



Queen Street East Bridge and Culvert Replacement

Class Environmental Assessment

October 6, 2017

Prepared for:





R.V. Anderson Associates Limited
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October 6, 2017

RVA 163254

Region of Peel
Engineering and Construction - Capital Works
10 Peel Centre Drive, 4th Floor
Brampton, ON L6T 4B9

Attention: Mr. Serguei Kabanov, CD, CET, rcca - Project Manager

Dear Mr. Kabanov:

Re: Class Environmental Assessment - Queen Street East

This Class Environmental Assessment was conducted in accordance with the requirements of the Municipal Class Environmental Assessment (Class EA) – Schedule 'B' (2015), and has now been completed. A Notice of Study Completion will be advertised in the Caledon Enterprise and Caledon Citizen newspapers on October 12, 2017, inviting the public to review this Environmental Study Report (ESR). A copy of the Notice of Study Completion is attached for your reference and will also be mailed to interested stakeholders.

Please arrange copies of this report to be available for review at the locations provided in the Notice of Study Completion. We will forward a copy of this report to the Ministry of the Environment and Climate Change, Credit Valley Conservation and Ministry of Natural Resources and Forestry.

The public are invited to provide comments or concerns with this study. If no Part 2 Orders have been received by the Minister of Environment within 30 calendar days of filing of the Notice of Study Completion, the Region may implement the study recommendations, complete the design and proceed to construction.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED

John P. Does, P.Eng., PMP
Project Director

Encls.

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NOTICE OF STUDY COMPLETION

Queen Street East Bridge and Culvert Replacement over Shaw's Creek, in the Village of Alton, Town of Caledon

The Study

The Regional Municipality of Peel has completed a Schedule "B" Municipal Class Environmental Assessment study for the improvements to the Queen Street East (Highway 136) bridge and culvert over Shaw's Creek, in the Village of Alton, Town of Caledon. Please see the key plan.

The Process

The project team received input from interested stakeholders, the public, various agencies, and one Public Information Centre. The team evaluated various road improvement alternatives, assessed the potential environmental effects of the proposed improvements and developed mitigation measures.



Key Plan

Key Elements of the Recommended Design

The study recommends:

- A new 25 metre span bridge and 10 metre span / 3 metre rise open bottom culvert to improve hydraulic capacity; and
- Raising the road profile a minimum 1.4 metres to reduce flooding over the road.

Environmental Study Report (ESR)

An ESR has been prepared to document the planning and decision-making process. The results of the study will be available for review for 30 calendar days, starting on **Monday, October 16, 2017**, at the following locations:

<p>Region of Peel, Clerk's Department Suite A, 5th Floor 10 Peel Centre Drive Brampton, Ontario, L6T 4B9 Tel: (905) 791-7800 Toll Free: 1 (888) 919-7800 Monday – Friday: 8:30 – 4:30 p.m.</p>	<p>Town of Caledon, Clerk's Department 6311 Old Church Road Caledon, Ontario, L7C 1J6 Tel: (905) 584-2272 Toll Free: 1 (888) 225-3366 Monday – Friday 8:30 – 4:30 p.m.</p>
<p>Ministry of the Environment and Climate Change Central Region Office 5775 Yonge Street, 8th Floor Toronto, Ontario, M2M 4J1 Tel: (416) 326-6700 Monday – Friday 8:30 – 4:30 p.m.</p>	<p>Caledon Public Library – Alton Branch 35 Station Street Alton, Ontario, L7K 0E2 Tel: (519) 941-5480 Tuesday: 10 – 8:30 p.m. Wednesday: 12:30 – 8:30 p.m. Thursday: 10 – 6 p.m. Saturday: 10 – 4 p.m.</p>

Comments

Please provide written comments to **Mr. Serguei Kabanov, C.E.T.** at the Region of Peel within the 30-day review period. If the concerns cannot be resolved through discussions with the Regional Municipality of Peel, a request may be made to the Minister of the Environment to issue a Part II Order to the project.

A Part II Order request must be received by the Minister of the Environment, the Honourable Chris Ballard, 135 St. Clair Avenue West, 12th Floor, Toronto, Ontario, M4V 1P5 no later than November 15, 2017.

A copy of the Part II Order request must also be sent to:

<p>Mr. Serguei Kabanov, C.E.T. Project Manager Regional Municipality of Peel 10 Peel Centre Drive Suite 'B', 4th Floor Brampton, Ontario, L6T 4B9 Tel: (905) 791-7800, ext. 8754 Fax: (905) 791-1442 serguei.kabanov@peelregion.ca</p>	<p>Mr. David O'Sullivan, P.Eng. Consultant Project Manager R.V. Anderson Associates Limited 2001 Sheppard Avenue East Suite 300 Toronto, Ontario, M2J 4Z8 Tel: (416) 497-8600, ext. 1245 Fax: (416) 497-0342 dosullivan@rvanderson.com</p>
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Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.





Queen Street East Bridge and Culvert Replacement

Class Environmental Assessment

Regional Municipality of Peel

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RVA 163254

October 6, 2017

CLASS ENVIRONMENTAL ASSESSMENT REPORT

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1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

The Regional Municipality of Peel has retained R.V. Anderson Associates Limited (RVA) to conduct a Schedule 'B' Municipal Class Environmental Assessment (Class EA) and design for bridge and culvert improvements to Queen Street East (the 'Project') from Orangeville-Brampton Railway to approximately 0.5 kilometres west of Porterfield Road in the Village of Alton, Town of Caledon. The Class EA was completed in accordance with the requirements of Schedule 'B' of the Municipal Engineers Association, Municipal Class Environmental Assessment (2015).

The purpose of the Project is to develop, assess and provide recommendations for hydraulic improvements to the existing structures and evaluate alternatives to the undertaking. The proposed works are part of the Region of Peel's plans to reconstruct Queen Street East, which will maintain its original two-lane configuration.

1.2 Study Area

The study area, as shown in **Figure 1.1**, is bound by Orangeville-Brampton Railway to the west and extends approximately 0.5 kilometres easterly.



Figure 1.1 – Study Area

Current land uses in the area are mainly low density residential west of the railway crossing, and wetland / rural east of the railway crossing. Shaw's Creek, a tributary to the Credit River, flows from north to south within the study area. The lands fall within the regulation limits of the Credit Valley Conservation Authority (CVC).

1.3 Background

Queen Street East (Highway 136) is a two-lane rural arterial roadway under the jurisdiction of the Regional Municipality of Peel. Under Peel's Road Characterization Study, the design is to follow the standard for a Rural Main Street with a 20 metre right of way, and remain a two-lane roadway.

The Town of Caledon's Official Plan provides details for the future planning in the Village of Alton. The Town has developed a Community Improvement Plan that involves revitalization and urbanization of the downtown area with principles of improved streetscaping, public area beautification, improved on-street parking, streetlighting, traffic calming and heritage conservation. The Project is located at the entry into the Town from the east and will incorporate these principles wherever possible.

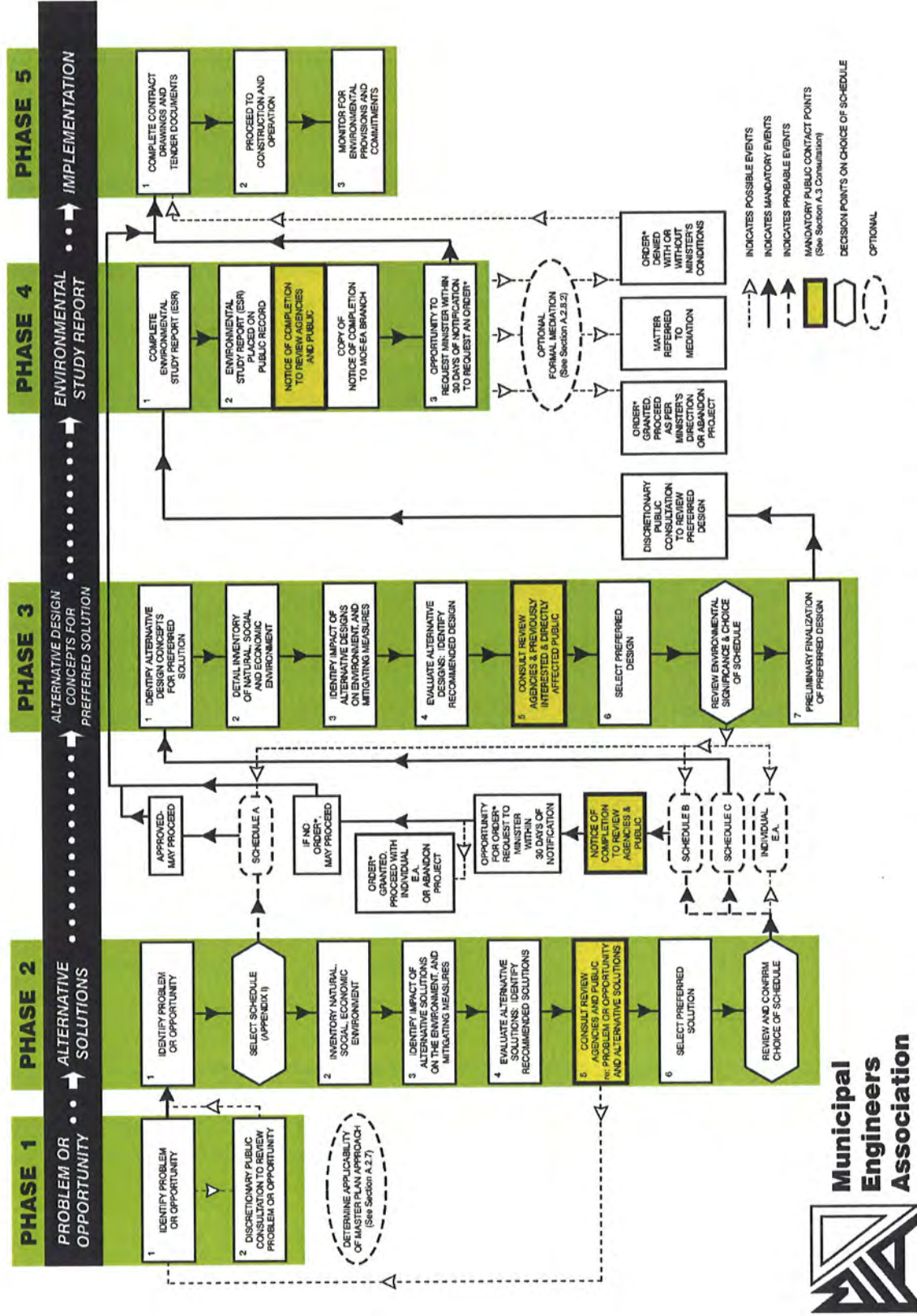


Figure 1.2 – Municipal Class Environmental Assessment

1.4 The Municipal Class Environmental Assessment (Class EA)

As stated above, this study is being conducted in accordance with the requirements of the Municipal Class Environmental Assessment (Class EA) – Schedule 'B' (2015) which is an approved process under the Environmental Assessment Act. **Figure 1.2** illustrates the framework for the Class EA process which is a legislated planning process comprising of up to five phases with mandatory points of public contact. The focus of the framework is a comprehensive and transparent decision-making process.

The Class EA is broken down into phases, namely:

- **Phase 1** – Identify problem or opportunity;
- **Phase 2** – Identify alternative solutions, evaluate and select the preferred solution;
- **Phase 3** – Identify alternative design concepts, evaluate and select the preferred design concepts.
- **Phase 4** – Complete the Environmental Study Report (ESR) and place it on the public record; and
- **Phase 5** – Project implementation, which is to undertake the contract drawings and tender documents for the project and proceed to construction and operation of the project.

This Schedule 'B' study will complete Phases 1 and 2 of the Class Environmental Process with the final deliverable being the documentation of the planning process as provided in this Project File report. The Project will then proceed to Phase 5.

1.4.1 The Environmental Study Report (ESR)

The Project File represents the documentation of the Environmental Assessment (EA) process for municipal road projects for which a Class EA has been accepted and approved under the Act. The Project File addresses and documents the planning and design phase of a process that terminates with the construction of the project. It includes a discussion of the purpose of the project, the project approach, the existing natural and social environmental conditions in the project area, the planning alternatives and design options considered, the impacts of each of the alternatives and the construction requirements associated with the implementation of the project. The process followed in the study is prescribed in the Municipal Class Environmental

Assessment document published by the Municipal Engineers Association, October 2000 as amended in 2015.

Following the issuance of a public notice of the completion of the Class EA, the Report is placed on the public record for review with the Clerk of Peel Region and the Region's website. Following a 30-calendar day review period, the requirements of the Environmental Assessment Act will be deemed to have been satisfied, subject to the appropriate resolution of any objections received from the public and/or review agencies.

1.4.2 Part II Order Requests

Anyone with concerns related to any aspect of the Class EA may express such concerns in writing to the Clerk's Office at the Region of Peel within the 30-calendar day review period following the Notice of Study Completion. If concerns cannot be resolved through discussions with the Region of Peel representatives, then a 'Part II Order' (a provision in the Class EA for elevating the status of the project in the Class EA process) may be requested. A written submission may be made to the Minister of the Environment within the 30-day calendar review period requesting an Individual Environmental Assessment in accordance with the Environmental Assessment Act.

The Ministry will consider such requests. A notice of the Minister's decision respecting requests for an Individual Environmental Assessment will be given within 66 days of the request. In all such 'bump-up' requests, the Minister's decision is final.

The proposed improvements to the bridge and culvert structure have been classified as a Schedule 'B' type project as outlined in the Municipal Class Environmental Assessment document.

This ESR is prepared for the public record to give the public an opportunity to review and contribute to the Class EA process for this Project and to provide details of the undertaking by identifying the impacts and describing the measures to mitigate any impacts. The supplementary studies and documents referred to throughout this report are assembled in the Appendices.

The Region of Peel and their consultants remain available to meet interested parties and agencies to review details of the proposed undertaking. Anyone requiring further information regarding any aspect of this Project or wishing to provide additional comments is encouraged to contact the Region of Peel at the address noted below.

Regional Municipality of Peel
10 Peel Centre Drive
Suite B, 4th Floor
Brampton, ON L6T 4B9

Contact: Serguei Kabanov, C.E.T.
Telephone: 905-791-7800 Ext 8754
Fax: 905-791-1442
E mail: serguei.kabanov@peelregion.ca

1.5 Canadian Environmental Assessment Act (CEAA)

Municipal projects may be subject to the requirements of the Canadian Environmental Assessment Act 2012 (CEAA). A federal environmental assessment may be required when, in respect to a project, a federal authority:

- is the proponent;
- provides financial assistance to the proponent;
- makes federal lands available for the project; or
- issues a permit or license or other form of approval pursuant to a statutory or regulatory provision referred to in the “Law List Regulations”.

For this Project, CEAA may potentially be “triggered” by the following proposed activities:

- Harmful, disruption or destruction of fish habitat which would require authorization under the Federal *Fisheries Act*; and
- the Navigable Waterways trigger which would require a permit under the *Navigable Waters Protection Act*

During the Class EA, the various requirements of CEAA were incorporated into the municipal Class EA process and approvals obtained as required.

1.6 Study Organization

The Class Environmental Assessment Study was carried out by a consulting team lead by R.V. Anderson Associates Limited (RVA) on behalf of the Region of Peel. The RVA team consists of several multi-disciplinary specialists. The study team is outlined below:

Region of Peel:

- Serguei Kabanov – Project Manager

Consulting Team

- John P. Does – Project Director – R.V. Anderson Associates Limited (RVA)

- David O’Sullivan – Project Manager – RVA
- John Parish –Fluvial Geomorphology Lead – Matrix Solutions Limited
- Judson Venier – Natural Environment Lead – LGL Limited
- James McWilliam – Streetscaping Lead – McWilliam Associates
- Kim Slocki – Archaeology and Built Heritage Lead - Archeoworks

1.7 Study Schedule

The study was initiated in October 2016. Key dates were as follows:

- Notice of Study Commencement..... October 2016
- First Public Information Centre..... June 7, 2017
- Notice of Study Completion October 12,2017

1.8 Public Consultation

Public Consultation is a key feature of environmental assessment planning projects. Input received from the public and various stakeholder groups, potentially affected Aboriginal communities, as well as from provincial ministries, agencies, and authorities can generate meaningful dialogue between the project planners and the public. This consultation allows for the exchange of ideas and the broadening of the information base, leading to better decision-making during the study.

The public participation program followed by the Region of Peel for Municipal Class EA projects meets the requirements set out in the document entitled “Municipal Class Environmental Assessment” published by the Municipal Engineers Association in October 2000, and amended in 2015.

Various Aboriginal communities, government agencies, authorities and interest groups were informed of the Class EA Study commencement, as well as the Public Information Centre, by local newspaper notices, direct mailings to stakeholders and agencies and flyers distributed in the study area.

A complete list of consultation groups whom were contacted is provided in **Appendices A and B** of this report.

1.8.1 Notice of Study Commencement

Flyers outlining the details of the study’s commencement were distributed to properties within the study area in October 2016. Those who were interested in being kept informed

of the study's progress and decisions were invited to contact Peel's project manager to ask questions, and to be placed on the mailing list to be kept apprised of project information. The flyer also advised them of a future Public Information Centre / Meeting. A copy of this Notice of Study Commencement is included in **Appendix A**.

The Notice of Commencement was also mailed to Aboriginal communities, various ministries, agencies, local and adjacent municipalities, school boards, railway companies, and local councillors.

The Notice of Commencement was advertised in the "Caledon Citizen" and "Caledon Enterprise" community newspapers on October 20, 2016 and posted on the Region's website.

1.8.2 Contact with Stakeholders

Following the Notice of Commencement of the EA, correspondence was received from various stakeholders as outlined below and shown in **Appendix A**, and include:

- Ministry of Natural Resources and Forestry (MNRF) advising that Species at Risk were noted within the study area, and requesting that MNRF remain involved during the EA.
- Transport Canada advising that a self-assessment is needed to confirm if the Project impacts any federal lands and / or Acts administered by them, such as Navigation Protection Act or Railway Safety Act.
- Canadian Environmental Assessment Agency advising that the Project does not appear to be subject to a federal environmental assessment.
- Ministry of the Environment and Climate Change providing an "Areas of Interest" document, and advising of potential interested Aboriginal communities to be notified.
- Ministry of Infrastructure Ontario (MOI) advising of requirements if the Project were to impact MOI lands.

2.0 EXISTING AND FUTURE CONDITIONS

2.1 Existing Road Network

Queen Street East is a two-lane rural road with a posted speed limit of 50 km/h at the west end of the study area and transitions to 80 km/h towards the east end of the study area. The paved road width ranges from 8 m to 9 m and the right-of-way is 30 m minimum.

The road will remain a two-lane cross-section, but will be urbanized with curbs, splash pads, sidewalks on both sides and streetlighting improvements.

2.2 Structures

At present, there is an existing two-lane bridge structure over Shaw's Creek with a span of approximately 9 m. This bridge currently is in poor structural condition, is at the end of its service life and needs to be replaced.

An existing 3 m wide by 1.35 m high concrete box culvert is located to the east of the bridge and conveys a tributary of Shaw's Creek. The culvert is in good structural condition.

The structures will be replaced with larger structures to increase hydraulic capacity which is further described below.

2.3 Bridge and Culvert Hydraulics

The main channel of Shaw's Creek flows in a south-easterly direction via Queen Street East bridge. The tributary of Shaw's Creek also flows in a south-easterly direction via a concrete box culvert located approximately 63 metres east of the bridge. The tributary joins the main channel approximately 40 metres downstream from Queen Street East.

Hydraulic analyses undertaken for Shaw's Creek main channel and its tributary identified that the existing 9 m open-span bridge and 3 m box culvert are undersized, causing backwater effects, and the existing road is overtopped during major storm events.

The proposed structures will need to satisfy the following criteria:

- A minimum 1 metre freeboard (i.e. vertical measurement) to edge of travel lane to be provided during the design event (i.e. 100-year storm) and no road overtopping during a Regional storm event.
- Bridge soffit clearance should be minimum 1 metre during the 100-year storm event. In addition, the water levels during the Regional storm event were desired to be below the bridge girders.

- Culvert soffit clearance should be minimum 0.3 metres during the 100-year storm event.

2.4 Municipal Services, Drainage and Utilities

2.4.1 Municipal Services

A 200 mm watermain exists on Queen Street East from west of the pumping station to the west limit of the study area. There are no watermains east of the pumping station.

No storm or sanitary sewers are present on Queen Street East, east of the railway corridor.

2.4.2 Drainage

The study area is part of the Shaw's Creek Watershed. Queen Street presently consists of a rural cross-section. The minor storm system drainage is collected in ditches directed towards outfalls that discharge flows into the wetland.

2.4.3 Utilities

Hydro One Network maintains aerial hydro lines on the north side of the road. Rogers Cable and Bell Canada also use the hydro poles to support their infrastructure, in addition to buried Bell Canada cables west of the bridge. There are no gas mains east of the railway corridor.

2.5 Natural Environment

The following summarizes the existing natural environment in the study area. For further details, the complete Natural Environment Report is provided in **Appendix C**.

2.5.1 Designated Natural Areas

Designated natural areas include areas identified for protection by the Ontario Ministry of Natural Resources and Forestry, Credit Valley Conservation, Regional Municipality of Peel and the Town of Caledon. A review of the MNRF Natural Heritage Information Centre (NHIC 2016) indicates that there is one Provincially Significant Wetland (PSW) and one Environmentally Significant/Sensitive Area (ESA) identified within 120 m of the study area. There are no Areas of Natural and Scientific Interest (ANSI).

The Credit River at Alton Wetland Complex is a PSW that exists both north and south of Queen Street East within the study area. In 2016, the exact boundaries of this wetland were staked by a MNRF biologist and surveyed.

The Credit River at Alton ESA also lies within the study area and includes the Shaw's Creek valley on the south side of Queen Street.

Greenbelt Plan Area

The entire study area is identified as "Protected Countryside" within the Greenbelt Plan Area and specifically "Natural Heritage System".

Peel Region Official Plan

The study area is identified as "Core Area of the Greenlands System in the Region of Peel Official Plan".

2.5.2 Aquatic Habitat

Shaw's Creek and its tributary are both cold-water aquatic communities which support Brook Trout (*Salvelinus fontinalis*). The sub watershed study also identifies that Brook Trout spawning habitat is present within the vicinity of Queen Street East. Brook Trout are a sensitive species which require clear, cold, well oxygenated water for all life processes, especially spawning.

Fisheries community information was obtained from secondary sources, in addition to dip net sampling during field investigations.

Physical habitat features were surveyed in sufficient detail to enable mapping and identification of key habitat types. The physical habitat attributes that had been assessed include: (a) instream cover, (b) bank stability, (c) substrate characteristics, (d) stream dimensions, (e) barriers, (f) stream morphology, (g) terrain characteristics, (h) stream canopy cover, (i) stream gradient, (j) aquatic vegetation, (k) ground water seepage areas, and (l) general comments.

It should be noted that during a site visit in May 2016, the MNRF had noted spawning American Brook Lamprey (Lethenteron appendix) being observed in the tributary of Shaw's Creek immediately upstream of the Queen Street East crossing. This species prefers cold-water habitats and is relatively sensitive to pollution and turbidity.

2.5.3 Wildlife and Wildlife Habitat

The study area is comprised of a mix of anthropogenic, semi-natural and natural features in a landscape that varied from rural-residential properties to natural area. Rural-residential properties are scattered throughout much of the study area, particularly outside of the natural areas associated with Shaw's Creek and the tributary of Shaw's Creek. Rural-residential areas generally contained low quality wildlife habitat consisting of manicured lawns, gardens and scattered road-side trees.

Wildlife and wildlife habitat was found to be distributed across the entire study area; however, core wildlife habitat areas were associated with Shaw's Creek and its tributary, and adjacent natural areas. Meadow, swamp and mixed forest habitats along Queen Street within the study area contribute to the higher quality wildlife habitats identified within the lands examined. The natural areas surrounding the study area are also relatively intact and have experienced only modest fragmentation from roads and other infrastructure development. On the local landscape scale, this natural area is likely to provide significant wildlife movement opportunity and function.

