ iNaturalist
- ✓ Ontario Reptile and Amphibian Atlas
- ✓ List Conservation Authorities you contacted:______________________________________

  ____
- ✓ List local naturalist groups you contacted:____

  ____
- ✓ List local Indigenous communities you contacted:___________________________________

  ____
- ✓ List any other local land trusts or Environmental Non-Government Organizations you contacted:____

  ____
- ✓ List and field studies that were conducted to identify species at risk, or their habitat, likely to be present or absent at or near the site: _____________________________________

  ____
- ✓ List what you think the likely impacts of your activity are on species at risk and their habitat (e.g. damage or destruction of habitat, killing, harming or harassing species at risk):____

  ____

TATHAM ENGINEERING

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File 122279

August 14, 2023

recipient name
recipient title position
recipient company
street address
city, Ontario postal
email

Re: Old Shiloh Road Bridge, Udora, ON
Class Environmental Assessment Comments

Dear Resident:

Thank you for your interest in the Old Shiloh Road Bridge. We are writing to acknowledge receipt of your comments or your request to be included in the project mailing list. Further to the Public Information Centre held on May 17, 2023, the Town received a variety of comments related to the Study and the alternatives being considered.

As a result of the comments, the Town undertook an additional traffic count at the bridge. In addition to the traffic counts, the Town is also undertaking a more detailed life cycle cost analysis of the rehabilitation and replacement options to further understand the overall financial impacts of both the capital and maintenance costs over the life of the bridge.

Enclosed is a general fact sheet and list of frequently asked questions pertaining to the Study. We hope that these help to answer any questions you may have.

For further information and to review the results of the various background studies that have been completed in support of the Class Environmental Assessment Study, please visit the Town's project website georgina.ca/oldshilohbridge to review Technical Memorandum 1.

The results of the comments received, and the life cycle cost analysis will be utilized to re-evaluate the alternative solutions and confirm the preferred solution. These findings will be presented in Technical Memoranda 2 & 3 which will then be posted to the project website.

A Notice of Study Completion will be circulated upon completion of the Project File Report and we welcome any additional comments from you at that time.

We trust this is satisfactory.

Yours truly,
Tatham Engineering Limited

Emma Wilkinson, HBA, B.E.Sc., P.Eng.
Senior Engineer, Project Manager
EKW: rlh

copy: Ryan Post, P.Geo. Town of Georgina rpost@georgina.ca

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Appendix H:
Life Cycle Cost Analysis

OLD SHILOH ROAD BRIDGE IMPROVMENTS

PRELIMINARY COST ESTIMATE : REHABILITATION

Item & Description		Unit	Estimated Quantity		Unit Price		Total Cost
PART A: GENERAL WORK							
A1	Mobilization & Demobilization	LS	1	$	60,000	$	60,000
A2	Contract Bonds & Insurance	LS	1	$	50,000	$	50,000
A3	Traffic Control and Signage	LS	1	$	20,000	$	20,000
A4	Environmental Protection	LS	1	$	25,000	$	25,000
A6	Access to Work	LS	1	$	75,000	$	75,000
					Sub-Total Part A	**$**	**230,000**
PART B: BRIDGE WORKS							
B1	Partial Depth Concrete Removals	m2	200	$	1,500	$	300,000
B2	Concrete Patch Repairs	m3	20	$	18,000	$	360,000
B3	Concrete Abutment Repairs	m3	8	$	5,500	$	44,000
B4	Remove and Replace Approach Guide Rail	m	160	$	650	$	104,000
B5	Remove and Replace Bridge Barrier	m	60	$	3,000	$	180,000
B6	Asphalt Removal	m2	420	$	25	$	10,500
B7	Concrete Crack Injection	m3	200	$	500	$	100,000
B8	Bridge Deck Waterproofing	m2	180	$	75	$	13,500
B9	Paving	tonne	105	$	200	$	21,000
B10	Erosion Protection	LS	1	$	25,000	$	25,000
B11	Concrete Approach Slabs	m3	18	$	3,500	$	63,000
B12	Concrete End Walls	m3	6	$	5,500	$	33,000
B13	Concrete Sealing	m2	500	$	160	$	80,000
					Sub-Total Part B	**$**	**1,334,000**
					Sub-Total Items A & B	**$**	**1,564,000**
					Contingency 20%	**$**	**313,000**
					GRAND TOTAL	**$**	**1,877,000**

OLD SHILOH ROAD BRIDGE IMPROVMENTS

PRELIMINARY COST ESTIMATE : REPLACEMENT - ONE LANE

Item & Description		Unit	Estimated Quantity		Unit Price		Total Cost
PART A: GENERAL WORK							
A1	Mobilization & Demobilization	LS	1	$	60,000	$	60,000
A2	Contract Bonds & Insurance	LS	1	$	50,000	$	50,000
A3	Traffic Control and Signage	LS	1	$	20,000	$	20,000
A4	Environmental Protection	LS	1	$	35,000	$	35,000
A6	Access to Work	LS	1	$	75,000	$	75,000
A7	Excavation	LS	1	$	50,000	$	50,000
					Sub-Total Part A	**$**	**290,000**
PART B: BRIDGE WORKS							
B1	Remove Existing Bridge	LS	1	$	150,000	$	150,000
B2	Dewatering/Unwatering of Structural Excavation	LS	1	$	25,000	$	25,000
B3	Structural Backfill	tonne	1,055	$	35	$	36,925
B4	Piles	LS	1	$	120,000	$	120,000
B5	Concrete Pile Cap	m3	60	$	3,000	$	180,000
B6	Concrete Abutments	m3	65	$	3,000	$	195,000
B7	Concrete Wingwalls	m3	288	$	3,000	$	864,000
B8	Concrete Deck	m3	40	$	3,000	$	120,000
B9	Concrete Approach Slabs & Sleeper Slab	m3	25	$	3,000	$	75,000
B10	Concrete End Walls	m3	6	$	3,000	$	18,000
B11	Box Girders	LS	1	$	250,000	$	250,000
B12	Wingwall Ties	Ea.	8	$	25,000	$	200,000
B13	Bearings	each	4	$	5,000	$	20,000
B14	Bridge Deck Waterproofing	m2	190	$	75	$	14,250
B15	Bridge Barrier	m	60	$	1,500	$	90,000
B16	R50 River Stone 300mm Depth c/w Filter Fabric	m2	350	$	200	$	70,000
B17	Asphalt Removal	m2	420	$	25	$	10,500
B18	Paving	tonne	105	$	200	$	21,000
B19	Restoration - Topsoil, Seed, and Mulch	LS	1	$	25,000	$	25,000
B20	Expansion Joint - Type C (Sleeper Slab)	m	12	$	5,000	$	60,000
					Sub-Total Part B	**$**	**2,544,675**
					Sub-Total Items A & B	**$**	**2,834,675**
					Contingency 20%	**$**	**425,000**
					GRAND TOTAL	**$**	**3,259,675**

OLD SHILOH ROAD BRIDGE IMPROVMENTS

PRELIMINARY COST ESTIMATE : REPLACEMENT - TWO LANE

Item & Description		Unit	Estimated Quantity		Unit Price		Total Cost
PART A: GENERAL WORK							
A1	Mobilization & Demobilization	LS	1	$	60,000	$	60,000
A2	Contract Bonds & Insurance	LS	1	$	50,000	$	50,000
A3	Traffic Control and Signage	LS	1	$	25,000	$	25,000
A4	Environmental Protection	LS	1	$	50,000	$	50,000
A6	Access to Work	LS	1	$	75,000	$	75,000
A7	Excavation	LS	1	$	75,000	$	75,000
					Sub-Total Part A	**$**	**335,000**
PART B: BRIDGE WORKS							
B1	Remove Existing Bridge	LS	1	$	150,000	$	150,000
B2	Dewatering/Unwatering of Structural Excavation	LS	1	$	35,000	$	35,000
B3	Structural Backfill	tonne	2,110	$	35	$	73,850
B4	Piles	LS	1	$	175,000	$	175,000
B5	Concrete Pile Cap	m3	90	$	3,000	$	270,000
B6	Concrete Abutments	m3	115	$	3,000	$	345,000
B7	Concrete Wingwalls	m3	430	$	3,000	$	1,290,000
B8	Concrete Deck	m3	70	$	3,000	$	210,000
B9	Concrete Approach Slabs & Sleeper Slab	m3	40	$	3,000	$	120,000
B10	Concrete End Walls	m3	6	$	3,000	$	18,000
B11	Box Girders	LS	1	$	350,000	$	350,000
B12	Wingwall Ties	Ea.	12	$	25,000	$	300,000
B13	Bearings	each	4	$	5,000	$	20,000
B14	Bridge Deck Waterproofing	m2	325	$	75	$	24,375
B15	Bridge Barrier	m	60	$	1,500	$	90,000
B16	R10 River Stone 300mm Depth c/w Filter Fabric	m2	400	$	205	$	82,000
B17	Asphalt Removal	m2	420	$	25	$	10,500
B18	Paving	tonne	175	$	200	$	35,000
B19	Restoration - Topsoil, Seed, and Mulch	LS	1	$	35,000	$	35,000
B20	Expansion Joint - Type C (Sleeper Slab)	m	20	$	5,000	$	100,000
					Sub-Total Part B	**$**	**3,733,725**
					Sub-Total Items A &B	**$**	**4,068,725**
					Contingency 20%	**$**	**814,000**
					GRAND TOTAL	**$**	**4,882,725**

OLD SHILOH ROAD BRIDGE IMPROVMENTS

PRELIMINARY COST ESTIMATE : BUILD ADJACENT

Item & Description		Unit	Estimated Quantity		Unit Price		Total Cost
PART A: GENERAL WORK							
A1	Mobilization & Demobilization	LS	1	$	60,000	$	60,000
A2	Contract Bonds & Insurance	LS	1	$	50,000	$	50,000
A3	Traffic Control and Signage	LS	1	$	25,000	$	25,000
A4	Environmental Protection	LS	1	$	50,000	$	50,000
A6	Access to Work	LS	1	$	75,000	$	75,000
A7	Excavation	LS	1	$	75,000	$	75,000
					Sub-Total Part E	**$**	**335,000**
PART B: BRIDGE WORKS							
B1	Partial Depth Concrete Removals	m2	100	$	1,500	$	150,000
B2	Concrete Patch Repairs	m3	10	$	18,000	$	180,000
B3	Remove and Replace Approach Guide Rail	m	160	$	650	$	104,000
B4	Remove and Replace Bridge Barrier	m	60	$	3,000	$	180,000
B5	Asphalt Removal	m2	420	$	25	$	10,500
B6	Concrete Crack Injection	m3	200	$	500	$	100,000
B7	Bridge Deck Waterproofing	m2	180	$	75	$	13,500
B8	Paving	tonne	105	$	200	$	21,000
B9	Erosion Protection	LS	1	$	25,000	$	25,000
B10	Concrete Approach Slabs - existing bridge	m3	18	$	3,500	$	63,000
B11	Concrete End Walls	m3	6	$	5,500	$	33,000
B12	Concrete Sealing	m2	500	$	160	$	80,000
B13	Dewatering/Unwatering of Structural Excavation	LS	1	$	35,000	$	35,000
B14	Structural Backfill	tonne	2,110	$	35	$	73,850
B15	Piles	LS	1	$	175,000	$	175,000
B16	Concrete Pile Cap	m3	91	$	3,000	$	272,160
B17	Concrete Abutments	m3	115	$	3,000	$	345,600
B18	Concrete Wingwalls	m3	432	$	3,000	$	1,296,000
B19	Concrete Deck	m3	68	$	3,000	$	202,500
B20	Concrete Approach Slabs & Sleeper Slab	m3	40	$	3,000	$	118,800
B21	Concrete End Walls	m3	6	$	3,000	$	18,000
B22	Box Girders	LS	1	$	350,000	$	350,000
B23	Wingwall Ties	Ea.	12	$	25,000	$	300,000
B24	Bearings	each	4	$	5,000	$	20,000
B25	Bridge Deck Waterproofing	m2	325	$	75	$	24,375
B26	Bridge Barrier	m	60	$	1,500	$	90,000
B27	Asphalt Removal	m2	660	$	25	$	16,500
B28	Paving	tonne	440	$	200	$	88,000
B29	R10 River Stone 300mm Depth c/w Filter Fabric	m2	400	$	205	$	82,000
B30	Restoration - Topsoil, Seed, and Mulch	LS	1	$	35,000	$	35,000
B31	Expansion Joint - Type C (Sleeper Slab)	m	20	$	5,000	$	100,000
					Sub-Total Part B	**$**	**4,602,785**
					Sub-Total Items A & B	**$**	**4,937,785**
					Contingency 20%	**$**	**988,000**
					GRAND TOTAL	**$**	**5,925,785**

Description - Bridge		Cost	Year
Bridge Rehabilitation	$	1,877,000	0
Bridge Rehabilitation	$	1,284,000	5
Bridge Replacement	$	4,883,000	10
Minor Rehabilitation	$	1,221,000	40
Major Rehabilitation	$	1,954,000	60
Residual Value of Bridge	$	171,200	75
TOTAL COST OVER 75 YEARS	**$**	**11,047,800**	
NET PRESENT VALUE (2023 $)	**$**	**6,662,000**	

Notes

1. NPV based on present day values for future improvements, discounted 4%/ year to 2023.
2. 75-year lifecycle considered
3. Bridge to be replaced in year 10

useful life of bridge in years	75
residual life of bridge at year 75	10

OLD SHILOH ROAD BRIDGE **ALTERNATIVE C2**

CLASS EA STUDY - SCHEDULE B REPLACE WITH TWO LANE BRIDGE

Description - Bridge	Cost	Year
Bridge Replacement	$ 4,883,000	0
Minor Rehabilitation	$ 1,221,000	30
Major Rehabilitation	$ 1,954,000	50
residual value of bridge structure	$ -	75
TOTAL COST OVER 75 YEARS	**$ 8,058,000**	
NET PRESENT VALUE (2023 $)	**$ 5,534,000**	

Notes

1. NPV based on present day values for future improvements, discounted 4%/ year to 2023.
2. 75-year life cycle considered
3. Bridge to be replaced in year 0

useful life of bridge in years	75
residual life of bridge at year 75	0

OLD SHILOH ROAD BRIDGE

CLASS EA STUDY - SCHEDULE B

Description - Bridge	**Cost**	**Year**
residual value of bridge structure	$ -	75
TOTAL COST OVER 75 YEARS	**$ -**	
NET PRESENT VALUE (2023 $)	**$ 5,534,000**	

Notes

1. NPV based on present day values for future improvements, discounted 4%/ year to 2023.
2. 75-year life cycle considered
3. Bridge to be replaced in year 0

useful life of bridge in years	75
residual life of bridge at year 75	0

Appendix I:
Heritage Impact Assessment

Heritage Impact Assessment (HIA)

of 1925 Concrete Single Span Bowstring Arch Bridge B4
Old Shiloh Bridge, Part of Lot 20, Concession 2 (Geographic Township of Georgina),
Town of Georgina, Regional Municipality of York

Submitted to

Town of Georgina
26557 Civic Centre Road
Keswick, ON, L4P 3G1
905-476-4301

Prepared by

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Archaeological Consulting License # P058
Corporate Project # 2022-986

22 January 2024

TABLE OF CONTENTS

Project Personnel

Heritage Consultant	Michael Henry CAPH
Field Reconnaissance	Michael Henry CAPH
Report Preparation	Olivia Vieira Michael Henry CAPH
Photography	Michael Henry CAPH

Executive Summary

This report describes the results of the 2023 Heritage Impact Assessment (HIA) of the 1925 concrete single span bowstring arch bridge B4 (hereafter referred to as Old Shiloh Road Bridge), Part of Lot 20, Concession 2 (Geographic Town of Georgina) Town of Georgina, Regional Municipality of York, conducted by AMICK Consultants Limited. The existing bridge is a single span cast-in-place concrete bowstring arch structure which carries Old Shiloh Road over a tributary of the Pefferlaw River (Pefferlaw Brook), both of which are tributaries of Lake Simcoe. The Old Shiloh Road Bridge supports vehicular and pedestrian traffic. The bridge was constructed in 1925 in the existing Town of Georgina. This investigation was undertaken to support a Municipal Class Environmental Assessment process. All work was conducted in conformity with the Ontario Heritage Act (RSO 2005).

The Old Shiloh Road Bridge is a located within the Lake Simcoe Region Conservation Authority (LSRCA) regulated area. In consideration of the significance of the Old Shiloh Road Bridge to the heritage of the Town of Georgina, the bridge is considered a local landmark as it serves to commemorate the lacustrine and terrestrial transportation history, as well as the settlement and resource management history of the community. The Old Shiloh Road Bridge meets the criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest (CHVI) as stipulated by the Cultural Heritage Evaluation Report (CHER) completed for the structure (AMICK 2020). The CHER indicated that the bridge requires an HIA in the event that removal, rehabilitation, or modifications are proposed for this bridge, especially as they related to the cultural heritage attributes identified for the bridge.

Based on the results of research, site investigation, and application of the criteria from Ontario Regulation 9/06, the Old Shiloh Road Bridge was determined to have elements of moderate cultural heritage value or interest based on the design/physical, contextual, and historical/associative values. Maintaining an association with the bridge's current location and design will satisfy the heritage concerns. The Corporation of the Town of Georgina Municipal Class Environmental Assessment Study (2022), the Old Shiloh Road Bridge CHER (AMICK 2023), and the Old Shiloh Road Bridge HIA (AMICK 2023) must be consulted should demolition or replacement of this structure be under consideration or an option under consideration within the EA process.

A detailed visual inspection was undertaken as per the Ontario Structure Inspection Manual (OSIM) was conducted in 2020, which indicated the bridge was approaching the end of its lifecycle and recommended that planning should commence for its replacement (Georgina.ca, 2022b). The existing bridge may not meet current road or bridge safety standards and may be operating beyond its expected lifespan.

Based on the conclusions of this survey, the following recommendations are made:

1) If the existing bridge is to be replaced, it is recommended that the Town undertake full recording and documentation of the existing structure in situ prior to removal of the existing bridge structure.

2) If the existing bridge is to be replaced, it should be reinstated in the same general location to preserve the historic crossing.

3) The Cultural Heritage Value of the Bridge could be commemorated through reflection of the architectural form of the existing bridge in the design of the replacement bridge.

4) The Cultural Heritage Value of the Bridge could be remembered with a commemorative monument, memorial, or art installation.

5) The Old Shiloh Road Bridge HIA should be consulted when considering viable alternatives to maintain the function of this bridge while respecting its CHVI.

6) This report should be filed with the Town of Georgina as part of the documentation for the EA.

7) This report should be filed with the Ministry of Citizenship and Multiculturalism (MCM) for review and comment as supporting documentation for the EA.

1.0 INTRODUCTION AND METHODOLOGY

1.1 Introduction

This report describes the results of the 2023 Heritage Impact Assessment (HIA) of the 1925 concrete single span bowstring arch bridge B4 (hereafter referred to as Old Shiloh Road Bridge), Part of Lot 20, Concession 2 (Geographic Town of Georgina) Town of Georgina, Regional Municipality of York, conducted by AMICK Consultants Limited. The existing bridge is a single span cast-in-place concrete bowstring arch structure. The Bridge is a single-lane, concrete bowstring arch structure on conventional closed abutments. There are four wing walls extending beyond the bridge to provide roadside stability. There are four concrete pilasters located at each of the four corners of the structure. The structure was built in 1925 and has a deck length of 24 metres. The travel width is 5.2 metres between barriers and the overall structure width is 6.5 m. Concrete barriers are located on each side of the structure and form part of the overall arch system. Each of the two arches is tied to the deck at each end and through the use of four evenly spaced vertical columns. It has not undergone any significant modifications since construction and shows signs of age through weathering and accumulated damage through time.

1.2 Previous Work and Guiding Regulations

The Corporation of the Town of Georgina retained AMICK Consultants Limited, qualified heritage consultants, to complete a Heritage Impact Assessment under the Municipal Class EA criteria. This investigation was undertaken to support a Municipal Class Environmental Assessment process. All work was conducted in conformity with the Ontario Heritage Act (RSO 2005). In addition to the current report, previous cultural heritage assessments were undertaken for the Old Shiloh Road Bridge by AMICK. The bridge was previously rehabilitated for a triple load posting of 20, 21, and 27 tonnes in 1998 (Figure 4) and concrete repairs were done between 2011-2014 (Figure 5).

1.2.3 Cultural Heritage Evaluation Report of the Old Shiloh Road Bridge CHER (AMICK Consultants Limited, 2023)

The Cultural Heritage Evaluation Report (CHER) completed for the Old Shiloh Road Bridge reviewed primary and secondary resources including maps, local histories, and regional reports, and included a site visit and photographic documentation of the Old Shiloh Road Bridge (AMICK 2023). The general character of the property is discussed in this report and those aspects of the property to which O. Reg. 9/06 applies are reviewed and a short description of the bridge is provided. Following the description, a Statement of Cultural Heritage Value or Interest conveyed why the property is important, explaining cultural meanings, associations and connections the property holds for the community that reflected one of or more of the evaluation criteria. The Cultural Heritage Evaluation Report (CHER) completed for the Old Shiloh Road Bridge indicated that the structure will require an HIA in the event that removal and/or modifications are proposed for this structure, and that an HIA must be completed when changes are anticipated to the heritage attributes identified for the bridge (AMICK 2023: 15).

1.2.4 Summary

The present report is a fulfilment of the requirement for an HIA as recommended in the AMICK (2023) reports and the Georgina Official Plan (2016). The present report was undertaken as a validation of these prior recommendations, and will serve to recommend the replacement of the Old Shiloh Road Bridge with a two-lane bridge.

1.3 Methodology

The present manifestation of the Old Shiloh Road Bridge, originally built in 1925, meets the criteria of being over 40 years old, and as such, the Ontario Ministry of Citizenship and Multiculturalism (MCM) considers that the bridge may have cultural heritage value. Therefore, in light of any proposed structural modifications that would affect the appearance or cultural integrity of the Old Shiloh Road Bridge, a Heritage Impact Assessment must be prepared by a qualified heritage consultant for this project. This report has been prepared to address this requirement. The proponent is advised that they should file this report with the MCM for the purpose of review by MCM Heritage Planning Staff as part of the EA process. AMICK Consultants Limited was engaged by the proponent to undertake this study on 18 September 2023. The objectives in undertaking this study are to:

1) Describe the methodology that was employed and the legislative and policy context that guides heritage evaluations of bridges over 40 years old;
2) Provide an historical overview of the design and construction of the bridge within the broader context of the surrounding town and bridge construction generally;
3) Describe existing conditions and heritage integrity;
4) Evaluate the bridge within Regulation 9/06 of the *Ontario Heritage Act* and draw conclusions about the heritage attributes of the structure; and
5) Assess the impacts of the proposed rehabilitation or replacement, ascertaining sensitivity to change in the context of identified heritage attributes and recommend appropriate mitigation measures.

2.0 LOCATION AND DESCRIPTION

2.1 Old Shiloh Road Bridge

The Old Shiloh Road Bridge is located in the Town of Georgina, Part of Lot 20, Concession 2 (Geographic Town of Georgina) Township of York, Regional Municipality of York. The location of the bridge is illustrated in Figure 1 of this report. This report consists of an HIA for the Old Shiloh Road Bridge as part of a bridge replacement project.

The Old Shiloh Road Bridge is single span cast-in-place concrete bowstring arch structure which carries Old Shiloh Road over a Pefferlaw Brook. There are four wing walls extending beyond the bridge to provide roadside stability. There are two concrete pilasters located at two of the corners of the structure, one at one corner of the structure, and three at the last corner of the structure. The structure was built in 1925 and has a deck length of 24 metres. The travel width is 5.2 metres between barriers and the overall structure width is 6.5 m. Concrete barriers are located on each side of the structure and form part of the overall arch system. Each of the two arches is tied to the deck at each end and through the use of four evenly spaced vertical columns.

2.2 Registered/Designated Heritage Sites

The bridge is located within the Lake Simcoe Region Conservation Authority (LSRCA) regulated area.

2.3 Structural Inspection

A rehabilitation and replacement evaluation was prepared by Tathum Engineering Limited, has determined that the structure is in need of replacement and the addition of another lane based of traffic volumes (2023). According to previous rehabilitation drawings from the MTO given to Tatham Engineering Limited, the bridge was previously rehabilitated for a triple load posting in 1988 and between 2011-2014.

2.4 Overview of Local Historical Context

As a contributory document to the Environmental Assessment (EA) process, this report relies on contemporary studies completed as components of this EA, in addition to follow up research. The history of the area has been well researched and documented by AMICK Consultants Limited (2023) in their CHER. Their report notes the following:

> #### *3.1.1 Euro-Canadian Settlement*
>
> *North of Lake Ontario, evidence suggests that early occupation began around 9000 B.C. People probably began to move into this area as the glaciers retreated and glacial lake levels began to recede. The early occupation of the area probably occurred in conjunction with environmental conditions that would be*

comparable to modern Sub-Arctic conditions. Due to the great antiquity of these sites, and the relatively small populations likely involved, evidence of these early inhabitants is sparse and generally limited to tools produced from stone or to by-products of the manufacture of these implements.

York County's boundaries were originally from Lake Ontario to Lake Simcoe, until 1834. The County of York was originally comprised of ten townships and the Town of York (now Toronto) until Toronto separated and incorporated in 1834 (Town of Whitchurch-Stouffvile 2010).

The present-day Town of Georgina was created through the amalgamation of the Town of Georgina and the Township of North Gwillimbury in 1971. The largest of the communities now within the Town of Georgina were Keswick and Sutton. Keswick was once known as Medina and is the largest urban community within the Town of Georgina. Keswick was originally a village in the Township of North Gwillimbury before amalgamation with Sutton to form the Town of Georgina. Sutton was originally a mill site named Bouchier Mills in honour of the builder of the dam on the Black River which was constructed in 1831. In 1864 the village name was changed to Sutton (Town of Georgina 2012).

(AMICK Consultants Limited, 2023: 6)

2.5 Overview of Ontario Bridge Construction History

The history of settlement in Ontario is inextricably tied to the history or the development of overland transportation. As David Cuming notes in his Discovering Heritage Bridges on Ontario Roads (n.d.: 31), "Ontario with its myriad of rivers, creeks, streams and lakes has resulted in a substantial number of minor barriers to communication". As a result, bridges have always formed a significant component of overland transportation and communication routes. The first major roads in Ontario followed settlement by the United Empire Loyalists after the American War of Independence. These early roads were built for strategic military purposes but soon attracted settlement along these routes. Subsequent road construction, whether built by government agencies or private concerns also served to attract settlement and initial settlement promoted construction of further roadways as settlement moved inland from the Great Lakes and the initial transportation corridors (Cuming n.d.: 32).

Bridges were a necessity from the earliest days of road construction. The earliest bridges consisted of nothing more than two parallel logs stretching from one bank to the other with logs overlying these at a right angle. These bridges could be easily and quickly replaced as they rotted or should they be swept away by floodwaters or ice flows (Cuming n.d.: 32). Bridges needed to cover larger spans were constructed by early settlers based on principles employed in the construction of early houses and barns.

Truss systems used in the framing of structures were employed. Two such standard bridge types emerged fairly early on: The King Truss Bridge and the Queen Truss Bridge. The King Truss was built by setting a vertical beam supported by two inclined beams midway along a horizontal beam. The King Truss Bridge could span a gap of up to sixty (60) feet. The Queen truss system was employed for wider spans. This bridge was constructed with two vertical beams supported by one inclined beam for each and joined by a horizontal top beam. The Queen Truss Bridge could span a gap of up to one hundred and twenty (120) feet (Cuming n.d.: 35).

In the years between 1841 and 1849, the Department of Public Works spent $1,300,564 on roads in Canada West, including the construction of forty-three major bridges at a total cost of $206, 928. A full third of these bridges were timber-built Queen Truss Bridges. During this same period numerous bridge designs were patented in the United States under fierce competition to increase the length and strength of bridges. As a result, bridge construction in North America began a period of transition from wood to metal structures (Cuming n.d.: 36).

Many road bridge designs that evolved were based on principles derived from railroad construction. Other designs that had a major impact on bridge engineering evolved independently. The Whipple Truss was first built in 1841. This new design consisted of a totally metal bowstring arch bridge. The arch of the bridge and the vertical supporting members were manufactured of cast iron while the diagonal bracing used wrought iron. The typical bridge built in the middle of the 19th century in the United States was entirely made of wrought iron (Cuming n.d.: 37). In Ontario the timber bridge dominated the landscape in rural areas from 1780-1880 and persisted into the early twentieth century. Wrought iron bridges were built in areas with higher population densities such as the thriving market towns of Brantford, Peterborough, London and Paris. These communities all had wrought iron bridges that were constructed during the 1870s (Cuming n.d.: 38).

Metal bridges were sold in separate components produced in factories and shipped to the location of construction and assembled on site. Bridge components were ordered through catalogues. To simplify construction, the first metal bridges were assembled using “pin connections”, which were essentially threaded bolts that obviated the need for specialists or specialized equipment such as rivets required. Construction of such bridges could be completed with unskilled local labour in two to three weeks. These bridges were ideally suited to bridge construction in small communities or rural contexts (Cuming n.d.: 38).

Beginning in the 1880s designers began to replace wrought iron elements in bridges with steel. This marked the beginning of a transition from wrought iron to steel bridges (Cuming n.d.: 41). Several factors contributed to the rapid development and proliferation of steel bridges at the beginning of the twentieth century. Portable pneumatic tools allowed for the use of rivets on even rural sites of bridge construction and pin connections rapidly disappeared. Rivets allowed for longer and sturdier construction. New production methods made steel as cheap as wrought iron. The concurrent developments in heavier vehicle and agricultural machinery required bridges capable of taking heavier loads which made construction of timber bridges impractical even in rural areas. “Through truss” style construction was employed over larger spans or in locations where traffic loads were heavy. Steel bridges were erected in quantity throughout Ontario following 1900 (Cuming n.d.: 42). The improvement in highway and bridge construction was particularly notable following the end of the First World War with massive increases in automobile traffic and the development of heavy construction machinery (Cuming n.d.: 51-53).

Experimentation with reinforced concrete bridge construction began in the 1880s in France followed by the United States. The first concrete arch bridge was constructed in Ontario in 1905 and was comprised of mass concrete. The first steel reinforced bridge was constructed in 1906. The appeal of reinforced concrete as a construction technology stemmed from its great strength, length of use and low maintenance requirements compared to steel or iron which required regular painting and rust removal (Cuming n.d.: 44). The strength of a reinforced tied concrete arch above the deck was early recognized as a design suitable for almost any location, particularly in crossings with low banks where arched construction below the deck was unsuitable (Cuming n.d.: 47). By 1914 it was clear that concrete would dominate the construction of bridges for the foreseeable future (Cuming n.d.: 49). Concrete bridge construction of two types, the tied arch and the concrete beam, boomed in the 1920s (Cuming n.d.: 51).