Swamp and marsh communities are located in the vicinity of Shaw's Creek and its tributary. Anuran (frogs and toads) breeding habitat is expected to be present within these aquatic habitats and they likely function as habitat for aquatic and semi-aquatic bird and mammal species.

Mixed forest habitats were found to be distributed across much of the study area. These communities provide interior forest (where units are large enough) and forest edge habitat for several species and serve as corridor/movement habitat for wildlife species.

Cultural meadow and manicured habitats were noted across the study area and were generally associated with roadside areas and rural-residential settings. These areas are more highly disturbed and therefore, wildlife species identified within these areas were generally species considered to be urban or tolerant of anthropogenic features and disturbance, or non-native species.

Mammal Species

Three mammal species were identified during field investigations in the study area. Northern raccoon (*Procyon lotor*) tracks were commonly identified along the roadside, while eastern chipmunk (*Tamias striatus*) was identified in association with a residence. A single road-killed American mink (*Neovison vison*) was also identified in the area of the Shaw's Creek crossing. The mammal species documented represent an assemblage that readily utilizes human influenced landscapes. Other mammal species which inhabit forest, open-county, aquatic and anthropogenic habitat types are expected to be found within the study area.

Herpetofauna Species

Two herpetofauna species (one reptile and one amphibian) were observed in the study area during field investigations. Green Frogs (*Lithobates clamitans*) were identified within aquatic habitats in the study area and tracks from a Snapping Turtle (*Chelydra serpentina*) were identified in proximity to the bridge structure at Shaw's Creek. Additional herpetofauna species which inhabit forest, open-county, aquatic and anthropogenic habitat types are expected to be found within the study area.

Bird Species

Breeding bird surveys were conducted on two mornings during the 2016 breeding bird season to document breeding bird evidence (BBE) and to characterize the nature, extent and significance of breeding bird usage of the habitats within the study area. A single breeding bird point count station was selected in proximity to the Shaw's Creek bridge structure, but wandering transects across the study area were also used to record bird species.

The study area contained a low to moderate number of breeding bird species representing several habitat types. Breeding evidence was obtained for 28 species of birds. Breeding evidence was confirmed in four species and was found to be probable for 15 species. An additional nine species were identified as having the potential to breed within the study area. Confirmed breeding by bird species was documented based on adults carrying food for young and active nests observed, including species such as Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospica melodia*), Eastern Phoebe (*Sayornis phoebe*) and Common Yellowthroat (*Geothlypis trichas*). Other species were classified as probable breeders due to behaviours such as territory established or agitated behaviour including American Robin (*Turdus migratorius*), Tree Swallow (*Tachycineta bicolor*), Northern Cardinal (*Cardinalis cardinalis*) and Eastern Kingbird (*Tyrannus tyrannus*).

An Eastern Phoebe nest was found under the bridge at Shaw's Creek. The Eastern Phoebe is provided protection under the *Migratory Birds Convention Act*. Species which were most commonly encountered across the study area were generally species associated with forest/forest edge, swamp/marsh, open-country and anthropogenic habitat types. Two bird species identified are considered area-sensitive and/or interior species according to the Significant Wildlife Habitat Technical Guide (MNR 2000).

2.5.4 Vegetation

The study area consists of a mixture of cultural and wetland vegetation communities, including portions of vegetation communities that are already in a disturbed state as a result of land uses. Evidence of disturbance includes a high proportion of non-native plant species that are well adapted to persist in areas that experience regular disturbances. This includes species that are adapted to high light conditions, limited soil moisture, and species that are tolerant of salt spray.

There were four Ecological Land Classification (ELC) community types identified within the study limits during LGL's botanical surveys: Dry-Moist Old Field Meadow (CUM1-1); Alder Swamp Thicket (SWT2-1); Mineral Cattail Marsh (MAS2-1); Mixed Forest (FOM). Old field meadows (CUM1-1) were identified immediately adjacent to Queen Street

within the ROW, and within several of these communities, small clusters of cattails (*Typha sp.*) had established within ditches.

The vegetation communities identified within the study area are considered widespread and common in Ontario.

2.5.5 Flora

A total of 54 vascular plants were recorded within the study area. Four of these plants could only be identified to genus. Of the 50 plants identified to species, 25 (50%) identified plant species are native to Ontario and 25 (50%) plant species are considered introduced and non-native to Ontario. None of the plant species identified are of provincial concern.

2.5.6 Species at Risk

No aquatic species at risk are known to be present in Shaw's Creek or its tributary within the vicinity of the study area.

No plant species were encountered during the botanical investigation that are regulated under the Ontario *Endangered Species Act* (ESA) or the *Canada Species at Risk Act* (SARA) (i.e., those plant species regulated as Endangered, Threatened, or Special Concern).

Twenty-two recorded species of bird are protected under the Migratory Birds Convention Act (MBCA) and a single bird species is protected under the Fish and Wildlife Conservation Act (FWCA). Three mammals and a single herpetofauna species are also provided protection under the FWCA.

Of the 33 wildlife species recorded within the study area, one is listed under the Species at Risk in Ontario list, as evidenced by tracks from a Snapping Turtle being identified in proximity to Shaw's Creek.

The Snapping Turtle is listed as 'Special Concern' under the ESA and SARA; however, this species is not a regulated species (Endangered or Threatened) under the ESA. Snapping Turtle tracks and evidence of potential nesting were noted in the gravel road shoulder near Shaw's Creek. The Snapping Turtle is generally associated with aquatic setting such as lakes, ponds, bays and inlets. This is an aquatic species but Snapping Turtles may leave the water to seek out new aquatic habitats or to lay eggs. Suitable habitat for Snapping Turtle within the study area would generally be limited to Shaw's Creek and associated aquatic communities identified across the site. As noted above, Snapping Turtles may use gravel road shoulders present within the study area as

nesting habitat. Similarly, Snapping Turtles from surrounding areas may use habitats within the study area during movements from one aquatic area to another.

3.0 PROBLEM AND OPPORTUNITY

3.1 Problem and Opportunity Statement

Based on the review of existing hydraulic conditions within the study area, neither the existing bridge or culvert have the required hydraulic capacities to satisfy criteria for the 100-year and Regional storm events. In addition, Queen Street East is overtopped during both storm events.

The current needs along Queen Street East is to replace the bridge and culvert with larger spans to satisfy hydraulic criteria and to raise the road profile to provide the required minimum freeboard during the 100-year storm event and prevent overtopping of the road during the Regional storm event.

4.0 ALTERNATIVE SOLUTIONS AND EVALUATION

4.1 Alternative Solutions

To improve hydraulics, the following options had been considered:

- Option 1 – Bridge replacement only, with various spans up to 30 m.
- Option 2 – Replace bridge with 20 m span and raising the road profile up to 1 m.
- Option 3 – Replace bridge with 20 m span, replace culvert with 10 m span / 3 m rise open bottom culvert, and raising the road profile a minimum of 1.5 m.
- Option 4 – Replace bridge with 25 m span, replace culvert with 10 m span / 3 m rise open bottom culvert, and raising road profile a minimum 1.4 m

4.2 Evaluation of Alternative Solutions

The alternative solutions were evaluated based on the criteria outlined above as presented in Table 4-1. A general description of the alternative solutions is provided below, together with a summary of the evaluation.

Table 4-1 – Preliminary Evaluation Matrix

Criteria	Alternative 1 New Bridge up to 30m Span	Alternative 2 New 20m Bridge and Raise Road Profile by 1.5m	Alternative 3 New 20m Bridge and 10m Culvert and Raise Road Profile	Alternative 4 New 25m Bridge and 10m Culvert and Raise Road Profile
Design Considerations:				
Hydraulic Capacity	<ul style="list-style-type: none"> × Freeboard for 100-year storm not satisfied × Clearance for Regional Storm not satisfied × High backwater effect × Road overtopping 	<ul style="list-style-type: none"> × Freeboard for 100-year storm not satisfied × Clearance for Regional Storm not satisfied × High backwater effect × Road overtopping 	<ul style="list-style-type: none"> ✓ Freeboard for 100-year storm satisfied ✓ Clearance for Regional Storm satisfied ✓ No backwater effect ✓ No road overtopping 	<ul style="list-style-type: none"> ✓ Freeboard for 100-year storm satisfied ✓ Clearance for Regional Storm satisfied ✓ No backwater effect ✓ No road overtopping
Fluvial / Geomorphic	✓ 100-year erosion limit satisfied	× 100-year erosion limit not satisfied	× 100-year erosion limit not satisfied	✓ 100-year erosion limit satisfied
Natural Environment	✓ No impacts to PSW	✓ No impacts to PSW	✓ No impacts to PSW	✓ No impacts to PSW
Drainage	✓ Existing drainage patterns maintained	✓ Existing drainage patterns maintained	✓ Existing drainage patterns maintained	✓ Existing drainage patterns maintained
Geometric Requirements for Road	<ul style="list-style-type: none"> ✓ Design speed unaffected ✓ No impact to traffic safety 	<ul style="list-style-type: none"> ✓ Design speed unaffected ✓ No impact to traffic safety 	<ul style="list-style-type: none"> ✓ Design speed unaffected ✓ No impact to traffic safety 	<ul style="list-style-type: none"> ✓ Design speed unaffected ✓ No impact to traffic safety

Options 1 and 2 did not satisfy all hydraulic criteria for freeboard and soffit clearance, and the road was overtopped during a Regional storm event. Both Options 3 and 4 satisfied all hydraulic criteria for freeboard and soffit clearances, without overtopping the road during a Regional storm event.

A fluvial assessment of Shaw's Creek was performed which defined the limits of the future meander amplitude and had recommended as long a span as possible to allow the bridge abutments to be located behind the 100-year erosion limit as well as improves terrestrial passage. The fluvial assessment also determined that the 10 m span / 3 m rise open bottom culvert was appropriate from a fluvial geomorphic perspective and provides improvements to aquatic habitat and terrestrial passage.

The Hydraulic Assessment and the Tributary Crossing Assessment technical memorandum can be found in **Appendix D**.

4.3 Public Consultation

Ministries, agencies, Aboriginal communities and interest groups listed in **Appendix B** were mailed notices of a Public Information Centre (PIC). Advertisements were placed in the local newspapers on May 4, 2017. There were also notices distributed by mail to residents within the study area. Information was posted on the Region's website informing the public about the PIC.

Following the Notice of Public Information Centre, correspondence was received from various stakeholders as described below and are provided in **Appendix B**, which include:

- Chippewas of Rama First Nation indicating they have received the Notice of PIC.
- Transport Canada advising that a self-assessment is needed to confirm if the Project impacts any federal lands and / or Acts administered by them, such as Navigation Protection Act or Railway Safety Act.
- Ministry of Tourism Culture and Sport advising of the potential for archaeological and built heritage resources may be present and to conduct screening to verify if additional assessment is required.

The PIC was held at Alton Public School on June 7, 2017, between 6:30 and 8:30 p.m.

The purpose of the meeting was to provide the public with information about the study's background and purpose, the identification of problems/opportunities, the alternative solutions developed to address the problems/opportunities, and the assessment of the alternative solutions leading up to the identification of a preliminary preferred solution.

The PIC was conducted in an open house format. Seventeen people had signed the register indicating their attendance. Participants were invited to review the display boards, ask questions and discuss any concerns with the Region or consultant's representatives.

Attendees were also encouraged to submit written feedback on the comment sheets provided. Written comment sheets were received from fifteen persons. The presentation materials were also posted on the Region's website. Display boards and PIC comment sheets received are included in **Appendix B**.

4.4 Selection of a Preferred Alternative Solutions

Based on the evaluation of the above alternative solutions, and the comments received from the public and agencies during the public consultation, Option 4 which includes a 25 metre span bridge and 10 metre span / 3 metre rise open bottom culvert, with a

raising of the road profile by a minimum of 1.4 metres, best addresses the hydraulic and fluvial criteria and is recommended for the design.

Refer to **Appendix E** for the preliminary general arrangement drawings for the proposed bridge and culvert improvements.

5.0 IMPACT ASSESSMENT AND MITIGATION MEASURES

The potential environmental effects and mitigation are identified in this section of the report.

5.1 Archaeology and Built Heritage

5.1.1 Archaeological Potential

Archeoworks performed a Stage 1 Archaeological Assessment of the study corridor. This comprised of a desktop review of the ground conditions using historical aerial photography and maps.

The desktop review identified some parts of the study corridor to be disturbed and having archaeological potential removed, other parts of the study corridor having low to no archaeological potential and the remainder identified as having archaeological potential. It is recommended that a Stage 2 Archaeological Assessment be performed on site during detailed design to confirm the study corridor is clear of cultural heritage resources.

The Stage 1 Archaeological Assessment can be found in **Appendix F**.

5.1.2 Built Heritage Screening

The Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes checklist was used to evaluate the potential heritage significance of the existing bridge structure which may require removal and replacement.

The checklist completed by Archeoworks identified a need for further investigations. It is recommended a Cultural Heritage Evaluation Report (CHER) be performed during detailed design to confirm the heritage significance of the structure. Refer to **Appendix G** for a copy of the checklist.

5.2 Property Requirements and Access

Sufficient property exists to construct the proposed bridge and culvert improvements. No additional property is required. However, the property requirements will be finalized during detail design to accommodate the required construction of the Project. The

Region will be discussing any other property requirements with individual property owners and also will be discussing access to the properties.

A full road closure is anticipated to replace the structures due to the narrow road platform area available on either side of the PSW. However, during construction, local traffic access to properties will be maintained.

5.3 Dust and Noise Control

The contractor will be required to minimize dust by various measures outlined in the contract documents.

Applicable local municipal noise control by-laws will be identified in the contract documents, and the hours of work is to comply with the applicable noise by-law.

5.4 Disposal of Excess Material

All excess material removed during construction will be tested for contaminants and will be disposed off site by the contractor at an approved receiving site.

5.5 Natural Environment

5.5.1 Aquatic Habitat and Fisheries

Shaw's Creek and its tributary are cold-water aquatic communities which support Brook Trout and spawning habitat is present within the vicinity of Queen Street East. There are no aquatic Species at Risk within the study area.

During detail design, consultation and coordination with the CVC and MNRF is required for approval of the proposed bridge and culvert replacement works.

Bridge demolition and culvert demolition / new construction are to be scheduled outside of the sensitive time periods for cold-water fish communities located within the study area. (i.e. June 15th to September 15th).

It is anticipated that since the proposed bridge has a much longer span that enables the abutments to be placed with an increased setback beyond the banks, that the bridge piling and abutment work may be able to proceed outside the permitted timing windows only if mitigation measures, approved by CVC, are in place to avoid disturbing the creek. Effective mitigation measures will be designed and approved through consultation with the CVC and MNRF during the detailed design and construction phases.

5.5.2 Wildlife and Wildlife Communities

The bridge and culvert replacement will not create new permanent barriers to wildlife. Although earth walls will be required with the raising of the road profile within the wetland area, wildlife will be directed to cross Queen Street East via the two new enlarged watercourse crossing structures, which will provide safer passage below the road, rather than on the surface of the road.

Further opportunities for wildlife passage will be explored during detailed design.

5.5.3 Vegetation and Vegetation Communities

No plant species that are regulated under the Ontario Endangered Species Act or the Canada Species at Risk Act were encountered during LGL's botanical investigation within the subject area.

The vegetation communities identified within the study area are considered widespread and common in Ontario. The proposed road widening will create disturbances to the vegetation along the edge of the existing right-of-way and in the Shaw's Creek and tributary area. Any trees being removed will require tree compensation.

5.5.4 Potential Impacts to Migratory Birds

An Eastern Phoebe nest was found under the bridge at Shaw's Creek. The Eastern Phoebe is provided protection under the Migratory Birds Convention Act (MBCA).

The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests.

To comply with the requirements of the MBCA, disturbance, clearing or disruption of vegetation where migratory birds may be nesting is to be completed between September 1 and March 31. If these activities must be undertaken between April 1 to August 31, a nest survey will be conducted by a qualified avian biologist to identify and locate active nests of species covered by the MBCA. If an active nest is located, a mitigation plan shall be developed and provided to Environment Canada – Ontario Region for review prior to implementation.

5.5.5 Environmental Monitoring

An environmental inspector will be on site during construction to verify the encroachment into the PSW on the north and south sides of the road is avoided. The environmental inspector will also verify that construction fencing, tree protection barriers and erosion and sedimentation control measures are installed correctly, properly maintained and are functional.

5.6 Storm Drainage

A stormwater management plan, including the size and location of storm sewer pipes, will be developed during detail design. To improve the quality of the stormwater discharging into Shaw's Creek and its tributary, best management practices will be used to provide the quality and quantity control treatment required by the CVC and MOECC.

5.7 Proposed Mitigation Strategy

5.7.1 Aquatic Habitat and Fisheries

To protect fish and fish habitat, the following Best Management Practices will be employed to reduce impacts during construction:

- No in-water or near-water work will be permitted between September 16 and June 14 (exact dates to be confirmed by MNR and CVC during detailed design) to protect spawning cold-water fish habitat. In-water / near-water works includes bridge and culvert removal and grading works within banks;
- Work areas will be delineated with construction fencing to minimize the area of disturbance;
- Appropriate sediment controls will be installed prior to and maintained during construction to prevent entry of sediments into the watercourse. These controls will be dynamic and may change with the project if site conditions warrant;
- All debris/materials associated with construction will be contained and prevented from entering the watercourse;
- Where cofferdams are to be employed, dewatering effluent will be treated prior to discharge to receiving watercourse;
- Cofferdams will be constructed using pea gravel bags, sheet piling or other appropriate material to isolate the work area. Flows will be maintained at all times;
- Fish isolated by construction activities (if present) will be captured and safely released to the watercourse;
- Only clean material free of particulate matter will be placed in the watercourse;
- Good housekeeping practices related to materials storage/stockpiling, equipment fuelling/maintenance, etc. will be implemented during construction; and

- Disturbed riparian areas will be vegetated and/or covered with an erosion control blanket as quickly as possible to stabilize the banks and minimize the potential for erosion and sedimentation.

5.7.2 Vegetation and Vegetation Communities

The following Best Management Practices should be employed to protect naturalized areas from construction zones:

- Planting restoration of all disturbed areas to re-stabilize exposed substrates and restore ecological edge functions. Planting restoration plans should include complimentary native species suited to site conditions;
- A tree inventory should be undertaken during detail design to prepare protection plans and appropriate compensation for any removals; and
- The proposed streetscaping plan should replace impacted vegetation, and incorporate additional plantings in both riparian and boulevard areas.

6.0 SUMMARY OF IDENTIFIED CONCERNS AND FUTURE COMMITMENTS

This section documents outstanding concerns brought forward during the study and the commitments to be made by the proponent during the detailed design of the project:

- In order to mitigate the effects to fish and wildlife habitat, streetlighting adjacent to natural features will be designed with directional downcast lighting to permit illumination of the roadway and sidewalk, but prevents illumination of the natural features.
- During the detailed design phase, effective erosion and sediment control measures will be designed and approved through consultation with the regulatory agencies. During the construction phase, the measures will be monitored by qualified environmental inspectors.
- Opportunities for wildlife crossings to reduce wildlife mortality associated with vehicular exposure will be further explored during detailed design.
- A Stage 1 Archaeological Assessment performed during the study has identified a need to perform further review of archaeological potential at the site. During the detailed design phase, a Stage 2 Archaeological Assessment will be

performed to confirm the project does not impact existing archaeological / cultural heritage resources.

- A Cultural Heritage Evaluation Report (CHER) will be performed during the detailed design phase to further assess the built heritage potential of the existing bridge structure.

APPENDIX A

**PUBLIC CONSULTATION NOTICES AND
CORRESPONDENCE**

Environmental Assessment Study

NOTICE OF STUDY COMMENCEMENT

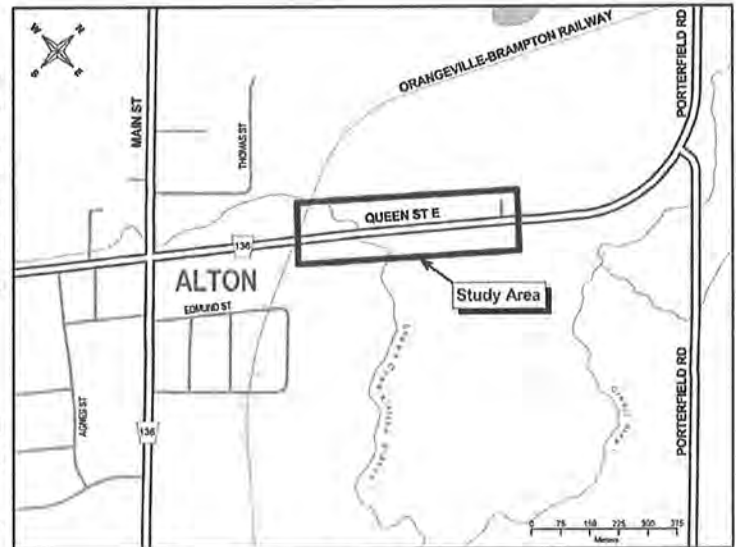
Queen Street East Bridge and Culvert Replacement over Shaw's Creek, in the Village of Alton, Town of Caledon

The Study

The Regional Municipality of Peel has initiated a Municipal Class Environmental Assessment Study to assess proposed improvements to the Queen Street East Bridge (Highway 136) and culvert replacement over Shaw's Creek, in the Village of Alton, Town of Caledon, as shown on the key plan. The proposed improvements include replacing both structures to increase hydraulic capacity.

The Process

The project is being carried out in accordance with the requirements for a Schedule 'B' project under the Municipal Class Environmental Assessment (2015). The study will review the need and justification for possible improvements to the existing structures and assess alternatives to the undertaking.



Key Plan

Interested persons are encouraged to bring issues and concerns to the attention of the Region at any time during this process. Region Staff and their Consultants will also be available at a future Public Meeting to answer your questions about the project.

If you have any comments or questions or require any further information about the Study or the Municipal Class Environmental Assessment process, please direct them to the persons listed below.

Mr. Serguei Kabanov, C.E.T.

Project Manager
Regional Municipality of Peel
10 Peel Centre Dr.
Suite B, 4th Floor
Brampton, Ontario
L6T 4B9
Phone: 905-791-7800, ext. 8754
Fax: 905-791-1442
Email: serguei.kabanov@peelregion.ca

Mr. David O'Sullivan, P.Eng.

Project Manager
R.V. Anderson Associates Limited
2001 Sheppard Ave. East, Suite 400
Toronto, Ontario
M2J 4Z8
Phone: 416-497-8600 ext.1245
Fax: 416-497-0342
Email: dosullivan@rvanderson.com

Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

This Notice first issued on October 20, 2016.

Environmental Assessment Study

NOTICE OF STUDY COMMENCEMENT

Queen Street East Bridge and Culvert Replacement
over Shaw's Creek, in the Village of Alton, Town of Caledon

The Study

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If you have any comments or questions or require any further information about the Study or the Municipal Class Environmental Assessment process, please direct them to the persons listed below.

Mr. Serguei Kabanov, C.E.T.

Project Manager
Regional Municipality of Peel
10 Peel Centre Dr.
Suite B, 4th Floor
Brampton, Ontario
L6T 4B9
Phone: 905-791-7800, ext. 8754
Fax: 905-791-1442
Email: serguei.kabanov@peelregion.ca

Mr. David O'Sullivan, P.Eng.

Project Manager
R.V. Anderson Associates Limited
2001 Sheppard Ave. East, Suite 400
Toronto, Ontario
M2J 4Z8
Phone: 416-497-8600 ext.1245
Fax: 416-497-0342
Email: dosullivan@rvanderson.com

Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

This Notice first issued on October 20, 2016.

With the exception of personal information, all comments will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's *Environmental Assessment Act*.

Date:

Attention:

Dear:

Re: Class Environmental Assessment Study (Schedule 'B')
Queen Street East (Highway 136) Bridge and Culvert Replacement
over Shaw's Creek, in the Village of Alton, Town of Caledon
Notice of Study Commencement

The Peel Region has initiated a Municipal Class Environmental Assessment (Class EA) for the Queen Street East Bridge and Culvert Replacement over Shaw's Creek in the Village of Alton, Town of Caledon. The purpose of this letter is to inform you of the study.

The purpose of the study is to address hydraulic capacity issues relating to the existing structures and to evaluate alternatives leading to an increased hydraulic capacity. A copy of the Notice of Study Commencement is attached.

The study is being conducted in accordance with the requirements for a Schedule 'B' Municipal Class EA, which is approved by under the Ontario Environmental Assessment Act.

A key component of the study will be consultation with interested stakeholders (public and regulatory agencies) including a Public Information Centre (PIC). Details regarding the forthcoming PIC will be advertised as the study progresses.

The Region has retained R.V. Anderson Associates Limited to undertake this study.

If you have any comments or questions, or require further information about the Study, please feel free to contact the undersigned.

Yours truly,



Serguei Kabanov, CD, CET, rcca
Project Manager, Roads, Design and Construction
Public Works
10 Peel Centre Drive, Suite 'B', 4th Floor
Brampton, Ontario
L6T 4B9
Tel: 905-791-7800 ext. 8754
Serguei.kabanov@peelregion.ca

Encl.: Notice of Study Commencement

c.c.David J. O'Sullivan, R.V. Anderson Associates Limited

From: Maureen Baker [<mailto:maureen.baker@caledon.ca>]

Sent: October 28, 2016 11:13 AM

To: Kabanov, Serguei

Subject: Letter received re Class EA - Queen Street East (Highway 136) Bridge & Culvert Replacement over Shaw's Creek, Alton - Notice of Study Commencement

Hi Serguei, I'm sending this email to you to let you know that Mary Hall is no longer with the Town of Caledon. Any correspondence in future should be directed to the General Manager of Community Services, Peggy Tollett.

Thanks.

Maureen Baker
Senior Administrative Assistant
Planning & Development
Community Services

Town of Caledon
6311 Old Church Road
Caledon, ON L7C 1J6

905-584-2272 x. 4225
www.caledon.ca

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Good Morning Serguei;

Please be advised that this Ministry's Rural Planner for Peel Region is Jackie Van de Valk. Please refer to the Rural Planner map for coverage areas and contact information so that you can update your contact information accordingly.

<http://www.omafr.gov.on.ca/english/landuse/lupmap.htm>

I have forwarded the Class EA Study Notice for the above noted project to Jackie's attention.

Regards,

Carol

Carol Neumann

Rural Planner, Environmental and Land Use Policy
Ontario Ministry of Agriculture, Food and Rural Affairs
6484 Wellington Road 7, Elora, ON N0B 1S0
Tel: 519-846-3393

Agriculture Information Contact Centre

1-877-424-1300 or TTY 1-855-696-2811



	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
30	Carey DeGorter Director of Administration / Town Clerk	Ms Landry	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6			
31	Mary Hall Director of Planning and Development	Ms Hall	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272		
32			Town of Caledon	Caledon Environmental Advisory Committee	6311 Old Church Road		Caledon	ON	L7C 1J6			
33	Sally Drummond Heritage Resource Officer	Ms Drummond	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272		
34	Mr. Ben Roberts Economic Development Officer	Mr. Roberts	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272, ext. 4011		ben.roberts@caledon.ca
35	Ms Susan DeJesus PUCC Coordinator	Ms DeJesus	Peel Region		10 Peel Centre Drive		Brampton	ON	L6T 4B9	905-791-7800, ext. 5076		PUCC.Applications@peelregion.ca; Susan.DeJesus@peelregion.ca
36	Mr. Ken Chiu Communications Specialist	Mr. Chiu	Peel Region		10 Peel Centre Drive		Brampton	ON	L6T 4B9	905-791-7800, ext. 4667		ken.chiu@peelregion.ca
37	Mr. Tod Jenkins CAD Supervisor	Mr. Jenkins	Peel Region		10 Peel Centre Drive		Brampton	ON	L6T 4B9	905-791-7800, ext. 7810		tod.jenkins@peelregion.ca

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
A. PROVINCIAL GOVERNMENT AGENCIES												
1	Lisa Myslicki Environmental Coordinator	Ms Myslicki	Infrastructure Ontario		1 Dundas Street West	Suite 2000	Toronto	ON	M5G 2L5			
2	Ms Hoeun Heng	Ms Heng	Infrastructure Ontario		1 Dundas Street West	Suite 2000	Toronto	ON	M5G 2L5			
3	District Manager	Sir / Madam	Ministry of the Environment and Climate Change	Halton-Peel District Office	4145 North Service Road	Suite 3000	Burlington	ON	L7L 6A3			
4	Dorothy Moszynski Environmental Resource Planner & EA Coordinator	Ms Moszynski	Ministry of the Environment and Climate Change	Central Region Air, Pesticides and Environmental Planning Technical Support Section	5775 Yonge St.	8th Floor	Toronto	ON	M2M 4J1	416-326-3469		
5	Mr. Vince Tedesco Regional Director	Mr. Tedesco	Ministry of Community and Social Services		6377 Mississauga Road	Suite 2000	Mississauga	ON	L5N 6J5			
6	Mark Heaton District Planner	Mr. Heaton	Ministry of Natural Resources and Forestry		50 Bloomington Road W.	R.R. #2	Aurora	ON	L4G 3G8	905-713-7400		
7	Victor Doyle Manager, Community Planning	Mr. Doyle	Ministry of Municipal Affairs and Housing	Central Municipal Services Office	777 Bay Street	14th Floor	Toronto	ON	M5G 2E5	416-585-6109		
8	Mr. Tim Haldenby Senior Planner	Mr. Haldenby	Ministry of Municipal Affairs and Housing	Provincial Planning & Environmental Services Branch	777 Bay Street	14th Floor	Toronto	ON	M5G 2E5	416-585-6109		
9	Malcolm Horne Planner / Archaeologist	Mr. Horne	Ministry of Tourism, Culture and Sport	Toronto District Office	400 University Avenue	4th Floor	Toronto	ON	M7A 2R9	416-314-7146		
10	Carol Neumann Rural Planner	Ms Neumann	Ministry of Agriculture, Food and Rural Affairs		6484 Wellington Road 7	Unit 1	Elora	ON	N0B 1S0	519-846-0941		
11	David Cooper Manager, Agricultural Land Use	Mr. Cooper	Ministry of Agriculture, Food and Rural Affairs		1 Stone Road West		Guelph	ON	N1G 4Y2	519-826-3117		
12	Inspector Brent Mikstas	Inspector Mikstas	Ontario Provincial Police		268 Keele Street		Toronto	ON	M6M 3Z4	416-235-4981		
B. FEDERAL GOVERNMENT AGENCIES												
13	Monique Mousseau Regional Manager	Ms Mousseau	Transport Canada	Ontario Region Environment Affairs, Programs Branch	4900 Yonge Street	Suite 300	Toronto	ON	M2N 6A5	416-952-0485	416-952-0514	mousseu@tc.gc.ca
14	Paul Savoie Impact Assessment Biologist	Mr. Savoie	Fisheries and Oceans Canada	District Office	3027 Harvester Road	Unit 304	Burlington	ON	L7R 4K3	905-639-8687	905-639-3549	
15	Regional Environmental Assessment Coordinator		Health Canada	Ontario Region	180 Queen Street West		Toronto	ON	M5V 3L7			
16	Mr. Rob Dobos Head EA Section Ontario Region	Mr. Dobos	Environment Canada	Ontario Region	867 Lakeshore Road	P.O. Box 5050	Burlington	ON	L7R 4A4			
17	Ms Marie-Josée Lemieux	Ms Lemieux	Parks Canada	Historic Site and Monument Board	25 Eddy Street		Gatineau	QC	K1A 0M5			
18	Ms Jeannette Anderson Enforcement Officer	Ms Anderson	Canada Transport Agency		4900 Yonge Street	Suite 300	Toronto	ON	M2N 6A5			
19	Mr. Duck Kim Senior Program Officer	Mr. Kim	Canadian Environmental Protection Agency		55 St. Clair Avenue East	Room 907	Toronto	ON	M4T 1M2			
C. MUNICIPAL GOVERNMENT AGENCIES												
20	Mr. Mike Grodzinski	Mr. Grodzinski	Peel Regional Police	Corporate Planning and Resources	7750 Hurontario Street		Brampton	ON	L6V 3W6	905-453-2121, ext. 4740		
21	Mr. Jim Patton Superintendent	Mr. Patton	Peel Regional Police	22 Division	7750 Hurontario Street		Brampton	ON	L6V 3W6	905-453-3311, ext. 2200		
22	Mr. Gerry Morden Fire Chief	Mr. Morden	Peel Fire and Emergency Services		15 Fairview Road West		Mississauga	ON	L5B 1K7			
23	Mr. Peter Dundas Director	Mr. Dundas	Region of Peel Ambulance Services		5299 Maingate Drive		Mississauga	ON	L4W 1G6			
24	Mr Dave Forfar Fire Chief	Chief Forfar	Town of Caledon	Fire and Emergency Services	Headquarters 6311 Old Church Road		Caledon	ON	L7C 1J6			
25	Mayor Allan Thompson	Mayor Thompson	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	416-319-6543 (cell)	905-584-4325	allan.thompson@caledon.ca
26	Ms Barb Shaughnessy Regional Councillor, Ward 1	Councillor Shaughnessy	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-586-0907		barb.shaughnessy@caledon.ca
26	Johanna Downey Regional Councillor, Ward 2	Councillor Downey	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	416-434-4102		johanna.downey@caledon.ca
27	Gord McClure Town Councillor, Ward 2	Councillor McClure	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-843-9797		
28	Kant Chawla Senior Transportation Planner	Mr. Chawla	Town of Caledon	Policy Department	6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272, ext. 4293		
29	Craig Campbell Director of Public Works	Mr. Campbell	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272, ext. 4238		

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
FIRST NATIONS												
1			Indian and Northern Affairs Canada	Environmental Unit Environmental Assessment Coordination	25 St. Clair East,	8th Floor	Toronto	ON	M4T 1M2			
2	Alan Kary	Mr. Kary	Ministry of Aboriginal Affairs Canada	Policy and Relationships Branch	720 Bay Street	4th Floor	Toronto	ON	M5G 2K1	416-326-4762		
	Don Boswell Senior Claims Analyst	Mr. Boswell	Indian and Northern Affairs Canada	Specific Claims Branch	10 Wellington Street	Room 1310	Gatineau	QC	K1A 0H4			boswelld@inac.gc.ca
4	Josée Beauregard Ontario / Nunavut Team	Josée Beauregard	Indian and Northern Affairs Canada	Litigation Management and Resolution Branch	25 Eddy Street		Gatineau	QC	K1A 0H4			
	Glen Forest Senior Administrator Officer	Mr. Forest	Six Nations of the Grand River Territory		P.O. Box 5000 1695 Chiefswood Road		Oshweken	ON	N0A 1M0	519-445-2201		
	Chief William K. Montour	Chief Montour	Six Nations of the Grand River Territory		P.O. Box 5000 1695 Chiefswood Road		Oshweken	ON	N0A 1M0	519-445-2205, ext. 230		wkm@sixnations.ca arleenmaracle@sixnations.ca
7	Lonny Bomberry Director, Lands and Resources	Mr. Bomberry	Six Nations of the Grand River Territory		P.O. Box 5000 1695 Chiefswood Road		Oshweken	ON	N0A 1M0	519-445-2201		
	Margaret Sault Director	Ms Sault	Mississaugas of New Credit First Nation		2789 Mississauga Road	RR #6	Hagersville	ON	N0A 1H0	905-768-1133		
9	Chief Bryan LaForme	Chief LaForme	Mississaugas of New Credit First Nation		2789 Mississauga Road	RR #6	Hagersville	ON	N0A 1H0	905-768-1133	905-768-1225	bryanlaforme@newcreditfirstnation.com
10	Hohahes Leroy Hill Secretary to Haudenosaunee Confederacy Chief's Council	Mr. Hill	Haudenosaunee Confederacy Chiefs Council		2634 6th Line Road	RR #2	Oshweken	ON	N0A 1M0	519-717-7326		jocko@sixnations.com
11	Chief Allen MacNaughton	Chief MacNaughton	Haudenosaunee Confederacy Chiefs Council		2634 6th Line Road	RR #2	Oshweken	ON	N0A 1M0	519-755-2769		
	Richard Pickard Director of Administration	Mr. Pickard	Nation Hurrone Wendat		225 Place Chef Michel Laveau		Wendake	QC	G0A 4V0	418-843-3767		
13	Franklin Roy	Mr. Roy	Indian and Northern Affairs of Canada	Litigation Management and Resolution Branch	10 Wellington Street	Room 1310	Gatineau	QC	K1A 0H4			
	Janet Townson Claims Analyst, Ontario Team	Ms Townson	Indian and Northern Affairs Canada	Specific Claims Branch	1310-10 Wellington Street		Gatineau	QC	K1A 0H4	819-953-4667	819-997-9873	
	Sean Darcy Manager	Mr. Darcy	Indian and Northern Affairs Canada	Assessment and Historical Research	10 Wellington Street		Gatineau	QC	K1A 0H4	819-997-8155	819-997-1366	
16	Marc-Andre Millaire Litigation Team Leader for Ontario	Mr. Millaire	Indian and Northern Affairs Canada	Litigation Management and Resolution Branch	10 Wellington Street		Gatineau	QC	K1A 0H4	819-994-1947	819-953-1139	
17		Sir / Madam	Métis Nation of Ontario		500 Old St. Patrick Street	Unit D	Ottawa	ON	K1N 9G4			
18	Chief Sharon Stinson-Henry	Chief Stinson-Henry	Chippewas of Rama First Nation		5884 Rama Road	Suite 200	Rama	ON	L0K 1T0			
19	Mr. Richard Cuddy Vice-President & Chair	Mr. Cuddy	Credit River Métis Council		CONTACT BY EMAIL ONLY							rcuddy@hotmail.ca
20	Mr. Allan Dokis Director - Intergovernmental Affairs	Mr. Dokis	Anishinabek Nation / Union of Ontario Indians		Nipissing First Nation	PO Box 611	North Bay	ON	P1B 8J8			
21	Ms Janice Taylor Contact Administrator	Ms Taylor	Mississaugas of Scugog Island First Nation		R.R. #2	P.O. Box N13	Sutton West	ON	L0E 1R0			
22	Ms Kathy Brant Contact Administrator		Saugeen Ojibway Nation		22521 Island Road	R.R. #5	Port Perry	ON	L9L 1B6			
23	Mr. Jake Linklater Case Manager		Six Nations of the Grant River Territory		R.R. #5		Warton	ON	N0H 2T0			

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
OTHER COMMUNITY GROUPS												
1	Brenda Bebbington	Ms Bebbington	Peel Agriculture Society		12942 Heart Lake Road		Caledon	ON	L6T 3S1	905-843-0210		
2	Andy Kovacs President	Mr. Kovacs	Halton / North Peel Naturalists Club		P.O. Box 115		Georgetown	ON	L7G 4T1	905-702-1132		
3	Margaret Jones Executive Director	Ms Jones	Brampton Clean City Committee		115 Orenda Road		Brampton	ON	L6W 1V7	905-874-2828		
4	To Whom it May Concern	To Whom it May Concern	Credit River Anglers Association		P.O. Box 42093 128 Queen St. South		Mississauga	ON	L5M 1K8	905-814-5794		info@craa.on.ca
5	John Hibberd Senior Project Manager Environmental Services	Mr. Hibberd	HEI Group		369 Manor Road East		Toronto	ON	M4S 1S7	416-840-5607		
6			Alton Grange Association									

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
SCHOOL BOARDS												
1	Paul Mountford, MCIP, RPP Intermediate Planner Officer	Mr. Mountford	Peel District School Board	Planning and Accommodation	HJA Brown Education Centre 5650 Hurontario Street		Mississauga	ON	L5R 1C6	905-890-1099		
2	John Melito Superintendent of Planning and Development	Superintendent Melito	Dufferin-Peel Catholic District School Board	Planning and Development Department	40 Matheson Boulevard West		Mississauga	ON	L5R 1C5			
3	John B. Kostoff Director of Education	Mr. Kostoff	Dufferin-Peel Catholic District School Board	Planning and Development Department	40 Matheson Boulevard West		Mississauga	ON	L5R 1C5			

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
CONSERVATION AUTHORITIES												
1	Jakub Kilis, RPP Planner, Environmental Assessment	Mr. Kilis	Credit Valley Conservation		1255 Old Derry Road		Mississauga	ON	L5N 6R4	905-670-1615, ext. 287		jkilis@creditvalley.ca

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
TRANSPORTATION												
1	Stefan Linder, B.Eng., MBA Manager, Public Works Design and Construction	Mr. Linder	CN Rail		4 Welding Way off Administration Road		Vaughan	ON	L4K 1B9	905-669-3261 stefan.linder@cn.ca		
2	Daryl Barnett Director, Railway Corridor Infrastructure	Mr. Barnett	Metrolinx (GO Transit)		20 Bay Street	Suite 600	Toronto	ON	M5J 2W3			
3	Mr. S. Soper	Mr. Soper	Canadian Pacific Railway		2025 McCowan Road		Scarborough	ON	M1F 4A8			
4	Mr. Dante Palladinelli	Mr. Palladinelli	GTAA / Toronto Pearson International Airport		3111 Conair Drive		Mississauga	ON	L5P 1B2			
5	Mr. Steve Gallagher	Mr. Gallagher	Orangeville Railway Development Corporation		75 First Street	Suite 230	Orangeville	ON	L9W 5B6			

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
UTILITIES												
1	Mr. Peter Rutkowski	Mr. Rutkowski	Allstream Canada PUC Brampton / Caledon		50 Worcester Road		Etobicoke	ON	M9W 5X2	416-649-7500		peter.rutkowski@allstream.com
2	Mr. Jamie Bignell	Mr. Bignell	Hydro One - Low Voltage		40 Olympic Drive		Dundas	ON	L9H 7P5			
3	Mr. Robert Evangelista Engineering Supervisor - Development	Mr. Evangelista	Hydro One Brampton		175 Sandalwood Parkway West		Brampton	ON	L7A 1E8	905-840-6300, ext. 5508	905-840-1305	revangelista@hydroonebrampton.com
4	Mr. Toni Paolasini	Mr. Paolasini	Hydro One Networks Towers - Transmission		483 Bay Street		Toronto	ON	M5G 2P5			
5	Ms Cara Clairman	Ms Clairman	Ontario Power Generation	Hydro One - Sustainable Development	700 University Avenue	9th Floor	Toronto	ON	M5G 1X6			
6	Mr. Vince Cina Special Projects Supervisor	Mr. Cina	Enbridge Gas Distribution	Distribution Planning Department	500 Consumers Road		Toronto	ON	M2J 1P8	416-758-7936		Vince.cina@enbridge.com
7	Mr. Joe Marozzo	Mr. Marozzo	Enbridge Gas Distribution	Distribution Planning Department	P.O. Box 650		Scarborough	ON	M1K 5E3	416-758-7906		joe.marozzo@enbridge.com
8	Mr. Darryl Dimitroff Planner	Mr. Dimitroff	Rogers Cable		3573 Wolfdale Road		Mississauga	ON	L5C 3T6			
9	Mr. Philip Bauslaugh	Mr. Bauslaugh	Bell Canada		5115 Creek Banki Road	Floor 3 West	Mississauga	ON	L4W 5R1			
10	Ms Janice Young Manager, Right-of-Way	Ms Young	Bell Canada		100 Borough Drive	Floor 3 Green	Scarborough	ON	M1P 2W2			
11	Ms Colleen Mitchell Community Awareness and Land Specialist	Ms Mitchell	Imperial Oil		100 5th Concession Road East		Waterdown	ON	L0R 2H1			
12	Ms Darlene Presley Lehman and Associates Planning Consultant	Ms Presley	Trans Canada Pipeline		97 Collier Street		Barrie	ON	L4M 1H2			
13	Mr. W. Paul Lane, C.E.T. Senior Property and Construction Technologist	Mr. Lane	Sun-Canadian Pipeline		P.O. Box 470		Waterdown	ON	L0R 2H0			
14	Mr. Anthony Segreto	Mr. Segreto	Telus Communications	Telus Central Region	2700 Matheson Blvd.. East	5th Floor West Tower	Mississauga	ON	L4W 4V9			
15	Coordinator - Crossings and Facilities	Sir / Madam	Trans-Northern Pipelines Inc.		45 Vogell Road	Suite 310	Richmond Hill	ON	L4B 3P6			
16	Mr. Gord Barclay	Mr. Barclay	FCI Broadband		280 Hillmount Road	Unit 9	Markham	ON	L6C 3A1			
17	Mr. Samir Patel	Mr. Patel	Cogeco Data Services Inc.		413 Horner Avenue		Etobicoke	ON	M8W 4W3			
18	Mr. Steve Hounsell Senior Advisor	Mr. Hounsell	Ontario Power Generation	Sustainable Development	700 University Avenue		Toronto	ON	M5G 1X6			
19	Mr. Brian Kilbride Implementation Coordinator	Mr. Kilbride	Blink Communications Inc.		861 Redwood Square		Oakville	ON	L6L 6N3			
20	Ms Susan DeJesus PUC Coordinator	Ms DeJesus	Peel Region							905-791-7800, ext. 5076		PUC.Applications@peelregion.ca; Susan.DeJesus@peelregion.ca

From: Eplett, Megan (MNRF) [<mailto:Megan.Eplett@ontario.ca>]

Sent: November 3, 2016 10:22 AM

To: Kabanov, Serguei

Cc: Heaton, Mark (MNRF)

Subject: Class EA Queen Street East (Highway 136) Bridge and Culvert Replacement over Shaw's Creek, Village of Alton, Town of Caledon

Hello Sergeui,

MNRF has received the Notice of Commencement for the subject study. Please note MNRF has records of species at risk within the vicinity of the project area. Barn Swallow, a threatened species may be nesting on the existing structures. Please continue to keep MNRF involved in this EA as it moves forward.

Thank you,

Megan

Megan Eplett

A/ District Planner | Ministry of Natural Resources and Forestry | Aurora District
50 Bloomington Road, Aurora, Ontario, L4G 0L8 | ☎ (905) 713-7369 | ✉
megan.eplett@ontario.ca

From: "sonia laine" <sonia.laine@cnhw.qc.ca>
To: "Kabanov, Serguei" <serguei.kabanov@peelregion.ca>
Subject: **Updating you Correspondence list**

Good afternoon Mr. Kabanov,

This email is to inform you that Mr. Richard Pickard is no longer working for the Huron Nation Band Council. You can send your future correspondence to: Executive Secretary
Conseil de la Nation huronne-wendat
255, Place Chef Michel Laveau
Wendake, Qc G0A 4V0

Thank you

Tiawenhk!
Sonia Lainé
Secrétaire
Conseil de la Nation huronne-wendat
255, Place Chef Michel Laveau
Wendake (Québec) G0A 4V0
418-843-3767 poste 2103

From: EnviroOnt
To: Serquei.kabanov@neelregion.ca; David OSullivan
Subject: NEATS 43285: Class EA - Queen Street E Bridge and Culvert Replacement over Shaw's Creek, Village of Alton ONT
Date: November-04-16 1:10:52 PM

Hello,

Thank you for your correspondence.

Please note Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents to self-assess if their project will interact with a federal property **and** require approval and/or authorization under any Acts administered by Transport Canada*.

Under the *Canadian Environmental Assessment Act, 2012*, Transport Canada is required to determine the likelihood of significant adverse environmental effects of projects that will occur on federal property prior to exercising a power, performing a function or duty in relation to that project. The project proponent should review the Directory of Federal Real Property, available at <http://www.tbs-sct.gc.ca/dfpr-rbif/>, to verify if the project will potentially interact with any federal property and/or waterway. The project proponent should also review the list of Acts that Transport Canada administers and assists in administering that may apply to the project, available at: <https://www.tc.gc.ca/eng/acts-regulations/acts.htm>.

If the aforementioned does not apply, the Environmental Assessment program should not be included in any correspondence. If there is a role under the program, correspondence should be forwarded *electronically* to: EnviroOnt@tc.gc.ca.