Beginning in the 1930s a new innovation in bridge design challenged more traditional arched designs. The rigid frame reinforced concrete bridge employed a shallow arch below the deck and could be easily widened to accommodate demands of growing traffic pressures. This was a major advantage over earlier bridge designs such as the tied arch for which such an alteration was impossible (Cuming n.d.: 52).

Conde McCullough achieved his reputation in bridge engineering largely due to his facility for recognizing cost-effective designs based on long-term maintenance costs. His Economics of Bridge Design was a well-received treatise on this subject when published in 1929. This promoted the rise of composite bridge construction during the Depression years of the 1930s. Composite design using steel, wood, and concrete arose; each material has individual strengths and weaknesses for use in bridge design. These range from weight capacity, durability, and, of course, cost.

The nature of materials often leads to their combination in bridge construction, where steel deck girders support a concrete floor or a timber bridge that rests upon a steel or concrete series of piers or abutments. These structures are referred to as “composite” design and by and large most bridges utilize more than a single material, if only for the wearing surface of the roadbed. For purposes of categorization their primary material, usually in reference to the structural support system, classifies bridges. As a result, a steel beam bridge with laminated wood deck and concrete piers is deemed a steel beam bridge.

Slab, beam and girder bridges are essentially similar and related designs, building upon the same basic structural principle, with a single member in tension that spans a void between two fixed points. Structurally a "slab" is the simplest, relying solely upon the inherent strength of a single member for both structure and road surface. A beam bridge is, in essence, a slab (the road deck) that is additionally strengthened by some number of longitudinal members. A girder bridge is a beam bridge with additional transverse supports between the beams (Kramer 2004: 7). Beam and Girder bridge types introduced in the 1930s remained in use throughout the post WWII period (Kramer 2004: 25).

Steel as used in composite bridge construction can be divided into two basic categories that reflect temporal advances in construction technology — rolled section beams versus the later use of welded members. Rolled sections refer to "H" or "I" or other shapes that are manufactured whole (the earlier of the technologies). Welded section beams are made of flat plates, welded into various shapes.

2.5.1 The Old Shiloh Road Bridge

The CHER of the Old Shiloh Road Bridge (AMICK 2023) notes the following:

> *The existing bridge is a single span cast-in-place concrete bowstring arch structure which carries Old Shiloh Road over Pefferlaw Brook. This bridge is an increasingly rare example of a concrete rainbow (through) arch bridge, often called a concrete bowstring bridge. A very beautiful and graceful structure type, a number of these bridges were built throughout Ontario. This one retains good historic integrity including original railings.*
>
> *A field review was undertaken by Michael Henry on 17 January 2023 to conduct photographic documentation of the bridge crossing and to collect data relevant for completing a heritage evaluation of the structure. Results of the field review were then utilized to describe the existing conditions of the bridge crossing. This section provides a general description of the bridge crossing and associated cultural heritage features.*
>
> *The rural context of the bridge suggests that the erection of this bridge was likely in response to the proliferation of automotive traffic and mechanized farm machinery in the early 20th century. The selection of a concrete arch construction in preference to a steel truss bridge was probably made on the basis of a perceived need for added strength.*

> *Historically, the bridge is situated along an early settlement road. Given the settlement history of the area and that this bridge was constructed in 1925, there was likely at least one previous crossing at this location. Figure 2 shows the bridge location today superimposed on a Historic County map of 1860 and Figure 3 shows the bridge location today superimposed on a Historic Atlas map of 1878. Research into this likelihood has not resulted in the location of further information on the history of the crossing itself.*
>
> (AMICK 2023: 7)

The Old Shiloh Road Bridge is currently owned/maintained by the Town of Georgina. Inspections have found that the Old Shiloh Road Bridge is in need of replacement or rehabilitation.

2.6 Heritage Legislative Requirements

Within the Province of Ontario there are a number of legislative requirements which necessitate the consideration of potential heritage features during the planning process.

1. The provincial interest in cultural heritage and the conservation of heritage resources is articulated in the Ontario Heritage Act (RSO 2005). This legislation provides the legislative framework for the conservation of Ontario's heritage. The Ontario Heritage Act is administered by the Ontario Ministry of Culture.
2. Heritage resource conservation is also identified as a provincial interest within the Provincial Policy Statement (2014).
3. Heritage resource conservation is also identified as a provincial interest within the Planning Act (RSO 1990a).
4. Heritage resource conservation is also identified as a provincial interest within the Environmental Assessment Act (RSO 1990b). This legislation considers cultural and built components to be integral elements of the environment. The impact of proposed undertakings to cultural heritage resources must be addressed as part of the standard environmental assessment process in the Province of Ontario.
5. The Public Transportation and Highway Improvement Act (RSO 1990c) and Ontario Regulation 104/97 address the design, construction and maintenance of bridges.

In partnership with other provinces, territories and the federal government, Ontario is also a participant in the Historic Places Initiative, which is a national program to encourage heritage conservation across Canada.

2.7 Municipal Planning Policy Context

The Town of Georgina and York Region encourages the protection and conservation of cultural heritage features.

2.7.1 Municipal Consultation

Community engagement and consultation was undertaken as a standard procedure within the Environmental Assessment (EA) process.

3.0 CULTURAL HERITAGE EVALUATION

The pace of development over the past two decades and projected ongoing development, places many potential heritage bridges under threat. Although most evidence of landscape changes can be seen in the expansion of established communities, the increase in population and commercial activities in these centres results in a greater volume of traffic on regional roads which necessitates improvements to the overall road network. The need for improvements in overland communication and shipping routes has required, and will continue to require, improvements to roadways and associated water crossings.

O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest establishes the criteria by which all types of cultural heritage resources are evaluated:

> *"1. The property has design value or physical value because it,*
>
> > *i. is a rare, unique, representative or early example of a style, type, expression, material or construction method,*
> >
> > *ii. displays a high degree of craftsmanship or artistic merit, or*
> >
> > *iii. demonstrates a high degree of technical or scientific achievement.*
>
> *2. The property has historical value or associative value because it,*
>
> > *i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,*
> >
> > *ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or*
> >
> > *iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.*
>
> *3. The property has contextual value because it,*
>
> > *i. is important in defining, maintaining or supporting the character of an area,*

ii. is physically, functionally, visually or historically linked to its surroundings, or

iii. is a landmark. O. Reg. 9/06, s. 1 (2)."

3.1 Cultural Heritage Evaluation of the Old Shiloh Road Bridge

A property is generally considered to be of cultural heritage value or interest if it meets one or more of the criteria set forth under O. Reg. 9/06. In the CHER (AMICK 2023), the Old Shiloh Road Bridge has been evaluated against the three main criteria and their various subsets. The current report holds no discrepancies with the cultural heritage values assigned to the Old Shiloh Road Bridge in the CHER (AMICK 2023). The results are described in the following table and descriptive sections:

TABLE 1:

Design or Physical Value	
is a rare, unique, representative or early example of a style, type, expression, material or construction method	Yes
displays a high degree of craftsmanship or artistic merit	No
demonstrates a high degree of technical or scientific achievement	No
Historical or Associative Value	
has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,	No
yields, or has the potential to yield information that contributes to an understanding of a community or culture, or	No
demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.	Yes
Contextual Value	
is important in defining, maintaining or supporting the character of an area,	No
is physically, functionally, visually or historically linked to its surroundings, or	No
is a landmark.	Yes

3.1.1 Design or Physical Value

The AMICK CHER notes the following:

The Old Shiloh Road bridge is a simple single span reinforced concrete bowstring arch bridge, constructed in 1925. The structure is typical of the cast in place concrete bowstring arch type. It has not undergone any significant modifications since construction and shows signs of age through weathering and accumulated damage through time. It does not demonstrate a high degree of either

> *craftsmanship or of scientific achievement. It is the only bridge of its kind in York Region.*
>
> (2023: 13)

3.1.2 Historical or Associative Value

The AMICK CHER notes the following:

> *The Old Shiloh Road bridge is a simple single span reinforced concrete bowstring arch bridge, constructed in 1925. The structure is typical of the cast in place concrete bowstring arch type. It has not undergone any significant modifications since construction and shows signs of age through weathering and accumulated damage through time. It does not demonstrate a high degree of either craftsmanship or of scientific achievement. It is the only bridge of its kind in York Region.*
>
> (2023: 13)

3.1.3 Contextual Value

The AMICK CHER notes the following:

> *The bridge is physically linked to its surroundings as a bridge that was constructed in-situ at this location at a long established brooke crossing. The bridge is functionally linked to its surroundings as a component of the rural road system and road network that has existed since at least the middle of the 19th century. This does suggest that this location and the associated crossing represents a landmark feature. However, as a rare example of a once common built form, this bridge has become a landmark feature owing to its distinctive character in contrast with other local and regional bridges.*
>
> (2023: 13-14)

3.1.4 Cultural Heritage Value

The revised procedures set out in the Municipal Class Environmental Assessment, October 2007 and in the amendment approved on August 17, 2023 by the Ontario Minister of the Environment and described in Section 1.2 advise that if the property meets the criteria in Ontario Regulation 9/06, pursuant to the Ontario Heritage Act, it is considered to be a cultural heritage resource.

The Old Shiloh Road Bridge meets the criteria outlined in Regulation 9/06 of the Ontario Heritage Act and the structure therefore has cultural heritage value or interest.

3.2 Statement of Cultural Heritage Value or Interest

The above evaluation confirms that the Old Shiloh Road Bridge meets at least one of the criteria contained in Regulation 9/06 of the Ontario Heritage Act. In particular, the bridge is determined to retain contextual value in that they are physically and historically linked to the community.

The Old Shiloh Road Bridge is typical of the engineering capabilities of the era in which it was constructed, and there are no aesthetic embellishments upon the structure. The Old Shiloh Road Bridge is a beautiful example of a concrete bowstring bridge. The bridge itself is not considered to have any specific design or physical attributes that would lend to its significance as a unique specimen of a high degree of engineering ingenuity or merit for design value. However, in consideration of its significance to the three themes of water use, settlement, and transportation, the bridge may be considered to hold some Cultural Heritage Value or Interest (CHVI). Its heritage significance centres on its physical and historical link to the transportation industries, as well as its perseverance as the oldest remaining bridge structure in the area.

In consideration of the significance of the Old Shiloh Road Bridge to the heritage value of the Town of Georgina, the bridge is considered a local landmark as it serves to commemorate the lacustrine and terrestrial transportation history, as well as the settlement, landscape manipulation, and resource management history of the community. Accordingly, the Old Shiloh Road Bridge is found to have further Cultural Heritage Value based on criteria set forth in O. Reg. 9/06: Criteria for Determining Cultural Heritage Value or Interest.

3.2.1 Heritage Attributes of the Old Shiloh Road Bridge

The Old Shiloh Road Bridge has been determined to have elements of moderate cultural heritage value or interest based on the contextual and associative values. The heritage attributes associated with the cultural heritage value of the bridge are as follows:

1. Commemorates the lacustrine and terrestrial transportation history, as well as the settlement and resource management history of the community
2. Considered a local landmark
3. Association with the concrete bowstring bridge style

4.0 PROPOSED UNDERTAKING AND GUIDELINES

4.2 Proposed Undertaking

The Old Shiloh Road Bridge Municipal Class Environmental Assessment (EA) will examine the option to rehabilitate, replace, or twin the existing bridge by incorporating heritage and EA requirements and confirm the need to replace components of the existing bridge in order to rehabilitate the structure to ensure its longevity.

The repair and rehabilitation of the Old Shiloh Road Bridge involves a considerable amount of structural replacement as well as some minor repairs and maintenance. The existing structure has been identified as being deficient with respect to physical condition, roadway width, load carrying capacity and barrier protection.

The Bridge is a single-lane, concrete bowstring arch structure on conventional closed abutments. There are four wing walls extending beyond the bridge to provide roadside stability. There are two concrete pilasters located at two of the corners of the structure, one at one corner of the structure, and three at the last corner of the structure. The structure was built in the early 1900s (ca. 1925) and has a deck length of 24 metres. The travel width is 5.2 metres between barriers and the overall structure width is 6.5 m. Concrete barriers are located on each side of the structure and form part of the overall arch system. Each of the two arches is tied to the deck at each end and through the use of four evenly spaced vertical columns.

This configuration classifies the structure as a single load path structure, which means that if the railings were significantly damaged it, could result in total bridge failure. Single load path structures are not encouraged in Ontario for this reason. There are no pedestrian sidewalks. The structure has been identified as being deficient with respect to structural capacity, geometry, physical condition and roadside safety.

In order to address the deteriorating condition of the bridge and its numerous deficiencies as a vehicular and pedestrian crossing, a number of alternatives are being considered.

The alternative solutions include:

1. Do nothing;
2. Rehabilitate the existing bridge;
3. Remove and replace the bridge; and
4. Construct a new bridge adjacent to the existing bridge.

4.1 Town of Georgina Heritage Guidelines

The Georgina Official Plane states that reassessment or redevelopment of roads and bridges will be done in a way to minimize impact on cultural heritage resources (Georgina 2016).

5.0 HERITAGE IMPACT ASSESSMENT

5.1 Consideration of Heritage Conservation Alternatives

As Old Shiloh Road is subject to potential replacement, all feasible options for conserving the contextual value of the structure should be considered in order to continue the historical and visual link to its surrounding landscape, which has changed little over time, while ensuring a safe and efficient structure.

The new Bridge will need to be widened to accommodate the current and future transportation needs of the surrounding communities. The current bridge is a single lane contrary to current provincial bridge design guidelines. The Bridge may also be lengthened, meaning construction outside of the existing abutments. The bridge may need to be increased in height depending on the outcome of a hydrological study which will examine how high the water level has been and what water level to plan for upstream flooding in the future.

Two mitigation options are suggested by the Ontario Heritage Bridge Guideline in the case of bridge replacement/removal:

1) Replacement/removal of existing bridge and construction of a new bridge with replication of the appearance of the heritage bridge in the new design, with allowances for the use of modern materials;
2) Replacement/removal of existing bridge and construction of a new bridge with historically sympathetic design qualities to the heritage bridge, with allowances for the use of new technologies and materials.

4.2 Potential Impacts to Cultural Heritage

The alternatives listed above were then evaluated for impacts based on the document entitled, Screening for Impacts to Built Heritage and Cultural Heritage Landscapes *(MTCS 2010)* by the Ministry of Tourism, Culture and Sport.

The alternative chosen should respond directly to the heritage value or values which have been identified for the bridge, but nevertheless must address the higher order criteria for engineering values and public safety. A structure with significant heritage value but which cannot support the required traffic loads and lacks essential safety components is not a viable option. Bridges are, first and foremost, engineering works that allow for the safe and efficient flow of traffic and commerce.

For a replacement structure, the *Standards and Guidelines for the Conservation of Historic Places in Canada* emphasize preference for a sympathetically designed structure that has “the same form, appearance and material properties as the replaced element, and have adequate strength or load-bearing capabilities” (Canada’s Historic Places, 2010, p.203). Some elements such as the safety requirements of barriers will limit truly sympathetic options but can be considered. In this instance, the material properties in a replaced structure need only to replicate the above deck appearance that defines the character of Old Shiloh Road Bridge.

There are a limited number of alternatives that satisfy the requirements for safety and durability of the structure and respect the Heritage aspects of the Site. The role of the bridge within the road network supports the established culture and both historic and future development of the community. From a heritage perspective it appears that alternatives that keep a significant portion of the original fabric of the bridge do not satisfy the requirement to preserve it unaltered for a significant amount of time. The required minimum alterations to stabilize and repair a reinforced concrete structure of this age and condition in and of themselves alter and changes the original bridge to the extent very little of the original structure would remain, if any. Under such circumstances, rehabilitation is more costly and time consuming than new construction would be to achieve the same ends, namely, a new bridge. If these alternatives were pursued they would still require alterations to meet safety requirements which would adversely change the original look of the bridge and further emphasize the lack of historical integrity to the resulting form.

It would appear that from the alternatives that satisfy the minimum safety requirements, those which establish a new replica or sympathetic bridge would be favoured over alternatives that take the structure out of the road network or provide a parallel bridge as the role in the road network is important to the culture and history of the community and the views from the bridge are part of the heritage landscape. A parallel bridge would alter the alignment of the road and detract from the established connections to the surrounding landscape.

The design of this bridge has high heritage value given the relative rarity of this bridge type on the landscape of the present time. Therefore, any replicated or commemorated heritage attributes identified should emphasize the salient features of the design, namely the bowstring arch and rail system above the deck by which the bridge is most readily identified. The Heritage Impacts identified herein should be included in the evaluation of alternatives within the environmental assessment.

4.3 Implementation and Monitoring

All documentation of the current bridge should be undertaken prior to construction works, including a complete photographic record, and updating any existing drawings or surveys of Old Shiloh Road with as-found annotations at the time of major rehabilitation or replacement of the bridge. Documentation should be undertaken to the standards of the Historic American Engineering Record, or equivalent, filed on record with the Ministry of Citizenship and Multiculturalism as well as local community heritage organizations and archives, and the County of York Public Library System. Digital copies of any associated photography should be included in the documentation.

6.0 CONCLUSIONS & RECOMMENDATIONS

Based on the results of research, site investigation, and application of the criteria from Ontario Regulation 9/06, the Old Shiloh Bridge was determined to have elements of high cultural heritage value or interest based on the design/physical, contextual, and historical/associative values. Maintaining an association with the bridge's current location and design will satisfy the heritage concerns. The Corporation of the Town of Georgina Municipal Class Environmental Assessment Study (2022), the Old Shiloh Road Bridge CHER (AMICK 2023), and the Old Shiloh Road Bridge HIA (AMICK 2023) must be consulted should demolition or replacement of this structure be under consideration or an option under consideration within the EA process.

A detailed visual inspection was undertaken as per the Ontario Structural Inspection Manual (OSIM) was conducted in 2020, which indicated the bridge was approaching the end of its lifecycle and recommended that planning should commence for its replacement (Georgina.ca, 2022b). The existing bridge may not meet current road or bridge safety standards and may be operating beyond its expected lifespan.

Based on the conclusions of this survey, the following recommendations are made:

1) If the existing bridge is to be replaced, it is recommended that the Town undertake full recording and documentation of the existing structure in situ prior to removal of the existing bridge structure.

2) If the existing bridge is to be replaced, it should be reinstated in the same general location to preserve the historic crossing.

3) The Cultural Heritage Value of the Bridge could be commemorated through reflection of the architectural form of the existing bridge in the design of the replacement bridge.

4) The Cultural Heritage Value of the Bridge could be remembered with a commemorative monument, memorial, or art installation.

5) The Old Shiloh Road Bridge HIA should be consulted when considering viable alternatives to maintain the function of this bridge while respecting its CHVI.

6) This report should be filed with the Town of Georgina as part of the documentation for the EA.

7) This report should be filed with the Ministry of Citizenship and Multiculturalism (MCM) for review and comment as supporting documentation for the EA.

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Figure 1 Location of the Subject Property (Google Maps 2020)

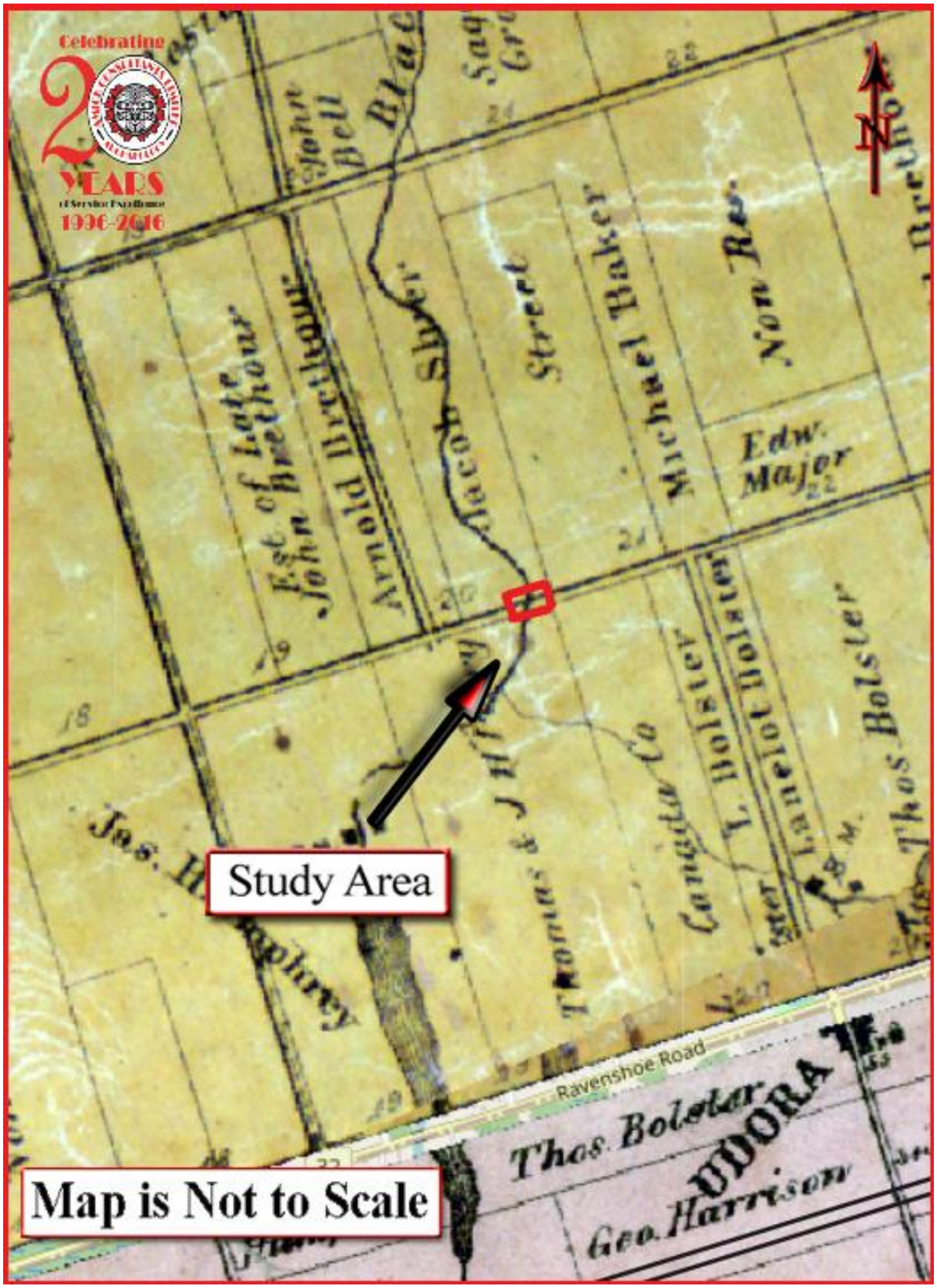

Figure 2 Segment of Ontario Historical County Maps (Tremaine 1860)

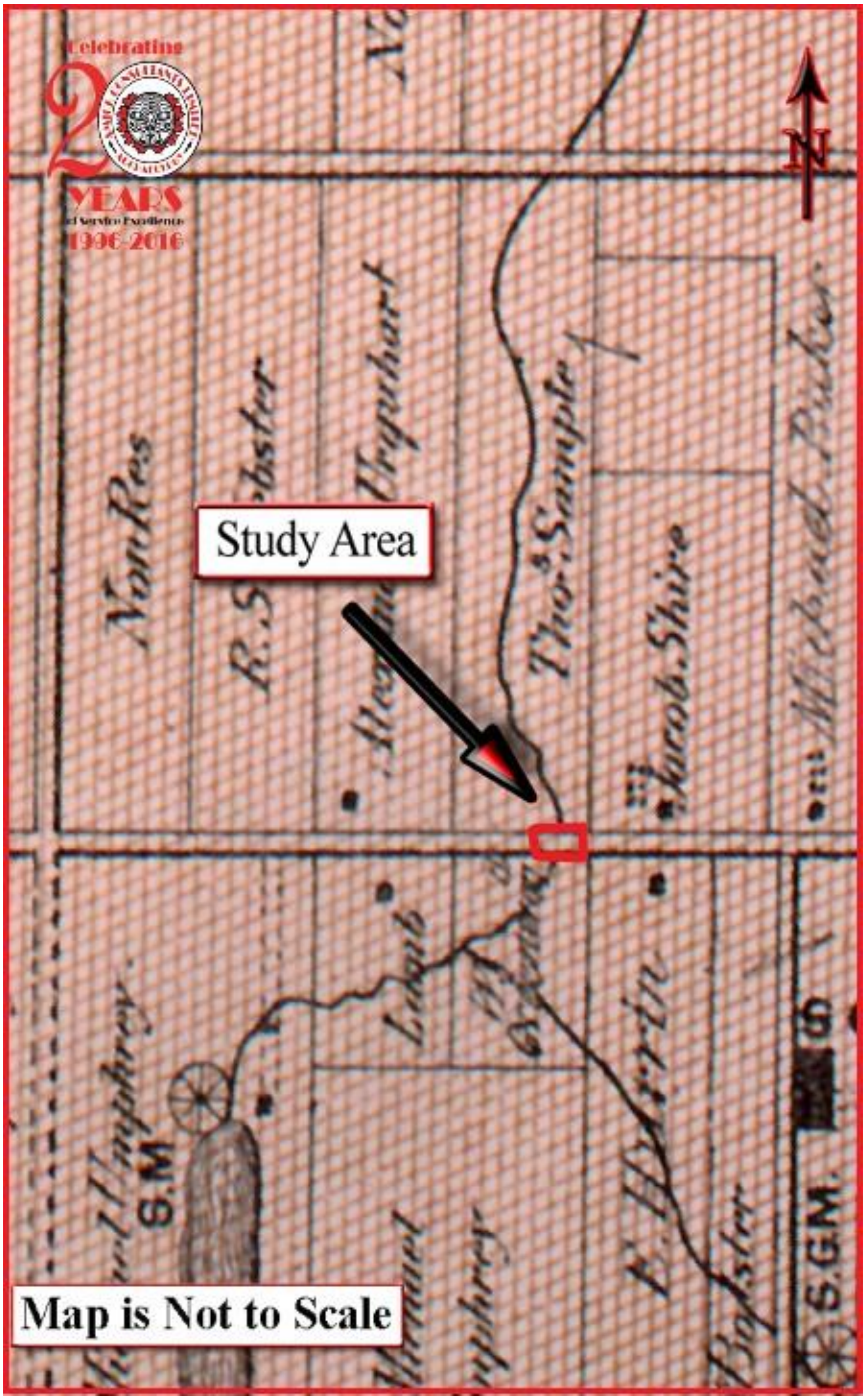

Figure 3 Segment of Historical County Maps (Miles & Co 1878)

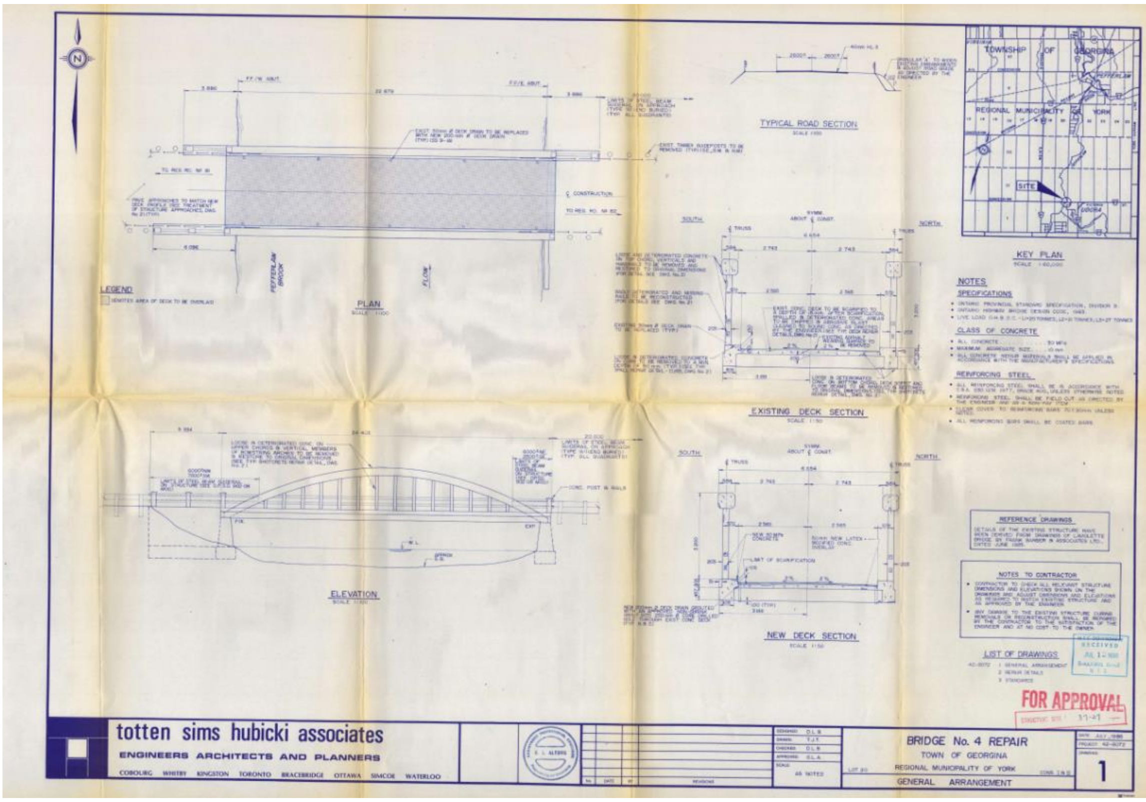

Figure 4 Diagram of Rehabilitation in 1988 (Totten Sims Hubicki Associates 1998)