*Below is a summary of the most common Acts that have applied to projects in an Environmental Assessment context:

- **Navigation Protection Act (NPA)** – the Act applies primarily to works constructed or placed in, on, over, under, through, or across scheduled navigable waters set out under the Act. The Navigation Protection Program administers the NPA through the review and authorization of works affecting scheduled navigable waters. Information about the Program, NPA and approval process is available at: <http://www.tc.gc.ca/eng/programs-621.html>. Enquiries can be directed to NPPONT-PPNONT@tc.gc.ca or by calling (519) 383-1863.
- **Railway Safety Act (RSA)** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing safe railway operations. Additional information about the Program is available at: <https://www.tc.gc.ca/eng/railsafety/menu.htm>. Enquiries can be directed to RailSafety@tc.gc.ca or by calling (613) 998-2985.
- **Transportation of Dangerous Goods Act (TDGA)** – the transportation of dangerous goods

by air, marine, rail and road is regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: <https://www.tc.gc.ca/eng/tdg/safety-menu.htm>. Enquiries can be directed to TDG-TMDOntario@tc.gc.ca or by calling (416) 973-1868.

- **Aeronautics Act** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: <https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm>. Enquires can be directed to CASO-SACO@tc.gc.ca or by calling 1 (800) 305-2059 / (416) 952-0230.

Please advise if additional information is needed.

Thank you,

Environmental Assessment Program | Programme d'évaluation environnementale
Transport Canada, Ontario Region | Transports Canada, Région de l'Ontario
4900 Yonge St., Toronto, ON M2N 6A5 | 4900, rue Yonge, Toronto, ON, M2N 6A5
Email | Courriel: EnviroOnt@tc.gc.ca
Facsimile | télécopieur: (416) 952-0514
Government of Canada | Gouvernement du Canada

From: Ontario Region / Region d'Ontario (CEAA/ACEE) [<mailto:CEAA.ontario.ACEE@ceaa-acee.gc.ca>]
Sent: November 14, 2016 12:36 PM
To: Kabanov, Serguei
Subject: Email - Region of Peel - Letter A - 2016-11-14

Dear Mr. Kabanov,

Please find letter attached regarding the Queen Street East (Highway 136) Bridge and Culvert Replacement.

Kind Regards,
Caitlin

Caitlin Cafaro
Administrative Clerk, Ontario
Canadian Environmental Assessment Agency / Government of Canada
caitlin.cafaro@ceaa-acee.gc.ca / Tel: 416-952-1576

Caitlin Cafaro
Commis à l'administration, Ontario
Agence canadienne d'évaluation environnementale / Gouvernement du Canada
caitlin.cafaro@ceaa-acee.gc.ca / Tél. : 416-952-1576

From: Koops, Krystina [<mailto:Krystina.Koops@dpcdsb.org>]
Sent: November 8, 2016 8:15 AM
To: Kabanov, Serguei
Subject: Class EA Queen Street Bridge and culvert replacement

Hi Serguei,

Thank you for allowing Dufferin-Peel Catholic District School Board the opportunity to provide comments on this matter. We have no concerns at this time, however we would like to continue receiving updates and notices.

As a note, your circulation letter was addressed to Mr. John Melito. Can you please delete the name and just leave the correspondence to the Superintendent of Planning and Operations. We've had 2 different superintendents since him and thought it would be easier to leave the name blank.
Thanks.

Krystina Koops, MCIP, RPP
Planner
Dufferin-Peel Catholic District School Board
Phone: (905) 890-0708 ext. 24407
Fax: (905) 890-1557
E-mail: krystina.koops@dpcdsb.org

Hydro One Brampton Networks Inc.
175 Sandalwood Pkwy West
Brampton, Ontario L7A 1E8
Tel: (905) 840-6300

www.HydroOneBrampton.com

RECEIVED

NOV 08 2016

PUBLIC WORKS
REGION OF PEEL



October 31, 2016

Region of Peel
10 Peel Centre Drive
Suite B, 4th Floor
Brampton, ON
L6T 4B9

ATTN: Serguei Kabanov

Re: Class Environmental Assessment Study (Schedule 'B')
Queen Street East (Highway 136) Bridge and Culvert Replacement over
Shaw's Creek, in the Village of Alton, Town of Caledon
Notice of Study Commencement

Mr. Kabanov,

I am writing here to inform you that the letter you sent earlier pertaining to the Class Environmental Assessment Study dated October 24, 2016 does not apply to Hydro One Brampton as it is not within our territory.

If you have any questions, you can reach me at 905 840 6300 ext. 5508.

Yours truly,

A handwritten signature in black ink, appearing to read "RE", written over a horizontal line.

Robert Evangelista
Manager of System Planning & Expansion - HOBNI

From: Bell, Trevor (MOECC) <Trevor.Bell@ontario.ca>
Sent: November-10-16 12:06 PM
To: sergei.kabanov@peelregion.ca
Cc: David OSullivan; Martin, Paul (MOECC); Webb, Tim (MOECC)
Subject: Queen Street East Bridge and Culvert Replacement over Shaw's Creek Schedule B Municipal Class EA
Attachments: TSS_NoSC Response Letter_Queen Street East Bridge and Culvert Replacement over Shaw's Creek.docx; TSS_NoSC Response Letter_Queen Street East Bridge and Culvert Replacement over Shaw's Creek_signed.PDF

Good afternoon,

Please find attached a letter from the Ministry of the Environment and Climate Change (MOECC), Central Region Technical Support Section regarding the above mentioned project.

Please note – MOECC is in the process of developing an internal protocol to provide clients with a list of potentially interested Aboriginal communities that should be notified of and invited to participate in Environmental Assessment studies. Please disregard the section in the attached letter directing you to contact the Ministry of Aboriginal Affairs (now Ministry of Indigenous Relations and Reconciliation). MOECC has developed a list of potentially interested Aboriginal communities that must be notified of your project and invited to participate in consultation activities. These communities are as follows:

- Mississaugas of the New Credit First Nation
- Métis Nation of Ontario

Feel free to contact me with any questions or concerns you may have.

Sincerely,

Trevor Bell

Environmental Resource Planner and EA Coordinator
Technical Support Section | Central Region
Ministry of the Environment and Climate Change
5775 Yonge St., 8th Floor
Toronto, ON M2M 4J1
T: 416-326-3577
E: trevor.bell@ontario.ca

Ministry of the Environment
and Climate Change

Central Region
Technical Support Section

5775 Yonge Street, 8th Floor
North York, Ontario M2M 4J1

Tel: (416) 326-6700
Fax: (416) 325-6347

Ministère de l'Environnement et de
l'Action en Matière de Changement Climatique

Région du Centre
Section d'appui technique

5775, rue Yonge, 8^{ème} étage
North York, Ontario M2M 4J1

Tél.: (416) 326-6700
Télééc.: (416) 325-6347



November 10, 2016

File No.: EA 01-06-05

Serguei Kabanov, C.E.T.
Project Manager
Regional Municipality of Peel
10 Peel Centre Drive
Suite B, 4th Floor
Brampton, ON L6T 4B9
serguei.kabanov@peelregion.com

**RE: Queen Street East Bridge and Culvert Replacement over Shaw's Creek
Regional Municipality of Peel
Schedule B Municipal Class Environmental Assessment
Response to Notice of Study Commencement**

Dear Mr. Kabanov,

This letter acknowledges that the Regional Municipality of Peel has initiated a study to assess proposed improvements to the Queen Street East Bridge and culvert replacements over Shaw's Creek in the Village of Alton, Town of Caledon, under the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA).

The attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please identify the areas of interest which are applicable to your project and ensure they are addressed. Proponents who address all of the applicable areas of interest can minimize potential delays to their project schedule.

Failure to properly follow the Class EA process is an offence under the *Environmental Assessment Act*. It may also result in the ministry withholding/revising an approval provided under the Act and/or the Minister issuing a Part II Order for the project.

A draft copy of the Project File Report (PFR) should be sent to this office prior to the filing of the final draft, allowing approximately 30 days review time for the ministry's reviewers to provide comments. Please also forward our office the Notice of Completion and final PFR when completed. Should your team have any questions regarding the above, please contact me at 416-326-3577.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Trevor Bell", written over a horizontal line.

Trevor Bell
Environmental Resource Planner and EA Coordinator
Air, Pesticides and Environmental Planning

c. D. O'Sullivan, Project Manager, R.V. Anderson Associates Limited

P. Martin, Supervisor, APEP, Central Region, MOECC
T. Webb, Manager (A), Halton Peel District Office, MOECC
Central Region EA File
A & P File

AREAS OF INTEREST

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

Ecosystem Protection and Restoration

- Any impacts to ecosystem form and function must be avoided where possible. The PFR should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.
- All natural heritage 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:
 - Areas of Natural and Scientific Interest (ANSIs)
 - Rare Species of flora or fauna
 - Watercourses
 - Wetlands
 - Woodlots

We recommend consulting with the Ministry of Natural Resources and Forestry (MNR), 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, you may consider the provisions of the Rouge Park Management Plan if applicable

Surface Water

- The PFR must include a sufficient level of 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, and 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 PFR and utilized when designing stormwater control methods. We recommend that 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 PFR should describe how the proposed project and its mitigation measures are consistent with the requirements of this regulation and the OWRA.

□ 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 PFR.
- If the potential construction or decommissioning of water wells is identified as an issue, the PFR 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 PFR. In particular, a Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 litres per day.

□ Air Quality, Dust and Noise

- If there are sensitive receptors in the surrounding area of this project, an 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, a quantification of air quality impacts by determining emission rates and conducting dispersion modelling, and an assessment of effects. The assessment will compare to all available standards for any contaminants of concern. Please contact this office during the scoping process to confirm the appropriate level of assessment.
- 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 PFR should consider the potential impacts of increased noise levels during the operation of the undertaking due to potentially higher traffic volumes resulting from this project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

□ Servicing and Facilities

- 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 the Environmental Approvals Access and Service Integration Branch (EAASIB) to determine whether a new or amended ECA will be required for any proposed

infrastructure.

- We recommend referring to the ministry's "D-Series" guidelines – Land Use Compatibility 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.

□ Contamination and Soils

- Any current or historical waste disposal sites should be identified in the PFR. 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.
- Since the removal or movement of soils may be required, the ministry's document "Management of Excess Soil – A Guide for Best Management Practices" should be followed regarding all activities related to soil management. If potential contamination involved at the site, 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 ministry's District Offices for further consultation if contaminated sites are present.
- The location of any underground storage tanks should be investigated in the PFR. 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.
- The PFR should identify any underground transmission lines in the study area. The owners should be consulted to avoid impacts to this infrastructure, including potential spills.

□ Mitigation and Monitoring

- 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.
- All waste generated during construction must be disposed of in accordance with ministry requirements.
- 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 PFR 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. The proponent's construction and post-construction monitoring plans should be documented in the PFR.

□ Planning and Policy

- The Provincial Policy Statement (2014) contains policies that protect Ontario's natural heritage, such as significant ANSIs, watercourses and wetlands. Applicable policies should

be referenced in the PFR, and the proponent should demonstrate how this proposed project is consistent with these policies, including describing measures that prevent and minimize potential impacts. You may wish to consider consulting with the Ministry of Municipal Affairs & Housing.

Parts of the study area may be subject to the Oak Ridges Moraine Conservation Plan, Niagara Escarpment Plan, Greenbelt Plan, Lake Simcoe Protection Plan, Source Protection Plans, or Growth Plan for the Greater Golden Horseshoe. The PFR should demonstrate how the proposed study adheres to the relevant policies in these plans.

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, in particular 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* (EAA), although the plan itself would not be.
- The PFR should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making. The PFR must also demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all public consultation efforts undertaken during the planning process. Additionally, the PFR should identify all concerns that were raised and how they have been addressed throughout the planning process. The Class EA also directs proponents to include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments.
- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment. The PFR should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic 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 PFR.
- Please include in the PFR a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including MOECC's PTTW and ECAs, conservation authority permits, and approval under the *Canadian Environmental Assessment Act* (CEAA).
- Ministry guidelines and other information related to the issues above are available at <http://www.ontario.ca/environment-and-energy/environment-and-energy> under the publications link. We encourage you to review all the available guides and to reference any relevant information in the PFR.

Aboriginal Consultation

- Your proposed project may have the potential to affect Aboriginal communities who hold or claim Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. The Crown has a duty to consult First Nation and Métis communities when it knows

about established or credibly asserted Aboriginal or treaty rights, and contemplates decisions or actions that may adversely affect them.

- Although the Crown remains responsible for ensuring the adequacy of consultation with potentially affected Aboriginal communities, it may delegate procedural aspects of the consultation process to project proponents.
- The environmental assessment process requires proponents to consult with interested persons and government agencies, including those potentially affected by the proposed project. This includes a responsibility to conduct adequate consultation with First Nation and Métis communities.
- The ministry relies on consultation conducted by proponents when it assesses the Crown's obligations and directs proponents during the regulatory process.
- Where the Crown's duty to consult is triggered in relation to your proposed project, the Ontario Ministry of the Environment and Climate Change is delegating the procedural aspects of rights-based consultation to you through this letter.
- Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the "Aboriginal Consultation Information" checklist below. Please complete the checklist contained there, and keep related notes as part of your consultation record. Doing so will help you assess your project's potential adverse effects on Aboriginal or treaty rights.
- You must contact the Director, Environmental Approvals Branch if you have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right, consultation has reached an impasse, or if a Part II Order request has been submitted. The ministry will then assess the extent of any Crown duty to consult in the circumstances, and will consider whether additional steps should be taken and what role you will be asked to play in them.

ABORIGINAL CONSULTATION INFORMATION

Consultation with Interested Persons under the Ontario Environmental Assessment Act

Proponents subject to the Ontario *Environmental Assessment Act* are required to consult with interested persons, which may include First Nations and Métis communities. In some cases, special efforts may be required to ensure that Aboriginal communities are made aware of the project and are afforded opportunities to provide comments. Direction about how to consult with interested persons/communities is provided in the Code of Practice: Consultation in Ontario's Environmental Assessment Process available on the Ministry's website:

<http://www.ontario.ca/environment-and-energy/consultation-ontarios-environmental-assessment-process>

As an early part of the consultation process, proponents are required to contact the Ontario Ministry of Aboriginal Affairs' Consultation Unit and visit Aboriginal Affairs and Northern Development Canada's Aboriginal and Treaty Rights Information System (ATRIS) to help identify which First Nation and Métis communities may be interested in or potentially impacted by their proposed projects.

ATRIS can be accessed through the Aboriginal Affairs and Northern Development Canada website:

http://sidait-atris.aadnc-aandc.gc.ca/atris_online/

For more information in regard Aboriginal consultation as part of the Environmental Assessment process, refer to the Ministry's website:

www.ontario.ca/government/environment-assessments-consulting-aboriginal-communities

You are advised to provide notification directly to all of the First Nation and Métis communities who may be interested in the project. You should contact First Nation communities through their Chief and Band Council, and Metis communities through their elected leadership.

Rights-based consultation with First Nation and Métis Communities

Proponents should note that, in addition to requiring interest-based consultation as described above, certain projects may have the potential to adversely affect the ability of First Nation or Métis communities to exercise their established or credibly asserted Aboriginal or treaty rights. In such cases, Ontario may have a duty to consult those Aboriginal communities.

Activities which may restrict or reduce access to unoccupied Crown lands, or which could result in a potential adverse impact to land or water resources in which harvesting rights are exercised, may have the potential to impact Aboriginal or treaty rights. For assistance in determining whether your proposed project could affect these rights, please refer to the attached "Preliminary Assessment Checklist: First Nation and Métis Community Interest."

If there is likely to be an adverse impact to Aboriginal or treaty rights, accommodation may be required to avoid or minimize the adverse impacts. Accommodation is an outcome of consultation and includes any mechanism used to avoid or minimize adverse impacts to Aboriginal or treaty rights and traditional uses. Solutions could include mitigation such as adjustments in the timing or geographic location of the proposed activity. Accommodation may

in certain circumstances involve the provision of financial compensation, but does not necessarily require it.

For more information about the duty to consult, please see the Ministry's website at:

www.ontario.ca/government/duty-consult-aboriginal-peoples-ontario

The proponent must contact the Director, Environmental Approvals Branch if a project may adversely affect an Aboriginal or treaty right, consultation has reached an impasse, or if a Part II Order or an elevation request is anticipated; the Ministry will then determine whether the Crown has a duty to consult.

The Director of the Environmental Approvals Branch can be notified either by email with the subject line "Potential Duty to Consult" to EAASIBgen@ontario.ca or by mail or fax at the address provided below:

Email:	EAASIBgen@ontario.ca Subject: Potential Duty to Consult
Fax:	416-314-8452
Address:	Environmental Approvals Branch 135 St Clair Ave W Toronto ON M4V1P5

Delegation of Procedural Aspects of Consultation

Proponents have an important and direct role in the consultation process, including a responsibility to conduct adequate consultation with First Nation and Métis communities as part of the environmental assessment process. This is laid out in existing environmental assessment codes of practice and guides that can be accessed from the Ministry's environmental assessment website at

www.ontario.ca/environmentalassessments

The Ministry relies on consultation conducted by proponents when it assesses the Crown's obligations and directs proponents during the regulatory process. Where the Crown's duty to consult is triggered, various additional procedural steps may also be asked of proponents as part of their delegated duty to consult responsibilities. In some situations, the Crown may also become involved in consultation activities.

Ontario will have an oversight role as the consultation process unfolds but will be relying on the steps undertaken and information you obtain to ensure adequate consultation has taken place. To ensure that First Nation and Métis communities have the ability to assess a project's potential to adversely affect their Aboriginal or treaty rights, Ontario requires proponents to undertake certain procedural aspects of consultation.

The proponent's responsibilities for procedural aspects of consultation include:

- Providing notice to the elected leadership of the First Nation and/or Métis communities (e.g., First Nation Chief) as early as possible regarding the project;

- Providing First Nation and/or Métis communities with information about the proposed project including anticipated impacts, information on timelines and your environmental assessment process;
- Following up with First Nation and/or Métis communities to ensure they received project information and that they are aware of the opportunity to express comments and concerns about the project. If you are unable to make the appropriate contacts (e.g. are unable to contact the Chief) please contact the Environmental Assessment and Planning Coordinator at the Ministry's appropriate regional office for further direction.
- Providing First Nation and/or Métis communities with opportunities to meet with appropriate proponent representatives to discuss the project;
- Gathering information about how the project may adversely impact the relevant Aboriginal and/or Treaty rights (for example, hunting, fishing) or sites of cultural significance (for example, burial grounds, archaeological sites);
- Considering the comments and concerns provided by First Nation and/or Métis communities and providing responses;
- Where appropriate, discussing potential mitigation strategies with First Nation and/or Métis communities;
- Bearing the reasonable costs associated with these procedural aspects of consultation, which may include providing support to help build communities' capacity to participate in consultation about the proposed project.
- Maintaining a Consultation Record to show evidence that you, the proponent, completed all the steps itemized above or at a minimum made meaningful attempts to do so.
- Upon request, providing copies of the Consultation Record to the Ministry. The Consultation Record should:
 - summarize the nature of any comments and questions received from First Nation and/or Métis communities
 - describe your response to those comments and how their concerns were considered
 - include a communications log indicating the dates and times of all communications; and
 - document activities in relation to consultation.

Successful consultation depends, in part, on early engagement by proponents with First Nation and Métis communities. Information shared with communities must be clear, accurate and complete, and in plain language where possible. The consultation process must maintain sufficient flexibility to respond to new information, and we trust you will make all reasonable efforts to build positive relationships with all First Nation and Métis communities contacted. If you need more specific guidance on Aboriginal consultation steps in relation to your proposed project, or if you feel consultation has reached an impasse, please contact the Environmental Assessment and Planning Coordinator at the Ministry's appropriate regional office.

Preliminary Assessment Checklist: First Nation and Métis Community Interests and Rights

In addition to other interests, some main concerns of First Nation and Métis communities may pertain to established or asserted rights to hunt, gather, trap, and fish – these activities generally occur on Crown land or water bodies. As such, projects related to Crown land or water bodies, or changes to how lands and water are accessed, may be of concern to Aboriginal communities.

Please answer the following questions and keep related notes as part of your consultation record. "Yes" responses will indicate a potential adverse impact on Aboriginal or treaty rights.

Where you have identified that your project may trigger rights-based consultation through the following questions, you should arrange for a meeting between you and the Environmental Assessment and Planning Coordinator at the Ministry's appropriate regional office to provide an early opportunity to confirm whether Ontario's duty to consult is triggered and to discuss roles and responsibilities in that event.

	YES	NO
<p>1. Are you aware of concerns from First Nation and Métis communities about your project or a similar project in the area?</p> <p>The types of concerns can range from interested inquiries to environmental complaints, and even to land use concerns. You should consider whether the interest represents on-going, acute and/or widespread concern.</p>		
<p>2. Is your project occurring on Crown land, or is it close to a water body? Might it change access to either?</p>		
<p>3. Is the project located in an open or forested area where hunting or trapping could take place?</p>		
<p>4. Does the project involve the clearing of forested land?</p>		
<p>5. Is the project located away from developed, urban areas?</p>		
<p>6. Is your project close to, or adjacent to, an existing reserve?</p> <p>Projects in areas near reserves may be of interest to the First Nation and Métis communities living there.</p>		
<p>7. Will the project affect First Nations and/or Métis ability to access areas of significance to them?</p>		
<p>8. Is the area subject to a land claim?</p> <p>Information about land claims filed in Ontario is available from the Ministry of Aboriginal Affairs; information about land claims filed with the federal government is available from Aboriginal Affairs and Northern Development Canada.</p>		
<p>9. Does the project have the potential to impact any archaeological sites?</p>		

From: Burton, Helen [<mailto:Helen.Burton@peelpolice.ca>]
Sent: November 23, 2016 1:51 PM
To: Kabanov, Serguei
Subject: Notice of Study commencements

Sir,

Insp Gordinski retired from the service some time ago now, please address all future correspondence to Inspector Operational Planning and Resources in order to ensure the material reaches the correct department.

Regards

Helen

Helen Burton
Cst 2615
Operational Planning and Resources
Peel Regional Police
905 453 3311 ext 4743

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December 9, 2016

Response to EA Notice

Thank you for providing Infrastructure Ontario (IO) with a copy of your Environmental Assessment Notice. From the information you have provided, it is unclear if you are proposing to use lands under the control of the Ministry of Infrastructure (MOI lands) to support your proposed project.

Prior to MOI consenting to the use of MOI lands, the applicable environmental assessment, duty to consult Aboriginal peoples (if triggered) and heritage obligations will need to be met. In order for MOI to allow you access to MOI lands and to carry out proposed activities, MOI must ensure that provincial requirements and due diligence obligations are satisfied. These requirements are in addition to any such obligations you as the proponent of the project may have.

You as the proponent of the project will be required to work with Infrastructure Ontario (IO) to fulfill MOI's obligations which may include considering the use of any MOI lands as part of your individual environmental assessment. All costs associated with meeting MOI's obligations will be the responsibility of the proponent. Please note that time should be allocated in your project timelines for MOI to ensure that its obligations have been met and to secure any required internal government approvals required to allow for the use of the MOI lands for your proposed project.

In order for MOI and IO to assist you to meet your required project timelines, please recognize that early, direct contact with IO is imperative. The due diligence required prior to the use of MOI lands for your proposed project, may include but may not be limited to the following:

- Procedural aspects of the Provincial Crown's Aboriginal Duty to Consult obligations – see *Instruction Note 1*
- Requirements of the MOI Public Work Class Environmental Assessment – see *Instruction Note 2*
- Requirements of the Ministry of Tourism Culture and Sport (MTCS) Standards and Guidelines for Consultant Archaeologists– see *Instruction Note 3*
- Requirements of the MTCS Standards and Guidelines for the Conservation of Provincial Heritage Properties Consultant Archaeologists – see *Instruction Note 4*

Representatives from IO are available to discuss your proposed project, the potential need for MOI lands and the corresponding provincial requirements and due diligence obligations.

Please review the attached instruction notes which provide greater detail on the due diligence obligations associated with the use of MOI lands for your proposed project. We are providing this information to allow you as the proponent to allocate adequate time and funding into your project schedule and budgets. If your project requires you to study MOI lands, then an agreement is required and all studies undertaken on MOI lands will be considered confidential until approval is received. IO will require electronic copies of all required studies on MOI lands that you undertake.

We strongly encourage you to work with IO as early as possible in your process to identify if any MOI lands would be required for your proposed project. Please note that on title MOI control may

be identified under the name of MOI or one of its predecessor ministries or agencies which may include but is not limited to variations of the following: Her Majesty the Queen/King, Hydro One, MBS, MEI, MEDEI, MGS, MOI, OLC, ORC, PIR or Ministry of Public Works¹.

Please provide Rita Kelly with a confirmation in writing of any MOI lands that you propose to use for your proposed project and why the lands are required along with a copy of a title search for the MOI lands.

For more information concerning the identification of MOI lands in your study area or the process for acquiring access to or an interest in MOI lands, please contact:

Rita Kelly
Project Manager
Land Transactions, Hydro Corridors & Public Works
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON
M5G 2L5
Tel: (416) 212-4934
Email: rita.kelly@infrastructureontario.ca

An application package and requirements checklist is attached for your reference. Please note that transfer of an interest in MOI lands to a proponent can take up to one year and there is no certainty that approval will be obtained.

For more information concerning the MOI Public Work Class Environmental Assessment process and due diligence requirements, please contact:

Lisa Myslicki
Environmental Specialist
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON
M5G 2L5
Tel: (416) 557-3116
Email: lisa.myslicki@infrastructureontario.ca

¹ MBS - Management Board Secretariat; MEI - Ministry of Energy and Infrastructure; MEDEI – Ministry of Economic Development, Employment and Infrastructure; MGS - Ministry of Government Services; MOI - Ministry of Infrastructure; OLC - Ontario Lands Corporation; ORC - Ontario Realty Corporation; PIR - Ministry of Public Infrastructure Renewal

If MOI lands are not to be impacted by the proposed project, please provide a confirmation in writing to Infrastructure Ontario.

Thank you for the opportunity to provide initial comments on your proposed project.

Sincerely,

Patrick Grace
Director
Land Transactions, Hydro Corridors & Public Works
Infrastructure Ontario
1 Dundas Street West, Suite 2000
Toronto, ON, M5G 2L5

INSTRUCTION NOTE 1

Provincial Crown's Aboriginal Duty to Consult obligations

The Crown has a constitutional Duty to Consult (DTC) in certain circumstances and Aboriginal consultation may be required prior to MOI granting access to MOI lands or undertaking other activities. The requirement for Aboriginal consultation may be triggered given Aboriginal or treaty rights, established consultation or notification protocols, government policy and/or program decisions, archaeological potential or results, and/or cultural heritage consultation obligations. The requirement for Aboriginal consultation will be assessed by MOI.

Prior to the use of MOI lands, MOI must first meet any duty to consult obligations that may be triggered by the proposed use of MOI lands. It is incumbent on you to consult with IO as early in the process as possible once you have confirmed that MOI lands would be involved.

MOI will evaluate the potential impact of your proposed project on Aboriginal and treaty rights. MOI may assess that the Crown's Duty to Consult (DTC) requires consultation of Aboriginal communities. Proponents should discuss with IO whether MOI will require consultation to occur and if so, which communities should be consulted.

Where MOI determines that Aboriginal consultation is required, MOI will formally ask you to consult or continue to consult with Aboriginal peoples at the direction of MOI.

On behalf of MOI you will also be required to:

1. Maintain a record and document all notices and engagement activities, including telephone calls and/or meetings;
2. Provide the Ministry updates on these activities as requested; and
3. Notify the Ministry of any issues raised by Aboriginal communities.

If consultation has already occurred, IO strongly encourages you to provide complete Aboriginal consultation documentation to IO as soon as possible. This documentation should include all notices and engagement activities, including telephone calls and/or meetings.

Any duty to consult obligations must be met prior to publically releasing the Notice of Completion for the assessment undertaken under the MOI PW Class EA.

INSTRUCTION NOTE 2

Requirements of the MOI Public Work Class Environmental Assessment

MOI has an approved Class EA (the Ministry of Infrastructure Public Work Class Environmental Assessment (Public Work Class EA) to assess undertakings that affect MOI lands including disposing of an interest in land or site development. Details on the Public Work Class EA can be found at:

<http://www.infrastructureontario.ca/Templates/Buildings.aspx?id=2147490336&langtype=1033>

You may be required to work with IO to complete an environmental assessment under the Public Work Class EA for the undertakings related to MOI lands. IO will work with you to ensure that all of the MOI undertakings or activities related to the use of MOI lands are identified, that the appropriate Category of undertaking is used and a monitoring and report back mechanism is established to ensure that MOI's obligations are met.

The completion of another environmental assessment process that assesses the undertakings related to MOI lands may satisfy MOI's obligations under the Public Work Class EA. You will be required to work with IO to determine the most appropriate approach to meeting the Public Work Class EA obligations for undertakings related to MOI lands on a case by case basis.

Where it is decided that the assessment of undertakings related to MOI lands can be assessed as part of the environmental assessment being undertaken by the proponent then it is likely that the following provisions will be required:

- that the environmental assessment documents set out that one process will be relied on by both the proponent and MOI to evaluate their respective undertakings and meet their respective obligations to assess the potential impacts of their undertakings;
- that the proponent's description of the undertaking to be assessed include all of the MOI undertakings related to the use or access to MOI lands (see Glossary of Terms);
- the associated EA Category from the Public Works Class EA be identified and met by the environmental assessment (see Figure 22. Category Listing Matrix and/or Tale 2.1 EA Category Identification Table);
- that the proponent's environmental assessment indicate that MOI would be relying on the proponent's assessment to satisfy MOI's obligations under the *Environment Assessment Act*;
- establish a monitoring and report back mechanism to ensure that any obligations of MOI resulting from the assessment will be met; and

An environmental assessment consultation plan be developed to ensure that all stakeholders required to be consulted regarding the undertakings on the MOI lands are consulted

Other Due Diligence Requirements

There may also be other additional due diligence requirements for the use of MOI lands in the proposed project. These may include:

- Phase One Environmental Site Assessment and follow up
- Stage 1 Archaeological Assessment and follow up

-
- Survey
 - Title Search
 - Species at Risk Survey(s)
 - Appraisal

INSTRUCTION NOTE 3 – ARCHAEOLOGY - (see also *Instruction Note on Duty to Consult*)

Archaeological sites are recognized and protected under the *Ontario Heritage Act*. Carrying out archaeological fieldwork is a licensed, regulated activity under the 2011 Ministry of Culture Standards and Guidelines for Consulting Archaeologists. Please visit.....

Archaeological due diligence is required for any proposed project on MOI land that could cause significant below ground disturbance such as, new building construction, installation/modification of site services, and installation/maintenance of new pipelines or transmission lines.

You, as the proponent, must engage IO prior to undertaking any archaeological work on MOI lands.

IO has two in-house licensed archaeologists who should be consulted early in the preparatory stages of a proposed project when geographic and site locations are being considered so that the potential for archaeological resources including historic and Aboriginal material (ion Aboriginal villages and burials sites) can be assessed.

To support both the Public Work Class EA and MOI's duty to consult analysis, archaeological assessments are required to determine if there are any significant findings that may be of cultural value or interest to Aboriginal people (e.g., archaeological or burial sites).

Archaeological work can begin before the assessment under the Public Works Class EA begins but the Class EA cannot be completed until the duty to consult that may be triggered regarding archaeological resources are fulfilled.

Depending upon the number or significance of resources found, the duty to consult may be triggered during any of the 4 phases of archaeological work (see below) or anytime during project construction.

The discovery of Aboriginal resources can impact on activities, including project and site plans, timelines and all costs. As the proponent, you are expected to ensure that you project timelines include adequate time and resources to address MOI due diligence obligations, including internal government approvals. All costs associated with meeting MOI's archaeological obligations will be the responsibility of the proponent.

For Archaeological Assessments (Stages 1 through 4), proponents must adhere to the four stage archaeological fieldwork process prescribed by the Ontario Ministry of Tourism, Culture and Sport (MTCS) as per the 2011 Standards and Guidelines for Consultant Archeologists. Not all noted Stages will be necessary for all work. Respondents must follow industry procedures and practices as per the MTCS Standards and Guidelines for Consultant Archeologists 2011 for each Stage of archaeological assessment, all reporting criteria and formatting, and any other license requirements and/or obligations.

- Stage 1 Background Study - Evaluation of Archaeological Potential
 - Archival research and non-intrusive site visit
- Stage 2 Property Assessment

-
- In-field systematic pedestrian survey or test pitting and reporting
 -
 - Stage 3 Site-specific Assessment
 - Limited excavation to determine site significance and size
 - Field works and reporting
 - Stage 4 Site mitigation
 - Through either avoidance/protection or excavation Field work 4 to 8 weeks
 - Develop summary report
 - MTCS review – expedited review of summary report 6 weeks
 - Final report
 - Time to develop and implement mitigation measures – negotiation, legal protections, avoidance

IO Contact Information and direction to IO website....

INSTRUCTION NOTE 4 – HERITAGE REQUIREMENTS

Built Heritage/Cultural Landscapes

Built heritage/cultural landscapes (cultural heritage) are recognized and protected under the Ontario Heritage Act, the regulations to that Act and the 2010 Ministry of Culture Standards and Guidelines for Conservation of Provincial Heritage Properties (S&Gs) Criteria for determining cultural heritage value or interest are set out in O. Reg. 9/06 and 10/06. The S&Gs set out a process for identifying properties of cultural heritage value, and the standards for protection, maintenance, use and disposal of these properties. Please visit.....

Cultural heritage due diligence will be required for any proposed project on MOI land with the potential to impact cultural heritage resources, such as new building construction, installation/modification of site services, landscape modifications and installation/maintenance of new pipelines, transmission lines.

To support MOI's heritage and MOI PW Class EA obligations, proponents will be required to undertake cultural heritage assessments for all projects that require MOI lands. This will help to determine if the MOI lands are of cultural value or interest to the Province and the level of heritage significance. Where a property has heritage value, proponents may be required to develop appropriate conservation measures/plans and heritage management plans.

You, as the proponent, are strongly encouraged engage IO heritage staff as early in your project planning process as possible and in advance of beginning any cultural heritage assessment work. IO staff will be able to provide advice on the S&Gs and will provide any available heritage information for the MOI lands.

Proponents must also follow industry procedures and practices for all components of cultural heritage assessment work, all reporting criteria and formatting, and any other requirements and/or obligations. IO heritage staff can help identify any required reports.

Should MOI lands be identified under the S&Gs as a Provincial Heritage Property (local significance) or a Provincial Heritage Property of Provincial Significance, IO must be engaged to determine next steps.

Please note that if a Provincial Heritage Property of Provincial Significance is to be impacted, it is likely that consent from the Minister, Ontario Minister, Tourism, Culture and Sport (MTCS) will be required prior to access being granted to MOI lands. Minister's consent requires a detailed application and approvals should land dispositions or building demolitions be applied for as part of the proposed project.

As the proponent, you are expected to ensure that your project timelines include adequate time and resources to address MOI's heritage due diligence obligations, including internal government approvals. All costs associated with meeting MOI's heritage obligations are the responsibility of the proponent.

Staff contacts.....

APPENDIX B

**PUBLIC INFORMATION CENTRE
MATERIAL AND COMMENTS**

QUEEN STREET EAST

Bridge and Culvert Replacement over Shaw's Creek, in the Village of Alton, Town of Caledon

This is a **Public Information Centre** for a Municipal Class Environmental Assessment Study to present proposed improvements to Queen Street East (Highway 136), including the bridge and culvert replacement over Shaw's Creek, in the Village of Alton, Town of Caledon, as shown on the Key Plan. The proposed improvements include replacing both structures to increase hydraulic capacity, raising the road profile and streetscape enhancements.



Please join us at the
Public Information Centre
Wednesday, June 7, 2017

At the Alton Public School
19681 Main Street Alton, ON L7K 0E1
6:30 pm to 8:30 pm

**Your opinion matters and we
welcome your participation!**

For study background details call:

Serguei Kabanov
905-791-7800, ext. 8754

The Region of Peel is committed to ensure that all Regional services, programs and facilities are inclusive and accessible for persons with disabilities. Please contact the project manager if you need any disability accommodations to participate in the public meeting.

This notice was first issued on May 4, 2017.

May 15, 2017:

Re: Class Environmental Assessment Study (Schedule 'B')
Queen Street East (Highway 136) Bridge and Culvert Replacement
over Shaw's Creek, in the Village of Alton, Town of Caledon
Notice of Public Information Centre

The Peel Region has initiated a Municipal Class Environmental Assessment (Class EA) for the Queen Street East Bridge and Culvert Replacement over Shaw's Creek in the Village of Alton, Town of Caledon. The purpose of this letter is to inform you of the upcoming Public Information Centre (PIC).

The purpose of the study is to address hydraulic capacity issues relating to the existing structures and to evaluate alternatives leading to an increased hydraulic capacity. A copy of the Notice of Public Information Centre is attached.

The study is being conducted in accordance with the requirements for a Schedule 'B' Municipal Class EA, which is approved by under the Ontario Environmental Assessment Act.

A key component of the study will be consultation with interested stakeholders (public and regulatory agencies) including a Public Information Centre (PIC).

The Region has retained R.V. Anderson Associates Limited to undertake this study.

If you have any comments or questions, or require further information about the Study, please feel free to contact the undersigned.

Yours truly,



Serguei Kabanov, CD, CET, rcca
Project Manager, Roads, Design and Construction
Public Works
10 Peel Centre Drive, Suite 'B', 4th Floor
Brampton, Ontario
L6T 4B9
Tel: 905-791-7800 ext. 8754
Serguei.kabanov@peelregion.ca

Encl.: Notice of Study Commencement

c.c. David J. O'Sullivan, R.V. Anderson Associates Limited

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
A. PROVINCIAL GOVERNMENT AGENCIES												
1	Lisa Myslicki Environmental Coordinator	Ms Myslicki	Infrastructure Ontario		1 Dundas Street West	Suite 2000	Toronto	ON	M5G 2L5			
2	Ms Hoeun Heng	Ms Heng	Infrastructure Ontario		1 Dundas Street West	Suite 2000	Toronto	ON	M5G 2L5			
3	District Manager	Sir / Madam	Ministry of the Environment and Climate Change	Halton-Peel District Office	4145 North Service Road	Suite 3000	Burlington	ON	L7L 6A3			
4	Dorothy Moszynski Environmental Resource Planner & EA Coordinator	Ms Moszynski	Ministry of the Environment and Climate Change	Central Region Air, Pesticides and Environmental Planning Technical Support Section	5775 Yonge St.	8th Floor	Toronto	ON	M2M 4J1	416-326-3469		
5	Ms Karen Eisler Regional Director	Ms Eisler	Ministry of Community and Social Services	Central Region	6733 Mississauga Road	Suite 200	Mississauga	ON	L5N 6J5	905-567-7177, ext. 313		karen.eisler@ontario.ca
6	Mark Heaton District Planner	Mr. Heaton	Ministry of Natural Resources and Forestry		50 Bloomington Road W.		Aurora	ON	L4G 3G8	905-713-7400		mark.heaton@ontario.ca
7	Victor Doyle Manager, Community Planning	Mr. Doyle	Ministry of Municipal Affairs and Housing	Central Municipal Services Office	777 Bay Street	13th Floor	Toronto	ON	M5G 2E5	416-585-6104		
8	Mr. Tim Haldenby Senior Planner	Mr. Haldenby	Ministry of Municipal Affairs and Housing	Provincial Planning & Environmental Services Branch	777 Bay Street	14th Floor	Toronto	ON	M5G 2E5	416-585-6109		
9	Malcolm Horne Planner / Archaeologist	Mr. Horne	Ministry of Tourism, Culture and Sport	Toronto District Office	400 University Avenue	4th Floor	Toronto	ON	M7A 2R9	416-314-7146		
10	Carol Neumann Rural Planner	Ms Neumann	Ministry of Agriculture, Food and Rural Affairs		6484 Wellington Road 7	Unit 1	Elora	ON	N0B 1S0	519-846-0941		
11	David Cooper Manager, Agricultural Land Use	Mr. Cooper	Ministry of Agriculture, Food and Rural Affairs		1 Stone Road West		Guelph	ON	N1G 4Y2	519-826-3117		
12	Inspector Brent Mikstas	Inspector Mikstas	Ontario Provincial Police		268 Keele Street		Toronto	ON	M6M 3Z4	416-235-4981		
B. FEDERAL GOVERNMENT AGENCIES												
13	Monique Mousseau Regional Manager	Ms Mousseau	Transport Canada	Ontario Region Environment Affairs, Programs Branch	4900 Yonge Street	Suite 300	Toronto	ON	M2N 6A5	416-952-0485	416-952-0514	mousseu@tc.gc.ca
14			Fisheries and Oceans Canada		867 Lakeshore Road		Burlington	ON	L7S 1A1	1-855-852-8320		FisheriesProtection@dfo-mpo.gc.ca
15	Regional Environmental Assessment Coordinator		Health Canada	Ontario Region	180 Queen Street West		Toronto	ON	M5V 3L7			
16	Mr. Rob Dobos Head EA Section Ontario Region	Mr. Dobos	Environment Canada	Ontario Region	867 Lakeshore Road	P.O. Box 5050	Burlington	ON	L7R 4A4	1888-852-8320		
17	Ms Marie-Josée Lemieux	Ms Lemieux	Parks Canada	Historic Site and Monument Board	25 Eddy Street		Gatineau	QC	K1A 0M5			
18	Ms Jeannette Anderson Enforcement Officer	Ms Anderson	Canada Transportation Agency		4900 Yonge Street	Suite 300	Toronto	ON	M2N 6A5			
19	Environmental Coordinator		Transport Canada	Ontario Region (PHE)	4900 Yonge Street		North York	ON	M2N 6A5			enviroOnt@tc.gc.ca
20	Ms Anjala Puvananathan Regional Director, Ontario Region	Ms Puvananathan	Canadian Environmental Assessment Agency		55 St. Clair Avenue East	Room 907	Toronto	ON	M4T 1M2			
C. MUNICIPAL GOVERNMENT AGENCIES												
21	Inspector Operational Planning and Resources		Peel Regional Police	Corporate Planning and Resources	7750 Hurontario Street		Brampton	ON	L6V 3W6			
22	Mr. Jim Patton Superintendent	Mr. Patton	Peel Regional Police	22 Division	7750 Hurontario Street		Brampton	ON	L6V 3W6	905-453-3311, ext. 2200		
23	Mr. Tim Beckett Fire Chief	Mr. Beckett	Peel Fire and Emergency Services	City of Mississauga	15 Fairview Road West	2nd Floor	Mississauga	ON	L5B 1K7	905-613-3777		
24	Chief Peter Dundas	Chief Dundas	Peel Region Paramedic Services		10 peel Centre Drive		Brampton	ON	L6T 4B9			
25	Mr. Dave Forfar Fire Chief	Chief Forfar	Town of Caledon	Fire and Emergency Services	6311 Old Church Road		Caledon	ON	L7C 1J6			
26	Mayor Allan Thompson	Mayor Thompson	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	416-319-6543 (cell)	905-584-4325	allan.thompson@caledon.ca
27	Ms Barb Shaughnessy Regional Councillor, Ward 1	Councillor Shaughnessy	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-586-0907		barb.shaughnessy@caledon.ca
28	Mr. Doug Beffort Area Councillor, Ward 1	Councillor Beffort	Town of Caledon		6312 Old Church Road		Caledon	ON	L7C 1J6	516-927-5365 (home) 416-931-4900 (cell)		doug.beffort@caledon.ca
29	Johanna Downey Regional Councillor, Ward 2	Councillor Downey	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	416-434-4102		johanna.downey@caledon.ca
30	Gord McClure Town Councillor, Ward 2	Councillor McClure	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-843-9797		
31	Kant Chawla Senior Transportation Planner	Mr. Chawla	Town of Caledon	Policy Department	6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272, ext. 4293		
32	Craig Campbell Director of Public Works	Mr. Campbell	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272, ext. 4238		

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
33	Carey DeGorter Director of Administration / Town Clerk	Ms DeGorter	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6			
34	Peggy Tollett General Manager of Community Services	Ms Tollett	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272		
35			Town of Caledon	Caledon Environmental Advisory Committee	6311 Old Church Road		Caledon	ON	L7C 1J6			
36	Ms Sandra Dolson Economic Development Officer	Ms Dolson	Town of Caledon	Strategic Initiatives	6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272, ext. 4152		sandra.dolson@caledon.ca
37	Sally Drummond Heritage Resource Officer	Ms Drummond	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272		
38	Mr. Ben Roberts Economic Development Officer	Mr. Roberts	Town of Caledon		6311 Old Church Road		Caledon	ON	L7C 1J6	905-584-2272, ext. 4011		ben.roberts@caledon.ca
39	Ms Susan DeJesus PUCC Coordinator	Ms DeJesus	Peel Region		10 Peel Centre Drive		Brampton	ON	L6T 4B9	905-791-7800, ext. 5076		PUCC.Applications@peelregion.ca; Susan.DeJesus@peelregion.ca
40	Mr. Ken Chiu Communications Specialist	Mr. Chiu	Peel Region		10 Peel Centre Drive		Brampton	ON	L6T 4B9	905-791-7800, ext. 4667		ken.chiu@peelregion.ca
41	Mr. Tod Jenkins CAD Supervisor	Mr. Jenkins	Peel Region		10 Peel Centre Drive		Brampton	ON	L6T 4B9	905-791-7800, ext. 7810		tod.jenkins@peelregion.ca
UTILITIES												
1	Mr. Peter Rutkowski	Mr. Rutkowski	Allstream Canada PUCC Brampton / Caledon		50 Worcester Road		Etobicoke	ON	M9W 5X2	416-649-7500		peter.rutkowski@allstream.com
2	Mr. Jamie Bignell	Mr. Bignell	Hydro One - Low Voltage		40 Olympic Drive		Dundas	ON	L9H 7P5			
3	Mr. Toni Paolasini	Mr. Paolasini	Hydro One Networks Towers - Transmission		483 Bay Street		Toronto	ON	M5G 2P5			
4	Mr. Vince Cina Special Projects Supervisor	Mr. Cina	Enbridge Gas Distribution	Distribution Planning Department	500 Consumers Road		Toronto	ON	M2J 1P8	416-758-7936		Vince.cina@enbridge.com
5	Mr. Joe Marozzo	Mr. Marozzo	Enbridge Gas Distribution	Distribution Planning Department	P.O. Box 650		Scarborough	ON	M1K 5E3	416-758-7906		joemarozzo@enbridge.com
6	Mr. Darryl Dimitroff Planner	Mr. Dimitroff	Rogers Cable		3573 Wolfdale Road		Mississauga	ON	L5C 3T6			
7	Mr. Philip Bauslaugh	Mr. Bauslaugh	Bell Canada		5115 Creekbank Road	Floor 3 West	Mississauga	ON	L4W 5R1			
8	Ms Janice Young Manager, Right-of-Way	Ms Young	Bell Canada		100 Borough Drive	Floor 3 Green	Scarborough	ON	M1P 2W2			
9	Ms Colleen Mitchell Community Awareness and Land Specialist	Ms Mitchell	Imperial Oil		100 5th Concession Road East		Waterdown	ON	L0R 2H1			
10	Ms Darlene Presley Lehman and Associates Planning Consultant	Ms Presley	Trans Canada Pipeline		97 Collier Street		Barrie	ON	L4M 1H2			
11	Mr. W. Paul Lane, C.E.T. Senior Property and Construction Technologist	Mr. Lane	Sun-Canadian Pipeline		P.O. Box 470		Waterdown	ON	L0R 2H0			
12	Ms Indira Sharma	Ms Sharma	Telus Network c/o Telecon		25 York Street	22nd Floor	Toronto	ON	M5J 2V5			
13	Coordinator - Crossings and Facilities	Sir / Madam	Trans-Northern Pipelines Inc.		45 Vogell Road	Suite 310	Richmond Hill	ON	L4B 3P6			
14	Mr. Samir Patel	Mr. Patel	Cogeco Data Services Inc.		413 Horner Avenue		Etobicoke	ON	M8W 4W3			
15	Mr. Brian Kilbride Implementation Coordinator	Mr. Kilbride	Blink Communications Inc.		861 Redwood Square		Oakville	ON	L6L 6N3			
TRANSPORTATION												
1	Stefan Linder, B.Eng., MBA Manager, Public Works Design and Construction	Mr. Linder	CN Rail		4 Welding Way off Administration Road		Vaughan	ON	L4K 1B9	905-669-3261		stefan.linder@cn.ca
2	Mr. S. Soper	Mr. Soper	Canadian Pacific Railway		2025 McCowan Road		Scarborough	ON	M1F 4A8			
3	Mr. Dante Palladinelli	Mr. Palladinelli	GTAA / Toronto Pearson International Airport		3111 Conair Drive		Mississauga	ON	L5P 1B2			
4	Mr. Lou Lamanna	Mr. Lamanna	Orangeville Brampton Railway Development Corporation		75 First Street	Suite 230	Orangeville	ON	L9W 5B6			lou.lamanna@candoltd.com
CONSERVATION AUTHORITIES												
1	Jakub Kilis, RPP Planner, Environmental Assessment	Mr. Kilis	Credit Valley Conservation		1255 Old Derry Road		Mississauga	ON	L5N 6R4	905-670-1615, ext. 287		jkilis@creditvalley.ca
SCHOOL BOARDS												
1	Paul Mountford, MCIP, RPP Intermediate Planner Officer	Mr. Mountford	Peel District School Board	Planning and Accommodation Department	HJA Brown Education Centre 5650 Hurontario Street		Mississauga	ON	L5R 1C6	905-890-1099		