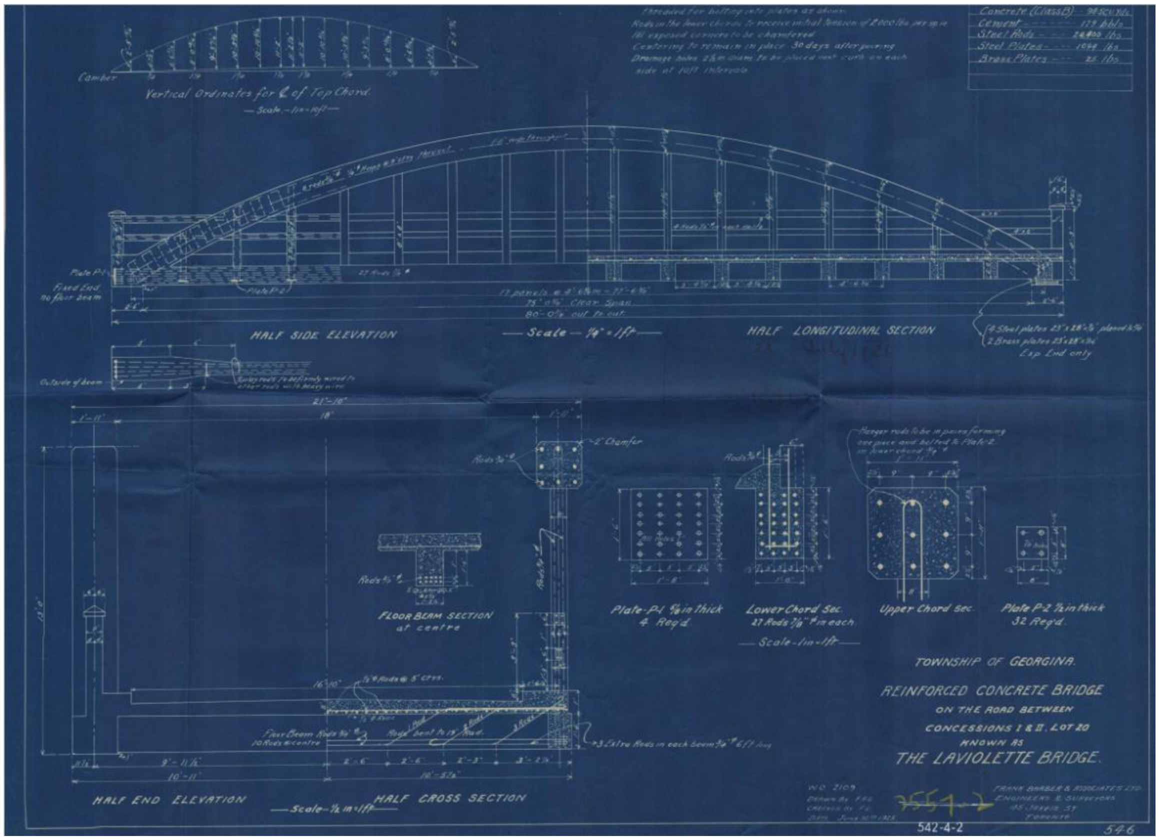

Figure 5 Original Design Drawing (Frank Barber & Associates 1925)

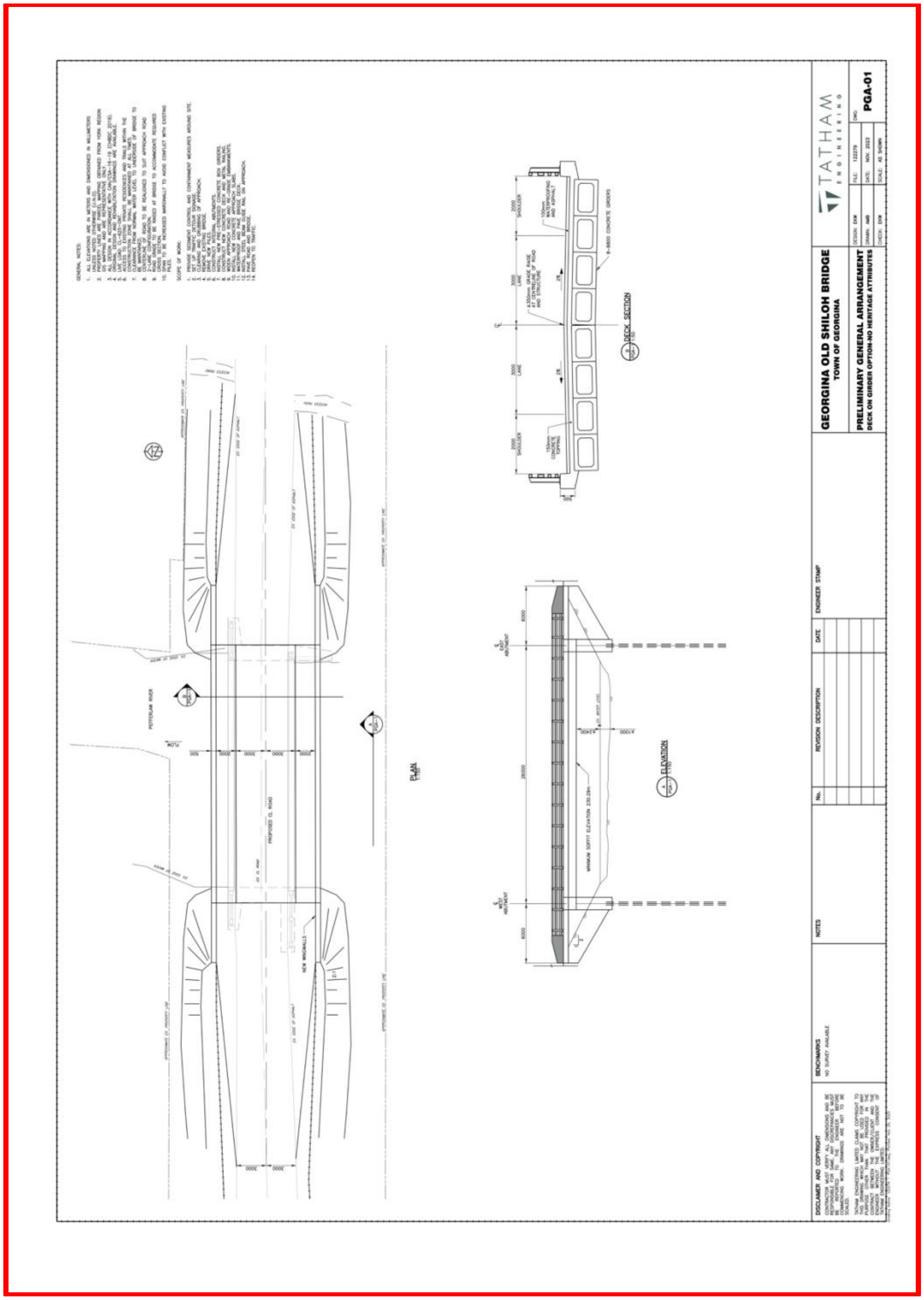

Figure 6 Preliminary General Arrangement Option 1 (Tatham Engineering 2023)

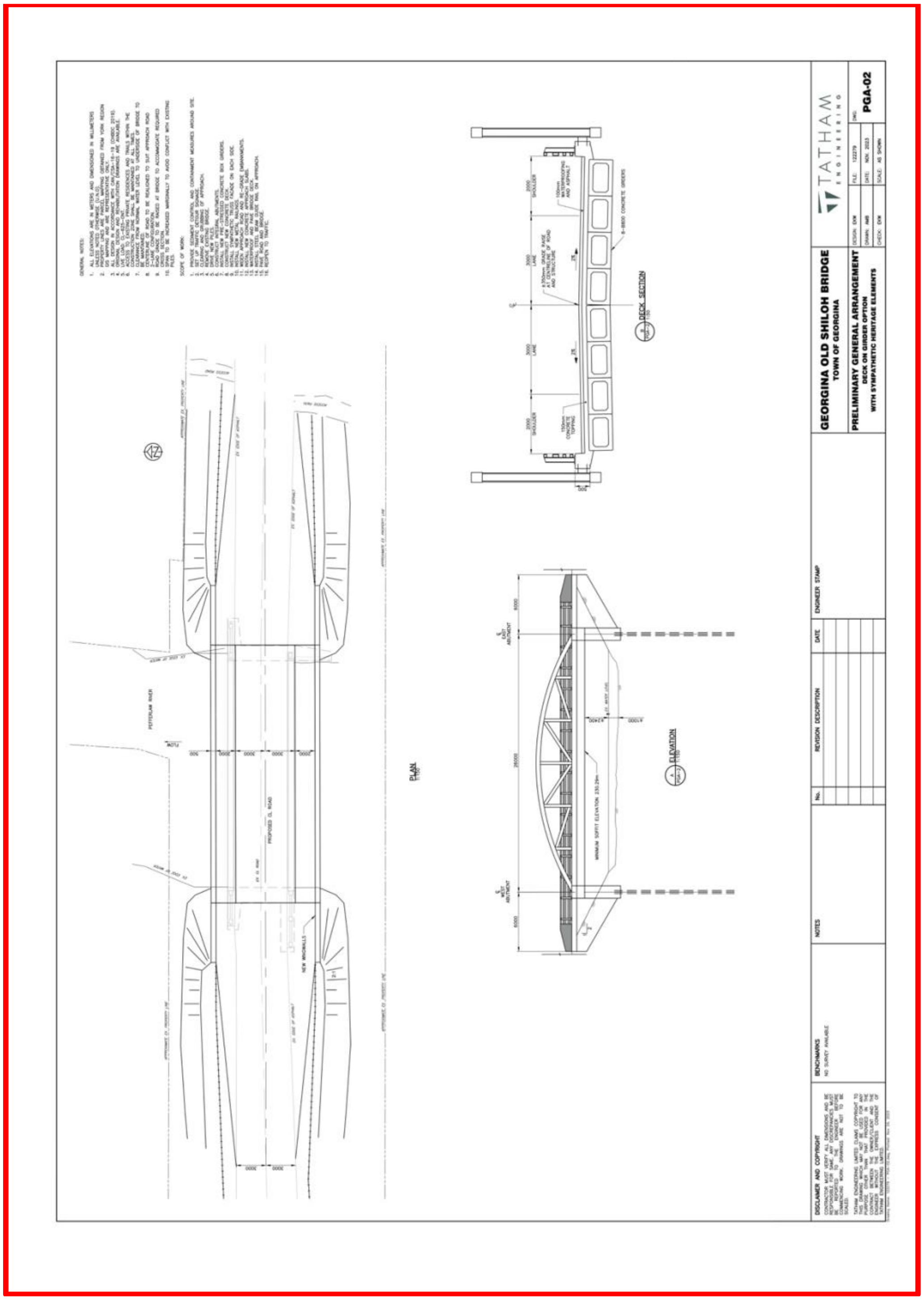

Figure 7 Preliminary General Arrangement Option 2 (Tatham Engineering 2023)

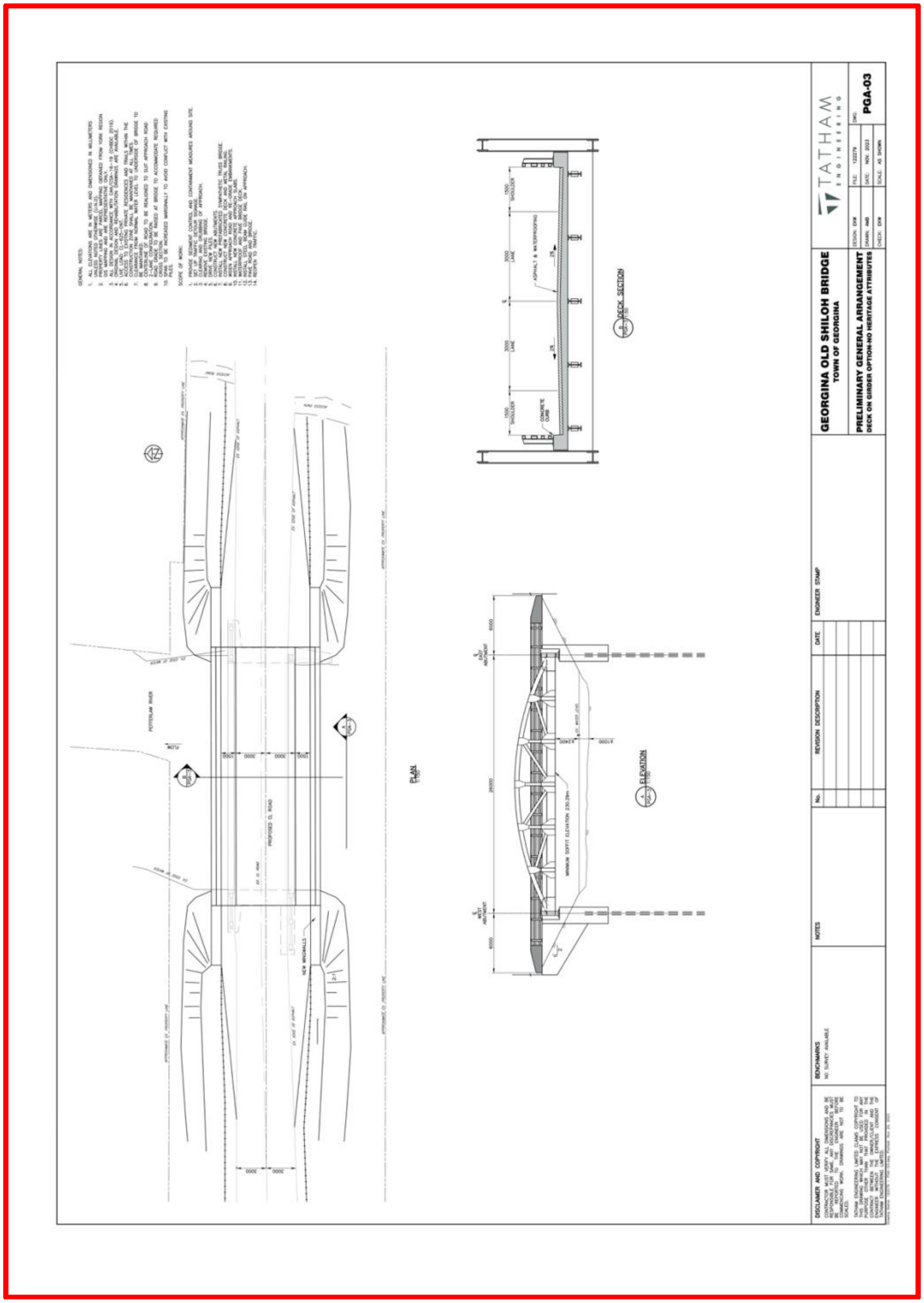

Figure 8 Preliminary General Arrangement Option 3 (Tatham Engineering 2023)

Plate 1 View of West Approach (Facing East)

Plate 2 View of East Approach (Facing West)

Plate 3 View of Deck (Facing Northwest)

Plate 4 View of the Eastern Side (Facing Southwest)

Plate 5 View of Deck (Facing West)

Plate 6 View of Pefferlaw Brook (Facing South)

Plate 7 View of Eastern Approach (Facing West)

Plate 8 View of Western Approach (Facing East)

Plate 9 View of Pefferlaw Brooke (Facing North)

Appendix J:
Environmental Impact Study

ENVIRONMENTAL IMPACT STUDY
Old Shiloh Bridge
Town of Georgina
Amended January 2024

RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

February 2, 2024
RS# 2022-261

Emma Wilkinson, P.Eng.
Senior Engineer, Project Manager
Tatham Engineering Ltd.
115 Sandford Fleming Dr., Suite 200
Collingwood, ON, L9Y 5A6

***SUBJECT*:** **Environmental Impact Study as part of Municipal Class EA**
***Update 1*: Preliminary Design**
Conc. 2 – Old Shiloh Rd. Bridge
Town of Georgina

Dear Emma:

RiverStone Environmental Solutions Inc. is pleased to provide you with the attached report.

Please contact us if there are any questions regarding the report, or if further information is required.

Best regards,

RiverStone Environmental Solutions Inc.

BWicks

Bev Wicks PhD
Senior Ecologist / Principal

MFrancis

Mike Francis, M.E.S., H.B.Sc., E.P.
Ecologist

ENVIRONMENTAL ASSESSMENT NON-TECHNICAL SUMMARY

<table>
<tr><td colspan="2">Type of Study
Environmental Impact Study</td><td>Date
February 2, 2024</td></tr>
<tr><td>Project Manager
Bev Wicks</td><td>Civic Address
2nd Concession
Town of Georgina</td><td>Development Proposed
Environmental Assessment</td></tr>
<tr><td></td><td>Planning Authorities
Town of Georgina</td><td>Proponent/Agent
Tatham Engineering</td></tr>
<tr><td colspan="3"><u>Report Summary</u>

The purpose of this study is to assess natural heritage features and functions associated with a bridge crossing over the Pefferlaw River in the Town of Georgina, known locally as the ‘Old Shiloh Bridge’. The crossing is associated with a riparian area to the Pefferlaw River that supports features including wetlands, woodlands, and wildlife habitat. This report is provided as an update to a preliminary assessment of site-specific natural heritage features and functions that may be present proximate to the bridge, to support a Class Environmental Assessment being coordinated by Tatham Engineering. The updated assessment included additional field investigations and a refinement to the impact assessment to focus on potential impacts of the preferred solution selected through the Environmental Assessment.

Several preliminary mitigation planning measures have been recommended to ensure that works do not result in a net negative impact to the natural environment. These measures are summarized in the list below.</td></tr>
</table>

Summarized Mitigation Recommendations

- **Prepare and submit a request for project review to the Department of Fisheries and Oceans (DFO) and adhere to all requirements of DFO in project planning and implementation.**
- **Consult with LSRCA regarding any requirements for regulated feature offsetting/compensation related to minor encroachment into wetlands as applicable.**
- **Activities and works in water must be designed and planned such that loss or disturbance to aquatic habitat is minimized as applicable.**
- **All in-water work must be isolated and completed in ‘dry’ conditions, with work area dewatered as applicable.**
- **Fish salvage must be undertaken prior to any de-watering of stream areas and following any work area flooding. Permits must be obtained from MNRF prior to fish salvage as applicable.**
- **Prepare a post-construction stabilization and restoration plan for any new surfaces, embankments, or areas otherwise directly disturbed by construction staging. Apply a restoration seed mix composed of native species only (except for stabilizing cover crop).**

- **Minimize riverbank and bed hardening to the extent possible (if replacement structures are required, these should be designed to maintain the existing natural substrates and gradients and allows continued fish passage, i.e., open bottom).**
- **Minimize removal of overhanging vegetation to the extent possible.**
- **Avoidance disturbance to submerged boulders and woody debris material outside of the bridge development footprint and consider opportunities to replace in-stream fish habitat structure post-construction as applicable.**
- **Restore natural bed substrates within and adjacent to replaced crossing structures following construction as applicable.**
- **In-water works (if required) and diversion of flows should avoid spring timing window from March 15th to July 15th . Timing windows should be confirmed with MNRF and/or LSRCA as applicable.**
- **Implement sediment and erosion control measures as per applicable best management practices to isolate the development footprint.**
    - **Sediment fencing must be constructed of heavy material and solid posts and be properly installed (trenched in) to maintain its integrity during inclement weather events.**
    - **Additional sediment fencing and appropriate control measures must be available on site so that any breach can be immediately repaired.**
    - **Regular inspection and monitoring will be necessary to ensure that the structural integrity and continued functioning of the sediment control measures is maintained (i.e., proper installation is not the only action necessary to satisfy the mitigation requirements).**
    - **An on-site supervisor should be responsible for daily inspections of the sediment and erosion control measures during construction activities and record the time and date of inspections, the status of the mitigation measures, and any repairs undertaken.**
    - **Removal of non-biodegradable erosion and sediment control materials should occur once construction is complete, and the site is stabilized.**
- **Best Management practices should be utilized with all machinery and fill being imported to the subject property to ensure that material and tracks are free from invasive species (*Phragmites australis*, etc.).**
- **Machinery should arrive on site in clean condition and is to be checked and maintained free of fluid leaks.**
- **Machinery must be refueled, washed, and serviced within the area isolated by sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.**
- **Locate all fuel and other potentially deleterious substances within the area isolated by sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.**
- **Temporary storage locations of aggregate/fill material (where required) should be located within the area isolated by sediment fencing. Storage areas should be sited to the west of**

Pefferlaw Brook. This material is to be contained by heavy-duty sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank as applicable.

- **Offloading of construction and aggregate/fill materials (where required) should be completed during fair weather conditions, a minimum of 30 m from wetlands and the top of watercourse bank as applicable.**
- **All stockpiled topsoil/overburden (where required) should be piled in low piles and stabilized as quickly as possible (e.g., erosion-prone areas covered with textile) to minimize the potential for runoff and wind erosion as applicable.**
- **Minimize vegetation removal and disturbance to the extent possible, particularly adjacent to the watercourse.**
- **Prepare a TIPP to determine the extent of potential tree removals following bridge design. Construction exclusion, staging, and tree protection measures should be included in the TIPP for mitigation planning.**
- **Following preparation of the TIPP, review opportunities for re-planting of trees that require removal as applicable.**
- **Any minor tree removals required to accommodate the bridge replacement design must be completed outside of the season in which endangered bats may be active, *i.e.*, April – Oct, inclusive. If substantial tree removals are determined to be required (*i.e.*, beyond the ROW), additional assessment of habitat usage and significance may be warranted as applicable.**
- **Work site isolation must utilize sediment and erosion control that represents suitable wildlife exclusion fencing as per best management practises endorsed by the MECP.**
- **If any individual turtles are encountered within works area, activities that have the potential to harm such individuals should stop immediately. A qualified biologist or MECP should then be contacted to determine the most appropriate mitigation measure.**
- **Grading and other activities that cause disturbance outside of the development envelope should be minimized to the extent possible during the construction period.**
- **In the spring prior to construction, install temporary bird exclusion mesh underneath bridges to prevent establishment of nests within the season of construction.**
- **Clearing of vegetation must be restricted to times outside of the period April 15 to October 30. If development and site alteration must occur within the period of April 1 to Aug 30, a nest survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests of migratory bird species covered by the MBCA. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season. If any clearing of mature trees must occur within the period April 15 to Oct 30, further measures may need to be taken with respect to mitigating harm to endangered bats which have the potential occur on site as applicable.**

Table of Contents

List of In-text Tables

List of Figures

List of Appendices

1 BACKGROUND & CONTEXT

RiverStone Environmental Solutions Inc. (RiverStone), working in conjunction with Tatham Engineering (Tatham), was retained by the Town of Georgina (the Town) to prepare an Environmental Impact Study (EIS) to address potential replacement/rehabilitation of a crossing of Concession Rd. 2 (Old Shiloh Rd.) over the Pefferlaw River. The bridge, known locally as the Old Shiloh Bridge, spans a broad meander of Pefferlaw Brook, directly west of the hamlet of Udora (**Figure 1**). For context, this assessment has been undertaken in support of a Municipal Class Environmental Assessment (EA), providing an initial inventory and characterization of natural heritage features and functions that are expected to occur within the vicinity of the crossing. An initial assessment was completed in Feb 2023, using field data collected in 2022, to inform the selection of alternatives being contemplated as part of the EA. This report has been updated to include information from additional site investigations undertaken in 2023, and to focus the preliminary impact assessment on a now identified preferred solution.

For context, the bridge is located in the planning jurisdictions of the provincial Greenbelt Plan and Lake Simcoe Protection Plan, as administered by the Town and the Lake Simcoe Region Conservation Authority (LSRCA). The study area is located within the natural heritage systems (*i.e.*, Greenlands System) of both the Town and the Region (see **Appendix 1**), as well as the natural heritage system for the Greenbelt Plan (see **Figure 1** and **Appendix 1**). Pefferlaw Brook, the watercourse that is spanned by the bridge, as well as its associated hazard features (*e.g.*, floodplain, wetlands), are regulated by the LSRCA under Ontario Regulation 179/06 of the *Conservation Authorities Act* (see **Appendix 1**). The watercourse and its riparian zone support fish habitat, wetland communities, and various other wildlife habitat values. The natural corridor associated with the river valley provides important landscape-scale connective linkages for wildlife movements. The broader landscape connected to the river valley at Old Shiloh Bridge contains large tracts of continuous woodland cover, provincially significant wetlands, and areas of natural and scientific interest. These and other features and functions are considered within the scope of this report.

The preliminary list of alternatives being considered as part of this EA included the following:

1) Do nothing;
2) Rehabilitate the existing bridge;
3) Remove and replace the bridge; and
4) Construct a new bridge adjacent to the existing bridge.

Except for option #1, all alternatives were considered to have the potential to adversely impact one or more natural heritage features through various pathways, including impacts related to the construction staging process, as well as long-term changes to the stream channel and associated areas of natural cover. It is our understanding that the alternative preferred by the Town at this time is #3, removal and replacement of the bridge. This EIS assesses the potential for site-specific natural heritage impacts that may result from implementation of this solution. This report is provided at a high-level, being based on a review of available background information and scoped site investigations undertaken during ‘out of season’ conditions. Moreover, potential design for replacement of the bridge is in a preliminary stage, meaning that potential impacts cannot be quantified in detail. Therefore, this assessment is also considered preliminary and general in nature. Supplemental assessment may be required to address specific concerns of agencies and/or required authorizations, depending on the detailed design of the new bridge.

2 APPROACH AND METHODS

The approach and methods used to carry out this EIS are detailed in this section. Broadly speaking, this includes:

1. Identifying a study area in which to focus assessment efforts.
2. Gathering and reviewing background biophysical information for the study area, including existing natural feature mapping and records for species of conservation interest which are relevant to the study area.
3. Conducting a site investigation to field-verify the presence or absence of relevant features, *e.g.*, wetland communities, habitat for endangered or threatened species.
4. Determining the potential for negative impacts to identified features associated with implementation of various development alternatives.
5. Identifying methods by which potential negative impacts can be mitigated via avoidance, minimization, and/or compensation measures, to inform the selection of the preferred alternative.

2.1 Identification of Study Area

For the purposes of this report, RiverStone identified a study area centered on the existing bridge structure. The study area includes a 120 m radius as measured from the center of the bridge on 2nd Concession, consistent with direction in the Natural Heritage Reference Manual (NHRM) under the Provincial Policy Statement (PPS). Direct assessment is limited to the right of way (ROW), with lands beyond the ROW assessed to the extent feasible by visual review and aerial photo review.

2.2 Background Information Sources Reviewed

Background biophysical information related to the study area was collected and reviewed from a variety of sources. This includes:

- **Town of the Georgina Official Plan** (Consolidated 2020)
- **Region of York Official Plan** (2022).
- **Greenbelt Plan (2017) & Technical Guidance Documents**
- **Pefferlaw River Subwatershed Plan. 2012. Lake Simcoe Region Conservation Authority.**
- **Stream Monitoring in the Tributaries of Lake Simcoe: Fish Technical Progress Series in Stream Monitoring: Report No 1. Lake Simcoe Region Conservation Authority.**
- **Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Areas and Natural Heritage Information Centre (NHIC)** database regarding information on occurrences of SAR and provincially tracked species (squares: 17PK4302, 17PK4303, 17PK4402, 17PK4403); accessed Dec 2023, at: http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US).
- **Species at Risk Information Request to Ministry of Environment, Conservation, and Parks (MECP)** – sent Feb 14 2023; response received Feb 15 2023.

- **Ontario Breeding Bird Atlas (OBBA) database and the Atlas of the Breeding Birds of Ontario, 2001–2005** (Cadman et al. 2007) regarding birds that were documented to be breeding in the vicinity of the study area during the 2001–2005 period (square: 17PK40; accessed at: http://www.birdsontario.org/atlas/squareinfo.jsp).
- **Ontario Reptile and Amphibian Atlas (ORAA)** database regarding records of reptiles and amphibians that have been observed within the vicinity of the study area (square: 17PK40; accessed Dec 2023 at: http://www.ontarioinsects.org/herpatlas/herp_online.html).
- **iNaturalist** database regarding general biodiversity records, with a focus on verified 'research-grade' observations within the vicinity of the study area, accessed Dec 2023 at: https://www.inaturalist.org/observations?place_id=any&subview=map.
- **Species at Risk (SAR) range maps** (accessed Dec 2023 at: http://www.ontario.ca/environment-and-energy/species-risk-ontario-list).
- **Distribution of Fish Species at Risk** generated by Fisheries and Oceans Canada (accessed at: http://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html).
- **Atlas of the Mammals of Ontario** (Dobbyn 1994) regarding mammal records within and adjacent to the study area.
- **Physiography of Southern Ontario** (Chapman and Putnam 2007) for information pertaining to the physiography and soils of the study area and adjacent lands.

2.3 Site Investigation

The background review of biophysical information as outlined in **Section 2.2** informed the scoping of an initial site investigation undertaken on Dec 7, 2022. Despite being outside of the ideal 'leaf-on' seasonal window, this site visit was able to inform a preliminary assessment of conditions within the study area, to the extent feasible via roadside-based surveys. Subsequent site investigations were undertaken on Oct 3 & 12, 2023 to further inform the assessment of existing conditions within the study area. While these surveys were not ideally timed in terms of capturing in-season conditions, spring and summer site work was not considered feasible given the schedule of the EA. Notwithstanding, information derived from early fall data collection can often be considered suitable for the purpose of site characterization. This assumes that the collected data is reviewed conservatively and not treated as the basis for presence/absence of species that would not be verifiable during such timing windows. Instead, further reliance on a 'habitat-based' assessment is required (see **Section 2.3.1** below). Given the nature of this specific site and the context for the work proposed, the site work undertaken to date may be sufficient to inventory and characterize relevant features and functions. On-site data collection included the following tasks:

- Scoped vegetation inventory and delineation of ecological land classification (ELC) units, verified during leaf-on conditions of Oct 3, 2023 site visit;
- General assessment of wildlife habitat features and functions;
- Qualitative assessment of fish habitat and general aquatic habitat structure within the study area;
- Survey of bridge structure for bird nests;
- Assessment/inventory of features that may represent habitat for endangered and/or threatened species, including qualitative assessment of woodlands representing potential endangered bat habitat, and leaf-on inventory of potential occurrences of endangered tree species; and,

- Assessment of key hydrologic features (*e.g.*, wetlands, drainage features) to inform delineation of feature limits within the right of way (ROW), and approximation of feature limits in adjacent private lands.

Table 1. Site investigations and primary tasks.

Date	Primary Task(s)	Staff
Dec 7, 2022	ELC; wetland and drainage feature assessment; fish habitat assessment, vegetation inventory; general wildlife habitat assessment	M. Francis
Oct 3, 2023	ELC/wetland limit verification (roadside survey); SAR tree survey within ROW	M. Francis
Oct 12, 2023	Fish habitat assessment	T. Robinson

Evidence for the presence of a species (or use of an area by a species) was determined from visual and/or auditory documentation (*e.g.*, song, call) and/or observation of nests, tracks, burrows, browse, and scats (where applicable). If/where present, natural features of conservation interest (*e.g.*, SAR habitat, etc.) were digitized and delineated in the field with a high accuracy GPS. Features of interest were photographed, and all information collected was catalogued for future reference. Representative photographs detailing on-site conditions are provided in **Appendix 2**.

2.3.1 Habitat-based Wildlife Assessment

RiverStone's primary approach to site assessment is habitat-based. We first focus on evaluating the potential for significant features and species within an area of interest, prior to undertaking any targeted assessments or surveys. An area is considered potential habitat if it satisfies several criteria, usually specific to a species, but occasionally characteristic of a broader group (*e.g.*, several species of turtles use sandy shorelines for nesting, several species of bats use cavity trees as day roosts and maternity sites, etc.). If habitat features are demonstrably absent from a study area, then targeted surveys would not be considered warranted to further support conclusions of the assessment.

Physical attributes of a site that can be used to assess habitat function include structural characteristics (*e.g.*, age and composition of forest canopy, water depth), ecological community (*e.g.*, meadow marsh, rock barren, coldwater stream), and structural connectivity to other habitat features required by a species of interest or indicator species. Species-specific habitat preferences and/or affinities are determined from status reports produced by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Cadman et al. (2007), unpublished documents, and direct experience.

2.3.2 Targeted Wildlife Assessment

Where appropriate, RiverStone explores further targeted assessments in accordance with applicable standard methods and protocols. Targeted survey efforts may be undertaken due to one or more triggers, such as a specific request from an approval authority, an existing record for a species of interest, or a limitation to a habitat-based assessment. For this scoped study, targeted survey methodologies were generally not undertaken due to seasonal limitations and the timing of project initiation. As noted above, scoped assessments were undertaken to assess the potential functionality of fish habitat and to survey for the presence/absence of SAR trees within the road ROW. Notwithstanding, given the nature of this specific site and the context for the work proposed, the site visits undertaken to date may be sufficient to conservatively inventory and characterize relevant features and functions.

2.3.3 Physical Assessment (Topography, Surficial Geology, & Drainage)

The geophysical setting of the study area was determined using topographic mapping, soils mapping, geological mapping, aerial photography, and descriptions gathered through on-site investigations. Drainage features (where present) are identified through the review of background mapping resources and/or delineated in the field.

2.3.4 Vegetation Community Assessment

All natural vegetation communities on the subject property were mapped according to Ecological Land Classification (ELC) community tables (Lee et al., 1998). ELC defines ecological units or communities based on bedrock, climate (temperature, precipitation), physiography (soils, slope, aspect), and corresponding vegetation. Use of the system permits biologists and other land managers to use a common language to describe vegetation communities, which in turn facilitates the identification of communities likely to support certain natural heritage features or functions. The ELC system is an organizational framework that can be applied at different scales. The ecological units most useful for site-specific evaluations are ecosites and vegetation types (also known as ecoelements).

In our experience, the ELC classification key is not comprehensive, and improvised classifications are occasionally used to describe communities, e.g., anthropogenic features. For this site, vegetation communities were delineated via aerial photo interpretation and subsequently confirmed and refined in the field. The boundaries of any identified wetland boundaries were delineated in accordance with the "50% wetland vegetation rule" as directed by the Ontario Wetland Evaluation System (OWES), where feasible. All observed vascular plant species are inventoried during the vegetation community assessment to identify any features/species of potential significance.

2.4 Key Natural Heritage Feature Assessment

Provincial and local planning policies employ varying terms for natural heritage features and designations that have recognized 'statuses' within the applicable planning jurisdiction. The study area is located within the planning areas for Ontario's Greenbelt Plan and the Lake Simcoe Protection Plan (LSPP). The terminology used in this report is consistent with the Greenbelt Plan and LSPP, including reference to relevant features as 'key natural heritage features' (KNHF) and 'key hydrologic features' (KHF). RiverStone conducted a review of the background information sources identified in **Section 2.2** to determine if KNHF/KHFs have been identified in association with the study area by the province and/or local planning authority. The definition of KNHF/KHFs is generally consistent under both the Greenbelt Plan and LSPP; however, the Greenbelt Plan definition is most exhaustive and includes the following:

- Permanent & intermittent streams
- Lakes (and their littoral zones)
- Seepage areas and springs
- Wetlands (including provincially significant wetlands)
- Fish habitat
- Sand barrens, savannahs, tallgrass prairies, and alvars.
- Areas of natural and scientific interest (life science)
- Significant valleylands

- Significant woodlands
- Habitat of endangered and threatened species
- Significant wildlife habitat (includes habitat for rare and special concern species)

RiverStone assesses the potential presence of each of the above KNHF/KHFs in accordance with applicable technical guidance documents, including the following:

- *Greenbelt Technical Paper 1 – Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside* (2005; updated by MNRF as of 2012)
- *Natural Heritage Reference Manual (NHRM) for the Natural Heritage Policies of the Provincial Policy Statement* (MNRF 2010)
- *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNRF 2015).

The potential presence/absence of relevant species of conservation interest, such as endangered and threatened species, are assessed using a combination of the background information review outlined in **Section 2.2** and the habitat-based approach outlined in **Section 2.3.1**. Our assessment of KNHF/KHFs is provided in **Section 4** of this report.

2.5 Impact and Mitigation Assessment

To carry out a defensible assessment of potential development impacts, RiverStone employs the following approach:

1. *Predict* impacts to identified natural heritage features within the study area based on the proposed development plan (from construction to post-completion), including both direct (*e.g.,* vegetation clearance) and indirect (*e.g.*, light pollution, encroachment post-development) impacts.
2. *Evaluate the significance* of predicted impacts to identified natural heritage features based on their spatial extent, magnitude, timing, frequency, and duration.
3. *Assess the probability or likelihood* that the predicted impacts will occur at the level of significance expected (*e.g.,* high, medium, low probability).

In instances where the potential for negative impacts to natural heritage features exists, mitigation measures are offered to avoid, minimize, and/or compensate for such impacts. RiverStone's natural heritage impact assessment and recommended mitigation measures are provided in **Section 5**.

2.6 Assessment of Conformance with Applicable Environmental Policies

There are several environmental policies (*e.g.*, statutes, regulations, plans, guidance documents, etc.) that may apply with the jurisdiction, including the list below. A scoped discussion of potential regulatory requirements is provided in **Section 6**.

- Federal *Fisheries Act*, R.S.C. 1985
- Federal *Migratory Birds Convention Act*, S.C. 1994, c. 22
- Provincial Policy Statement, 2020, pursuant to the *Planning Act*, R.S.O. 1990, c. P.13

    - Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005.
    - Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E.
- Provincial *Endangered Species Act*, S.O. 2007, c. 6
- Greenbelt Plan (2017)
- Lake Simcoe Protection Plan (2009)
- Region of York Official Plan (2022)
- Township of Georgina Official Plan (2016)
- Ontario Regulation 179/06 under the *Conservation Authorities Act*, R.S.O. 1990, c. C.27

3 EXISTING CONDITIONS

The following provides a description of the various existing conditions of the study area, including biological and physical characteristics identified through RiverStone's background review and on-site investigations. **Sections 3.1 – 3.4** discuss the general findings of our background and in-field assessment, while **Section 4** provides a subsequent detailed assessment of those identified features that represent *significant* features, as derived through the collective site summary and background assessment.

3.1 General Site Conditions and Land Uses

The study area (**Figure 1**) is centred on a single crossing structure over Pefferlaw Brook. The bridge itself appears quite old and is generally surrounded by mixed natural cover. Photos detailing existing conditions during the on-site assessment are provided in **Appendix 2**.

Based on a review of historical aerial imagery, the study area and surrounding landscape have been steadily regenerating to natural cover over the past ~70 years following a major decrease in agricultural activities. Most of the study area is now in a naturalized state, composed of mixed successional forest communities and low-lying riparian zones associated with the subtle valleylands to Pefferlaw Brook. There are no signs of active land use within the study area; however, the bridge may be used as a launching point for watercraft and potentially for fishing. Outside of the immediate study area, the dominant land use is rural residential, with a strip of residences along Concession Rd 2 to the west and the Hamlet of Udora directly adjacent to the east. There appears to be a recreational camp/park located directly north of the study area, with camp sites spread out for over a kilometer near the east bank of the watercourse.

3.2 Topography, Physiography, & Drainage

The study area is contained within the Lake Simcoe drainage basin, part of the broader physiographic region known as the Simcoe Lowlands (Chapman and Putnam 1984). The location is situated in a linear swath of sand plain, dividing higher elevation till plains to the east and large areas of low-lying peat and muck deposits to the west. While the direct channel of Pefferlaw Brook is within an area mapped as 'bottomland' soils, the immediately adjacent lands are composed of a complex of sandy loams, including those of the Brighton and Granby series. Both soil classes are a product of sandy outwash materials, occurring on smooth to gently sloping topography and having drainage characteristics ranging from good to poor. The entire study area sits at an approximate elevation of 230 m (above sea level), with a very subtle rise in elevation occurring to the both the east and west.

Drainage within the study area is facilitated by a single identified feature, Pefferlaw Brook. Areas up gradient from the watercourse appear to be imperfectly to poorly draining; however, no other discernable surface drainage features were observed within the study area. Physical characteristics of the reach of Pefferlaw Brook within the study area are discussed further under **Section 4.1**.

3.3 Fish and Wildlife Habitat

The cumulative results of RiverStone's background review, as well as habitat-based biological assessments indicate that the study area provides potential habitat for a variety of wildlife. RiverStone documented evidence on site for primarily generic wildlife species, including White-tailed Deer (*Odocoileus virginianus*), Raccoon (*Procyon lotor lotor*), Grey Squirrel (*Sciurus carolinensis*), Eastern Chipmunk (*Tamias striatus*), etc.

Only common, generalist bird species were documented during the out of season on-site investigations; and no targeted inventory was undertaken in this regard. Observed species included: Black-capped Chickadee (*Poecile atricapillus*), American Crow (*Corvus brachyrhynchos*), Mourning Dove (*Zenaida macroura*), and Downy Woodpecker (*Picoides pubescens*). A single bird nest was observed beneath the bridge that appeared to have been inactive for one or more seasons. Based on its structure, it is possible that this nest was used most recently by either an Eastern Phoebe (*Sayornis phoebe*) or Barn Swallow (*Hirundo rustica*); these species may re-use/re-build each others' nests in alternating years. A list of bird species documented within the local 10 km^2 OBBA data square is provided in **Appendix 3**.

No direct observations of any reptiles or amphibians were recorded during on-site investigations; however, RiverStone's site visit was not appropriately timed in this regard. It is assumed that suitable habitat features are present for certain species guilds (*i.e.*, turtles), and floodplain pools may be present throughout the study area that could support amphibian breeding habitat. Such potential functions are discussed further within the context of significant wildlife habitat. A list of herptile species documented within the local 10 km^2 ORAA data square is provided in **Appendix 3**.

Fish habitat was assumed to be present from the onset of this study, as Pefferlaw Brook represents a major watercourse with permanent flows. RiverStone's on-site investigations of fish habitat structure and function further refined our understanding of the habitat features that may be present within the study area. Fish habitat is described in further detail in **Section 4**.

Ultimately, all relevant observations of fish and wildlife species and/or habitat features, including individuals of species at risk or other species of conservation concern, are discussed in **Section 4** of this report within the context of KNHFs.

3.4 Vegetation Communities

Existing vegetation communities within the subject property were assessed through a combination of background review and on-site investigation. A desktop exercise was undertaken to map vegetation community boundaries using background information sources and current aerial photographs; the mapped vegetation communities were then ground-truthed to a high level and refined where necessary during the site investigation. Given the successional nature of some on-site vegetation assemblages, the assigned ELC codes/descriptions may be general in nature and non-conforming to the ELC guide. Vegetation community mapping with classifications generally based on Lee et al (1998) is provided on

Figure 2, and descriptions are provided below. Each description includes a list of representative plant species within each community. All species observed are considered common locally and provincially. A list of observed plant species can be provided upon request.

3.4.1 CUM1: Mineral Cultural Meadow Ecosite

This ecosite occurs within portions of the watercourse riparian zone where elevations are high enough to support moist upland plant assemblages of goldenrods (*Solidago* spp), Soapwort (*Saponaria officinalis*), asters (*Symphyotrichum lanceolatum*, *S. novae-angliae*), Raspberry (*Rubus strigosus*), and scattered patches of low Common Buckthorn (*Rhamnus cathartica*) and Manitoba Maple (*Acer negundo*).

3.4.2 MAM2: Mineral Meadow Marsh Ecosite

This ecosite occurs in the same open section of riparian/floodplain zone as CUM1 described above, but in slightly lower elevations. The predominant cover in these locations is a mix of Reed Canary-Grass (*Phalaris arundinacea*) and Joe-pye-weed (*Eutrochium maculatum*), with some sparse Cattail (*Typha sp*.) and Red-Osier Dogwood (*Cornus sericea*).

3.4.3 FOC4: Fresh White Cedar Coniferous Forest Ecosite

This ecosite is represented by areas of dense, successional White Cedar (*Thuja occidentalis*) canopy along subtle slopes. The dense shade supports minimal groundcover components, with Coltsfoot (*Tussilago farfara*) being the only noteworthy species. This ecosite intergrades with adjacent successional mixed forest, where Buckthorn, Apple (*Malus sp*.), and young Green Ash (*Fraxinus pennsylvanica*) are common.

3.4.4 FOM/CUW: Moist Mixed Forest/Cultural Woodland

This community is a successional mix of White Cedar with associates of Aspen (*Populus tremuloides*), White Spruce (*Picea alba*), Manitoba Maple, and mature thickets of Buckthorn. Viewed from the ROW, this area appeared quite variable with potential inclusions of thicket swamp mixed throughout (see **Section 3.4.5** below).

3.4.5 SWT2: Mineral Thicket Swamp Ecosite

This ecosite occurs in areas of slightly lower elevation within the FOM/CUW complex described above. Cover includes a mix of Red-Osier Dogwood, Joe-pye-weed, Alder (*Alnus incana*), Balsam Poplar (*Populus balsamifera*), Reed Canary-Grass, and sparse Cattail. Other inclusions of this ecosite may occur beyond view of the ROW, and maturity of cover may fluctuate to be more representative of deciduous or mixed swamp in some locations.

3.4.6 OA: Open Aquatic

This area is represented by the open water portions of the Pefferlaw Brook channel. No areas of aquatic vegetation were apparent at the time of assessment.

4 KEY NATURAL HERITAGE FEATURES ASSESSMENT

Based on the biophysical information collected during background information gathering, and the summarized existing conditions of the study area as described above, **Table 2** below identifies all

KNHFs (and KHFs) that are present (or potentially present) within the study area. RiverStone's rationale for identifying such features is provided in the sections that follow.

Table 2. Summary of the Assessment of Key Natural Heritage Features and Key Hydrologic Features within the Study Area.

Key Natural Heritage/Hydrologic Feature	Estimated Status of Natural Feature of Conservation Interest within the Subject property
Permanent & Intermittent Streams	*Present*. See **Section 4.1.**
Inland Lakes and Littoral Zones	*Absent*. See **Section 4.2.**
Seepage Areas and Springs	*Absent*. See **Section 4.3.**
Wetlands (Including PSWs)	*Present*. See **Section 4.4.**
Fish Habitat	*Present*. See **Section 4.1.**
Sand Barrens, Savannahs, Tallgrass Prairies, and Alvars	*Absent*. See **Section 4.5.**
Areas of Natural and Scientific Interest	*Absent*. See **Section 4.6.**
Significant Valleylands	*Present.* **See Section 4.7.**
Significant Woodlands	*Present.* **See Section 4.8.**
Habitat of Endangered and Threatened Species	*Potentially present.* **See Section 4.9.**
Significant Wildlife Habitat	*Potentially Present*. See **Section 4.10.**

Shaded rows denote KNHF/KHFs that are present or have the potential to be present within the study area.

4.1 Streams & Fish Habitat

Pefferlaw Brook represents the primary permanent watercourse within the study area. This watercourse represents a major landscape drainage feature, one of a few prominent catchments originating from the north slopes of the Oak Ridges Moraine and draining into southern Lake Simcoe. Pefferlaw Brook receives drainage from the Uxbridge Brook subwatershed approximately 500 m upstream from the study area. The total catchment area upstream from the study area measures approximately 350 km^2 (per Ontario Flow Assessment Tool).

The reach of Pefferlaw Brook traversing the study area is represented by a broad oxbow with a large swath of open riparian cover adjacent to the inside bank (west) and overhanging canopy cover along most of the outside bank (east). Channel morphology was assessed at a high level within the direct vicinity of the bridge and was consistent directly upstream and downstream of the crossing. The average channel width ranges from 10-15 m, with average depth of 0.5 m (ranging from 0.25-0.7 m) at the time of site visit. The banks are generally quite subtle, with an estimated bank full depth of 1-1.5 m. This reach is mostly represented by a continuous run with slow flow. A fallen tree on the south side of the bridge creates a back eddy along the eastern shoreline. A short section of riffle starts just before the southern side of the bridge and continues approximately five meters to the north of the bridge where some medium-sized boulders and wooden remnants of a previous structure divert flow. Substrate directly adjacent to and under the bridge is firmer, consisting of fine gravel with some boulders, wooden debris, and pockets of cobble, potentially associated with a previous structure. Outside of the bridge footprint, typical substrate is sand and muck with small patches of fallen branches and organic debris such as leaves with a sparse gravel component. A collection of boulders immediately north of the bridge along the western shore creates a back eddy in this area. Minnow species were observed using this area during the Oct 12, 2023 site visit, likely due to overhead cover and slower moving water within this reach. Outside of the emergent vegetation located on the southwest bank, there is minimal aquatic vegetation.

According to the Pefferlaw River/Brook Subwatershed Plan (LSRCA 2012), 45 species of fish have been recorded in the system through various data collection points since 1930. The plan notes that most of the system is managed as a coldwater fishery; however, the main branch and eastern tributary downstream of Udora are a warmwater system based on thermal properties. On this basis, we expect that spring fisheries timing windows will need to be avoided per reocmendation from Hannah Edwards, Management Biologist, Midhurst Aurora Owen Sound District, Ministry of Natural Resources and Forestry and address both warmwater and coldwater habitat considerations within the study area. Locally, warmwater fish communities, typified by key sunfish (Centrarchidae) species such as rock bass (*Ambloplites rupestris*), green sunfish (*Lepomis cyanellus*), pumpkinseed (*Lepomis gibbosus*), bluegill (*Lepomis macrochirus*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*) and black crappie (*Pomoxis nigromaculatus*) are expected to occur; however, additional cold and cool water species such as pike (*Esox lucius)*, that are found within the system, may use habitat within the wetlands adjacent to the watercourse within the study area during periods of flooding. The areas of riffles with associated gravel substrate may provide transient habitat for salmonid species such as brook trout, (*Salvelinus fontinalis*), that are present in the cold-water areas of the system, during cooler periods or times of high water.

Additional clarification will be sought from LSRCA and MNRF at the detailed design phase. Further discussion, including an assessment of potential impacts to fish habitat and the aquatic environment resulting from implementation of the preferred design, is provided in **Section 5.**

4.2 Lakes (and Littoral Zones)

No lakes were identified within the study area during RiverStone's on-site assessment or background information review. No further assessment undertaken.

4.3 Seepage Areas and Springs

RiverStone did not observe evidence of any groundwater emergence features directly within the ROW or adjacent portions of the study area that were visible from the ROW. It is assumed that, given the local topographic context, there is the potential for seepage areas and springs to occur within the broader study area; however, given that proposed works are focused specifically on the bridge footprint, such features are not considered relevant to this assessment. Moreover, if any groundwater emergence features are located within the surrounding landscape, there is no expectation that such features would be impacted or otherwise influenced by implementation of potential alternatives. No further assessment is provided with respect to seepage areas and springs.

4.4 Wetlands

There is a small area of wetland mapped as occurring within the study area as per provincial wetland mapping (see **Figure 1**). This small polygon is associated within an open area along the Pefferlaw Brook riparian zone. Mapped wetland within the study area is considered 'unevaluated'; there are no designated areas of provincially significant wetland (PSW) within the study area or the adjacent landscape. Based on a review of provincial mapping resources, the nearest PSW occurs ~700 m northeast of the study area.

As described in **Section 3.4**, on-site assessment verified two wetland ecosites within the study area, SWT2 and MAM2. These features are part of the complex of successional vegetation occurring within the direct riparian zone of Pefferlaw Creek and within the adjacent poorly defined valley corridor. The MAM2 ecosite is likely a product of general low elevation and periodic flooding on Pefferlaw Brook. The SWT2 ecosite appears to have formed in a subtle trough within an area of otherwise flat and poorly draining successional woodlands throughout the valley corridor. From an ecological perspective, neither ecosite appears to represent a high-functioning wetland feature, with no evidence of substantial standing water areas, organic materials accumulations, or other wetland-specific habitat structures. The MAM2 ecosite is likely functioning similar to adjoining areas of successional meadow, while the SWT2 ecosite would be expected to function similarly to the surrounding complex of successional woodland.

Further discussion, including an assessment of potential impacts to wetlands resulting from implementation of the potential alternatives, is provided in **Section 5.**

4.5 Sand Barrens, Savannahs, Tallgrass Prairies, and Alvars

No vegetation communities representing sand barrens, savannahs, tallgrass prairies, or alvars were identified within the study area during RiverStone's on-site assessment or background information review. No further assessment undertaken.

4.6 Areas of Natural and Scientific Interest (Life Science)

It is the responsibility of the MNRF to designate and administer mapping for ANSIs. Based on available background mapping, the nearest life science ANSI is located >1 km west of the study area (**Figure 1**). No further assessment undertaken.

4.7 Significant Valleylands

Significant valleylands represent valleys or other landform depressions with recognized significant attributes, such as supporting natural vegetation cover with associated ecological linkages and corridors. Designation of significant valleylands is ultimately the responsibility of the relevant planning authority; however, site-specific designation of these feature can be undertaken using standardized provincial criteria provided by the province and/or the planning authority. In this case, there does not appear to be an existing designation in the OPs of either the Town or Region that specifically identifies valleylands associated with the study area as significant.

Technical guidelines of the Greenbelt Plan define valleylands as follows:

> "*Significant valleylands include any of the features identified in any of the following three categories:*
>
> - *all streams with well-defined valley morphology (i.e. floodplains, riparian zones, meander belts and/or valley slopes) of an average width of 25 metres or more; the physical boundary is defined by the stable top of bank (as defined by the conservation authority); or*
> - *all spillways and ravines with the presence of flowing or standing water for a period of no less than two months in an average year. Such features must be greater than 50 metres in length; 25 metres in average width with a well-defined morphology (i.e. two valley walls of 15% slope or greater with a minimum height of 5 metres, and valley floor), and having an overall area of 0.5 ha or greater; or*

- *additional features beyond the ones described above that have been identified by the planning authority as providing one or more of the features or functions…".*

Despite the prominence of Pefferlaw Brook on the local landscape, the stream corridor is not contained within a well-defined valley landform; however, it does support a floodplain, riparian zones, and meanderbelt. In terms of defining the discrete limits of the valleyland feature, the immediate landscape is consistently low-lying, without distinct elevation changes beyond the immediate top of bank, which generally occurs directly adjacent to the active channel. We provide the general opinion that the study area contains significant valleylands, the limits of which should generally be defined by the Pefferlaw Brook channel and associated hazard limits (e.g., floodplain, meanderbelt). **Appendix 1** provides the current limits of hazard features regulated by LSRCA, which may be used as a general guide for the limits of significant valleylands within the study area. Further discussion, including an assessment of potential impacts to the functions of significant valleylands resulting from implementation of the selected alternative, is provided in **Section 5.**

4.8 Significant Woodlands

Significant woodlands represent areas of forested cover with recognized significant attributes, such as large contiguous blocks of woodland or woodlands with unique composition or characteristics. Designation of significant woodland is ultimately the responsibility of the relevant planning authority; however, site-specific designation of these feature can be undertaken using standardized provincial criteria provided by the province and/or the planning authority.

Multiple technical criteria are available to assess woodland significance within the overlapping planning jurisdictions in which the study area is located. For example, the LSPP and Greenbelt Plan both provide criteria for assessing woodland significance within their respective plan coverage areas. The Regional OP also provides a set of specific criteria in this regard. In our opinion, the Region's criteria are most applicable in this scenario as this is the most current document and the most specific from a jurisdictional perspective. The Regional OP criteria for significant woodland is as follows:

Section 3.4.30: That significant woodlands be verified on a site-by-site basis and shall include those woodlands meeting one of the following criteria:

a. Is 0.5 hectares or larger and:
i. directly supports globally or provincially rare plants, animals or communities as assigned by the Natural Heritage Information Centre; or,
ii. directly supports threatened or endangered species, with the exception of specimens deemed not requiring protection by the Province (e.g. as is sometimes the case with Butternut); or,
iii. is within 30 metres of a provincially significant wetland or wetland including those identified on Map 4, waterbody, permanent stream or intermittent stream;

b. Is 2 hectares or larger and:
i. is located outside of the Urban Area, Towns and Villages, or Hamlets and is within 100 metres of a Life Science Area of Natural and Scientific Interest, a provincially significant wetland or wetland including those identified on Map 4, significant valleyland, or fish habitat; or,
ii. occurs within the Regional Greenlands System;

c. Is south of the Oak Ridges Moraine and is 4 hectares or larger in size;

d. Is north of the Oak Ridges Moraine and is 10 hectares or larger in size;

e. On the Oak Ridges Moraine the woodland will be evaluated for significance based on the requirements of the Oak Ridges Moraine Conservation Plan and associated technical papers; or,

f. On lands in the Greenbelt Natural Heritage System, the woodland will be evaluated for significance based on the requirements of the Greenbelt Plan and associated technical papers; or,

g. On lands in the Lake Simcoe watershed, outside of the Greenbelt, the Oak Ridges Moraine Conservation Plan, and existing settlement areas, the woodland will be evaluated for significance based on the requirements of the Lake Simcoe Protection Plan and associated technical papers.

Based on a review of the Regional OP criteria, essentially all woodland cover within the study area would be considered significant woodland insofar at satisfying criteria of subsections (a) and (b) above. Woodland patches within the study area generally exceed 2 ha in area and are located proximate to a watercourse, fish habitat, wetland, and are contained within an area that presumably represents significant valleyland. Further discussion, including an assessment of potential impacts to the functions of significant woodlands resulting from implementation of the selected alternative, is provided in **Section 5.**

4.9 Habitat of Endangered and Threatened Species

To assess the potential presence of individuals and/or habitat for endangered and threatened species within the study area, RiverStone staff conducted the following:

- Review the range maps for all species designated as endangered and threatened in Ontario, as per Schedules 2 and 3 of Ontario Regulation 230/08 [(Species at Risk in Ontario List (SARO List)], located here: https://www.ontario.ca/laws/regulation/080230. In our experience, the potential presence of most provincially endangered and/or threatened species can be ruled out based on their limited geographical ranges in the province and/or a lack of specific habitat conditions which they require to carry out key life processes.
- Reviewed the NHIC database for existing records of element occurrences for endangered or threatened species (data squares 17PK4302, 17PK4303, 17PK4402, 17PK4403). Databases of iNaturalist, OBBA, and ORAA were also reviewed as of Dec 2023.
- Sent email inquiry to MECP regarding any records of element occurrences for endangered/threatened species in the local area – response received with no additional information provided (see **Appendix 4**).
- On-site investigation undertaken in 2022, during which vegetation conditions were characterized for detailed habitat-based assessment.

Information from the above assessment process was used to inform a site-specific screening, as contained in **Appendix 4**. The screening is based on a list of species that are known to occur within the regional jurisdiction. Through this screening, the species discussed below were identified as having the potential to be present within the subject property or directly adjacent lands. Where relevant, potential impacts to these species are discussed further in **Section 5**.

4.9.1 Endangered Bat Species (*Myotis lucifugus, Myotis septentrionalis, Perimyotis subflavus*)

These species, assessed as a species guild (related species with similar habitat characteristics), include several bat species listed as endangered in Ontario. Bats are highly mobile; however, individuals and groups of the noted bat species are also recognized as having some degree of fidelity to suitable local sites for daily and seasonal 'roosting' activities. While some species (*i.e.*, *Myotis lucifugus*) exhibit a preference for roosting in anthropogenic structures, natural roosting sites are also important. Natural roosting sites are generally associated with mature forests containing a sufficient density of large trees in various stages of decay, otherwise known as 'snags'. Snags provide features such as cavities and/or loose bark, on which bats rely for shelter and thermoregulation throughout the active season.

Treed features within the study area are largely limited to successional/cultural woodland and maturing thicket cover. The predominant tree species is White Cedar, with dense canopies that are often not well suited to supporting roosting habitat. Associate hardwood cover includes trees that are generally small (averaging less than 20 cm diameter) and healthy, lacking mature trees and abundant decaying canopy components that would be suited to supporting cavity formation. In general, there is no expectation that the study area supports highly functional habitat for bats. On the contrary, the rural setting and presence of wetland and open-water areas means that the study area may be amenable to supporting foraging habitat for bats.

Current direction from MECP prescribes that targeted surveys of treed habitats/snags are not necessary to quantify the quality/extent of potential habitat for endangered bat species IF a project would involve removal of only a small number of potential maternity or day roost trees in treed habitats (or none at all). This approach assumes that other appropriate mitigation measures (*i.e.*, timing windows) are employed to avoid impacts to individuals of endangered bat species (MECP 2021). For the purpose of our assessment, it is RiverStone's opinion that highly functional habitat features for endangered bat species are unlikely to occur within the study area and particularly within the ROW; however, it is not possible to rule out the potential for *individuals* of endangered bat species (or other bat species) to be present during the active season. Further discussion, including an assessment of potential impacts to individuals of endangered bat species resulting from implementation of the selected alternative, is provided in **Section 5.**

4.10 Significant Wildlife Habitat

Significant wildlife habitat (SWH) represents a range of habitat features that are recognized as providing specialized or otherwise important functions for various forms of wildlife. Designation of confirmed SWH is ultimately the responsibility of the relevant planning authority, and it is our understanding that no specific SWH designations have been applied to the study area. Notwithstanding, it is generally impractical for planning authorities to identify and designate most SWH features and functions on a comprehensive basis. Therefore, candidate SWH can be identified on a site-specific basis, often triggered through a large-scale development application.

To ensure due diligence in this regard, RiverStone has reviewed applicable technical guidance for the identification of specific SWH features and functions as contained in the SWH Criteria Schedules for Ecoregion 6E (MNRF 2015). A preliminary assessment of the criteria schedules is contained within **Appendix 5**. The results of RiverStone's field program and background review indicate that the following SWH features/functions that have the potential to occur within the study area. A discussion of potential impacts to candidate SWH features and functions is provided in **Section 5**.

- Seasonal Concentration Areas of Animals
  - Bat Maternity Colonies
  - Deer Yarding Area
- Specialized Habitat for Wildlife
  - Breeding Amphibian Habitat (Wetland)
- Habitat of Species of Conservation Concern
  - Special Concern and Rare Wildlife Species
- Animal Movement Corridors
  - Amphibian Movement Corridors
  - Deer Movement Corridors

4.10.1 Bat Maternity Colonies

Refer to **Section 4.9.1** for discussion regarding the potential for bat maternity habitat to be present on or adjacent to the subject property. While the discussion in **Section 4.9.1** is provided specifically for endangered bat species, the assessment and conclusions are comparable to species that are not protected under the ESA.