	Contact Name & Title	Salutation	Company Name	Department	Address1	Address2	City	Province	Postal Code	Phone	Fax	Email
2	Superintendent of Planning and Operations		Dufferin-Peel Catholic District School Board	Planning and Development Department	40 Matheson Boulevard West		Mississauga	ON	L5R 1C5			
3	John B. Kostoff Director of Education		Dufferin-Peel Catholic District School Board		40 Matheson Boulevard West		Mississauga	ON	L5R 1C5			
4	Mr. Stan Cameron Peel Region - School Trustee	Mr. Cameron	Peel District School Board		HJA Brown Education Centre 5650 Hurontario Street		Mississauga	ON	L5R 1C5			stan.cameron@peelsb.com
OTHER COMMUNITY GROUPS												
1	Brenda Bebbington	Ms Bebbington	Peel Agriculture Society		12942 Heart Lake Road		Caledon	ON	L6T 3S1	905-843-0210		
2	Andy Kovacs President	Mr. Kovacs	Halton / North Peel Naturalists Club		P.O. Box 115		Georgetown	ON	L7G 4T1	905-702-1132		
3	Margaret Jones Executive Director	Ms Jones	Brampton Clean City Committee		115 Orenda Road		Brampton	ON	L6W 1V7	905-874-2828		
4	To Whom it May Concern	To Whom it May Concern	Credit River Anglers Association		P.O. Box 42093 128 Queen St. South		Mississauga	ON	L5M 1K8	905-814-5794		info@craa.on.ca
5	Mr. Paul Newall	Mr. Newall	Alton Grange Association		19176 Main Street		Alton	ON	L7K 1P5			altongrangeassociation@hotmail.com
6	Ms Mary Cooney	Ms Cooney	Alton Village Association									stratton19@rogers.com
7	Ms Pam Stratton	Ms Stratton	Alton Village Association									stratton19@rogers.com
8	Ms Beth Caravaggio	Ms Caravaggio	Alton Village Association									bethcaravaggio@gmail.com
FIRST NATIONS												
1			Indian and Northern Affairs Canada	Environmental Unit Environmental Assessment Coordination	25 St. Clair East,	8th Floor	Toronto	ON	M4T 1M2			
2	Alan Kary	Mr. Kary	Ministry of Aboriginal Affairs Canada	Policy and Relationships Branch	720 Bay Street	4th Floor	Toronto	ON	M5G 2K1	416-326-4762		
3	Don Boswell Senior Claims Analyst	Mr. Boswell	Indian and Northern Affairs Canada	Specific Claims Branch	10 Wellington Street	Room 1310	Gatineau	QC	K1A 0H4			boswelld@inac.gc.ca
4	Josée Beaugard Ontario / Nunavut Team	Josée Beaugard	Indian and Northern Affairs Canada	Litigation Management and Resolution Branch	25 Eddy Street		Gatineau	QC	K1A 0H4			
5	Glen Forest Senior Administrator Officer	Mr. Forest	Six Nations of the Grand River Territory		P.O. Box 5000 1695 Chiefswood Road		Oshweken	ON	N0A 1M0	519-445-2201		
6	Chief William K. Montour	Chief Montour	Six Nations of the Grand River Territory		P.O. Box 5000 1695 Chiefswood Road		Oshweken	ON	N0A 1M0	519-445-2205, ext. 230		wkm@sixnations.ca arleenmaracle@sixnations.ca
7	Lonny Bomberry Director, Lands and Resources	Mr. Bomberry	Six Nations of the Grand River Territory		P.O. Box 5000 1695 Chiefswood Road		Oshweken	ON	N0A 1M0	519-445-2201		
8	Margaret Sault Director	Ms Sault	Mississaugas of New Credit First Nation		2789 Mississauga Road	RR #6	Hagersville	ON	N0A 1H0	905-768-1133		
9	Chief Bryan LaForme	Chief LaForme	Mississaugas of New Credit First Nation		2789 Mississauga Road	RR #6	Hagersville	ON	N0A 1H0	905-768-1133	905-768-1225	bryanlaforme@newcreditfirstnation.com
10	Hohahes Leroy Hill Secretary to Haudenosaunee Confederacy Chief's Council	Mr. Hill	Haudenosaunee Confederacy Chiefs Council		2634 6th Line Road	RR #2	Oshweken	ON	N0A 1M0	519-717-7326		jocko@sixnations.com
11	Chief Allen MacNaughton	Chief MacNaughton	Haudenosaunee Confederacy Chiefs Council		2634 6th Line Road	RR #2	Oshweken	ON	N0A 1M0	519-755-2769		
12	Executive Secretary		Conseil de la Nation huronne-wendat		225 Place Chef Michel Laveau		Wendake	QC	G0A 4V0	418-843-3767		
13	Franklin Roy	Mr. Roy	Indian and Northern Affairs of Canada	Litigation Management and Resolution Branch	10 Wellington Street	Room 1310	Gatineau	QC	K1A 0H4			
14	Janet Townson Claims Analyst, Ontario Team	Ms Townson	Indian and Northern Affairs Canada	Specific Claims Branch	1310-10 Wellington Street		Gatineau	QC	K1A 0H4	819-953-4667	819-997-9873	
15	Sean Darcy Manager	Mr. Darcy	Indian and Northern Affairs Canada	Assessment and Historical Research	10 Wellington Street		Gatineau	QC	K1A 0H4	819-997-8155	819-997-1366	
16	Marc-Andre Millaire Litigation Team Leader for Ontario	Mr. Millaire	Indian and Northern Affairs Canada	Litigation Management and Resolution Branch	10 Wellington Street		Gatineau	QC	K1A 0H4	819-994-1947	819-953-1139	
17		Sir / Madam	Métis Nation of Ontario		500 Old St. Patrick Street	Unit D	Ottawa	ON	K1N 9G4			
18	Chief Sharon Stinson-Henry	Chief Stinson-Henry	Chippewas of Rama First Nation		5884 Rama Road	Suite 200	Rama	ON	L0K 1T0			
19	Mr. Richard Cuddy Vice-President & Chair	Mr. Cuddy	Credit River Métis Council		CONTACT BY EMAIL ONLY							rcuddy@hotmail.ca
20	Mr. Allan Dokis Director - Intergovernmental Affairs	Mr. Dokis	Anishinabek Nation / Union of Ontario Indians		Nipissing First Nation	PO Box 611	North Bay	ON	P1B 8J8			
21	Ms Janice Taylor Contact Administrator	Ms Taylor	Chippewas of Georgina Island		R.R. #2	P.O. Box N13	Sutton West	ON	L0E 1R0			
22	Ms Kathy Brant Contact Administrator	Ms Brant	Mississaugas of Scugog Island First Nations		22521 Island Road	R.R. #5	Port Perry	ON	L9L 1B6			
23	Mr. Jake Linklater Case Manager	Mr. Linklater	Saugeen Ojibway Nation		R.R. #5		Warton	ON	N0H 2T0			

QUEEN STREET EAST

Bridge and Culvert Replacement over Shaw's Creek, in the Village of Alton, Town of Caledon

This is a **Public Information Centre** for a Municipal Class Environmental Assessment Study to present proposed improvements to Queen Street East (Highway 136), including the bridge and culvert replacement over Shaw's Creek, in the Village of Alton, Town of Caledon, as shown on the Key Plan. The proposed improvements include replacing both structures to increase hydraulic capacity, raising the road profile and streetscape enhancements.



Please join us at the
Public Information Centre
Wednesday, June 7, 2017

At the Alton Public School
19681 Main Street Alton, ON L7K 0E1
6:30 pm to 8:30 pm

**Your opinion matters and we
welcome your participation!**

For study background details call:

Serguei Kabanov
905-791-7800, ext. 8754

The Region of Peel is committed to ensure that all Regional services, programs and facilities are inclusive and accessible for persons with disabilities. Please contact the project manager if you need any disability accommodations to participate in the public meeting.

This notice was first issued on May 4, 2017.


**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

Name: 

Address: 
(Including postal code)

Organization: _____

E-mail: 

1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B C
2. Preferred bridge / culvert railings – see Board #16 (circle one) A B C
3. Preferred benches – see Board #17 (circle one) A B C
4. Preferred waste receptacles – see Board #18 (circle one) A B C
5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

I like the proposed pattern and colour.

6. Do you have any additional comments on the project?

A small staircase or gap in the fence would be a welcome accommodation for fishermen, and would also prevent people from climbing over fencing.
Also, wildlife ~~in~~ road signs to slow down and warn drivers would be welcome.

Please Print Clearly

QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1

Wednesday, June 7, 2017

Name: [Redacted]

Address: [Redacted]
(Including postal code)

Organization: resident

E-mail: [Redacted]

- 1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B **C**
- 2. Preferred bridge / culvert railings – see Board #16 (circle one) A B **C**
- 3. Preferred benches – see Board #17 (circle one) A B C *Bench? slide!*
- 4. Preferred waste receptacles – see Board #18 (circle one) A B C
- 5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

don't think the splash pads are necessary.
Also don't think we need sidewalk on both sides
on Queen East. *sidewalk - wide enough (6ft?) - roll curbs*

6. Do you have any additional comments on the project?

would like to see some trees planted to
soften the street
no streetlights needed (I got my glasses - hope this is
outside village. legible!)

Please Print Clearly

**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

Name: _____

Address: _____

(Including postal code)

Organization: _____

E-mail: _____

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4. Preferred waste receptacles – see Board #18 (circle one) A **B** C
5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

pattern looks good

6. Do you have any additional comments on the project?

flower boxes for the bridge maintained by the Region. Addition planters in the beautification corridor.

Please Print Clearly

**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

Name: _____

Address: _____

(Including postal code)

Organization: _____

E-mail: _____

1. Preferred bridge / culvert form liners – see Board #15 (circle one) **A B C**
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4. Preferred waste receptacles – see Board #18 (circle one) **A B C**
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6. Do you have any additional comments on the project?

Trees - please.

Sidewalk - one side.

Please Print Clearly

**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

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Address: _____
(Including postal code)

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E-mail: _____

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5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

RURAL NOT URBAN

6. Do you have any additional comments on the project?

TRAFFIC CALMING MEASURES

TREE PLANTING

PARKING LAYBYS

PREFERENCE - SINGLE SIDEWALK ON QUEEN

EAST OF MAIN

Please Print Clearly

**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

Name: _____

Address: _____
(Including postal code)

Organization: ALTON VILLAGE ASSOCIATION

E-mail: _____

1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B **C**
DO NOT LIKE BLACK GROUT LINES
2. Preferred bridge / culvert railings – see Board #16 (circle one) A B **C**
3. Preferred benches – see Board #17 (circle one) A B C
I LIKE BENCH BD 18 (B)
4. Preferred waste receptacles – see Board #18 (circle one) A **B** C
5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour? *OR*

BUT DO NOT WANT SIDE WALK ON 2 SIDES -

MAINTAIN WHAT WE HAVE PHASE 1 OR 2

6. Do you have any additional comments on the project?

KEEP US RURAL. NOT URBAN

WANT TREES / GRASS

Please Print Clearly

**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

Name: [REDACTED]

Address: [REDACTED]
(Including postal code)

Organization: Alton Grange Association / Resident

E-mail: [REDACTED]

- 1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B **C**
- 2. Preferred bridge / culvert railings – see Board #16 (circle one) A **B** C
- 3. Preferred benches – see Board #17 (circle one) A **B** C
- 4. Preferred waste receptacles – see Board #18 (circle one) A **B** C
- 5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

Proposed pattern OK

6. Do you have any additional comments on the project?

Light posts - lighter
Only med sidewalks on 1 side for Phase 1
& 2
Trees + grass Ginkgos, Lindens & few "feature"

Please Print Clearly

natives
ie maple

QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1

Wednesday, June 7, 2017

Name: [REDACTED] [REDACTED]

Address: [REDACTED]
(Including postal code)

Organization: *ALTON GRANGE ASSOC* *A.G.A.*

E-mail: [REDACTED] [REDACTED]

- 1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B C
- 2. Preferred bridge / culvert railings – see Board #16 (circle one) A B C
- 3. Preferred benches – see Board #17 (circle one) A B C
I like the bench on Board #18
- 4. Preferred waste receptacles – see Board #18 (circle one) A B C

5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?
Yes to proposed pattern + colour

6. Do you have any additional comments on the project?

** Only need sidewalk on 1 side of road (south side)
Rollover curb instead of barrier curb
Perhaps make some opportunities for planting trees!*

Please Print Clearly

QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1

Wednesday, June 7, 2017

Name: [REDACTED]

Address: [REDACTED]
(Including postal code)

Organization: Alton Mill Arts Centre

E-mail: [REDACTED]

1. Preferred bridge / culvert form liners – see Board #15 (circle one)

A B **C***

but geometry of B - stone to wrap all 4 sides

2. Preferred bridge / culvert railings – see Board #16 (circle one)

A B **C**

3. Preferred benches – see Board #17 (circle one)

A **B** C

4. Preferred waste receptacles – see Board #18 (circle one)

A **B** C

5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

yes like them

Like idea of permeable pavers in parking lay bys.

6. Do you have any additional comments on the project?

* Alton strives to be dry stone wall capital of Canada - make stone look like dry stone
Like forms of C but detailing of B (eg. where no stone form make cap on horizontal surfaces). No black grout lines.

Please Print Clearly

QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1

Wednesday, June 7, 2017

Name: _____

Address: _____
(Including postal code)

Organization: _____

E-mail: _____

1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B C
2. Preferred bridge / culvert railings – see Board #16 (circle one) A B C
3. Preferred benches – see Board #17 (circle one) *Railings from board 15 preferred.* A B C
4. Preferred waste receptacles – see Board #18 (circle one) *with arms in from 18 A* A B C
5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

6. Do you have any additional comments on the project?

- Have adequate parking - proper pedestrian access to the river close to the bridge for fishings - community safety speed limits from the school to past the bridge. Then Truck traffic taken off Queen + Main streets.

Please Print Clearly

QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1

Wednesday, June 7, 2017

Name: [Redacted]

Address: [Redacted]
(Including postal code)

Organization: resident

E-mail: [Redacted]

- 1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B **C**
- 2. Preferred bridge / culvert railings – see Board #16 (circle one) A B **C**
- 3. Preferred benches – see Board #17 (circle one) A **B** C *Bench on board 18*
- 4. Preferred waste receptacles – see Board #18 (circle one) A B **C**
- 5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

Don't endorse (want) a sidewalk on south side of Queen St East or west of bridge

6. Do you have any additional comments on the project?

*Keep us rural - downplay urban look
trees desired where possible - particularly south of Queen on each side of Main.
Linden??*

Please Print Clearly

**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

Name: [REDACTED]

Address: [REDACTED]
(Including postal code)

Organization: privat

E-mail: [REDACTED]

- 1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B C
- 2. Preferred bridge / culvert railings – see Board #16 (circle one) A B C
- 3. Preferred benches – see Board #17 (circle one) A B C
- 4. Preferred waste receptacles – see Board #18 (circle one) A B C
- 5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

i like what is proposed

6. Do you have any additional comments on the project?

concern regarding privacy of property - with increased parking and addition of street lighting and rest areas especially potential for increased activity (i.e. teenagers hanging out) during the evening will trees, etc be planted on existing properties to increase privacy.

Please Print Clearly

**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

Name: _____
Address: _____
(Including postal code)
Organization: private
E-mail: _____

- 1. Preferred bridge / culvert form liners – see Board #15 (circle one) A **B** C
- 2. Preferred bridge / culvert railings – see Board #16 (circle one) A B C
XXXXXX, dark grey with arches - see Board 15 #2
- 3. Preferred benches – see Board #17 (circle one) **A** B C
- 4. Preferred waste receptacles – see Board #18 (circle one) A **B** C
- 5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

yes, splashpad is fine - very good streetscaping - exciting

6. Do you have any additional comments on the project? For Phase 2 Queen St. East
Please consider "risk to life" of truck proximity to people
on Queen St E/Main South; bypass needed!!!!
- please delineate driveway entrance/exit at Queen St gas station
- please provide a barrier in front of Gas Station pumps →

Please Print Clearly

for traffic calming, barrier to exhaust fumes,
beautification and to prevent gravel trucks from ~~making~~
~~from~~ making U-turns up on the sidewalk

- request that banners (on lampposts) are smaller
and black/white (they are in our sightlines) the
current coloured ones are faded and they "squeak"
incessantly

Thank-you!

for listening.

**QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1**

Wednesday, June 7, 2017

Name: [REDACTED]

Address: [REDACTED]
(Including postal code)

Organization: Alton Mill Arts Centre

E-mail: meg@alton.ca

1. Preferred bridge / culvert form liners – [REDACTED] A B **C**
2. Preferred bridge / culvert railings – see Board #16 (circle one) A B **C**
3. Preferred benches – see Board #17 (circle one) A B **C**
4. Preferred waste receptacles – see Board #18 (circle one) A B **C**
5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?

Yes. Gateway feature a good idea.

6. Do you have any additional comments on the project?

* 1. Prefer a dry-stone wall look, which might be achieved with alternative C, incorporating smaller stone and wrapping the stone around all facades.

- Can we have street lamp options?

Please Print Clearly

(OVER)

- If this project is setting precedent for the section of Queen St west of Main St., please consider whether barrier curbs are suitable. ^{Barrier} Curbs will prevent on-street parking. Rolled curbs could facilitate parking on the street & maintain the current parking patterns.
- Rest area located beside the RR tracks ??
Not an inviting place to sit.

QUEEN STREET EAST
BRIDGE AND CULVERT REPLACEMENT OVER SHAW'S CREEK
PUBLIC INFORMATION CENTRE #1

Wednesday, June 7, 2017

Name: [REDACTED]

Address: [REDACTED]
(Including postal code)

Organization: Private citizen

E-mail: [REDACTED]

1. Preferred bridge / culvert form liners – see Board #15 (circle one) A B C
2. Preferred bridge / culvert railings – see Board #16 (circle one) A B C
3. Preferred benches – see Board #17 (circle one) A B C
bench on Board 18
4. Preferred waste receptacles – see Board #18 (circle one) A B C
5. Decorative splashpads – see Boards #19 and #20 – do you like the proposed pattern / colour? Would you suggest a different pattern / colour?
Do NOT Need 1.3 m sidewalk

*Don't like either. This is a rural village
NO barrier curb - too urban - rolling curb?*

6. Do you have any additional comments on the project?

- This is a "rural village" with small sidewalks on one side of road. 6 ft sidewalks are not in keeping with this heritage village.

Your plan is for ~~the~~ "Mississauga" not a quaint town street scene. Should be in keeping with the village. Like Alton

Please Print Clearly

Information received will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments received will become part of the public record.

- Concern about traffic on MAIN ST North white bridge is closed. MAIN N is NOT a built paved →

road. It was tarred over a dirt road.

Road closure on "136" For month does not make sense.

Queen Street East

Bridge and Culvert Replacement over Shaw's Creek

PUBLIC INFORMATION CENTRE

Date: June 7, 2017
Time: 6:30 p.m. to 8:30 p.m.
Location: Alton Public School
19681 Main Street
Alton, Ontario



The Region is undertaking a Municipal Class Environmental Assessment (EA) for road reconstruction, bridge and culvert improvements to Queen Street East to address concerns with hydraulic capacity. In addition, the Region is seeking input from the public on the urban streetscape design improvements being considered.

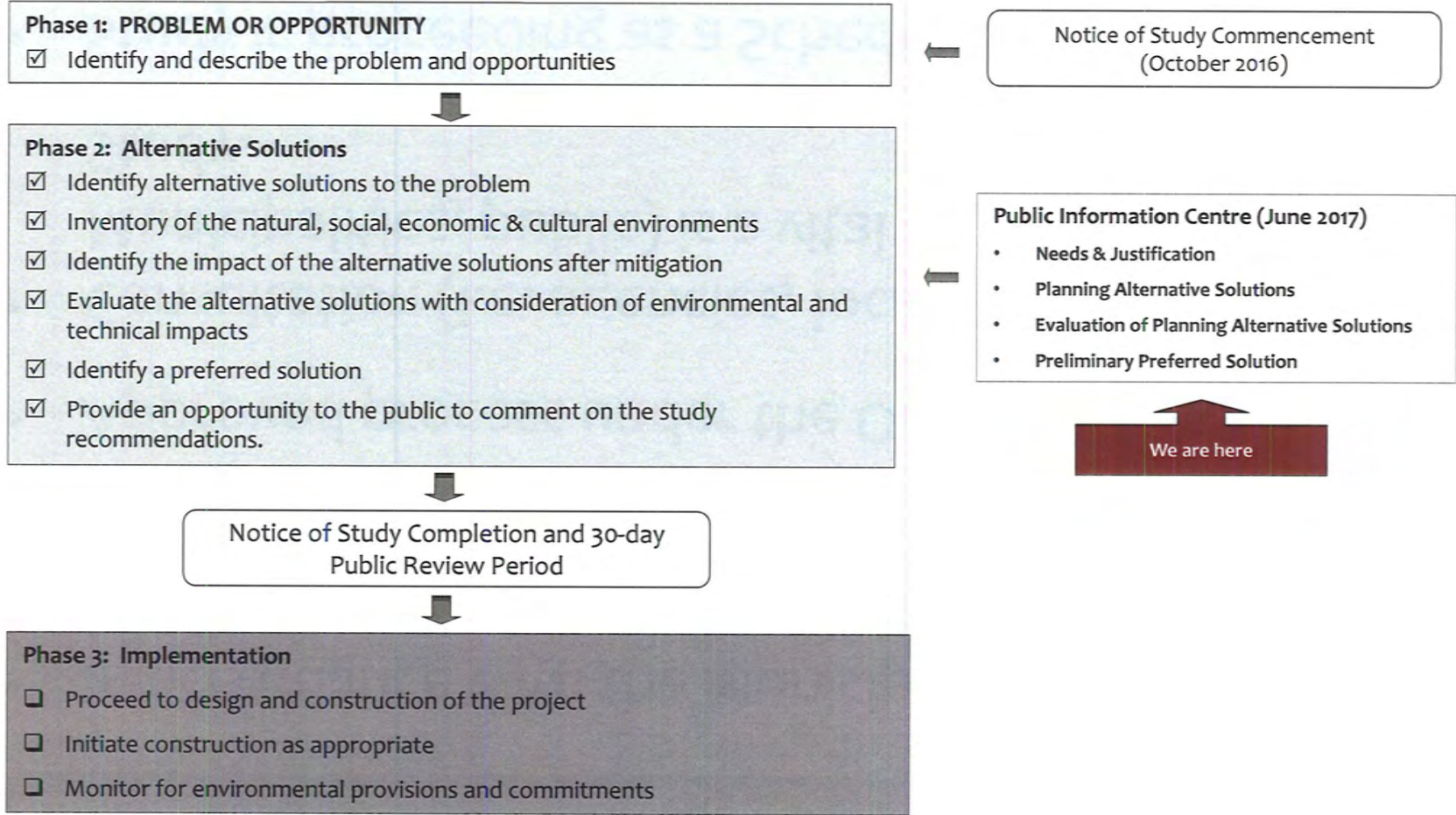
2

Study Approach

- In accordance with the Municipal Engineer's Association Class Environmental Assessment (Class EA Process).
- Approved process under the Ontario EA Act.
- Consultation (i.e. agencies, local community, Municipalities, public) is a vital component of this Study.
- Study is proceeding as a Schedule B Project – Approved, subject to screening and public review.