4.10.2 Deer Yarding Area & Migratory Corridor

The study area is contained within an area mapped by the MNRF as a Stratum 2 Deer Wintering Area. Stratum 2 'yards' are usually very broad-scale, covering large areas of the landscape where mixed forested cover is present. This is compared to Stratum 1 yards, which are considered the 'core' area of the yard that is most critical to supporting over-wintering deer. The Stratum 2 area that encompasses the study area measures over 50 km^2, and the study area is located along the southeastern edge of this mapped polygon (see **Figure 1**).

Despite the mapped Stratum 2 area, the study area likely provides only generic habitat function for White-tailed Deer. Several forest edges along the Pefferlaw River, roadways, and nearby residential areas likely detract from the overall value of the study area as deer wintering habitat.

4.10.3 Waterfowl Nesting Area

The Pefferlaw Brook corridor may support functional opportunities for waterfowl nesting. The availability of open water adjacent to mixed upland vegetation communities may support both ground-nesting and cavity-nesting waterfowl species. These habitat opportunities would most likely be associated with the open meadow/meadow marsh complex north of Concession Rd. 2 and any areas of woodland where tree cavities may be present.

4.10.4 Wetland Amphibian Breeding Habitat & Movement Corridor

Pefferlaw Brook riparian zones and floodplain features may support breeding habitat for one or more anuran species. Wetland communities observed during on-site investigations (as per **Figure 2**) do not appear to support abundant standing water that would be required to support significant breeding habitat. Notwithstanding, there is potential that floodplain pools or small open-water wetlands occur beyond view of the ROW that might support such functions.

4.10.5 Special Concern and Rare Wildlife Species

RiverStone staff have conducted a review of the list of species designated as special concern in Ontario, as per Schedule 4 of Ontario Regulation 230/08, located here: https://www.ontario.ca/laws/regulation/080230. RiverStone further reviewed several biodiversity databases for existing records of element occurrences for special concern or rare species, including: NHIC, iNaturalist, OBBA, and ORAA. Through a review of background and on-site survey data, as well as application of staff knowledge and experience, RiverStone noted the following species as being potentially present within the study area:

- Barn Swallow (*Hirundo rustica*; Special Concern)
- Eastern Wood-Pewee (*Contopus virens*; Special Concern)
- Wood Thrush (*Hylocichla mustelina*; Special Concern)
- Snapping Turtle (*Chelydra serpentina*; Special Concern)

NHIC's database contains no record of element occurrence for Barn Swallow for the 1 km grid squares associated with the study area; however, individuals have been documented in the local area as per the OBBA database. This species is frequently observed foraging within agricultural settings and other open areas, while nesting often occurs under bridges or on the sides of agricultural buildings (*e.g.*, barns). A single nest was observed under the existing bridge that may have been created and/or used by a Barn Swallow. The ESA status of Barn Swallow was recently changed from threatened to special concern, meaning that regulated protections would no longer be afforded to this nest (should it have been used by a Barn Swallow).

Woodland bird species such as Eastern Wood-Pewee and Wood Thrush are commonly distributed in suitable woodland habitat across the local and regional landscape. While the NHIC database contains no records for either species, the OBBA has confirmed breeding records for both species for the broad 10x10 km grid square in which the study area is contained. The cedar-dominant woodlands within the study area would not provide preferred cover for either species; however, areas of mixed canopy may support some limited habitat functions.

NHIC's database contains a record of element occurrence of Snapping Turtle for one or more of the data squares overlapping the study area. This species is commonly encountered in streams and diverse wetland types, and it is highly likely that individuals would use Pefferlaw Brook to move between areas of key habitat. It is also possible that individuals may use local road shoulders for nesting; however, timing of site visits would make observations of former nests difficult. No areas of naturally-functional nesting habitat were observed within or adjacent to the ROW, and the watercourse is not suitably structured to support over-wintering functions.

5 IMPACT ASSESSMENT AND RECOMMENDATIONS

5.1 Proposed Activity

This EIS has been undertaken to inform a Municipal Class EA coordinated by Tatham Engineering to address identified deficiencies in the Old Shiloh Bridge crossing over Pefferlaw Brook. The existing structure is approximately 98 years old, with multiple rehabilitation works having been conducted in the past to address assessed deficiencies in the structure. The crossing is designed for single-lane traffic, that may be problematic as local traffic volumes grow. Notwithstanding these issues, the age of the structure may bestow some historical/cultural significance that warrants consideration. The initial scope of this assessment involved characterization of natural heritage features and functions to inform selection of the various alternatives being contemplated, which included the following:

1) Do nothing;
2) Rehabilitate the existing bridge;
3) Remove and replace the bridge; and
4) Construct a new bridge adjacent to the existing bridge.

An updated assessment is provided herein to reflect selection of the preferred alternative, i.e., removal of the existing bridge and replacement with a two-lane structure (**Appendix 6**). While the preferred solution has been identified, detailed design of the bridge has not been undertaken to date. RiverStone has been circulated a preliminary concept drawing to inform a high-level assessment of potential impacts to identified features and functions. The recommendations provided within this report are preliminary and subject to change based on an evaluation of the detailed design. We note that additional future assessment may be warranted to inform requirements at detailed design stage.

5.2 Impact Assessment

As discussed in **Section 4**, multiple KNHF/KHFs have been confirmed or have the potential to occur in the study area. The preferred solution identified through the EA, i.e., remove and replace the bridge, has the potential to adversely impact one or more KNHF/KHFs through various pathways, including impacts related to the construction staging process, as well as long-term changes to the stream channel and associated areas of natural cover. The potential for negative impacts on all identified KNHF/KHFs is discussed in the sections below, and several recommendations are listed to support a scenario of no net negative impacts and/or appropriate authorizations where impacts cannot be avoided. **Table 3** provides a high-level summary of potential impacts and mitigation considerations.

In assessing and identifying potential negative impacts through a development process, it is important to highlight how the PPS defines negative impacts, *i.e.*:

> "*…degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities*"

Importantly, as stated in Section 13.2 of the Natural Heritage Reference Manual (for Natural Heritage Policies of the PPS):

> *The PPS definition for "negative impacts" does not state that all impacts are negative, nor does it preclude the use of mitigation to prevent, modify or alleviate the impacts to the significant natural heritage feature or area*".

RiverStone's impact assessment is intended to be reflective of the above guidance, with consideration for the integrity and function of each feature, and in acknowledgement that not all development and/or site alteration represents a negative impact to the natural environment. Moreover, in the context of the class EA process, it is important to highlight that infrastructure works undertaken as part of an EA are not considered development under the definitions of the PPS. Ultimately, RiverStone's assessment is intended to inform a review of the above proposal by the appropriate approval authority. Our assessment is based on a review of existing conditions at the time of our site investigation.

5.2.1 Streams, Wetlands, & Fish Habitat

Through flood dynamics and general hydrologic connectivity, Pefferlaw Brook is inherently connected to adjacent wetland vegetation communities that occur within the study area. This complex of in-channel structure and associated vegetation cover are also critical to supporting fish and fish habitat, and so these features/functions are discussed together herein. In general, development and/or site alteration activities that occur proximate to streams, wetlands, and fish habitat have the potential to cause negative impacts via the following pathways:

- Alterations of surface water and/or groundwater contributions to streams and wetlands that may result from:
    - Construction staging and detour requirements (*e.g.,* dewatering, etc.);
    - Increased post-construction coverage of impervious surfaces (*e.g.,* roads, roofs, etc.); and,
    - Permanent modifications to existing topography or drainage;
- Increased sediment and/or nutrient loadings to features via runoff exiting the development area from construction to post-completion of the project. This may adversely affect water quality via increased turbidity, nutrient enrichment, contamination by toxic substances, changes in pH, changes in flow or thermal regimes etc.;
- Disruption or loss of habitat for fish and other wetland-dependent wildlife, as well as constructed-related impacts to such wildlife during the construction process; and,
- Increased human activity/encroachment within the stream or wetland post construction, which may result in increased soil compaction, dumping, vandalism, or other disturbances.

Depending on the design of the replacement bridge, some extent of encroachment into natural features is expected to be required. Replacement of the bridge with a wider footprint has the potential to alter or disturb the structure of the channel and banks, which has potential implications for areas of associated fish habitat. To facilitate construction, removal of trees, boulders, and submerged woody debris is expected to be required, resulting in a loss of overhanging vegetation and a change to existing in-stream structure. These features provide shade and important habitat for fishes within this system where such structure may otherwise be lacking. Multiple fish species were observed using the eddies on the northwest bank of the brook, providing an area of habitat that is supported by in-stream boulders and overhanging vegetation. Removal of the boulders, cobble, and submerged woody debris in a system comprised primarily of sand substrates has the potential to alter flow regimes in the immediate area of the structure, both above and downstream of the immediate footprint. Such changes may impact keystone warm water Sunfish species and other species that occupy this reach of the Pefferlaw Brook. Mitigation is warranted to avoid net negative impacts in this regard, including consideration for post-construction replacement and enhancement of in-stream habitat structure and re-vegetation of riparian zones.

Based on the preliminary design provided by Tatham Engineering, it is expected that minor encroachment into areas of riparian wetland will likely be required to facilitate installation of new wing walls and conceptual 2:1 graded slopes from the widened road bed. It is estimated that such wetland encroachment would be limited to the area southwest of the crossing, with potential encroachment into the feature amounting to an estimated 100-200 m^2, depending on the extent of grading and construction staging requirements in this location. Based on the location and nature of observed wetland ecosites, there is no expectation that this minor encroachment would negatively impact functions of the broader riparian wetland complex. Observed wetlands are generic in nature, without any obvious sensitive habitat functions or specialized structure, e.g., floodplain pools, sensitive species assemblages. These communities intergrade with the disturbed, cultural vegetation that occurs within the direct road shoulder, which is where construction disturbance would be most concentrated.

In general, it is expected that most potential impacts to the watercourse, wetlands, and fish habitat would be related to construction processes, while changes in substrate composition and flow regime may result from the infrastructure itself. This could include potential destabilization of banks, release of sediment, potential contamination via fuel spills, and temporary blockage of fish passage. Such disturbances present a risk to sensitive aquatic communities and, most importantly, have the potential to result in harmful alteration, disruption, and destruction (HADD) of fish habitat. The federal *Fisheries Act* prohibits activities that cause the death of fish or HADD of fish habitat, so measures must be implemented to mitigate such potential outcomes.

Until further information is available regarding design details for the bridge, expected mitigation requirements are provided as follows to cover all potential impacts to the watercourse, fish habitat, and wetlands.

- **Prepare and submit a request for project review to the Department of Fisheries and Oceans (DFO) and adhere to all requirements of DFO in project planning and implementation.**
- **Consult with LSRCA regarding any requirements for regulated feature offsetting/compensation related to minor encroachment into wetlands as applicable.**
- **Activities and works in water must be designed and planned such that loss or disturbance to aquatic habitat is minimized as applicable.**
- **All in-water work must be isolated and completed in 'dry' conditions, with work area dewatered as applicable.**
- **Fish salvage must be undertaken prior to any de-watering of stream areas and following any work area flooding. Permits must be obtained from MNRF prior to fish salvage as applicable.**
- **Prepare a post-construction stabilization and restoration plan for any new surfaces, embankments, or areas otherwise directly disturbed by construction staging. Apply a restoration seed mix composed of native species only (except for stabilizing cover crop).**
- **Minimize riverbank and bed hardening to the extent possible (if replacement structures are required, these should be designed to maintain the existing natural substrates and gradients and allows continued fish passage, i.e., open bottom).**
- **Minimize removal of overhanging vegetation to the extent possible.**
- **Avoidance disturbance to submerged boulders and woody debris material outside of the bridge development footprint and consider opportunities to replace in-stream fish habitat structure post-construction as applicable.**
- **Restore natural bed substrates within and adjacent to replaced crossing structures following construction as applicable.**

- **In-water works (if required) and diversion of flows should avoid spring fisheries timing windows from March 15th-July 15th.Timing windows should be confirmed with MNRF and/or LSRCA as applicable.**
- **Implement sediment and erosion control measures as per applicable best management practices to isolate the development footprint.**
    - **Sediment fencing must be constructed of heavy material and solid posts and be properly installed (trenched in) to maintain its integrity during inclement weather events.**
    - **Additional sediment fencing and appropriate control measures must be available on site so that any breach can be immediately repaired.**
    - **Regular inspection and monitoring will be necessary to ensure that the structural integrity and continued functioning of the sediment control measures is maintained (i.e., proper installation is not the only action necessary to satisfy the mitigation requirements).**
    - **An on-site supervisor should be responsible for daily inspections of the sediment and erosion control measures during construction activity and record the time and date of inspections, the status of the mitigation measures, and any repairs undertaken.**
    - **Removal of non-biodegradable erosion and sediment control materials should occur once construction is complete, and the site is stabilized.**
- **Best Management practices should be utilized with all machinery and fill being imported to the subject property to ensure that material and tracks are free from invasive species (*Phragmites australis*, etc.).**
- **Machinery should arrive on site in clean condition and is to be checked and maintained free of fluid leaks.**
- **Machinery must be refueled, washed, and serviced within the area isolated by sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.**
- **Locate all fuel and other potentially deleterious substances within the area isolated by sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank.**
- **Temporary storage locations of aggregate/fill material (where required) should be located within the area isolated by sediment fencing. Storage areas should be sited to the west of Pefferlaw Brook. This material is to be contained by heavy-duty sediment fencing, a minimum of 30 m from wetlands and the top of watercourse bank as applicable.**
- **Offloading of construction and aggregate/fill materials (where required) should be completed during fair weather conditions, a minimum of 30 m from wetlands and the top of watercourse bank as applicable.**
- **All stockpiled topsoil/overburden (where required) should be piled in low piles and stabilized as quickly as possible (e.g., erosion-prone areas covered with textile) to minimize the potential for runoff and wind erosion as applicable.**

5.2.2 Significant Valleylands

Despite the lack of well-defined valley topography on the local landscape, the study area is contained within an area that may constitute significant valleylands. Pefferlaw Brook and its associated riparian zone and broader hazard limits (*e.g.*, floodplain, meanderbelt) can be considered the defining limits for the valleyland feature. Measuring ecological impacts to significant valleylands may be difficult as these features are generally represented by physical landforms that support a composite of other natural heritage features, such as woodlands, watercourses, wildlife habitat, etc.

The primary ecological functions associated with valleylands within the study area would be related to the conveyance of the associated watercourse feature, the provision of natural vegetation communities and wildlife habitats, and the continuity of natural cover that supports wildlife movement corridors. While the selected alternative would increase the built footprint associated with the bridge crossing, there is no expectation that this would negatively impact existing functions associated with the valleylands. Any site alteration would be concentrated within or adjacent to the existing built roadway, in a similar, albeit slightly wider, footprint. Post-construction, the proposed development will not result in change to the physical landform of the valley feature which, as noted, is not well defined in this specific location. Mitigation measures recommended elsewhere in this report are sufficient to ensure that the various features and functions associated with local valleylands are protected during and after potential site alteration activities.

5.2.3 Significant Woodlands

Woodland coverage is abundant within the study area and the broader landscape. Woodland communities observed from the ROW appear to be primarily successional in nature and not composed of mature trees or conservative plant assemblages. Regardless, these woodlands may be considered significant due to their size, continuity, and provision of habitat linkage functions. Impacts to woodland features from development activities are typically a result of the removal of large swaths of canopy cover. This can result in the direct loss of habitat functions through removal of unique features (*e.g.*, cavity trees), fragmentation of movement corridors, or reduction in amount of available interior woodland habitat.

Based on a preliminary design for the bridge replacement, it is likely that a small number of individual trees would be removed within the ROW to facilitate the project. Any potential tree removals would typically be identified through a Tree Inventory and Preservation Plan (TIPP) that assesses a specific design and grading plan. If any removals are determined to be required, we expect that these would be very minor and limited to individual trees around the structure footprint and within the ROW to the east of the structure.

Regardless of potential minor tree removals, most trees within the ROW are successional species that would be expected to quickly regenerate in appropriate locations following disturbance. Importantly, any minor removal of trees along the ROW would not result in a measurable reduction in the total area of contiguous woodland on the local landscape. There will also be no loss of habitat connectivity or interior woodland area, as the study area is situated along an existing functional woodland edge (roadway and stream corridor). In general, there is no expectation that the selected alternative would result in a negative impact to function and integrity of woodland features.

Regarding potential authorizations for works within significant woodlands, **Section 5.2.4** below discusses mitigation related to habitat for endangered and threatened species (*i.e.*, bats) that may be associated with woodland cover. It is our understanding that authorizations from the LSRCA would not be required for trees removals within the ROW, but may be required for removal of stumps, grubbing, grading, etc. within regulated areas. Additional recommendations with respect to mitigation of woodland impacts are provided below.

- **Minimize vegetation removal and disturbance to the extent possible, particularly adjacent to the watercourse.**
- **Prepare a TIPP to determine the extent of potential tree removals following bridge design. Construction exclusion, staging, and tree protection measures should be included in the TIPP for mitigation planning.**
- **Following preparation of the TIPP, review opportunities for re-planting of trees that require removal as applicable.**

5.2.4 Habitat of Endangered and Threatened Species

Of those species screened and discussed in **Section 4.9**, it is expected that the study area may support habitat or individuals for only one species/guild, endangered bat species. Areas of identified habitat for any endangered or threatened species are protected from destruction as per Section 10 of the ESA. Potential habitat cover for bats is generally ubiquitous within forested landscapes and, while the study area may not be expected to represent *significant* habitat for endangered bat species, the area may be expected to support some level of seasonal activity. Importantly, individuals of endangered bat species cannot legally be killed, harmed, or harassed as per Section 9 of Ontario's Endangered Species Act (ESA). RiverStone recommends that the project demonstrate best efforts to ensure that individuals of endangered bat species are not killed, harmed, or harassed through the development process (should they be present). To accomplish, the following is recommended:

- **Any minor tree removals required to accommodate the bridge replacement design must be completed outside of the season in which endangered bats may be active, *i.e.*, April – Oct, inclusive. If substantial tree removals are determined to be required (*i.e.*, beyond the ROW), additional assessment of habitat usage and significance may be warranted as applicable.**

5.2.5 Significant Wildlife Habitat

Section 4.10 identified a list of candidate SWH features and functions that have the potential to occur within or adjacent to the study area, based on our assessment of the SWH Criteria Schedules for Ecoregion 6E (**Appendix 4**). These include:

- Bat Maternity Colonies
- Deer Wintering Areas/Movement Corridor
- Waterfowl Nesting Areas
- Wetland Amphibian Breeding Habitat/Movement Corridor
- Habitat for Special Concern and Rare Wildlife Species
    - Barn Swallow
    - Eastern Wood-Pewee
    - Wood Thrush
    - Snapping Turtle

Given the scope and scale of the proposed works, there is no expectation that the study area would be impacted in a manner that would prevent the long-term continuation of any of the above-noted candidate SWH features and functions (should they occur). All these functions depend on the retention of existing vegetation communities, including wetlands and woodlands. It is expected that the selected alternative will result in minor encroachment into one wetland community and potential removal of individual trees within the ROW. In general, it is recommended that the bridge design review opportunities for avoiding the small riparian meadow marsh within the ROW southwest of the existing crossing, or at least minimizing the footprint of encroachment. Similarly, trees should be inventoried within the ROW and the results reviewed to maximize retention of existing vegetation as feasible.

Construction activities have the potential to cause short-term disruption to candidate SWH features/functions, with mitigation planning being an important step to minimize and avoid such impacts. Regarding bat maternity colonies, discussion provided in **Section 5.2.4** pertaining to endangered bat species is considered directly relevant herein. Other important measures pertaining to vegetation disturbance and construction timing windows are listed below to avoid any incidental harm to various wildlife species, including those listed above. If all mitigation measures recommended in this report are implemented, there is no expectation that implementation of the preferred alternative will result in net negative impacts to candidate SWH features and functions.

- **Work site isolation must utilize sediment and erosion control that represents suitable wildlife exclusion fencing as per best management practises endorsed by the MECP.**
- **If any individual turtles are encountered within works area, activities that have the potential to harm such individuals should stop immediately. A qualified biologist or MECP should then be contacted to determine the most appropriate mitigation measure.**

5.2.6 General Impact Assessment and Mitigation

It is RiverStone's preliminary opinion that the selected alternative can be accomplished without significant adverse impacts to the functions of identified KNHF/KHFs. Importantly, the option to replace the bridge avoids the need for continued rehabilitation works, which can be impactful on the natural environment on an ongoing basis. Regardless, the option to remove and replace the bridge will inherently result in some short-term disturbance within the ROW, including temporary construction disturbance, with the following general mitigation recommended in addition to those listed in previous sections.

- **Grading and other activities that cause disturbance outside of the development envelope should be minimized to the extent possible during the construction period.**
- **In the spring prior to construction, install temporary bird exclusion mesh underneath bridges to prevent establishment of nests within the season of construction.**
- **Clearing of vegetation must be restricted to times outside of the period April 15 to October 30. If development and site alteration must occur within the period of April 1 to Aug 30, a nest survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests of migratory bird species covered by the MBCA. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season. If any clearing of mature trees must occur within the period April 15 to Oct 30, further measures may need to be taken with respect to mitigating harm to endangered bats which have the potential occur on site as applicable.**

Table 3. Summary of Potential Impacts Resulting from Selected Alternative.

Feature	Alternative Option 3 (Selected Alternative) – Remove and Replace Bridge; Widen to Two Lanes
Streams and Fish Habitat	**Impacts:** Potential impacts related to pollution from construction equipment spills, sediment release from excavation works; de-stabilization of banks; potential in-water construction staging. Potential direct impacts to fish habitat, depending on in water footprints and changes in substrate and flow regimes. **Mitigation:** Construction best management practises for work-site isolation and re-fueling; sediment and erosion controls measures; bank stabilization measures; adherence to in-water timing windows, minimization of riverbank and bed hardening. **Authorizations:** Submission to DFO; permit application to LSRCA.
Wetlands	**Impacts:** Potential impacts related to pollution from construction equipment spills; sediment release from excavation works; potential minor wetland encroachment to accommodate widening. **Mitigation:** Construction best management practises for work-site isolation and re-fueling; sediment and erosion controls measures; potential restoration/offsetting measures. **Authorizations:** Permit application to LSRCA.
Significant Valleylands	**Impacts:** Potential de-stabilization of banks; no expected impacts to valley form and function. **Mitigation:** Post-construction bank stabilization measures.
Significant Woodlands	**Impacts:** Potential minor tree removals within ROW. **Mitigation:** Prepare Tree Inventory and Preservation Plan to determine extent of tree removals; potential restoration/offsetting measures.
Habitat of Threatened and Endangered Species	**Impacts:** Potential minor tree removals within ROW. **Mitigation:** Confirm absence of SAR trees; conduct removals during appropriate timing window to avoid incidental impacts to SAR bats. **Authorizations:** None expected; potential if SAR identified or if tree removal timing windows cannot be met.
Significant Wildlife Habitat	**Impacts:** Potential minor tree removals within ROW; disturbance to wildlife habitat functions during active season; disruption to wildlife movements during active season. **Mitigation:** Conduct any tree removals during appropriate timing window to avoid wildlife disturbance and incidental impacts to SAR bats; isolate work area to avoid wildlife access; consolidate work area as feasible to minimize disruption of seasonal movements.
Impact Summary	This alternative poses some minor impacts related to an overall expansion of footprint for the bridge and roadway approach, including potential minor tree removals and minor encroachment into a small riparian wetland area. In general, impacts are expected to be low and easily mitigated.

6 PERMITTING & APPROVALS CONSIDERATIONS

Multiple approvals and/or permits may be required to facilitate the proposed works, including:

- **Fisheries Act:** A request for review under the Federal *Fisheries Act* is expected to be required to ensure that the project is consistent with the Act.
- **Endangered Species Act:** Based on the results of RiverStone's detailed EIS herein, there is minimal potential for individuals or habitat for endangered or threatened species to occur within the project area. Based on our understanding of the project, and assuming full implementation of mitigation measures recommended herein, there is no expectation that works will result in a contravention of the ESA. At this time, it is not expected that permits/approvals are required under the ESA to permit the works to proceed.
- **Conservation Authorities Act:** In addition to the above, the study area is located within the Lake Simcoe Region Conservation Authority's regulatory jurisdiction. A permit or other authorization is expected to be required from the Conservation Authority under O. Reg. 179/06 to allow the bridge works to proceed.
- **Migratory Birds Convention Act:** Mitigation measures have been provided to ensure that works will not result in a contravention to the MBCA. No specific permits are required in this regard.

7 SUMMARY & CONCLUSIONS

The preceding report provides the results of RiverStone's assessment of natural heritage features and functions associated with a watercourse crossing in the Town of the Georgina. Alternatives for potential replacement or rehabilitation of this structure have been considered, with replacement and widening of the bridge identified as the preferred solution. Our report characterizes natural heritage features and constraints associated with a defined study area and provides an assessment of potential impacts to aid in further design. The report provides general mitigation planning that can be used to identify additional required measures to support implementation of the project. Pending review by appropriate authorities, further investigations of the study area may be required to assess potential natural heritage impacts associated with the project. Authorizations from one or more agencies are required to ensure compliance with environmental policies and regulations.

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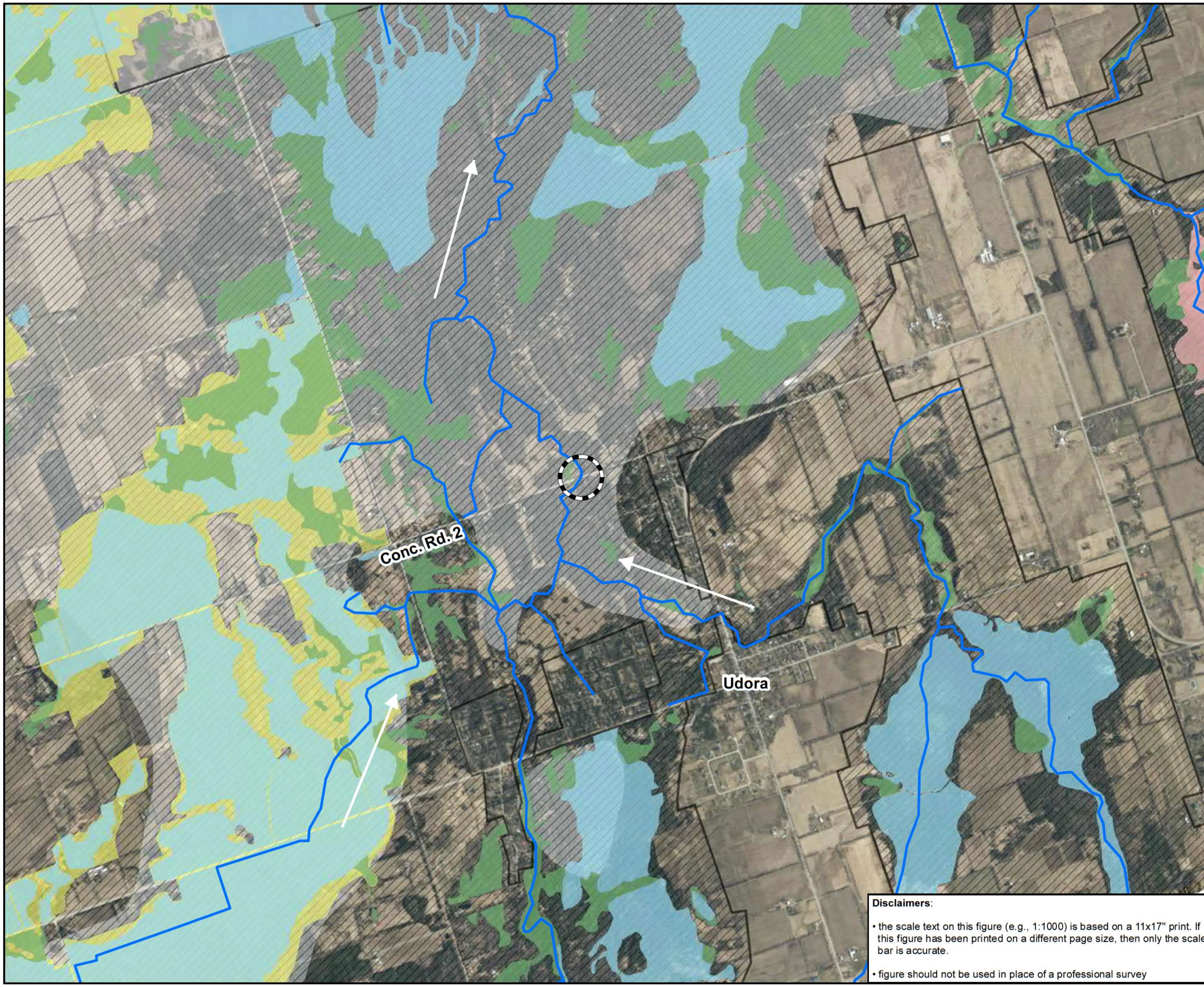


Disclaimers:

- the scale text on this figure (e.g., 1:1000) is based on a 11x17" print. If this figure has been printed on a different page size, then only the scale bar is accurate.
- figure should not be used in place of a professional survey

Legend

N

- Study Area
- Watershed Drainage Network (Land Information Ontario)
- Greenbelt Natural Heritage System
- Area of Natural and Scientific Interest (Land Information Ontario)
- Deer Wintering Area (Stratum 2)

Provincial Wetland Layer (Land Information Ontario)

- Evaluated Wetland - Non PSW
- Evaluated Wetland - PSW
- Unevaluated Wetland

Direction of Drainage

Orthorectified aerial photo - spring 2018

Scale	RS Project No.	Date Last Updated	By
1:21,000	2022-261	Feb 12, 2023	RS

0 320 640 Metres

RIVERSTONE ENVIRONMENTAL SOLUTIONS INC.

Figure 1. Study Area Location and Context.
'Old Shiloh Road Bridge', Concession Rd. 2, Township of Georgina

Prepared for: Tatham Engineering c/o Emma Wilkinson

Disclaimers:

- the scale text on this figure (e.g., 1:1000) is based on a 11x17" print. If this figure has been printed on a different page size, then only the scale bar is accurate.
- figure should not be used in place of a professional survey

Legend

N

- Study Area
- Wetland (RiverStone 2022)
- Woodland

Vegetation/Land Cover (ELC)

- CUM1: Mineral Cultural Meadow Ecosite
- FOC4: Fresh White Cedar Coniferous Forest Ecosite
- FOM/CUW: Fresh - Moist Mixed Forest/Cultural Woodland
- MAM2: Mineral Meadow Marsh Ecosite
- OA: Open Aquatic
- SWT2: Mineral Thicket Swamp

Direction of Drainage

Orthorectified aerial photo - spring 2018

Scale	RS Project No.	Date Last Updated	By
1:1,200	2022-261	Feb 13, 2023	RS

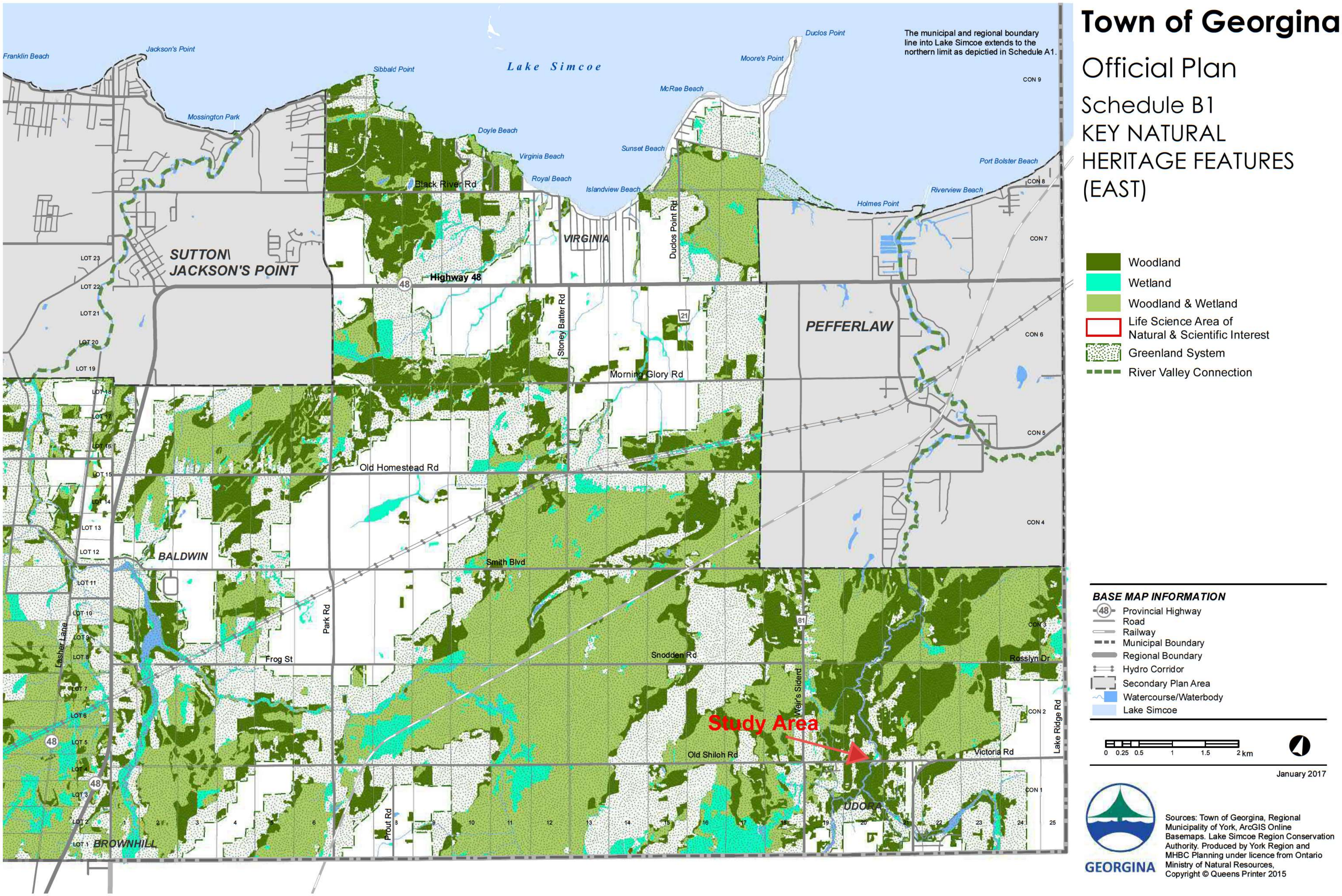
0 10 20 Metres

RIVERSTONE ENVIRONMENTAL SOLUTIONS INC.

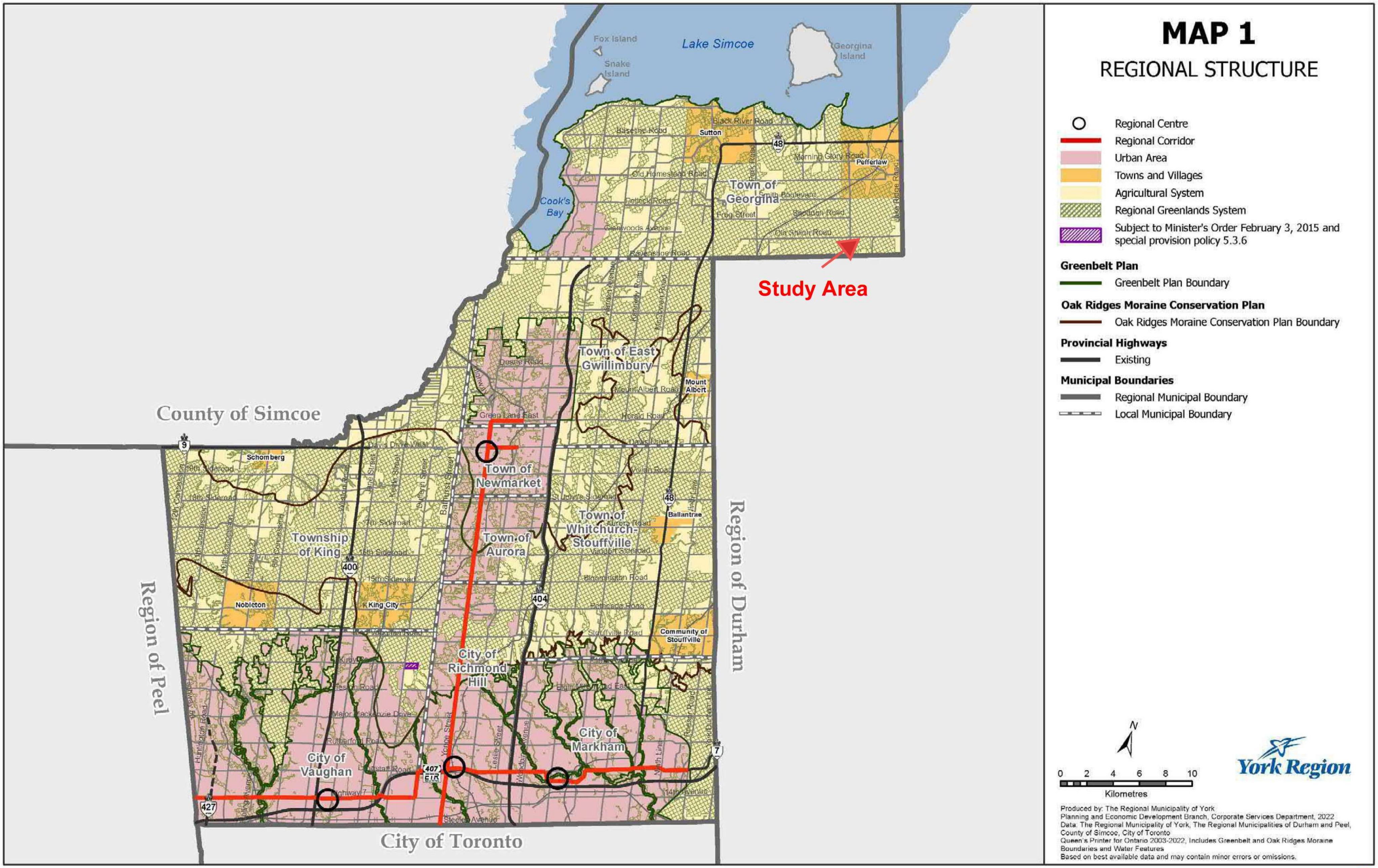
Figure 2. Existing Conditions.
'Old Shiloh Road Bridge', Concession Rd. 2, Township of Georgina

Prepared for: Tatham Engineering c/o Emma Wilkinson

Appendix 1. Planning & Regulatory Schedules.



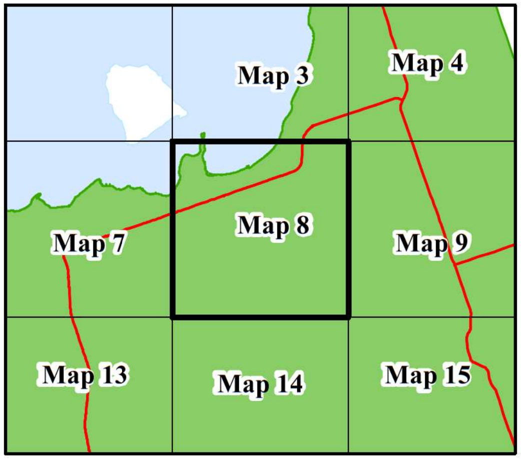
Town of Georgina
Official Plan
Schedule B1
KEY NATURAL HERITAGE FEATURES (EAST)
Lake Simcoe
The municipal and regional boundary line into Lake Simcoe extends to the northern limit as depicted in Schedule A1.
SUTTON\ JACKSON'S POINT
VIRGINIA
PEFFERLAW
BALDWIN
UDORA
BROWNHILL
Highway 48
Black River Rd
Morning Glory Rd
Old Homestead Rd
Smith Blvd
Frog St
Snodden Rd
Old Shiloh Rd
Victoria Rd
Rosslyn Dr
Park Rd
Prout Rd
Stoney Batter Rd
Ducios Point Rd
Weir's Siderd
Lake Ridge Rd
Lasher Lane
Study Area
Woodland
Wetland
Woodland & Wetland
Life Science Area of Natural & Scientific Interest
Greenland System
River Valley Connection
BASE MAP INFORMATION
Provincial Highway
Road
Railway
Municipal Boundary
Regional Boundary
Hydro Corridor
Secondary Plan Area
Watercourse/Waterbody
Lake Simcoe
0 0.25 0.5 1 1.5 2 km
January 2017
GEORGINA
Sources: Town of Georgina, Regional Municipality of York, ArcGIS Online Basemaps. Lake Simcoe Region Conservation Authority. Produced by York Region and MHBC Planning under licence from Ontario Ministry of Natural Resources, Copyright © Queens Printer 2015


MAP 1
REGIONAL STRUCTURE
Regional Centre
Regional Corridor
Urban Area
Towns and Villages
Agricultural System
Regional Greenlands System
Subject to Minister's Order February 3, 2015 and special provision policy 5.3.6
Greenbelt Plan
Greenbelt Plan Boundary
Oak Ridges Moraine Conservation Plan
Oak Ridges Moraine Conservation Plan Boundary
Provincial Highways
Existing
Municipal Boundaries
Regional Municipal Boundary
Local Municipal Boundary
Study Area
Lake Simcoe
Fox Island
Snake Island
Georgina Island
Cook's Bay
Town of Georgina
Sutton
Pefferlaw
Town of East Gwillimbury
Mount Albert
Town of Newmarket
Town of Whitchurch-Stouffville
Ballantrae
Town of Aurora
Township of King
Schomberg
Nobleton
King City
Community of Stouffville
City of Richmond Hill
City of Vaughan
City of Markham
County of Simcoe
Region of Peel
Region of Durham
City of Toronto
0 2 4 6 8 10
Kilometres
York Region
Produced by: The Regional Municipality of York
Planning and Economic Development Branch, Corporate Services Department, 2022
Data: The Regional Municipality of York, The Regional Municipalities of Durham and Peel, County of Simcoe, City of Toronto
Queen's Printer for Ontario 2003-2022, Includes Greenbelt and Oak Ridges Moraine Boundaries and Water Features
Based on best available data and may contain minor errors or omissions.

Greenbelt Plan, map division and enlargement

Map 8

greenbelt



LEGEND

Ontario

- Greenbelt Area*
- Protected Countryside
- Natural Heritage System
- Towns / Villages
- Urban River Valleys
- Niagara Escarpment Plan Area
- Oak Ridges Moraine Area
- External Connections
- Settlement Areas Outside the Greenbelt
- Upper Tier Municipal Boundaries
- Lower & Single Tier Municipal Boundaries
- Lots and Concessions
- Major Road or Highway
- Minor Road
- F.N. First Nations

The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should not be relied on as being a precise indicator of locations of features or roads nor as a guide to navigation.

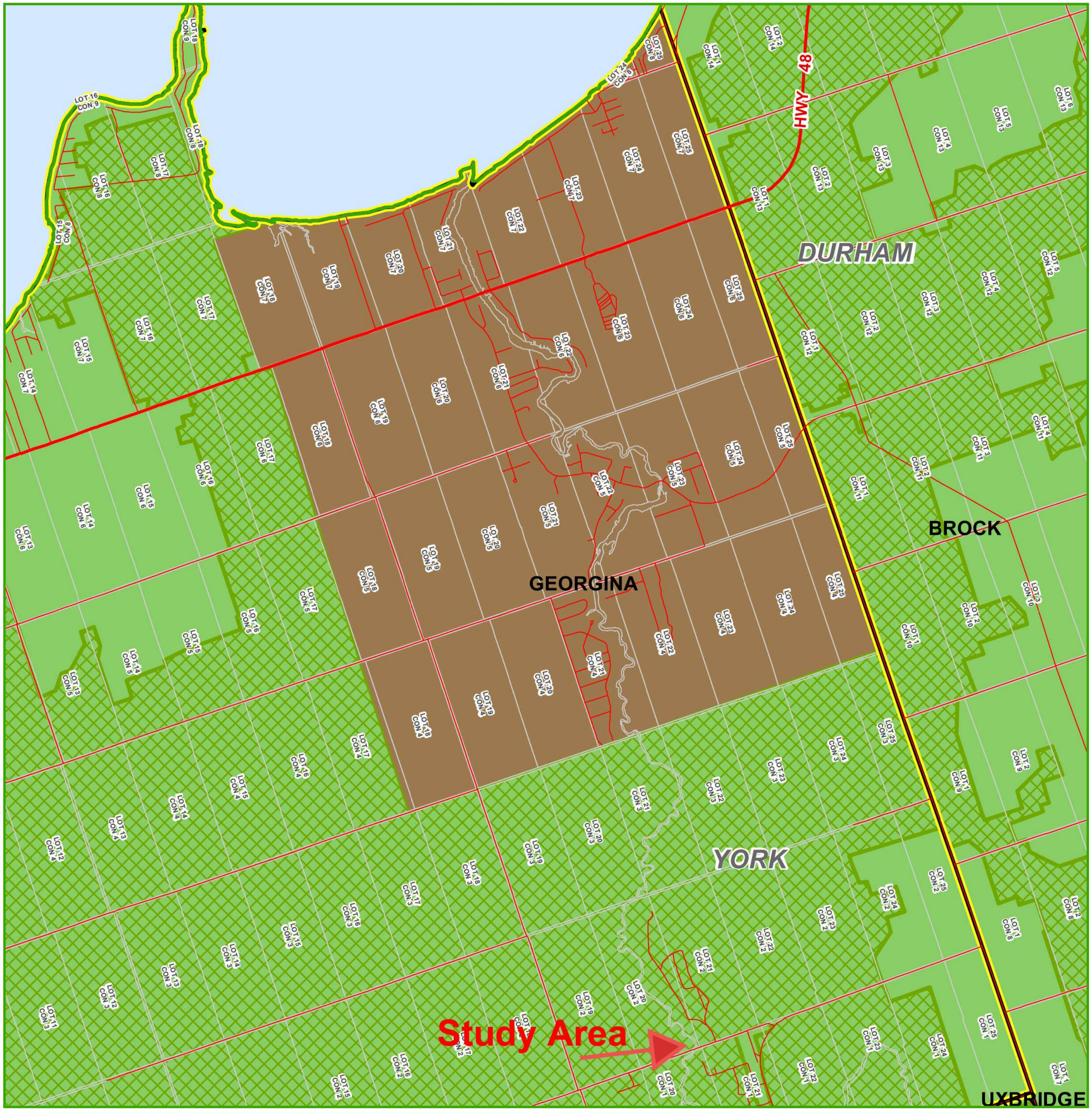
Settlement boundaries generally reflect information provided by the relevant municipality. For precise boundaries and locations of Settlement Areas (Greenbelt Towns/Villages and Hamlets) the appropriate municipalities should be consulted.

Source of Information:
Produced by and using data sources from the Ministry of Municipal Affairs, Ministry of Natural Resources and Forestry and the Ministry of Agriculture, Food and Rural Affairs.

Projection: UTM Zone17 NAD83

* Ontario Regulation 59/05, as amended.

0 0.25 0.5 1 1.5 2
Kilometres



RIVERINE HAZARDS WERE BASED ON EXISTING FLOOD PLAIN MAPPING. FLOOD PLAIN LIMITS WHERE ENGINEERING PRODUCTS DID NOT EXIST WERE DETERMINED BY LSRCA STAFF.
RIVERINE EROSION HAZARDS WERE DETERMINED BY LSRCA STAFF. A 15-METER SETBACK WAS APPLIED FROM THE LIMITS OF ALL RIVERINE HAZARDS.
SHORELINE FLOOD HAZARDS WERE DETERMINED BY LSRCA STAFF BY APPLYING THE EQUATIONS PREVIOUSLY DEVELOPED THROUGH AN ENGINEERING STUDY.
SHORELINE EROSION HAZARDS WERE DETERMINED BY LSRCA STAFF.
WETLANDS WERE DELINEATED BY THE MINISTRY OF NATURAL RESOURCES & FORESTRY. SETBACKS OF 120-M FROM PROVINCIALLY SIGNIFICANT WETLANDS (PSWs) AND 30-M FROM ALL OTHER WETLANDS WERE APPLIED.
MEANDERBELT WIDTHS WERE ESTABLISHED THROUGH A STUDY. IN THE ABSENCE OF A STUDY, MEANDERBELT WIDTHS WERE CALCULATED AS 20 TIMES THE BANKFULL WIDTHS ESTIMATED FROM THE CORRESPONDING DRAINAGE AREAS.

PLEASE REFER TO "REFERENCE MANUAL FOR DETERMINATION OF REGULATION LIMITS" (LSRCA, 2005) OR CONTACT LSRCA (905-895-1281) FOR MORE INFORMATION

1:10,000

0 0.225 0.45 0.9 1.35 1.8

Kilometers

NO.	REVISIONS	DATE
0	ONTARIO REGULATION 179/06 APPROVED	MAY 8, 2006
1	Mapping revisions to the regulation limit have been completed as referenced in the document "Regulation Limit Changes, May 2007"	SEPT. 28, 2007
2	Mapping revisions to the regulation limit have been completed as referenced in the document "Regulation Limit Changes, April 2009". Ortho imagery changed to reflect most recent imagery available. Map/data disclaimer changed to reflect most current disclaimers in use	APRIL 24, 2009
3	Mapping revisions to the regulation limit have been completed as referenced in the document "Regulation Limit Changes, July 2013". Ortho imagery changed to reflect most recent imagery available. Map/data disclaimer changed to reflect most current disclaimers in use	JULY 26, 2013
4	Mapping revisions to the regulation limit have been completed as referenced in the document "Regulation Limit Changes, September, 2014". Ortho imagery reflects most recent imagery available. Map/data disclaimer changed to reflect most current information.	SEPT. 26, 2014
5	Mapping revisions to the regulation limit have been completed as referenced in the document "Regulation Limit Changes, April, 2018". Ortho imagery reflects most recent imagery available. Map/data disclaimer changed to reflect most current information.	APRIL 1, 2018
6	Mapping revisions to the regulation limit have been completed as referenced in the document "Regulation Limit Changes, April, 2019". Ortho imagery reflects most recent imagery available. Map/data disclaimer changed to reflect most current information.	APRIL 1, 2019

CHECKED - NATURAL HERITAGE	KB
CHECKED - REGULATIONS	JP
CHECKED - ENGINEERING	JP
APPROVED	TH
DATE:	JANUARY 2006
MAPPED BY:	JB

(ONTARIO REGULATION 97/04)

REGULATION OF DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES.

ONTARIO REGULATION 179/06

PLOT DATE: APRIL 2019

FILE LOCATION:

SHEET NO. 57

OF 134

Appendix 2. Photos of Representative Site Conditions.

RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

Photo 1. Facing east towards crossing.

Photo 2. Facing southeast from west of crossing; riparian vegetation.

Photo 3. Facing north from west of crossing; riparian vegetation and open cultural meadow.

Photo 4. Facing east along south side bridge.

Photo 5. Facing south from bridge; riparian vegetation and successional woodlands.

Photo 6. Facing northeast from underneath bridge.

Photo 7. Facing west underneath bridge.

Photo 8. Facing north (downstream) from underneath bridge.

Photo 9. Substrates consisting of cobble, gravel, and sand directly adjacent to the bridge on the south side of the bridge.

Photo 10. Facing east from east side of bridge.

Photo 11. Facing south from southern edge of road allowance, east of bridge; Buckthorn thicket and Cedar woodlands.

Photo 12. Facing west from bridge; riparian vegetation and successional woodlands.

Photo 13. Facing southeast from east side of bridge; mixed successional woodlands with wetland thickets.

Photo 14. Facing east from east side of bridge.

Photo 15. Facing south from southern edge of road allowance, east of bridge; Buckthorn thicket and Cedar woodlands.

Photo 16. Facing north from southeast of bridge; typical Cedar woodlands along shallow valley slopes.

Appendix 3. Background Natural Heritage Data.

RIVERSTONE
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NHIC Data

To work further with this data select the content and copy it into your own word or excel documents.

OGF ID	Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	ATLAS NAD83 IDENT	COMMENTS
1034267	SPECIES	Bobolink	Dolichonyx oryzivorus		THR	THR	17PK4303	
1034266	NATURAL AREA	Zephyr Creek Swamp					17PK4302	
1034266	NATURAL AREA	Zephyr-Egypt Wetland Complex					17PK4302	
1034266	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17PK4302	
1034266	SPECIES	Snapping Turtle	Chelydra serpentina		SC	SC	17PK4302	
1034277	NATURAL AREA	Lower Pefferlaw Brook Wetland Complex					17PK4403	
1034277	SPECIES	Bobolink	Dolichonyx oryzivorus		THR	THR	17PK4403	
1034276	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17PK4402	

Atlas Data Summary

Select what type of data summary you would like to display and click the appropriate *view* button. You can use the square resource page to find out where your atlas squares or regions are located.

What years do you want to display : : all years combined Which version of the atlas Second (2001-2005)

How do you want to view the results: Tabular results

Show me statistics on the number of species reported, the effort, etc.

1. View summary statistics:: Province View
2. View summary statistics: By Square within region 1. Essex View
3. View list of completed Point Counts in **square** :: View

Show me the list of species, the highest breeding evidence and abundance

4. View species list for : : Province View
5. View species list for **square** or **block no.** : : 17PK40 View

Show me the list of regions or squares reporting a species

6. View list of Regions reporting View

Species list for square 17PK40 (number of entries returned: 112)

			Breeding Evidence				Point Counts			
Region	Square	Species	Max BE	Categ	#Sq	Atlasser Name	#PC	%PC	Abun	#Sq
45	17PK40	Canada Goose	FY	CONF	1	2 atlassers	5	19.23	0.7692	1
45	17PK40	Wood Duck	P	PROB	1	Joanne Nonnekes				
45	17PK40	Mallard	T	PROB	1	Josh Shook				
45	17PK40	Hooded Merganser	FY	CONF	1	Joanne Nonnekes				
45	17PK40	Ruffed Grouse	T	PROB	1	Joanne Nonnekes				
45	17PK40	Wild Turkey	NU	CONF	1	Joanne Nonnekes				

45	17PK40	American Bittern	T	PROB	1	Joanne Nonnekes				
45	17PK40	Green Heron	T	PROB	1	Joanne Nonnekes				
45	17PK40	Turkey Vulture	H	POSS	1	Joanne Nonnekes				
45	17PK40	Osprey	NY	CONF	1	Joanne Nonnekes				
45	17PK40	Northern Harrier	P	PROB	1	Roy Smith				
45	17PK40	Sharp-shinned Hawk	CF	CONF	1	Josh Shook				
45	17PK40	Northern Goshawk	P	PROB	1	Joanne Nonnekes				
45	17PK40	Broad-winged Hawk	S	POSS	1	Joanne Nonnekes				
45	17PK40	Red-tailed Hawk	T	PROB	1	Joanne Nonnekes				
45	17PK40	American Kestrel	H	POSS	1	Joanne Nonnekes				
45	17PK40	Virginia Rail	FY	CONF	1	Josh Shook				
45	17PK40	Sora	T	PROB	1	Joanne Nonnekes				
45	17PK40	Killdeer	T	PROB	1	Joanne Nonnekes				
45	17PK40	Rock Pigeon	D	PROB	1	Joanne Nonnekes				
45	17PK40	Spotted Sandpiper	FY	CONF	1	Joanne Nonnekes				
45	17PK40	Upland Sandpiper	H	POSS	1	Rayfield Pye				
45	17PK40	Common Snipe	V	PROB	1	Josh Shook				
45	17PK40	American Woodcock	T	PROB	1	Joanne Nonnekes				
45	17PK40	Mourning Dove	FY	CONF	1	Joanne Nonnekes	6	23.08	0.3077	1
45	17PK40	Black/Yellow-billed Cuckoo	S	POSS	1	Josh Shook				
45	17PK40	Black-billed Cuckoo	H	POSS	1	Roy Smith				
45	17PK40	Eastern Screech-Owl	S	POSS	1	Joanne Nonnekes				
45	17PK40	Barred Owl	FY	CONF	1	Joanne Nonnekes				
45	17PK40	Chimney Swift	T	PROB	1	Joanne Nonnekes				
45	17PK40	Ruby-throated Hummingbird	S	POSS	1	Joanne Nonnekes				
45	17PK40	Belted Kingfisher	CF	CONF	1	Josh Shook				
45	17PK40	Yellow-bellied Sapsucker	NY	CONF	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	Downy Woodpecker	T	PROB	1	Joanne Nonnekes				
45	17PK40	Hairy Woodpecker	FY	CONF	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	Northern Flicker	P	PROB	1	Joanne Nonnekes				
45	17PK40	Pileated Woodpecker	T	PROB	1	Joanne Nonnekes				
45	17PK40	Eastern Wood-Pewee	T	PROB	1	Joanne Nonnekes	3	11.54	0.1154	1
45	17PK40	Acadian Flycatcher	S	POSS	1	Joanne Nonnekes				
45	17PK40	Alder Flycatcher	T	PROB	1	Joanne Nonnekes	2	7.69	0.1538	1
45	17PK40	Least Flycatcher	T	PROB	1	Joanne Nonnekes	2	7.69	0.0769	1
45	17PK40	Eastern Phoebe	NY	CONF	1	Joanne Nonnekes				
45	17PK40	Great Crested Flycatcher	T	PROB	1	Joanne Nonnekes	6	23.08	0.2692	1
45	17PK40	Eastern Kingbird	FY	CONF	1	Roy Smith	2	7.69	0.0769	1
45	17PK40	Yellow-throated Vireo	S	POSS	1	Joanne Nonnekes				
45	17PK40	Warbling Vireo	T	PROB	1	Joanne Nonnekes				
45	17PK40	Red-eyed Vireo	T	PROB	1	Joanne Nonnekes	8	30.77	0.4231	1
45	17PK40	Blue Jay	FY	CONF	1	Joanne Nonnekes	6	23.08	0.2308	1
45	17PK40	American Crow	CF	CONF	1	Josh Shook	17	65.38	1.1154	1
45	17PK40	Common Raven	H	POSS	1	Joanne Nonnekes				
45	17PK40	Horned Lark	T	PROB	1	Joanne Nonnekes				
45	17PK40	Purple Martin	S	POSS	1	Joanne Nonnekes				
45	17PK40	Tree Swallow	AE	CONF	1	Josh Shook	4	15.38	0.2308	1

45	17PK40	Northern Rough-winged Swallow	AE	CONF	1	Joanne Nonnekes				
45	17PK40	Cliff Swallow	NY	CONF	1	Joanne Nonnekes				
45	17PK40	Barn Swallow	NY	CONF	1	Joanne Nonnekes	2	7.69	0.1923	1
45	17PK40	Black-capped Chickadee	FY	CONF	1	Joanne Nonnekes	4	15.38	0.3077	1
45	17PK40	Red-breasted Nuthatch	T	PROB	1	Joanne Nonnekes				
45	17PK40	White-breasted Nuthatch	T	PROB	1	Joanne Nonnekes				
45	17PK40	Brown Creeper	T	PROB	1	Joanne Nonnekes				
45	17PK40	House Wren	NU	CONF	1	Geoff Carpentier	2	7.69	0.1154	1
45	17PK40	Winter Wren	S	POSS	1	Joanne Nonnekes				
45	17PK40	Blue-gray Gnatcatcher	P	PROB	1	Joanne Nonnekes				
45	17PK40	Eastern Bluebird	V	PROB	1	Joanne Nonnekes				
45	17PK40	Veery	T	PROB	1	Joanne Nonnekes	5	19.23	0.3846	1
45	17PK40	Hermit Thrush	S	POSS	1	Joanne Nonnekes				
45	17PK40	Wood Thrush	NY	CONF	1	Joanne Nonnekes	3	11.54	0.1154	1
45	17PK40	American Robin	NE	CONF	1		16	61.54	1.1923	1
45	17PK40	Gray Catbird	T	PROB	1	Joanne Nonnekes				
45	17PK40	Brown Thrasher	S	POSS	1	Joanne Nonnekes				
45	17PK40	European Starling	FY	CONF	1	Joanne Nonnekes	4	15.38	0.1923	1
45	17PK40	Cedar Waxwing	D	PROB	1	Joanne Nonnekes	3	11.54	0.3077	1
45	17PK40	Blue-winged/Golden-winged Warbler	S	POSS	1	Joanne Nonnekes				
45	17PK40	Nashville Warbler	T	PROB	1	Joanne Nonnekes				
45	17PK40	Yellow Warbler	NE	CONF	1	Joanne Nonnekes	8	30.77	0.4231	1
45	17PK40	Chestnut-sided Warbler	T	PROB	1	Joanne Nonnekes	2	7.69	0.0769	1
45	17PK40	Magnolia Warbler	T	PROB	1	Joanne Nonnekes				
45	17PK40	Black-throated Blue Warbler	T	PROB	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	Yellow-rumped Warbler	P	PROB	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	Black-throated Green Warbler	T	PROB	1	Joanne Nonnekes	1	3.85	0.0769	1
45	17PK40	Blackburnian Warbler	T	PROB	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	Pine Warbler	T	PROB	1	Joanne Nonnekes				
45	17PK40	Black-and-white Warbler	T	PROB	1	Joanne Nonnekes	3	11.54	0.1154	1
45	17PK40	American Redstart	S	POSS	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	Ovenbird	T	PROB	1	Joanne Nonnekes	11	42.31	0.8462	1
45	17PK40	Northern Waterthrush	T	PROB	1	Joanne Nonnekes	6	23.08	0.3846	1
45	17PK40	Mourning Warbler	T	PROB	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	Common Yellowthroat	CF	CONF	1	Roy Smith	6	23.08	0.4231	1
45	17PK40	Canada Warbler	T	PROB	1	Joanne Nonnekes				
45	17PK40	Eastern Towhee	S	POSS	1	Joanne Nonnekes				
45	17PK40	Chipping Sparrow	CF	CONF	1	Josh Shook	1	3.85	0.0385	1
45	17PK40	Field Sparrow	T	PROB	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	Vesper Sparrow	T	PROB	1	Joanne Nonnekes				
45	17PK40	Savannah Sparrow	A	PROB	1	Joanne Nonnekes	2	7.69	0.0769	1
45	17PK40	Grasshopper Sparrow	A	PROB	1	Rayfield Pye				
45	17PK40	Song Sparrow	CF	CONF	1	Joanne Nonnekes	12	46.15	0.6154	1
45	17PK40	Swamp Sparrow	CF	CONF	1	Joanne Nonnekes	3	11.54	0.1923	1
45	17PK40	White-throated Sparrow	A	PROB	1	Joanne Nonnekes	2	7.69	0.0769	1
45	17PK40	Scarlet Tanager	T	PROB	1	Joanne Nonnekes	2	7.69	0.0769	1
45	17PK40	Northern Cardinal	T	PROB	1	Joanne Nonnekes	1	3.85	0.0385	1

45	17PK40	Rose-breasted Grosbeak	T	PROB	1	Joanne Nonnekes	5	19.23	0.1923	1
45	17PK40	Indigo Bunting	T	PROB	1	Joanne Nonnekes	2	7.69	0.0769	1
45	17PK40	Bobolink	P	PROB	1	Joanne Nonnekes	2	7.69	0.1538	1
45	17PK40	Red-winged Blackbird	NY	CONF	1	Joanne Nonnekes	17	65.38	2.1923	1
45	17PK40	Eastern Meadowlark	A	PROB	1	Geoff Carpentier	1	3.85	0.0385	1
45	17PK40	Common Grackle	CF	CONF	1	Geoff Carpentier	5	19.23	0.3462	1
45	17PK40	Brown-headed Cowbird	FY	CONF	1	Roy Smith	3	11.54	0.1923	1
45	17PK40	Baltimore Oriole	AE	CONF	1	Josh Shook	7	26.92	0.2692	1
45	17PK40	Purple Finch	D	PROB	1	Roy Smith				
45	17PK40	House Finch	T	PROB	1	Joanne Nonnekes	1	3.85	0.0385	1
45	17PK40	American Goldfinch	D	PROB	1	Josh Shook	15	57.69	1.0769	1
45	17PK40	House Sparrow	AE	CONF	1	Joanne Nonnekes	1	3.85	0.0385	1

New data summary | Download results

Disclaimer: If you wish to use the data in a publication, research or for any purpose, or would like information concerning the accuracy and appropriate uses of these data, read the data use policy and request form. **These data are current as of 7 Feb 2023 .**

LEGEND	
Breeding Evidence **Max BE:** Highest Breeding Evidence recorded **Categ:** Highest Breeding Category recorded (OBS=observed, POSS=possible, PROB=probable, CONF=confirmed) **#Sq:** Number of squares with species (Breeding Evidence) **Atlasser name:** Name of atlasser who reported the highest breeding evidence (if they accepted that their name be displayed). If more than one person provided the same breeding evidence code, then only the number of atlassers is listed.	**Point Counts** **#PC:** Number of Point Counts with species **%PC:** Percent of Point Counts with species **Abun:** Average number of birds per Point Count **#Sq:** Number of squares with species (Point Counts)

Ontario Breeding Bird Atlas, Birds Canada, 115 Front Street, P.O. Box 160 Port Rowan, ON, N0E 1M0 Canada
Phone: 1-519-586-3531 E-mail: atlas@birdsontario.org **Banner photo:** John Reaume

Display of records for square 17PK40

All species - All life stages; most recent data first

Number of rows of data displayed below: 53.