Municipal Class EA Process

Phases



4

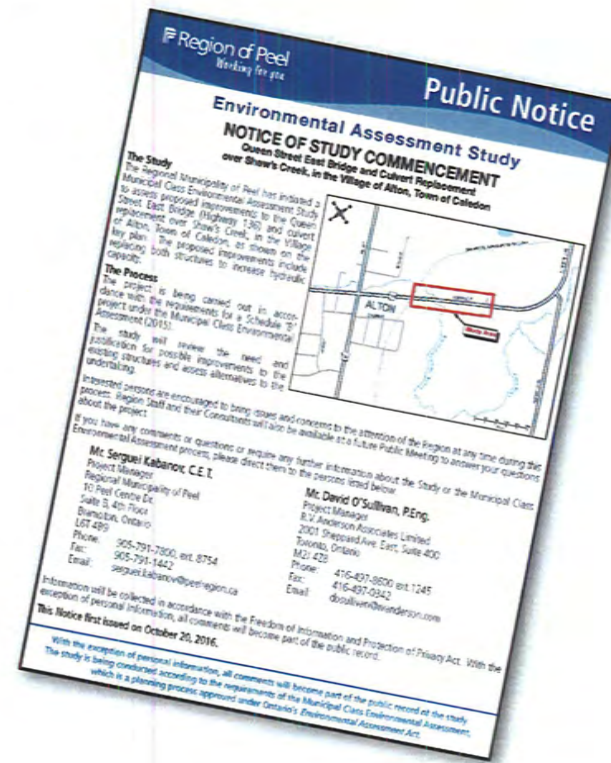
Study Area



Notice of Study Commencement

Various agencies were consulted in October 2016 to provide comment. They include:

- Federal Agencies
- Provincial Agencies
- Aboriginal Groups
- Municipal Government



6

Need and Justification for the Study

- The existing bridge and culvert do not have sufficient hydraulic capacity to satisfy the 100-year and Regional Storm events.
- Raising the road is required to provide the required freeboard during the 100-Year Storm and avoid overtopping the road during a Regional Storm.



7

Identification of Alternative Solutions

Option	Alternative Solution
1.	Bridge replacement only – with various spans up to 30m
2.	Replace bridge with 20m span and raising the road profile up to 1m.
3.	Replace bridge with 20m span, replace culvert with 10m span / 3m rise open bottom culvert, and raising the road a minimum of 1.5m.
4.	Replace bridge with 25m span, replace culvert with 10m span / 3m rise open bottom culvert, and raising the road a minimum of 1.5m.

- After an evaluation of alternative solutions, Option 4 is selected as the preferred alternative to meet hydraulic capacity requirements and bank erosion requirements.

8

Evaluation of Design Alternatives

The Design Alternatives were assessed using the following criteria:

1. Hydraulic Capacity
2. Fluvial / Geomorphic Requirements (Erosion)
3. Natural Environment
4. Drainage
5. Geometric Requirements for Road Design

Evaluation of Design Alternatives

Criteria	Alternative 1 New Bridge up to 30m Span	Alternative 2 New 20m Bridge and Raise Road Profile by 1.5m	Alternative 3 New 20m Bridge and 10m Culvert and Raise Road Profile	Alternative 4 New 25m Bridge and 10m Culvert and Raise Road Profile
Design Considerations:				
Hydraulic Capacity	<ul style="list-style-type: none"> *freeboard for 100-year storm not satisfied *clearance for Regional Storm not satisfied *high backwater effect *road overtopping 	<ul style="list-style-type: none"> *freeboard for 100-year storm not satisfied *clearance for Regional Storm not satisfied *high backwater effect *road overtopping 	<ul style="list-style-type: none"> ✓ freeboard for 100-year storm satisfied ✓ clearance for Regional Storm satisfied ✓ no backwater effect ✓ no road overtopping 	<ul style="list-style-type: none"> ✓ freeboard for 100-year storm satisfied ✓ clearance for Regional Storm satisfied ✓ no backwater effect ✓ no road overtopping
Fluvial / Geomorphic	✓ 100-year erosion limit satisfied	*100-year erosion limit not satisfied	*100-year erosion limit not satisfied	✓100-year erosion limit satisfied
Natural Environment	✓ no impacts to PSW	✓ No impacts to PSW	✓ No impacts to PSW	✓ No impacts to PSW
Drainage	✓ existing drainage patterns maintained	✓ Existing drainage patterns maintained	✓ Existing drainage patterns maintained	✓ Existing drainage patterns maintained
Geometric Requirements for Road	<ul style="list-style-type: none"> ✓ design speed unaffected ✓ no impact to traffic safety 	<ul style="list-style-type: none"> ✓ design speed unaffected ✓ no impact to traffic safety 	<ul style="list-style-type: none"> ✓ design speed unaffected ✓ no impact to traffic safety 	<ul style="list-style-type: none"> ✓ design speed unaffected ✓ no impact to traffic safety

10

Technically Preferred Design Alternative

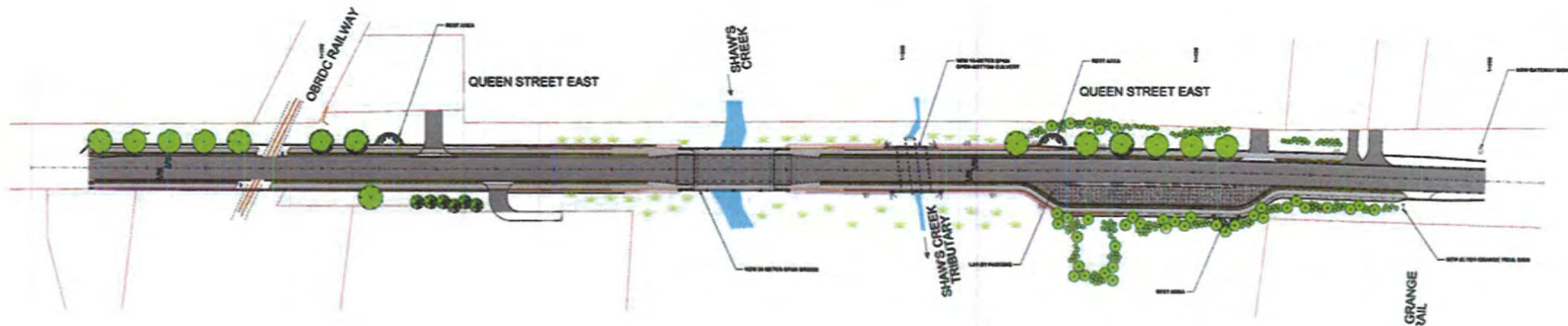
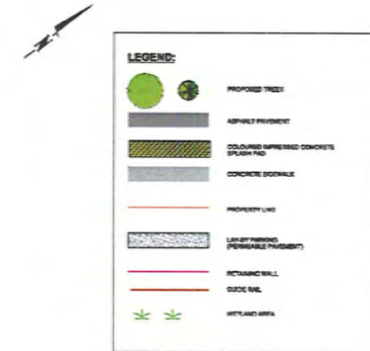
After an evaluation of alternative designs, replacing the existing bridge with a 25m span bridge, replacing the existing culvert with a 10m open-bottom structure, and raising the road profile by approximately 1.5m was chosen as the technically preferred design due to:

1. Requirement to provide 1.0m freeboard for 100-year storm event
2. Requirement to allow Regional Storm to pass under the bridge and culvert soffit
3. Requirement to avoid backwater effects
4. Requirement to accommodate 100-year erosion limit under bridge

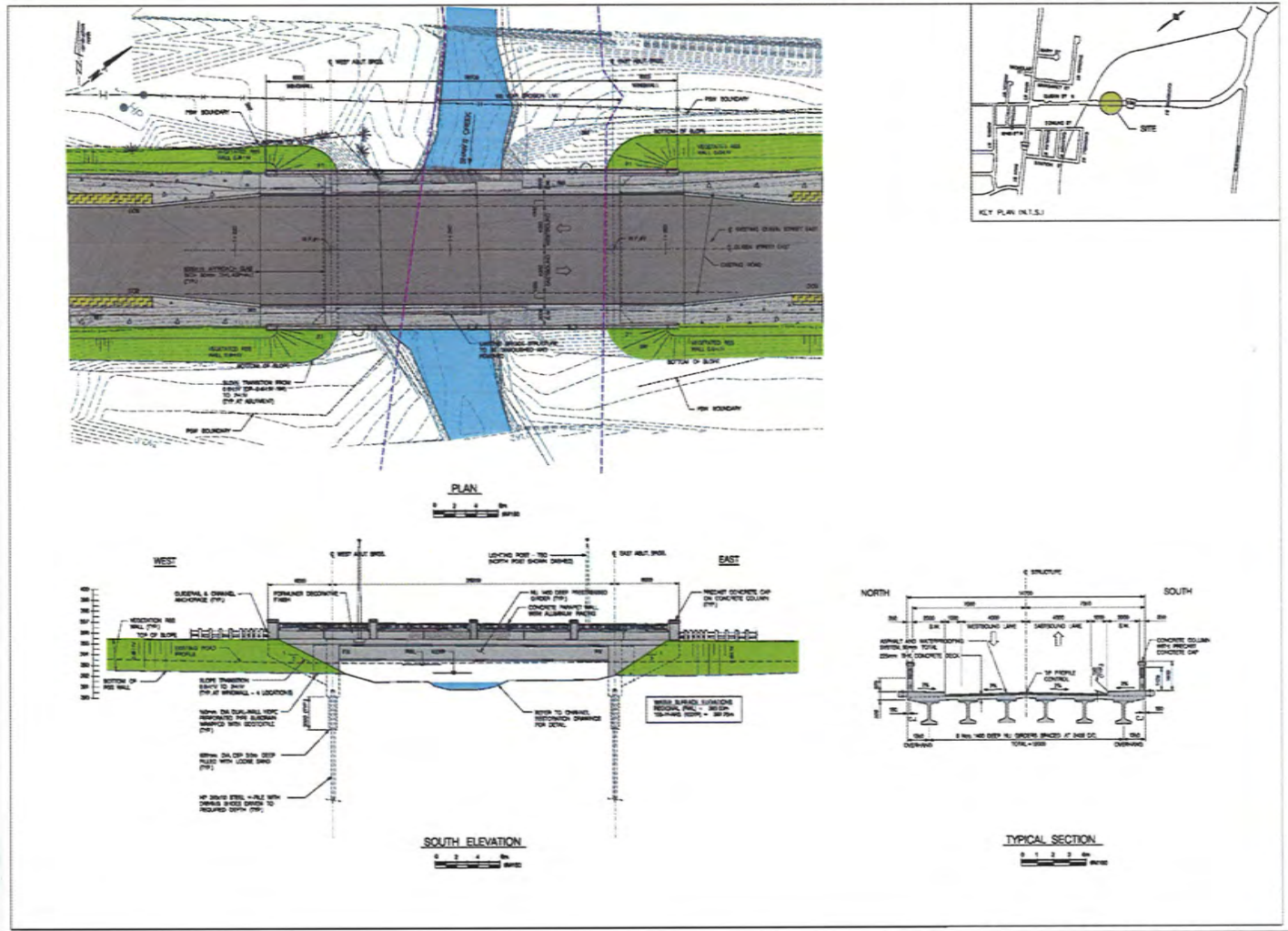
Technically Preferred Design Alternative

Queen Street East

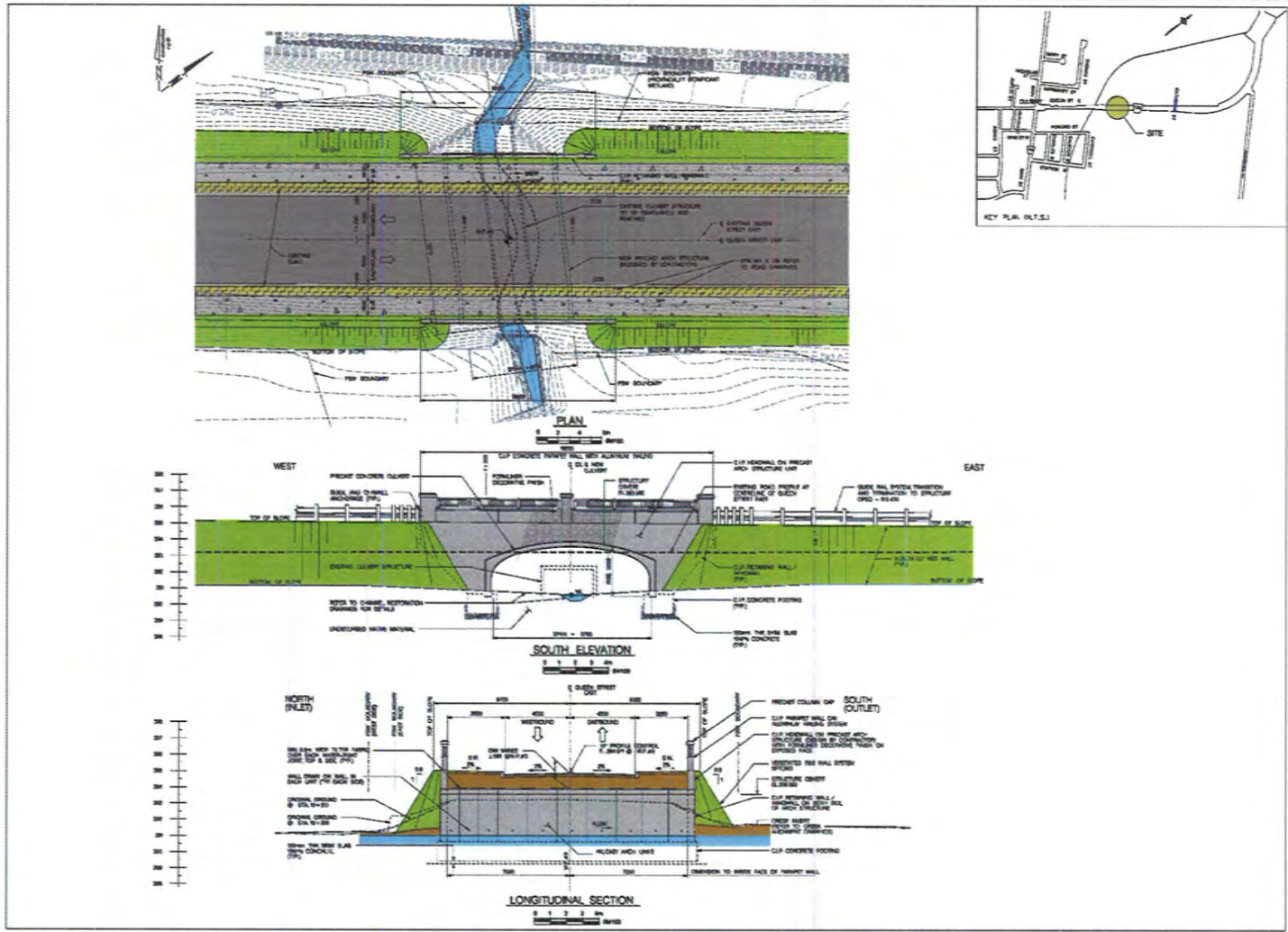
- 4.0m lanes with 'sharrows'
- 1.8m sidewalks each side
- Coloured impressed concrete splash pads
- Lay-by parking area at east end with accessible parking
- Decorative streetlighting and furniture
- Rest areas



Technically – Preferred Design Alternative



Technically – Preferred Design Alternative



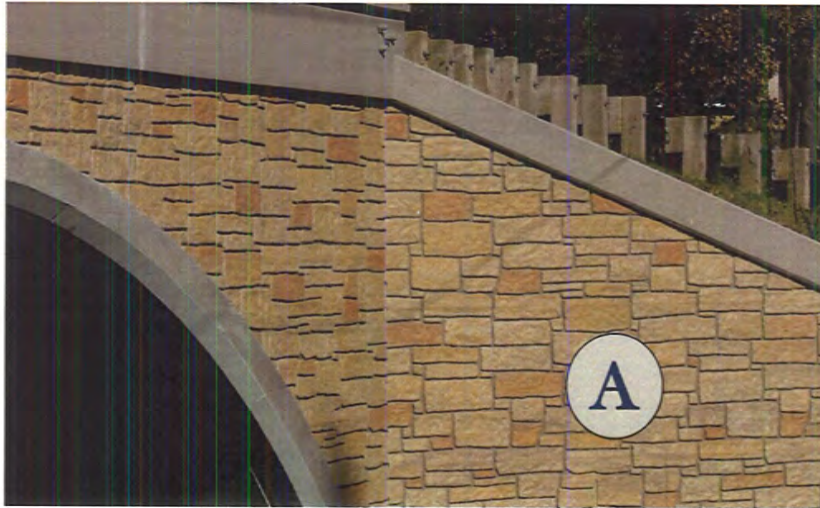
The Town of Caledon initiated a “Community Improvement Plan” for the Village of Alton, with the objective of achieving a more sustainable community that promotes health and the delivery of a high quality of life.

Through this consultation, Peel Region is seeking input from the community to develop a design framework for improvements. This includes an urban design approach, and specific streetscaping features including:

- Gateway Features
- Rest Areas
- Decorative Illumination
- Architectural Finishes on Bridge and Culvert Structures
- Street Furniture

Alton Village – Community Improvements

Architectural Finishes – Bridge/Culvert Concrete Formliners



Let us know your Preference

Alton Village – Community Improvements

Architectural Finishes – Bridge/Culvert Railings



Let us know your preference



Alton Village – Community Improvements

Street Furniture – Benches



Let us know
your preference



Alton Village – Community Improvements

Street Furniture – Waste Receptacles



Let us know your preference

Conceptual Rendering



Conceptual Rendering



Next Steps

- Review and respond to public and agency comments received at this PIC. Comments will be received until June 28, 2017.
- Issue Notice of Study Completion which formally commences a 30-day review period for the public to raise concerns.
- Complete the design and undertake construction of the preferred design.

- Full road closure anticipated, with local access provided to driveways
- Construction start date March 2018
- Expected construction completion in late 2018

YOUR INPUT IS IMPORTANT



Please complete a Comment Sheet before leaving

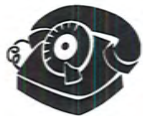


By Mail

Mr. Serguei Kabanov, C.E.T.
Region of Peel
Transportation Division
10 Peel Centre Drive
Suite B, 4th Floor
Brampton, ON L6T 4B9

OR

Mr. David O'Sullivan, P.Eng.
R.V. Anderson Associates Limited
2001 Sheppard Avenue East
Suite 300
Toronto, ON M2J 4Z8



By Phone

905-791-7800, ext. 8754

416-497-8600, ext. 1245



By Fax

905-791-1442

416-497-0342



By E-mail

Serguei.kabanov@peelregion.ca

dosullivan@rvanderson.com

These presentation boards are also available for viewing at
<http://www.peelregion.ca/news/notices/2017/notice-170503.htm>

From: EnviroOnt [<mailto:EnviroOnt@tc.gc.ca>]

Sent: May 30, 2017 10:39 AM

To: Kabanov, Serguei

Subject: NEATS 43286 Class EA - Queen Street E Bridge and Culvert Replacement over Shaw's Creek, Village of Alton ONT

Greetings,

Thank you for your correspondence. Please note, Monique Mousseau is not the appropriate contact for the Environmental Assessment Program. When providing Transport Canada with project notifications in the future, please direct all correspondence to the Environmental Co-coordinator at EnviroOnt@tc.gc.ca for a timely response. Additionally, please only provide Transport Canada with one copy of correspondence.

Please note Transport Canada **does not** require receipt of all individual or Class EA related notifications. We are requesting project proponents to self-assess if their project:

1. Will interact with a federal property and/or waterway by reviewing the Directory of Federal Real Property, available at www.tbs-sct.gc.ca/dfrp-rbif/; **and**
2. Will require approval and/or authorization under any Acts administered by Transport Canada* available at <http://www.tc.gc.ca/eng/acts-regulations/menu.htm>.

Projects that will occur on federal property prior to exercising a power, performing a function or duty in relation to that project, will be subject to a determination of the likelihood of significant adverse environmental effects, per Section 67 of the *Canadian Environmental Assessment Act, 2012*.

If the aforementioned does not apply, the Environmental Assessment program should not be included in any further correspondence and future notifications will not receive a response. If there is a role under the program, correspondence should be forwarded *electronically* to: EnviroOnt@tc.gc.ca with a **brief description of Transport Canada's expected role**.

*Below is a summary of the most common Acts that have applied to projects in an Environmental Assessment context:

- **Navigation Protection Act (NPA)** – the Act applies primarily to works constructed or placed in, on, over, under, through, or across scheduled navigable waters set out under the Act. The Navigation Protection Program administers the NPA through the review and authorization of works affecting scheduled navigable waters. Information about the Program, NPA and approval process is available at: <http://www.tc.gc.ca/eng/programs-621.html>. Enquiries can be directed to NPPONT-PPNONT@tc.gc.ca or by calling (519) 383-1863.
- **Railway Safety Act (RSA)** – the Act provides the regulatory framework for railway safety, security, and some of the environmental impacts of railway operations in Canada. The Rail Safety Program develops and enforces regulations, rules, standards and procedures governing safe railway operations. Additional information about the Program is available at: <https://www.tc.gc.ca/eng/railsafety/menu.htm>. Enquiries can be directed to RailSafety@tc.gc.ca or by calling (613) 998-2985.

- **Transportation of Dangerous Goods Act (TDGA)** – the transportation of dangerous goods by air, marine, rail and road is regulated under the TDGA. Transport Canada, based on risks, develops safety standards and regulations, provides oversight and gives expert advice on dangerous goods to promote public safety. Additional information about the transportation of dangerous goods is available at: <https://www.tc.gc.ca/eng/tdg/safety-menu.htm>. Enquiries can be directed to TDG-TMDOntario@tc.gc.ca or by calling (416) 973-1868.
- **Aeronautics Act** – Transport Canada has sole jurisdiction over aeronautics, which includes aerodromes and all related buildings or services used for aviation purposes. Aviation safety in Canada is regulated under this Act and the Canadian Aviation Regulations (CARs). Elevated Structures, such as wind turbines and communication towers, would be examples of projects that must be assessed for lighting and marking requirements in accordance with the CARs. Transport Canada also has an interest in projects that have the potential to cause interference between wildlife and aviation activities. One example would be waste facilities, which may attract birds into commercial and recreational flight paths. The *Land Use In The Vicinity of Aerodromes* publication recommends guidelines for and uses in the vicinity of aerodromes, available at: <https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm>. Enquires can be directed to CASO-SACO@tc.gc.ca or by calling 1 (800) 305-2059 / (416) 952-0230.

Please advise if additional information is needed.

Thank you,

Environmental Assessment Program, Ontario Region

Transport Canada / Government of Canada / 4900 Yonge St., Toronto, ON M2N 6A5

EnviroOnt@tc.gc.ca / Facsimile : (416) 952-0514 / TTY: 1-888-675-6863

Programme d'évaluation environnementale, Région de l'Ontario

Transports Canada / Gouvernement du Canada / 4900, rue Yonge, Toronto, ON, M2N 6A5

EnviroOnt@tc.gc.ca / télécopieur: (416) 952-0514

From: Rahman, Mahnaz (MCSS) [<mailto:Mahnaz.Rahman@ontario.ca>]

Sent: May 29, 2017 1:48 PM

To: Kabanov, Serguei

Cc: Rolo, Bruna (MCSS)

Subject: Class Environmental Assessment Study - Queen Street East Bridge and Culvert Replacement

Good Afternoon,

I'm responding to you in regards to the letter dated May 15, 2017, to Karen Eisler, Director of Central Region of the Ministry of Community and Social Services. Thank you for sharing the notice of the Public Information Centre. We have no comments or questions regarding the study.