Year	Common Name	Unique ID	Square ID
2019	Red-bellied Snake	483961	17PK40
2019	Snapping Turtle	519524	17PK40
2019	Western Chorus Frog	530947	17PK40
2018	Midland Painted Turtle	472849	17PK40
2018	Snapping Turtle	473352	17PK40
2018	Midland Painted Turtle	484301	17PK40
2018	Northern Leopard Frog	484322	17PK40
2018	Snapping Turtle	497472	17PK40
2017	Spring Peeper	365881	17PK40
2017	Midland Painted Turtle	455004	17PK40
2017	Eastern Gartersnake	459889	17PK40
2017	Midland Painted Turtle	494440	17PK40
2017	Midland Painted Turtle	494509	17PK40
2016	Blue-spotted Salamander	360463	17PK40
2016	Midland Painted Turtle	449475	17PK40

2016	Snapping Turtle	449480	17PK40
2016	Wood Frog	449986	17PK40
2016	Midland Painted Turtle	450881	17PK40
2016	Snapping Turtle	451351	17PK40
2015	Snapping Turtle	351599	17PK40
2015	Eastern Gartersnake	351806	17PK40
2015	Northern Leopard Frog	351807	17PK40
2013	Spring Peeper	154882	17PK40
2013	Snapping Turtle	351609	17PK40
2011	Gray Treefrog	160354	17PK40
2009	American Toad	160355	17PK40
2004	American Toad	154966	17PK40
2004	American Toad	154967	17PK40
2003	American Toad	154969	17PK40
2002	American Toad	154968	17PK40
2002	American Toad	154970	17PK40
2002	American Toad	154971	17PK40
2002	American Toad	154972	17PK40
2002	Blue-spotted Salamander	509794	17PK40
2001	Northern Leopard Frog	154810	17PK40
2001	Spring Peeper	154811	17PK40
2001	American Toad	155576	17PK40
2001	Spring Peeper	155577	17PK40
1991	Green Frog	159959	17PK40
1991	Wood Frog	159960	17PK40
1990	Northern Leopard Frog	155153	17PK40
1990	Snapping Turtle	443029	17PK40
1990	Snapping Turtle	443047	17PK40
1989	Spring Peeper	155151	17PK40
1989	Northern Leopard Frog	155152	17PK40
1989	Gray Treefrog	155754	17PK40

1989	Spring Peeper	155755	17PK40
1989	Northern Leopard Frog	157064	17PK40
1989	Spring Peeper	157066	17PK40
1989	Wood Frog	159227	17PK40
1989	Northern Leopard Frog	159228	17PK40
1989	Spring Peeper	159229	17PK40
1981	Green Frog	159958	17PK40

TEA home page | Main atlas page

Appendix 4. Endangered & Threatened Species Screening.

Species	ESA Status	General Description of Habitat and Range	Is the study area within the current known range of the species.	Do applicable databases contain records for this species within or adjacent to the study area.	Is suitable habitat present within the study area.	Is suitable habitat present within lands adjacent to the study area.	Discussion of relevance to proposal
Acadian Flycatcher (*Empidonax virescens*)	END	The Acadian Flycatcher is native to the Carolinian forests of Southern Ontario. It is area sensitive and prefers mature woodlands >25 ha in areas with >30% forest cover. Nesting habitats are deciduous or mixed woodlands with closed canopies, open understories, and limited groundcover. They prefer to nest near permanent or ephemeral ponds or streams.	UNKNOWN	POSSIBLE	NO	NO	The OBBA contains a possible breeding record for the associated 10km2 data square. No local records are present in NHIC or iNaturalist. No suitable habitat appears to be present within the study area. No further assessment undertaken. m
American Eel (*Anguilla rostrata*)	END	The American Eel migrates up the St. Lawrence River into the Ottawa River and Lake Ontario. They are habitat generalists and use benthic habitats with stones, debris, and vegetation for cover. Their distribution has been severely limited by human development and damming rivers.	NO	NO	N/A	N/A	N/A
American Ginseng (*Panax quinquefolius*)	END	American Ginseng requires well-drained but moist acidic to neutral soils overlying limestone or marble bedrock. They are obligate understory plants found in undisturbed mature deciduous and mixed forests, and occasionally in coniferous forests and swamps.	YES	NO	NO	NO	N/A
Bank Swallow (*Riparia riparia*)	THR	The Bank Swallow is a small aerial insectivore bird that nests colonially in burrows they excavate within banks. Colonies will nest in bluffs, riverbanks, aggregate pits, roadside embankments, and topsoil piles near open habitat that provides a steady source of insects. Colony sites must also be near roosting areas in wetland, reed, or cane beds.	YES	NO	NO	NO	N/A

[1]Highlighted species are present on or are likely to be present on the subject property.

Black Ash (*Fraxinus nigra*)	END	The Black Ash grows everywhere in Ontario except the Far North. These trees love moisture, and are commonly found in northern swampy woodlands, from eastern Manitoba, throughout Ontario, and as far east as Newfoundland.	YES	NO	POSSIBLE	POSSIBLE	Individuals were not observed during the Oct 4, 2023 site investigation, undertaken during the late, leaf-on timing window. No further assessment provided.
Blanding's Turtle (*Emydoidea blandingii*)	THR	Blanding's Turtle are semi-aquatic and use wetland habitats with shallow water and abundance vegetation. Their habitat includes a broad range of wetlands, forest clearings, and meadows. They breed in aquatic habitat and nest in open natural and anthropogenic upland areas.	POSSIBLE	NO	POSSIBLE	POSSIBLE	Suitable habitat is present on the local and regional landscape; however, there are no local records of occurrence in applicable databases (NHIC, iNaturalist, ORAA). The study area itself does not appear to support the wetland structure that this species requires to fulfill life processes. In general, there is no expectation that this species would occur within the study area. No further assessment provided.
Bobolink (*Dolichonyx oryzivorus*)	THR	Nests in hayfield and pastureland. Fields must have 25% or less woody plant cover. They require large fields (>10ha) and avoid small, fragmented habitats. They also avoid habitat within 75m if a forest edge.	YES	YES	NO	NO	N/A
Butternut (*Juglans cinerea*)	END	Butternut is shade intolerant and grows in rich, moist, well-drained loams along streambanks. Butternut is also found in well-drained gravel sites. It is often found at forest edges where it can access abundant sunlight.	YES	NO	POSSIBLE	POSSIBLE	Individuals were not observed during the Oct 4, 2023 site investigation, undertaken during the late, leaf-on timing window. No further assessment provided.
Cerulean Warbler (*Setophaga cerulea*)	THR	Found in two small breeding clusters in the Carolinian Forest and the Frontenac Axis. They breed in hilly, mature deciduous forests with a preference for oak and/or maple dominated forests with swampy bottomlands. They are area and edge-sensitive and require large continuous tracts of forest.	NO	NO	NO	NO	N/A
Chimney Swift (*Chaetura pelagica*)	THR	The Chimney Swift historically nested and roosted in large hollow trees, rock walls, and other vertical surfaces. They now use human-made structures like chimneys and have high site fidelity to nesting chimneys. 95% of nests are within 1 km of a waterbody.	YES	YES	NO	NO	N/A

[1]Highlighted species are present on or are likely to be present on the subject property.

Eastern Meadowlark (*Sturnella magna*)	THR	Nests in hayfields and pastureland. Will also nest in young orchards, golf courses, roadside verges, grain fields, and fencerows. Prefers habitat with >80% grass cover. Needs a minimum of 5 ha of continuous habitat.	YES	YES	NO	NO	N/A
Eastern Prairie White-fringed Orchid (*Platanthera leucophaea*)	END	The Eastern Prairie Fringed Orchid grows in open fens and wet prairies within southern Ontario. They require high sun exposure as well as high moisture. Populations are sparse, with most locations well documented.	NO	NO	NO	NO	N/A
Eastern Small-footed Myotis (*Myotis leibii*)	END	Eastern Small-footed Myotis overwinter in caves and mines in Ontario and do not disperse far from their hibernacula during the summer. They can be found roosting in rocky habitats singly or in groups but will also use human structures as day roosts. They are aerial insectivores and forage in forests, rocky habitats, and ponds.	YES	NO	NO	NO	N/A
Eastern Whip-poor-will (*Antrostomus vociferus*)	THR	The Eastern Whip-poor-will forages in open natural and anthropogenic habitats and nests in forests and forest edges with well-drained soils and moderate vegetation cover. Habitat immediately at the nest will be a short herbaceous plant, shrub, or sapling providing cover and shade with nearby perches for adults.	YES	NO	NO	NO	N/A
Henslow's Sparrow (*Ammodramus henslowii*)	END	Henslow's Sparrows' current breeding habitat is generally limited to Prince Edward County and the Regional Municipality of Halton. Their habitat is open grasslands with dense vegetation at least 30cm tall, thick standing dead material, <1% shrub cover, and intermediate moisture. They prefer larger, continuous grasslands and are sensitive to edge effects.	NO	NO	NO	NO	N/A
Jefferson Salamander (*Ambystoma jeffersonianum*)	END	Jefferson Salamanders have aquatic egg and larval stages in predatory fish-free ponds within deciduous and mixed forests. Once they metamorphose into adults they disperse up to a kilometer from their natal pond and use shaded forest habitats with thick leaf litter and high soil moisture. They use stone and woody debris as refugia.	NO	NO	NO	NO	N/A

[1]Highlighted species are present on or are likely to be present on the subject property.

King Rail (*Rallus elegans*)	END	The King Rail is found on Great Lakes shorelines and inland in Bruce and Simcoe counties. They use large marshes (>231 ha) with low shrub cover, emergent vegetation, and open water. Breeding habitat is wetlands with shallow water and dense emergent vegetation to weave nests. Foraging habitat is shallow wetlands and mudflats.	UNKNOWN	NO	NO	NO	N/A
Lake Sturgeon (*Acipenser fulvescens*)	END/THR	Lake Sturgeon need large continuous habitats in river and lake systems to provide for spawning, larval, juvenile, sub-adult, and adult habitat. Spawning takes place in shallow fast flowing headwaters where a natural or man-made barrier occurs. Spawning substrates are gravel, rock, hardpan, or sand. Larval and juvenile fish use clayey substrate habitats and older fish inhabit deep pools.	YES	NO	POSSIBLE	POSSIBLE	Due to impoundments on the Pefferlaw River, there is no expectation that this species would occur at this location. No further assessment undertaken.
Least Bittern (*Ixobrychus exilis*)	THR	Breeds in large marshes within Southern Ontario. Creates nest platforms from tall, dense emergent vegetation within 10m of water and prefers Typha spp. Will use other emergent vegetation. Needs 200 ha of wetland for nesting and foraging but does not need to be continuous wetland. Prefers complexes of smaller wetlands. Will avoid marshes surrounded by >30% forest cover or containing large trees.	YES	NO	NO	NO	N/A
Little Brown Myotis (*Myotis lucifugus*)	END	Little Brown Myotis are found throughout all of Canada. Their hibernacula are within caves and abandoned mines, wells, and tunnels. Maternity colonies are within a few kilometers of hibernacula within snag trees, rock crevices, exfoliating tree bark, and anthropogenic structures. Roosts and swarming sites are in similar areas around the hibernacula.	YES	NO	POSSIBLE	POSSIBLE	See report for further discussion.
Louisiana Waterthrush (*Parkesia motacilla*)	THR	The Louisiana Waterthrush is mainly found along the Niagara Escarpment and north shore of Lake Erie. They are dependent on clear, steep, lower order streams in ravines within large unbroken mature deciduous-mixed forests.	POSSIBLE	NO	NO	NO	N/A

[1]Highlighted species are present on or are likely to be present on the subject property.

Northern Myotis/Northern Long-eared Bat (*Myotis septentrionalis*)	END	Northern Myotis are found below the tree line in Canada and are mostly absent from the prairies. They use live and dead trees near water in forest habitats when active and migrate to caves and abandoned mines for hibernation.	YES	NO	POSSIBLE	POSSIBLE	See report for further discussion.
Purple Twayblade/Large Twayblade (*Liparis lilifolia*)	THR	Purple Twayblade is found mostly in southwestern Ontario; however, there are multiple known outlier populations. It prefers open forests and savannah with moist soil but will tolerate closed canopies, dry or moist soil, and most soil types. It also grows in swamps, prairies, alvars, and conifer plantations.	NO	NO	N/A	N/A	N/A
Red-Headed Woodpecker (*Melanerpes erythrocephalus*)	END	The Red-headed Woodpecker lives in open woodland and woodland edges and is often found in parks, golf courses and cemeteries. These areas typically have many dead trees, which the bird uses for nesting and perching. The Red-headed Woodpecker is found across southern Ontario, where it is widespread but rare.	YES	NO	UNKNOWN	UNKNOWN	While this species can be found in many generic locations, the study area does not support any open areas with large numbers of dead-standing trees that would represent ideal habitat. There are no records of occurrence on the local landscape in applicable databases (NHIC, OBBA, iNaturalist). In general, there is no expectation that the study area is supporting functional habitat for this species. No further assessment undertaken.
Redside Dace (*Clinostomus elongatus*)	END	The Redside Dace is limited to specific tributaries and watersheds of Lake Ontario, Lake Simcoe, Lake Erie, and Lake Huron. They use slow moving clear or brown-tinged streams with overhanging vegetation and pool and riffle habitat, typically in the headwaters of streams. In May when temperatures are between 16 and 18 C they spawn in the nests of Creek Chub and Common Shiner.	NO	NO	N/A	N/A	N/A
Tricolored Bat (*Perimyotis subflavus*)	END	The Tri-colored Bat have a scattered distribution and are found as far north as Sudbury. They are found in a variety of forested habitats They overwinter alone in caves and mines and roost in dead vegetation clumps and lichen in forested habitats near water.	YES	NO	POSSIBLE	POSSIBLE	See report for further discussion.

[1]Highlighted species are present on or are likely to be present on the subject property.

Unisexual Ambystoma - Jefferson Salamander dependent population (*Ambystoma laterale - (2) jeffersonianum*)	END	Unisexual Ambystoma have egg and larval stages in predatory fish-free ponds within deciduous and mixed forests. Once they metamorphose into adults they disperse up to a kilometer from their natal pond and use shaded forest habitats with thick leaf litter and high soil moisture. They use stone and woody debris as refugia.	NO	NO	NO	NO	N/A

[1]Highlighted species are present on or are likely to be present on the subject property.

Appendix 5. Significant Wildlife Habitat Screening.

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Seasonal Concentration Areas of Animals			
Waterfowl Stopover and Staging Areas (Terrestrial)	Fields with sheet water during Spring (mid March to May) Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. Agricultural fields with waste grains are commonly used by waterflow, these are not considered SWH unless they have spring sheet water available.	CUM1 , CUT1 Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	The study area does not contain any features that may support this habitat function. No further assessment provided - not SWH.
Waterfowl Stopover and Staging Areas (Aquatic)	Ponds, marshes, lakes, bays, coastal inlest, and watercourses used during migration. Sewage treatment Ponds and storm water Ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. These habitats have an abundance food supply (mostly aquatic invertebrates and vegetation in shallow water)	MAS1 , MAS2, MAS3, SAS1, SAM1, SAF1 , SWD1 , SWD2, SWD3, SWD4, SWD5, SWD6, SWD7	The study area does not contain any features that may support this habitat function. Riparian areas to Pefferlaw Brook do not appear to support large shallow/open water marsh, swamps, or ponds that provide typical stopover habitat. No further assessment provided - not SWH.
Shorebird Migratory Stopover Areas	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH.	BBO1, BBO2, BBS1, BBS2, BBT1, BBT2, SDO1, SDS2, SDT1, MAM1 , MAM2, MAM3, MAM4, MAM5	The study area does not contain any features that may support this habitat function. Within the study area, the Pefferlaw Brook shoreline does not support broad areas of muddy or sandy banks, bars, flats, armour rock, etc. No further assessment provided - not SWH.
Raptor Wintering Areas	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering sites (hawk/owl) need to be >20 ha with a combination of forest and upland. Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water, large trees and snags available for roosting.	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW. Bald Eagle: Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	The study area does not contain any features that may support this habitat function. No further assessment provided - not SWH.
Bat Hibernacula	Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. Active mine sites are not SWH. The locations of bat hibernacula are relatively poorly known.	Bat Hibernacula may be found in these ecosites: CCR1, CCR2, CCA1, CCA2. (Note: buildings are not considered to be SWH).	The study area does not contain any features that may support this habitat function. No further assessment provided - not SWH.
Bat Maternity Colonies	Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). Maternity roosts are not found in caves and mines in Ontario Maternity colonies located in Mature (dominant trees > 80yrs old) deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees Female Bats prefer wildlife trees (snags) in early stages of decay, class 1-3 . Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD, FOM, SWD, SWM.	One or more woodland ecosites with the study area has the potential to support this habitat function. See report for further discussion.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Turtle Wintering Areas	For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.	Snapping and Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO. Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as overwintering habitat.	The study area does not contain any features that may support this habitat function. Pefferlaw Brook is fast-flowing, relatively shallow, and does not appear to contain substantial accummulations of mud/organic substrates in the areas proximate to the bridge. No further assessment provided - not SWH.
Reptile Hibernaculum	For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures.	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1, FOC3.	The study area does not contain any features that may support this habitat function. No further assessment provided - not SWH.
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	Any site or areas with exposed soil banks, sandy hills, borrow pits, steep slopes, and sand piles that are undisturbed or naturally eroding that is not a licensed/permitted aggregate area. Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation.	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles. Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1, CUT1, CUS1, BLO1, BLS1, BLT1, CLO1, CLS1, CLT1.	The study area does not contain any features that may support this habitat function. No further assessment provided - not SWH.
Colonially - Nesting Bird Breeding Habitat Breeding Habitat (Tree/Shrubs)	Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. Most nests in trees are 11 to 15 m from ground, near the top of the tree.	SWM2, SWM3, SWM5, SWM6, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7, FET1.	The study area does not contain any features that may support this habitat function. No evidence of nests was observed during on-site investigations. No further assessment provided - not SWH.
Colonially - Nesting Bird Breeding Habitat (Ground)	Nesting colonies of gulls and terns are on islands or peninsulas (natural or artificial) associated with open water, marshy areas, lake or large river (two-lined on a 1;50,000 NTS map). Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6, MAS1 – 3, CUM, CUT, CUS	The study area does not contain any features that may support this habitat function. No further assessment provided - not SWH.
Migratory Butterfly Stopover Areas	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario. The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south. The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes.	Combination of ELC Community Series; need to have present one Community Series from each landclass: <u>Field:</u> CUM, CUT, CUS <u>Forest:</u> FOC, FOD, FOM, CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	Not applicable - study area not located within specified distance from Lake Ontario shoreline.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Landbird Migratory Stopover Areas	Woodlots need to be > 10 ha in size and within 5 km of Lake Ontario. If multiple woodlands are located along the shoreline of those woodlands <2 km from Lake Ontario are more significant. Sites have a variety of habitats; forest, grassland and wetland complexes. The largest sites are more significant. Woodlots and forest fragments are important habitats to migrating birds, these features location along the shore and located within 5 km of Lake Ontario are Candidate SWH.	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD.	Not applicable - study area not located within specified distance from Lake Ontario shoreline.
Deer Yarding Areas	Deer wintering areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. The Core of a deer yard (Stratum I) is located within Stratum II and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%. OMNRF determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual". -Woodlots with high densities of deer due to artificial feeding are not significant.	Note: OMNRF to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include; FOM, FOC, SWM and SWC. Or these ELC Ecosites; CUP2, CUP3, FOD3, CUT	The study area is located in a mapped Deer Yarding Area (Stratum 2). See report for further discussion.
Deer Winter Congregation Areas	Woodlots will typically be >100 ha in size. Woodlots <100 ha may be considered as significant based on MNRF studies or assessment. Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. Large woodlots > 100 ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. Woodlots with high densities of deer due to artificial feeding are not significant.	All Forested Ecosites with these ELC Community Series; FOC , FOM, FOD, SWC, SWM, SWD . Conifer plantations much smaller than 50 ha may also be used.	Not applicable - see Deer Yarding Area above.
Rare Vegetation Communities			
Cliffs and Talus Slopes	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris	Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT	No applicable ELC communities are contained within the study area.
Sand Barren	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	ELC Ecosites: SBO1, SBS1, SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always < 60%.	No applicable ELC communities are contained within the study area.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Alvar	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars may be complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.	ALO1, ALS1, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2 Five Alvar Indicator Species: 1) Carex crawei, 2) Panicum philadelphicum, 3) Eleocharis compressa, 4) Scutellaria parvula, 5) Trichostema brachiatum These indicator species are very specific to Alvars within	No applicable ELC communities are contained within the study area.
Old Growth Forest	Old Growth forests are characterized by exhibiting the greatest number of old-growth characteristics, such as mature forest with large trees that has been undisturbed. Heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Forest Community Series: FOD, FOC, FOM, SWD, SWC, SWM	Woodland communities within the study area do not exhibit old growth conditions.
Savannah	A Savannah is a tallgrass prairie habitat that has tree cover between 25–60%.	TPS1, TPS2, TPW1, TPW2, CUS2	No applicable ELC communities are contained within the study area.
Tallgrass Prairie	Tallgrass Prairie is an open vegetation with less than < 25% tree cover, and dominated by prairie species, including grasses.	TPO1, TPO2	No applicable ELC communities are contained within the study area.
Other Rare Vegetation Community	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M. The OMNRF/NHIC will have up to date listing for rare vegetation communities.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	No applicable ELC communities are contained within the study area.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Specialized Habitats for Wildlife			
Waterfowl Nesting Area	A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. Upland areas should be at least 120 m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. Wood Ducks, Bufflehead, Common Goldeneye and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites.	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4 Note: includes adjacency to provincially Significant Wetlands	The study area may support waterfowl nesting functions. See report for further discussion.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	The study area does not contain any features that may support this habitat function. No evidence of nests was observed during on-site investigations. No further assessment provided - not SWH.
Woodland Raptor Nesting Habitat	All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat. Interior habitat determined with a 200m buffer. In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	The study area does not contain any features that may support this habitat function. Woodland features within the study area are not representative of interior habitat. No further assessment provided - not SWH.
Turtle Nesting Areas	Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. For an area to function as a turtle nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	Exposed mineral soil (sand or gravel) areas adjacent (<100m) or within the following ELC Ecosites: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, BOO1	The study area does not contain any features that may support this habitat function. Except for road shoulders (not SWH), no functional nesting habitat was observed during the site investigation. No further assessment provided - not SWH.
Seeps and Springs	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system. Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.	Seeps/Springs are areas where groundwater comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	No seeps or springs were observed during the site investigation. No further assessment provided - not SWH.
Amphibian Breeding Habitat (Woodland)	Presence of a wetland or pond >500 m^2 (about 25 m diameter) within or adjacent (within 120m) to a woodland (no minimum size). The wetland, lake or pond and surrounding forest, would be the Candidate SWH. Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	The study area does not contain any features that may support this habitat function. There is no indication that woodlands within the study area contain open pools or ponds. No further assessment provided - not SWH.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Amphibian Breeding Habitat (Wetlands)	Wetlands and pools (including vernal pools) >500 m^2 (about 25 m diameter), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation.	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	Wetlands within the study area have the potential to support amphibian breeding functions. See report for further discussion.
Area-Sensitive Bird Breeding Habitat	Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. Interior forest habitat is at least 200 m from forest edge habitat.	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD.	The study area does not contain any features that may support this habitat function. Woodland features within the study area are not representative of interior habitat. No further assessment provided - not SWH.
Habitat for Species of Conservation Concern (not including Endangered or Threatened Species)			
Marsh Bird Breeding Habitat	Nesting occurs in wetlands. All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, FEO1, BOO1. For Green Heron: All SW, MA and CUM1 sites.	The study area does not contain any features that may support this habitat function. Wetland features are present within the study area; however, these features do not support appropriate structure to support breeding marsh birds. No further assessment provided - not SWH.
Open Country Bird Breeding Habitat	Large grassland areas (includes natural and cultural fields and meadows) >30 ha Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e., no row cropping or intensive hay or livestock pasturing in the last 5 years). Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.	CUM1, CUM2	The study area does not contain any features that may support this habitat function. No further assessment provided - not SWH.
Shrub/Early Successional Bird Breeding Habitat	Large field areas succeeding to shrub and thicket habitats >30 ha in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e., no row-cropping, haying or livestock pasturing in the last 5 years). Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or lightly grazed pasturelands.	CUT1, CUT2, CUS1, CUS2, CUW1, CUW2. Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	The study area does not contain any features that may support this habitat function. No further assessment provided - not SWH.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Terrestrial Crayfish	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish. Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed.	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, SWD, SWT, SWM, CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.	There is potential for terrestrial crayfish to occur within the study area; however, no evidence of crayfish burrows was observed during site investigation.
Special Concern and Rare Wildlife Species	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or Provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. All plant and animal element occurrences (EO) within a 1 or 10 km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy	There is potential for the study area to support habitat for special concern or rare wildlife species. See report for further discussion.
Animal Movement Corridors			
Amphibian Movement Corridors	Movement corridors between breeding habitat and summer habitat. Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat –Wetland) of this Schedule.	Corridors may be found in all ecosites associated with water. Corridors will be determined based on identifying the significant breeding habitat for these species (see above).	See report for further discussion.
Deer Movement Corridors	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH (see above). A deer wintering habitat identified by the OMNRF as SWH will have corridors that the deer use during fall migration and spring dispersion. Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).	See report for further discussion.

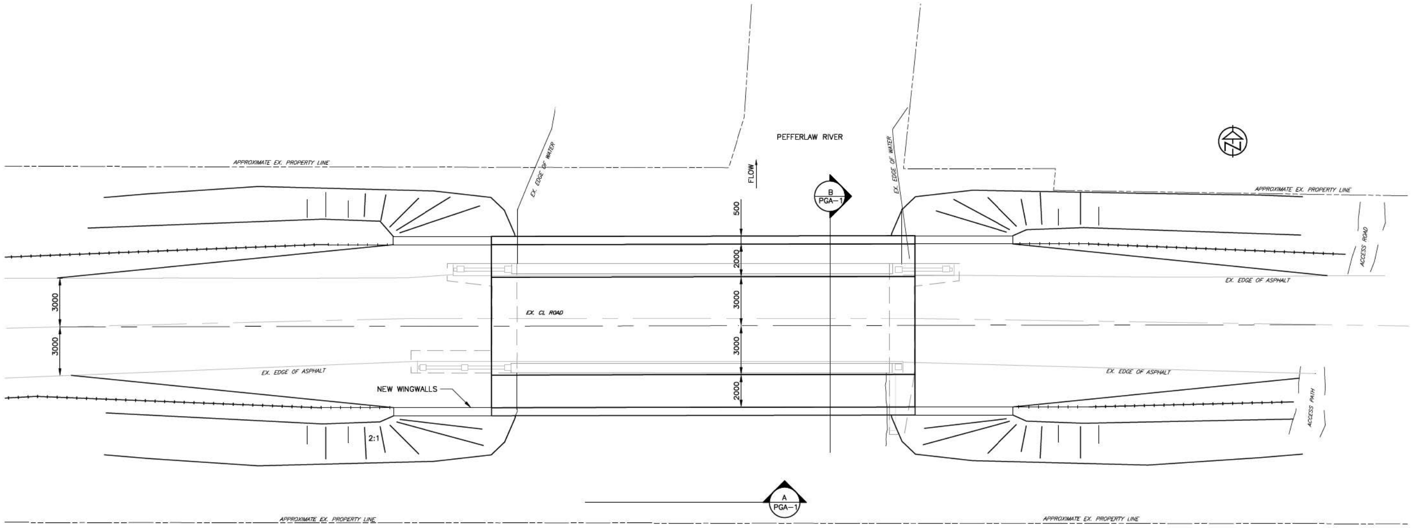
Appendix 6. Proposed Bridge Design.

GENERAL NOTES:

1. ALL ELEVATIONS ARE IN METERS AND DIMENSIONED IN MILLIMETERS UNLESS NOTED OTHERWISE (U.N.O).
2. PROPERTY LINES ARE PARCEL MAPPING OBTAINED FROM YORK REGION GIS MAPPING AND ARE REPRESENTATIVE ONLY.
3. ALL DESIGN IN ACCORDANCE WITH CAN/CSA-16-19 (CHBDC 2019).
4. ORIGINAL DESIGN AND REHABILITATION DRAWINGS ARE AVAILABLE.
5. LIVE LOAD: CL-625-ONT.
6. ACCESS TO EXISTING PRIVATE RESIDENCES AND TRAILS WITHIN THE CONSTRUCTION ZONE SHALL BE MAINTAINED AT ALL TIMES.
7. CLEARANCE FROM NORMAL WATER LEVEL TO UNDERSIDE OF BRIDGE TO BE MAINTAINED.
8. CENTERLINE OF ROAD TO BE REALIGNED TO SUIT APPROACH ROAD 2-LANE CONFIGURATION.
9. ROAD GRADE TO BE RAISED AT BRIDGE TO ACCOMMODATE REQUIRED CROSS SECTION.
10. SPAN TO BE INCREASED MARGINALLY TO AVOID CONFLICT WITH EXISTING PILES.

SCOPE OF WORK:

1. PROVIDE SEDIMENT CONTROL AND CONTAINMENT MEASURES AROUND SITE.
2. SET UP TRAFFIC DETOUR SIGNAGE.
3. CLEARING AND GRUBBING OF APPROACH.
4. REMOVE EXISTING BRIDGE.
5. DRIVE NEW PILES.
6. CONSTRUCT INTEGRAL ABUTMENTS.
7. INSTALL NEW PRE-STRESSED CONCRETE BOX GIRDERS.
8. CONSTRUCT NEW CONCRETE DECK AND METAL RAILING.
9. WIDEN APPROACH ROAD AND RE-GRADE EMBANKMENTS.
10. INSTALL NEW CONCRETE APPROACH SLABS.
11. WATERPROOF AND PAVE BRIDGE DECK.
12. INSTALL STEEL BEAM GUIDE RAIL ON APPROACH.
13. PAVE ROAD AND BRIDGE.
14. REOPEN TO TRAFFIC.



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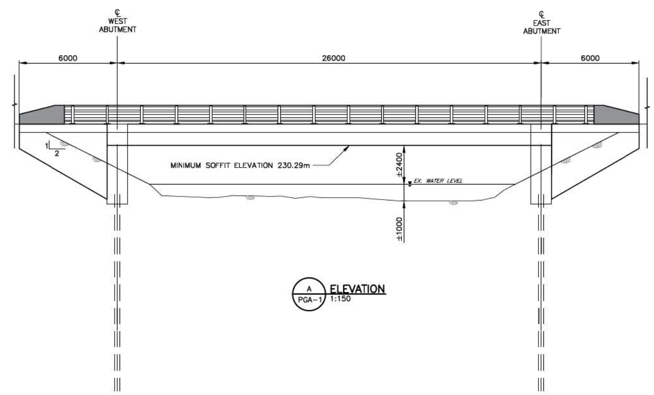

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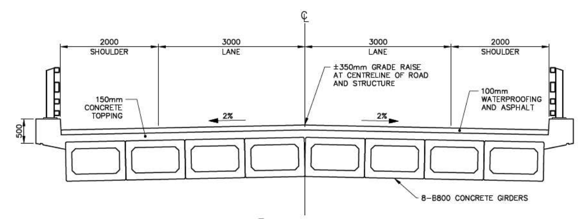


B PGA-1 DECK SECTION
1:50

BENCHMARKS

NO SURVEY AVAILABLE

NOTES

No.	REVISION DESCRIPTION	DATE

ENGINEER STAMP

GEORGINA OLD SHILOH BRIDGE
TOWN OF GEORGINA

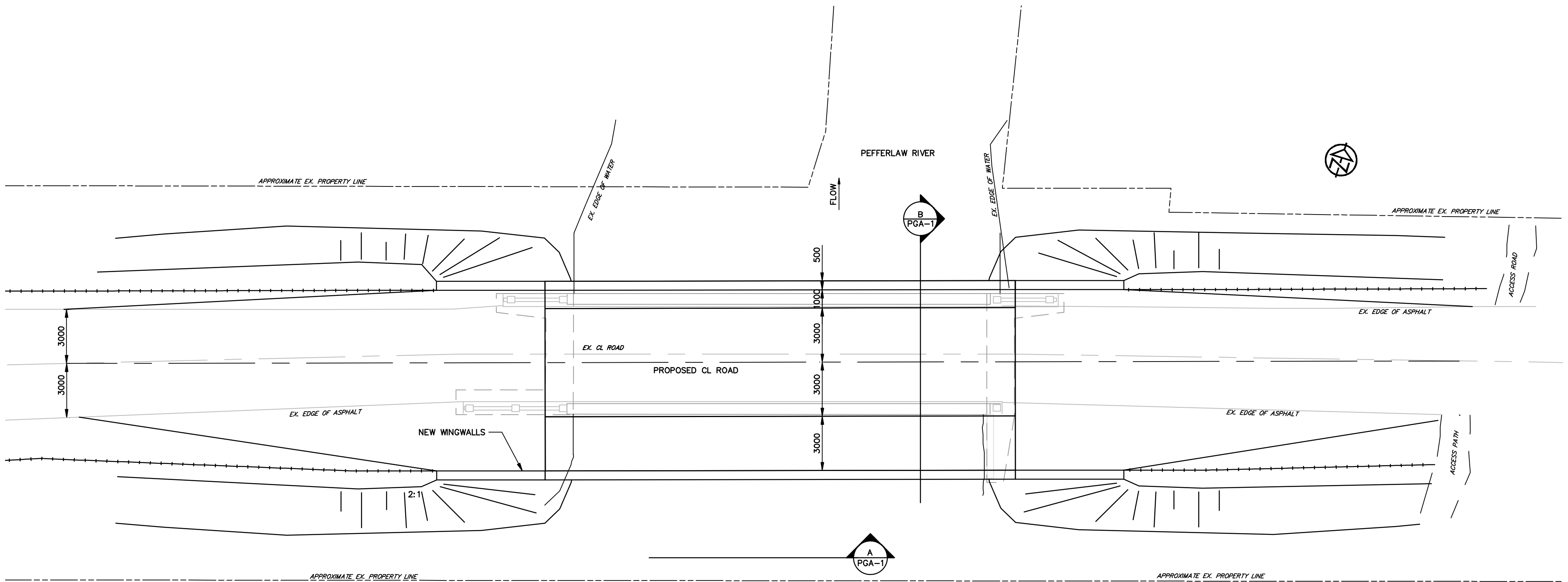
TATHAM ENGINEERING

PRELIMINARY GENERAL ARRANGEMENT
DECK ON GIRDER OPTION-NO HERITAGE ATTRIBUTES

DESIGN: EKW	FILE: 122279	DWG: PGA-01
DRAWN: AMB	DATE: NOV. 2023	
CHECK: EKW	SCALE: AS SHOWN	

Drawing Name: 122279 – PGA-01.dwg, Plotted: Nov 22, 2023

Appendix K:
Conceptual Design Drawings



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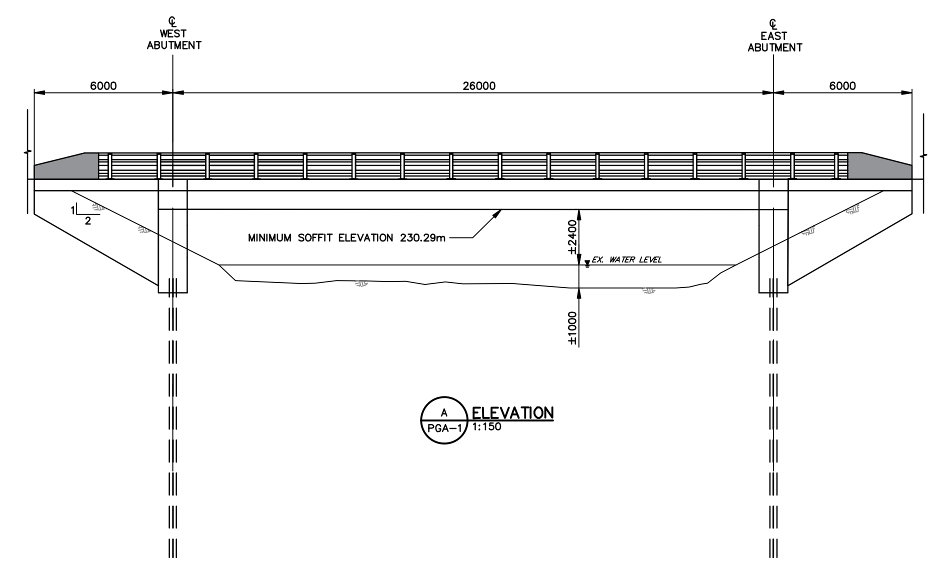

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ELEVATION
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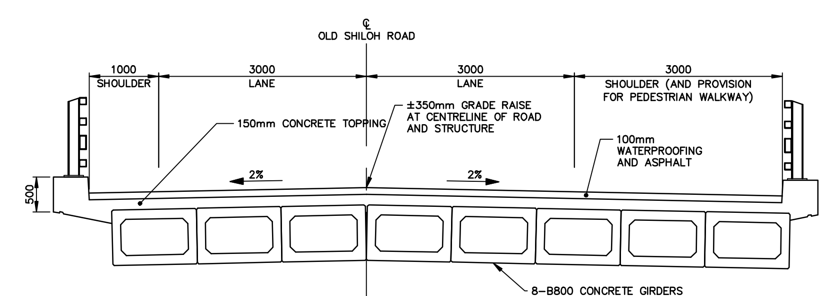


B
PGA-1
DECK SECTION
1:50
NOTE: DETAILED DESIGN SHOULD CONSIDER OPTIONS FOR PEDESTRIAN ACCESS ON ONE SIDE. SIDEWALK OR MULTI-USE TRAIL SHOULD BE CONSIDERED. OVERALL WIDTH MAY INCREASE SLIGHTLY TO ACCOMMODATE FINAL WIDTH OF PEDESTRIAN AREA AND WHETHER IT IS RAISED OR SEPARATED BY A BARRIER.

GENERAL NOTES:

1. ALL ELEVATIONS ARE IN METERS AND DIMENSIONED IN MILLIMETERS UNLESS NOTED OTHERWISE (U.N.O).
2. PROPERTY LINES ARE PARCEL MAPPING OBTAINED FROM YORK REGION GIS MAPPING AND ARE REPRESENTATIVE ONLY.
3. ALL DESIGN IN ACCORDANCE WITH CAN/CSA–16–19 (CHBDC 2019).
4. ORIGINAL DESIGN AND REHABILITATION DRAWINGS ARE AVAILABLE.
5. LIVE LOAD: CL–625–ONT.
6. ACCESS TO EXISTING PRIVATE RESIDENCES AND TRAILS WITHIN THE CONSTRUCTION ZONE SHALL BE MAINTAINED AT ALL TIMES.
7. CLEARANCE FROM NORMAL WATER LEVEL TO UNDERSIDE OF BRIDGE TO BE MAINTAINED.
8. CENTERLINE OF ROAD TO BE REALIGNED TO SUIT APPROACH ROAD 2–LANE CONFIGURATION.
9. ROAD GRADE TO BE RAISED AT BRIDGE TO ACCOMMODATE REQUIRED CROSS SECTION.
10. SPAN TO BE INCREASED MARGINALLY TO AVOID CONFLICT WITH EXISTING PILES.

SCOPE OF WORK:

1. PROVIDE SEDIMENT CONTROL AND CONTAINMENT MEASURES AROUND SITE.
2. SET UP TRAFFIC DETOUR SIGNAGE.
3. CLEARING AND GRUBBING OF APPROACH.
4. REMOVE EXISTING BRIDGE.
5. DRIVE NEW PILES.
6. CONSTRUCT INTEGRAL ABUTMENTS.
7. INSTALL NEW PRE–STRESSED CONCRETE BOX GIRDERS.
8. CONSTRUCT NEW CONCRETE DECK AND METAL RAILING.
9. WIDEN APPROACH ROAD AND RE–GRADE EMBANKMENTS.
10. INSTALL NEW CONCRETE APPROACH SLABS.
11. WATERPROOF AND PAVE BRIDGE DECK.
12. INSTALL STEEL BEAM GUIDE RAIL ON APPROACH.
13. PAVE ROAD AND BRIDGE.
14. REOPEN TO TRAFFIC.

BENCHMARKS

NO SURVEY AVAILABLE

NOTES

No.	REVISION DESCRIPTION	DATE

ENGINEER STAMP

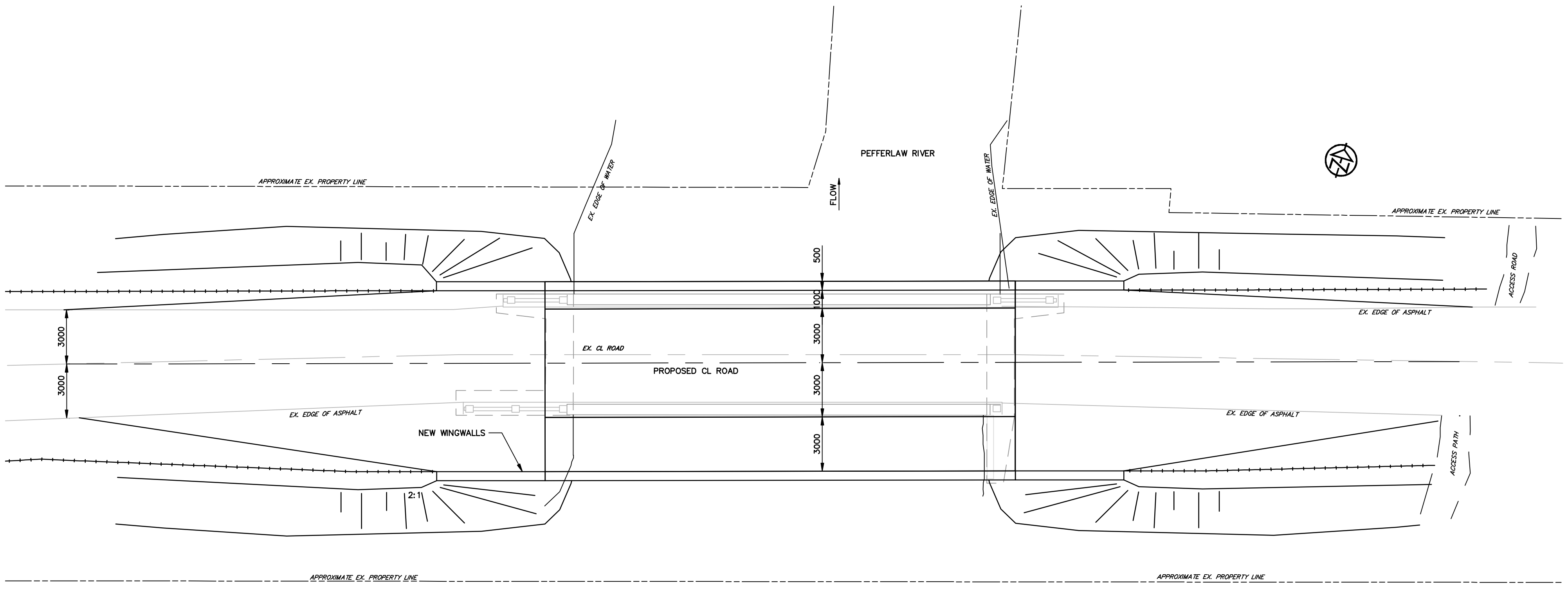
GEORGINA OLD SHILOH BRIDGE
TOWN OF GEORGINA

TATHAM ENGINEERING

PRELIMINARY GENERAL ARRANGEMENT
DECK ON GIRDER OPTION-NO HERITAGE ATTRIBUTES

DESIGN: EKW	FILE: 122279	DWG: PGA-01
DRAWN: AMB	DATE: NOV. 2023	
CHECK: EKW	SCALE: AS SHOWN	

Drawing Name: 122279 – PGA–01.dwg, Plotted: Jan 17, 2024



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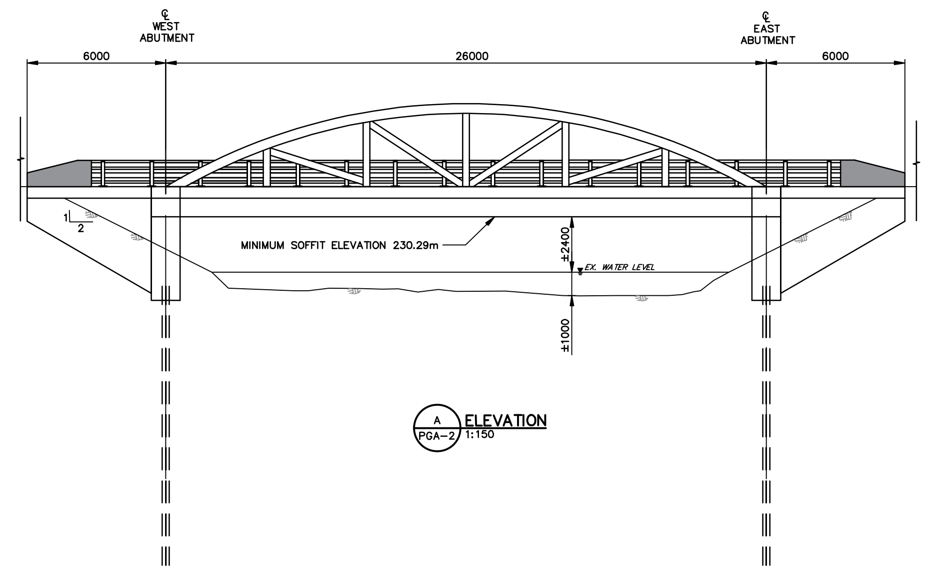

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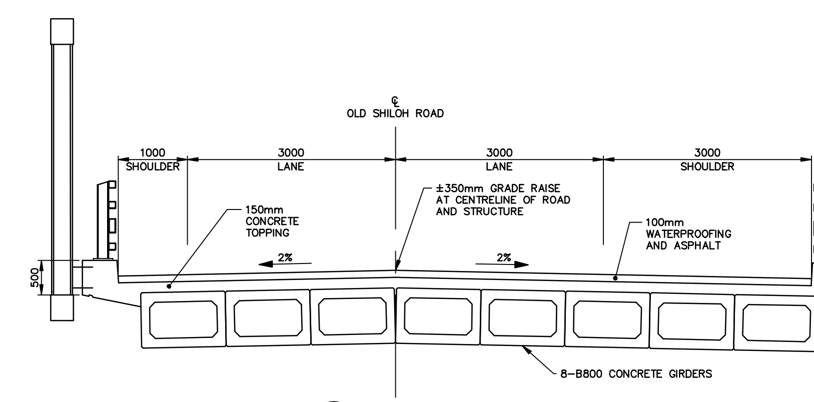

B PGA-2 DECK SECTION
1:50

GENERAL NOTES:

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6. CONSTRUCT INTEGRAL ABUTMENTS.
7. INSTALL NEW PRE-STRESSED CONCRETE BOX GIRDERS.
8. CONSTRUCT NEW CONCRETE DECK.
9. INSTALL SYMPATHETIC TRUSS FACADE ON EACH SIDE.
10. INSTALL NEW METAL RAILINGS.
11. WIDEN APPROACH ROAD AND RE-GRADE EMBANKMENTS.
12. INSTALL NEW CONCRETE APPROACH SLABS.
13. WATERPROOF AND PAVE BRIDGE DECK.
14. INSTALL STEEL BEAM GUIDE RAIL ON APPROACH.
15. PAVE ROAD AND BRIDGE.
16. REOPEN TO TRAFFIC.

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARKS

NO SURVEY AVAILABLE

NOTES

No.	REVISION DESCRIPTION	DATE

ENGINEER STAMP

GEORGINA OLD SHILOH BRIDGE
TOWN OF GEORGINA

PRELIMINARY GENERAL ARRANGEMENT
DECK ON GIRDER OPTION
WITH SYMPATHETIC HERITAGE ELEMENTS

TATHAM ENGINEERING

DESIGN: EKW	FILE: 122279	DWG:
DRAWN: AMB	DATE: NOV. 2023	**PGA-02**
CHECK: EKW	SCALE: AS SHOWN	

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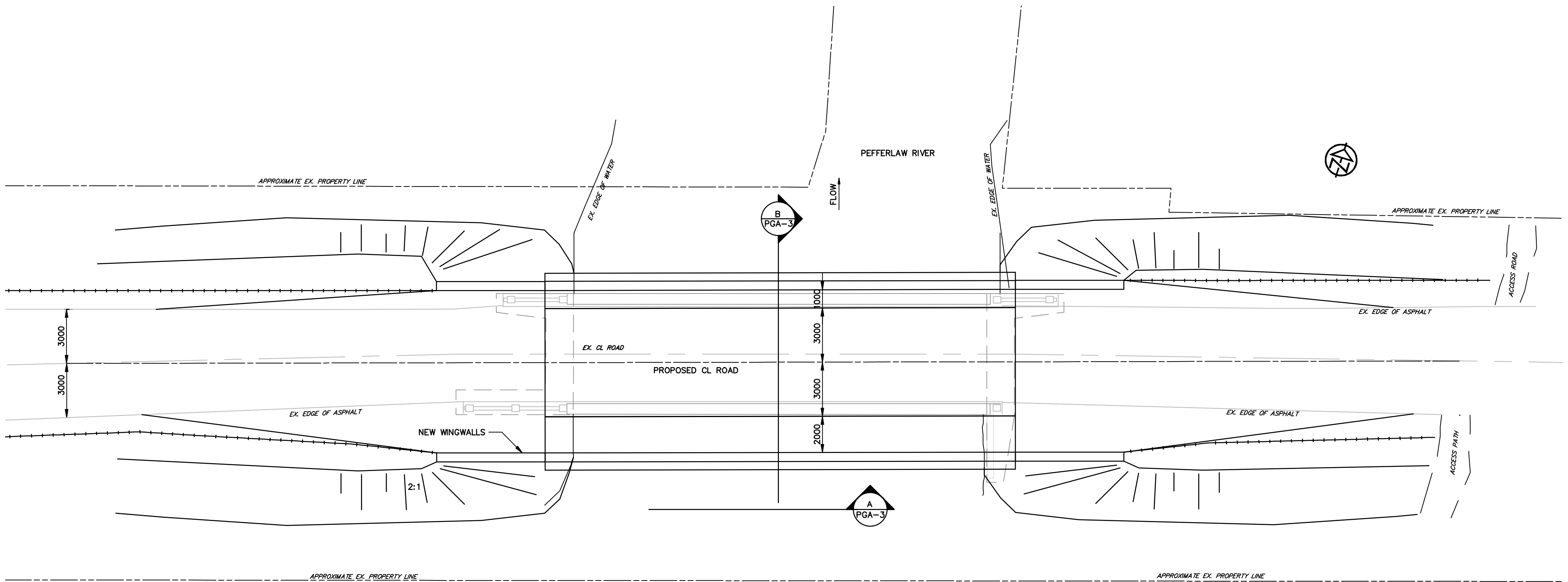

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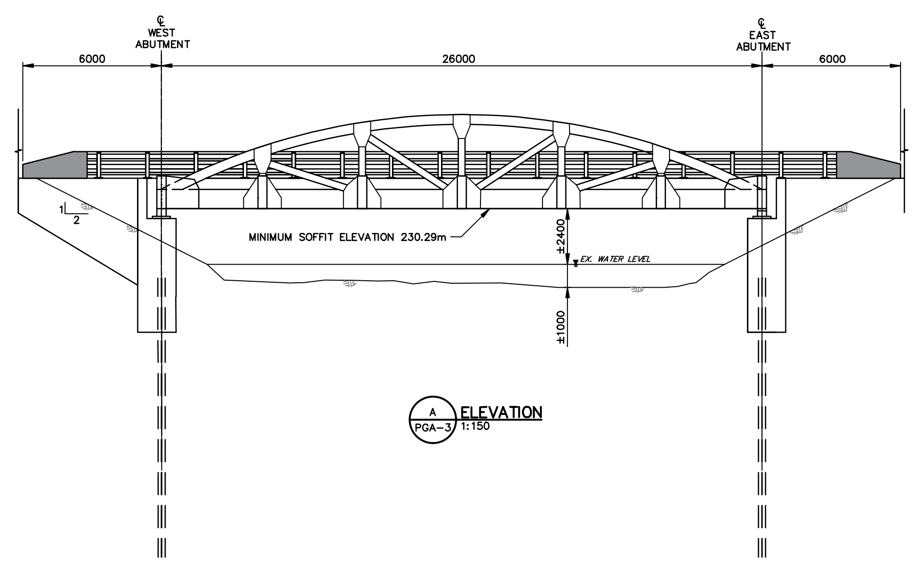

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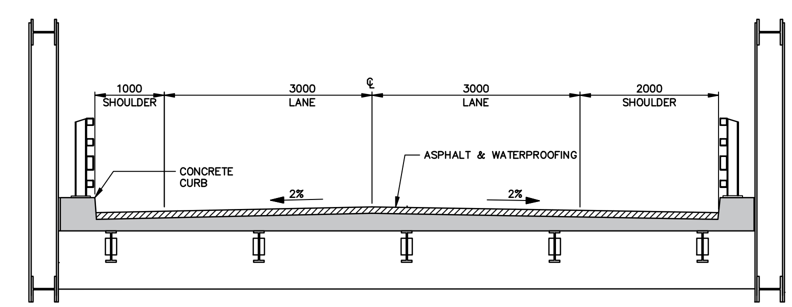

B PGA-3 DECK SECTION
1:50

GENERAL NOTES:

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5. DRIVE NEW PILES.
6. CONSTRUCT NEW ABUTMENTS.
7. INSTALL NEW PREFABRICATED SYMPATHETIC TRUSS BRIDGE.
8. CONSTRUCT NEW CONCRETE DECK AND METAL RAILING.
9. WIDEN APPROACH ROAD AND RE–GRADE EMBANKMENTS.
10. INSTALL NEW CONCRETE APPROACH SLABS.
11. WATERPROOF AND PAVE BRIDGE DECK.
12. INSTALL STEEL BEAM GUIDE RAIL ON APPROACH.
13. PAVE ROAD AND BRIDGE.
14. REOPEN TO TRAFFIC.

BENCHMARKS

NO SURVEY AVAILABLE

NOTES

No.	REVISION DESCRIPTION	DATE

ENGINEER STAMP

GEORGINA OLD SHILOH BRIDGE
TOWN OF GEORGINA

PRELIMINARY GENERAL ARRANGEMENT
STRUCTURAL TRUSS OPTION: INCORPORATES VISUAL HISTORIC ATTRIBUTES

TATHAM ENGINEERING

DESIGN: EKW	FILE: 122279	DWG:
DRAWN: AMB	DATE: NOV. 2023	PGA-03
CHECK: EKW	SCALE: AS SHOWN	

Drawing Name: 122279 – PGA-03.dwg, Plotted: Feb 06, 2024

Appendix L:
Cost Estimates

OLD SHILOH ROAD BRIDGE IMPROVMENTS

PRELIMINARY COST ESTIMATE : REPLACEMENT - TWO LANE

Item & Description		Unit	Estimated Quantity	Unit Price		Total Cost	
PART A: GENERAL WORK							
A1	Mobilization & Demobilization	LS	1	$	60,000	$	60,000
A2	Contract Bonds & Insurance	LS	1	$	50,000	$	50,000
A3	Traffic Control and Signage	LS	1	$	25,000	$	25,000
A4	Environmental Protection	LS	1	$	50,000	$	50,000
A6	Access to Work	LS	1	$	75,000	$	75,000
A7	Excavation	LS	1	$	75,000	$	75,000
					Sub-Total Part A	**$**	**335,000**
PART B: BRIDGE WORKS							
B1	Remove Existing Bridge	LS	1	$	150,000	$	150,000
B2	Dewatering/Unwatering of Structural Excavation	LS	1	$	35,000	$	35,000
B3	Structural Backfill	tonne	2,110	$	35	$	73,850
B4	Piles	LS	1	$	175,000	$	175,000
B5	Concrete Pile Cap	m3	90	$	3,000	$	270,000
B6	Concrete Abutments	m3	115	$	3,000	$	345,000
B7	Concrete Wingwalls	m3	430	$	3,000	$	1,290,000
B8	Concrete Deck	m3	70	$	3,000	$	210,000
B9	Concrete Approach Slabs & Sleeper Slab	m3	40	$	3,000	$	120,000
B10	Concrete End Walls	m3	6	$	3,000	$	18,000
B11	Box Girders	LS	1	$	350,000	$	350,000
B12	Wingwall Ties	Ea.	12	$	25,000	$	300,000
B13	Bearings	each	4	$	5,000	$	20,000
B14	Bridge Deck Waterproofing	m2	325	$	75	$	24,375
B15	Bridge Barrier	m	60	$	1,500	$	90,000
B16	R10 River Stone 300mm Depth c/w Filter Fabric	m2	400	$	205	$	82,000
B17	Asphalt Removal	m2	420	$	25	$	10,500
B18	Paving	tonne	175	$	200	$	35,000
B19	Restoration - Topsoil, Seed, and Mulch	LS	1	$	35,000	$	35,000
B20	Expansion Joint - Type C (Sleeper Slab)	m	20	$	5,000	$	100,000
					Sub-Total Part B	**$**	**3,733,725**
					Sub-Total Items A &B	**$**	**4,068,725**
					Contingency 20%	**$**	**814,000**
					GRAND TOTAL	**$**	**4,882,725**