Sincerely,

Mahnaz Rahman for Karen Eisler

From: Zirger, Rosi (MTCS) [<mailto:Rosi.Zirger@ontario.ca>]
Sent: Tuesday, June 20, 2017 11:02 AM
To: serguei.kabanov@peelregion.ca
Cc: David OSullivan <dosullivan@rvanderson.com>; John P. Does <jdoes@rvanderson.com>
Subject: RE: Queen Street East Bridge & Culvert Replacement over Shaw's Creek, Village of Alton

Good morning

Thank you for sending the link to the PIC boards. We noticed that the cultural heritage environment (e.g. archaeological resources, built heritage resources and cultural heritage landscapes) were not among the criteria considered in the design alternatives. Please be aware that the whole study areas must be screened for potential impacts to cultural heritage resources.

Our response letter of December 21, 2016 provided screening criteria - a [checklist](#) and [background material](#) available online - developed by Municipal Engineers Association for work on bridges that falls under the Municipal Class EA. However, we see from the PIC boards that the scope of work extends beyond the replacement of these structures and may result in impacts to areas adjoining the existing roadway, which may include areas of archaeological potential.

Accordingly, we suggest that the project be screened with the MTCS [Criteria for Evaluating Archaeological Potential](#) to determine if an archaeological assessment is needed. MTCS archaeological sites data are available at archaeology@ontario.ca. If this EA project area exhibits archaeological potential, then an archaeological assessment (AA) should be undertaken by an archaeologist licenced under the OHA, who is responsible for submitting the report directly to MTCS for review.

Similarly, the MTCS [Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes](#) should be completed to help determine whether this EA project may impact cultural heritage resources. The Clerk or Heritage Planning staff for the Town of Caledon can provide information on property registered or designated under the *Ontario Heritage Act*. Municipal Heritage Planners can also provide information that will assist you in completing the checklist.

If potential or known heritage resources exist, MTCS recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, should be completed to assess potential project impacts. Our Ministry's [Info Sheet #5: Heritage Impact Assessments and Conservation Plans](#) outlines the scope of HIAs. Please send the HIA to MTCS and the local municipality as appropriate for review, and make it available to local organizations or individuals who have expressed interest in review.

EA Reporting

All technical heritage studies and their recommendations are to be addressed and incorporated into EA projects. Please advise MTCS whether any technical heritage studies will be completed for this EA project, and provide them to MTCS before issuing a Notice of Completion. If your screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file.

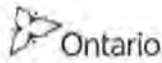
Please contact me as necessary for clarification or further discussion.

Sincerely

Rosi Zirger
A/Heritage Advisor
Ministry of Tourism, Culture & Sport
Culture Division | Programs & Services Branch | Heritage Programs Unit

401 Bay Street, Suite 1700 Toronto, Ontario M7A 0A7

Tel. 416.314.7159 | Fax 416.212-1802 | E-mail: rosi.zirger@ontario.ca



From: Kabanov, Serguei [<mailto:serguei.kabanov@peelregion.ca>]
Sent: June 20, 2017 7:26 AM
To: Zirger, Rosi (MTCS)
Cc: dosullivan@rvanderson.com; John Does (jdoes@rvanderson.com)
Subject: RE: Queen Street East Bridge & Culvert Replacement over Shaw's Creek, Village of Alton

Hi Rosi,

Thank you for writing back to us. Please see attached the link to PIC#1 material.

<http://www.peelregion.ca/news/notices/2017/notice-170503.htm>

If you have any further questions, please do not hesitate to contact us.

Thank you

Serguei Kabanov, CD, CET, rcca
Project Manager

From: Zirger, Rosi (MTCS) [<mailto:Rosi.Zirger@ontario.ca>]
Sent: June 19, 2017 4:09 PM
To: Kabanov, Serguei
Cc: dosullivan@rvanderson.com
Subject: RE: Queen Street East Bridge & Culvert Replacement over Shaw's Creek, Village of Alton

Good afternoon Mr. Kabanov

On May 23, 2017 the Ministry of Tourism, Culture and Sport (MTCS) received a Notice of Public Information Centre scheduled for June 7th for the project mentioned above. MTCS's interest in this EA project relates to its mandate of conserving Ontario's cultural heritage, which includes archaeological resources, built heritage resources, including bridges and cultural heritage landscapes.

Would you please send us the PIC panels or presentation for our review?

Would you also please update your contact list to remove the name of Malcolm Horne and send future notices to Rosi Zirger, Heritage Planner at rosi.zirger@ontario.ca or to 401 Bay Street, Suite 1700 Toronto, Ontario M7A 0A7.

Meanwhile, we would appreciate being kept informed of this project as it proceeds through the EA process. Please contact me as necessary for clarification or further discussion.

Sincerely

Rosi Zirger

A/Heritage Advisor

Ministry of Tourism, Culture & Sport

Culture Division | Programs & Services Branch | Heritage Programs Unit

401 Bay Street, Suite 1700 Toronto, Ontario M7A 0A7

Tel. 416.314.7159 | Fax 416.212-1802 | E-mail: rosi.zirger@ontario.ca



From: Zirger, Rosi (MTCS)

Sent: December 21, 2016 2:46 PM

To: dosullivan@rvanderson.com

Cc: serguei.kabanov@peelregion.ca

Subject: Queen Street East Bridge & Culvert Replacement EA

Good afternoon

The Ministry of Tourism, Culture and Sport (MTCS) has received a Notice of Study Commencement for the project mentioned above. Attached please find MTCS comments and recommendations for this project.

Meanwhile, we would appreciate being kept informed of this project as it proceeds through the EA process. Please update your contact list to remove the name of Malcolm Horne and send future notices to Rosi Zirger Heritage Planner at rosi.zirger@ontario.ca or to 401 Bay Street, Suite 1700 Toronto, Ontario M7A 0A7

Please contact me as necessary for further discussion.

From: Banke, Dana
Sent: May 30, 2017 10:01 AM
To: Kabanov, Serguei
Subject: Culvert Replacement over Shaws Creek - Alton

Dear Mr. Kabanov:

Please be advised that our interest in the study and any subsequent construction or development is limited to being kept aware of any closures, detours or hazards that would limit or impede access to the area or those areas of the community which would require our response to traverse through the study/construction area.

Please ensure that we are advised well in advance so that we can disseminate the information on alternate routes or anticipated delays.

Regards

D. R. Banke

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From: Chief Rodney Noganosh <chief@ramafirstnation.ca>
Date: June 2, 2017 at 11:39:31 AM EDT
To: "Serguei.kabanov@peelregion.ca" <Serguei.kabanov@peelregion.ca>
Cc: Shawna McKenzie <shawnam@ramafirstnation.ca>
Subject: re: Region of Peel – Class Environmental Assessment Study (Schedule 'B') – Queen Street East (Highway 136) Bridge and Culvert Replacement over Shaw's Creek, in the Village of Alton, Town of Caledon

Dear Serguei;

Thank you for your letter re: Region of Peel – Class Environmental Assessment Study (Schedule 'B') – Queen Street East (Highway 136) Bridge and Culvert Replacement over Shaw's Creek, in the Village of Alton, Town of Caledon.

Please be advised that we reviewed your letter. I have shared it with Council and we've forwarded the information to Karry Sandy McKenzie, Williams Treaties First Nation Process Co-ordinator/Negotiator. Ms. McKenzie will review your letter and take the necessary action if required. In the interim, should you wish to contact Ms. McKenzie directly, please do so at k.a.sandy-mckenzie@rogers.com

Thank you,

Chief Rodney Noganosh

Hollie Nolan

Executive Assistant to the Chief, Administration

Chippewas of Rama First Nation

(ph) 705-325-3611, 1216


(cell)

(fax) 705-325-0879

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APPENDIX C

NATURAL ENVIRONMENT REPORT

ENVIRONMENTAL IMPACT STATEMENT

QUEEN STREET EAST ROAD RECONSTRUCTION AND BRIDGE
REPLACEMENT, VILLAGE OF ALTON, REGIONAL MUNICIPALITY OF
PEEL (FILE 11-4830 / 13-4880)

prepared for:



prepared by:

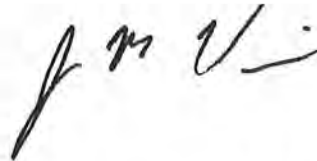


OCTOBER 2017

ENVIRONMENTAL IMPACT STATEMENT

QUEEN STREET EAST ROAD RECONSTRUCTION AND BRIDGE
REPLACEMENT, VILLAGE OF ALTON, REGIONAL MUNICIPALITY OF
PEEL (FILE 11-4830 / 13-4880)

prepared by:



JUDSON VENIER, M.Sc
Senior Fisheries Biologist

OCTOBER 2017

LGL Project # TA8612

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1.0 INTRODUCTION

Peel Region is undertaking detailed design for the reconstruction of Queen Street East and the replacement of the Shaw's Creek bridge and tributary culvert from 200 m west to 200 m east of the existing Shaw's Creek structure in the village of Alton. The study limits are presented in **Figure 1**.

This detailed design assignment is being conducted by R.V. Anderson Associates Limited on behalf of Peel Region. LGL Limited, as a sub-consultant to R.V. Anderson, is providing natural heritage services. This Environmental Impact Statement (EIS) documents the results of data collection and analysis in the Spring/Summer of 2016, the potential effects of this project on natural heritage and environmental protection measures.

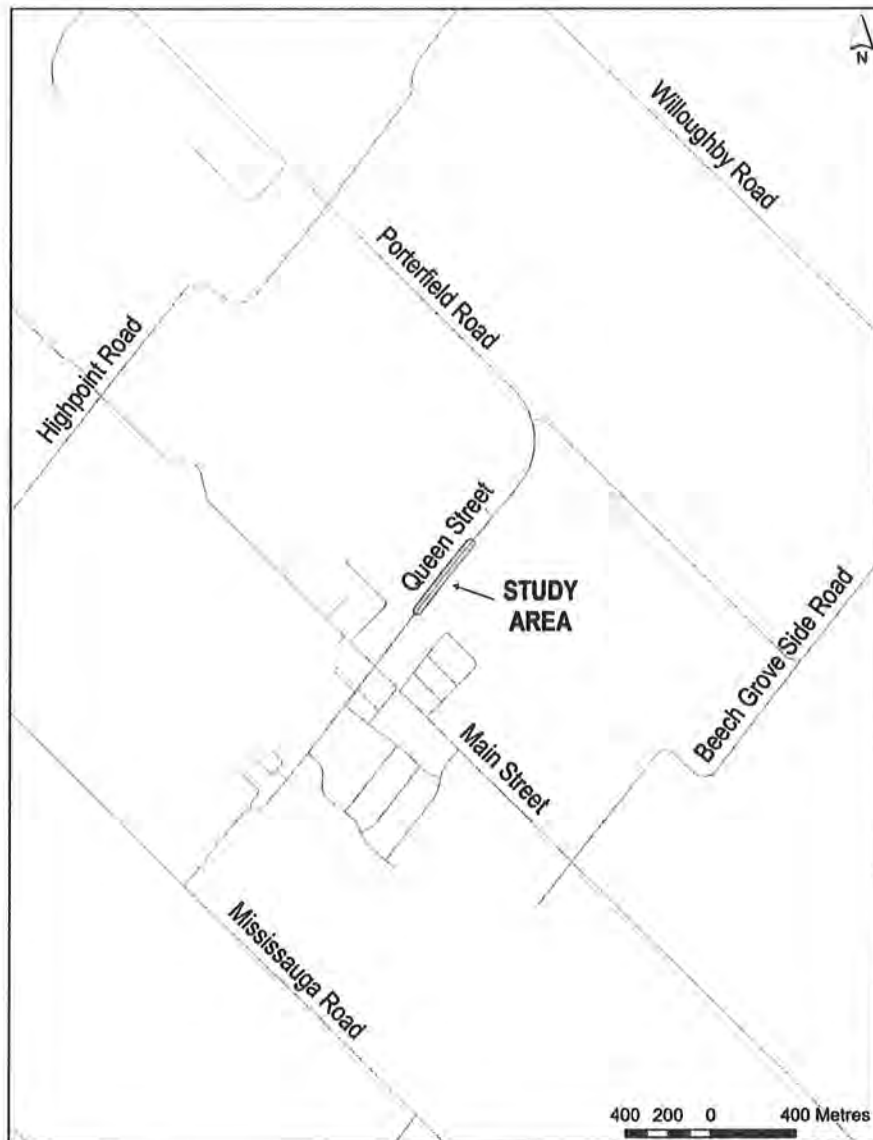


FIGURE 1. KEY PLAN

2.0 EXISTING CONDITIONS

The following discussion outlines the existing environmental conditions within the study area and identifies natural heritage areas and/or features of environmental sensitivity and/or significance.

2.1 Physiography and Soils

The study area is located within the Hillsburgh Sandhills (Orangeville Moraine) physiographic region. This physiographic region occupies the northwest portion of the Credit River watershed and consists of coarse-grained sediments (NAI Management Committee 2011). The topography exhibits high relief and consists of deposits of glacial outwash overlying glacial tills and bedrock (NAI Management Committee 2011).

The study area soils are comprised of Pontypool Sandy Loam, Caledon Loam, Muck, and Bottom Land (Hoffman and Richards 1953). These soils are described further in the following subsections (all descriptions from Hoffman and Richards 1953).

2.1.1 Pontypool Sandy Loam

Pontypool Sandy Loam soils are well-drained with coarse textures and low organic content. Areas with this soil series exhibit irregular steeply sloping topography. This soil group is found north and east of the watercourses within the study area.

2.1.2 Caledon Loam

Caledon Loam soils are well-drained with a smooth, moderately sloping topography. This soil type is composed of well-sorted gravelly materials mainly derived from shales. Caledon Loam soils are found to the south and west of Shaw's Creek within the study area.

2.1.3 Muck

Muck soils are comprised of decomposed organic matter. They are poorly drained and are found mainly in low-lying areas. Within the study area, Muck soils can be found to the west of Shaw's Creek, south of Queen Street.

2.1.4 Bottom Land

Bottom Land soils are immature soils found in low lying areas along watercourses which are subject to flooding. These soils typically have poor drainage. Within the study area, Bottom Land soils are found along both Shaw's Creek and its tributary.

2.2 Hydrology and Hydrological Resources

Hydrology and hydrological resources located within the study area are presented and discussed within a separate report and are not included in this EIS.

2.3 Aquatic Habitats and Communities

The Shaw's Creek subwatershed is one of several subwatersheds that comprise the headwaters of the Credit River watershed. It drains 77.8 km² of land area with a generally rural mix of land uses such as agriculture, natural (meadow, forest) and small settlement. Shaw's Creek and its tributary are considered to be coldwater habitats within the study area (CVC 2014).

Background Data

LGL conducted a secondary source review to identify the fish community within the watershed. The secondary source review included species at risk screening through aquatic species at risk mapping (DFO 2016), the Natural Heritage Information Centre (NHIC) database (MNRF 2016), correspondence with the MNRF Aurora District Office regarding species at risk and fish collection records, correspondence with CVC regarding fish sensitivity and fisheries collection records in the study area watercourses, in addition to reviews of the Shaw's Creek Draft Subwatershed Study Background Report (CVC 2006).

Based on a review of the Shaw's Creek Subwatershed Study (CVC 2014) and correspondence with CVC and MNRF, Shaw's Creek and its tributary are both cold water aquatic communities which support Brook Trout (*Salvelinus fontinalis*). The subwatershed study also identifies that Brook Trout spawning habitat is present within the vicinity of Queen Street. Brook Trout are a sensitive species which require clear, cold, well oxygenated water for all life processes, especially spawning. According to MNRF, no aquatic species at risk are present within the Shaw's Creek subwatershed within the limits of the study area.

Fisheries community information was obtained from the above secondary sources, in addition to LGL dip net sampling during field investigations. A summary of the fish communities present within the watercourses in the vicinity of the study area is presented in **Table 1**.

Field Investigations

An LGL fisheries biologist visited Queen Street East on May 18, 2016 to observe and document existing aquatic habitat conditions. The weather conditions during the site visit were partly cloudy and 13°C, with west winds, 10 km/h. No rain was recorded for the previous 24 hours.

Physical habitat features were surveyed in sufficient detail to enable mapping and identification of key habitat types. The physical habitat attributes assessed included: (a) instream cover, (b) bank stability, (c) substrate characteristics, (d) stream dimensions, (e) barriers, (f) stream morphology, (g) terrain characteristics, (h) stream canopy cover, (i) stream gradient, (j) aquatic vegetation, (k) ground water seepage areas, and (l) general comments. Fish collection records based on secondary source review and LGL field investigations (dip net sampling), are presented in **Table 1**. **Figure 2** presents the location of the crossings identified within the study area. An aquatic habitat summary is presented below which describes existing conditions observed during field investigations. Representative photographs of the crossings were also taken during the investigation and are provided in **Appendix A**.

It should be noted that during a site visit with Mark Heaton of the MNRF, spawning American Brook Lamprey (*Lethenteron appendix*) were observed in the Tributary of Shaw's Creek immediately upstream of the Queen Street crossing during May 2016 (M. Heaton, pers. comm.). This species prefers coldwater habitats and is relatively sensitive to pollution and turbidity.

2.3.1 Shaw's Creek

Shaw's Creek at the crossing location flows from north to south via a single 9 m wide channel under the single span Queen Street bridge structure. The crossing of Shaw's Creek is located approximately 530 m east of Main Street in the Village of Alton.

TABLE 1.
HISTORIC FISH COLLECTION RECORDS WITHIN THE STUDY AREA

Scientific Name	Common Name	Shaw's Creek	Tributary of Shaw's Creek	COSEWIC	SARA	MNR	Provincial
<i>Chrosomus eos</i>	Northern Redbelly Dace	x	x	-	-	-	S5
<i>Cyprinus carpio</i>	Common Carp	x		-	-	-	SNA
<i>Hybognathus hankinsoni</i>	Brassy Minnow	x	x	-	-	-	S5
<i>Luxilus cornutus</i>	Common Shiner	x		-	-	-	S5
<i>Margariscus nachtriebi</i>	Northern Pearl Dace	x		-	-	-	S5
<i>Notemigonus crysoleucas</i>	Golden Shiner		x	-	-	-	S5
<i>Pimephales notatus</i>	Bluntnose Minnow	x		-	-	-	S5
<i>Pimephales promelas</i>	Fathead Minnow	x	x	-	-	-	S5
<i>Rhinichthys cataractae</i>	Longnose Dace	x		-	-	-	S5
<i>Rhinichthys atratulus</i>	Blacknose Dace	x	x	-	-	-	SNA
<i>Semotilus atromaculatus</i>	Creek Chub	x	x	-	-	-	S5
<i>Catostomus commersonii</i>	White Sucker	x	x	-	-	-	S5
<i>Hypentelium nigricans</i>	Northern Hog Sucker	x		-	-	-	S4
<i>Ameiurus nebulosus</i>	Brown Bullhead	x		-	-	-	S5
<i>Salmo trutta</i>	Brown Trout	x		-	-	-	SNA
<i>Salvelinus fontinalis</i>	Brook Trout	x	x	-	-	-	S5
<i>Esox lucius</i>	Northern Pike	x		-	-	-	S5
<i>Umbra limi</i>	Central Mudminnow	x		-	-	-	S5
<i>Culaea inconstans</i>	Brook Stickleback	x		-	-	-	S5
<i>Ambloplites rupestris</i>	Rock Bass	x		-	-	-	S5
<i>Micropterus salmoides</i>	Largemouth Bass	x	x	-	-	-	S5
<i>Pomoxis nigromaculatus</i>	Black Crappie	x		-	-	-	S4
<i>Lepomis gibbosus</i>	Pumpkinseed	x	x	-	-	-	S5
<i>Etheostoma exile</i>	Iowa Darter	x	x	-	-	-	S5
<i>Perca flavescens</i>	Yellow Perch	x		-	-	-	S5

Note: x = Secondary Source Fish Collection Data, personal correspondence with CVC (February 2016)



LEGEND

- Provincially Significant Wetland (Credit River at Alton Wetland Complex)
 - Wetland not evaluated per OWES
 - Staked Wetland
 - Watercourse
- Vegetation Communities
- Vegetation Community Boundary
 - CUM1-1** Dry-Moist Old Field Meadow Type
 - CUP3** Coniferous Plantations
 - FOM** Mixed Forest
 - MAS2-1** Cattail Mineral Shallow Marsh Type
 - SWT2-1** Alder Mineral Thicket Swamp Type
 - M** Manicured

Data Sources: LGL Limited field surveys, Ministry of Natural Resources.



NATURAL HERITAGE



Project: TA8612	Figure: 2
Date: October, 2017	Prepared By: MWF
Scale: 1 : 2400	Checked By: JMV

Upstream of the Queen Street crossing, riffles and runs are the dominant morphology types. Two pools/deep runs (40-50 cm in depth) were identified in the upstream area of investigation. The wetted channel averages 6.5 m in width and 20-30 cm in depth. Bankfull width and depth are 7 m and 40-50 cm respectively. This creek does not appear to experience high fluctuations in water levels as only minor erosion was observed, and was in the form of undercut banks. Riparian cover is fairly low and provided by grasses, cattails and shrubs, however instream cover is very high. Instream woody debris and undercut banks providing fish cover are plentiful throughout the upstream section of channel. Substrates present within the upstream section of channel include gravel, cobble, sand, silt and detritus. Groundwater contribution to Shaw's Creek was noted to the west, immediately upstream of the culvert inlet. This groundwater appears to be upwelling in several locations within the cattail marsh adjacent to the creek. Redds (fish nests), presumably from Brook Trout spawning activity, were noted approximately 30 m upstream of Queen Street.

Downstream of the Queen Street crossing, a long series (~30m) of riffles occurs, in which a number of instream logs were noted. Downstream of the riffles, morphology consists of predominately runs, some of which appear to reach up to 50 cm in depth. Riparian cover throughout the downstream area of investigation is low and consists of grasses and some shrubs/small cedar trees similar to upstream. Instream cover is high and also consists of instream woody debris and undercut banks. Substrates throughout the downstream section of channel includes gravel, sand, cobble, silt and detritus. Approximately 85 m downstream of Queen Street, the tributary of Shaw's Creek (**Section 2.3.2**) joins Shaw's Creek from the north. Although outside of the right-of-way, it was noted that approximately 130 m downstream of Queen Street, several woody debris jams are present, and the watercourse is braided throughout this reach within dense riparian cedar tree cover. This reach also has very high instream cover throughout all branches of the channel which is provided by instream woody debris, overhanging trees and undercut banks. A wetland feature was noted to the east of the creek in this area, and several signs of groundwater contributions to the watercourse were also observed.

2.3.2 Tributary of Shaw's Creek

The tributary of Shaw's Creek flows from north to south via a box culvert at Queen Street. This tributary crosses Queen Street approximately 60 m east of the Shaw's Creek crossing.

To the north of Queen Street, this watercourse averages 1.5 m in width and 20-30 cm in depth. The channel is riffle and run dominated; however, a pool was noted at the inlet of the culvert, which is approximately 50 cm in depth. This watercourse is well connected to the surrounding floodplain as the riparian area is hummocky in nature, and conditions were generally wet. Bankfull averages 2 m in width and 50-60 cm in depth. Riparian cover throughout this section of channel is high and dominated by woody shrubs. Instream cover is also high, and is provided by instream woody debris and undercut banks. Groundwater contribution was noted at the upstream section of the channel as watercress was commonly seen throughout. Substrates were comprised of sand, gravel, silt and cobble.

Downstream of Queen Street, and prior to joining Shaw's Creek, the watercourse measures 30 m in length and appears channelized. Riparian cover is low, and provided by overhanging grasses. Instream cover is moderate and provided by instream woody debris and undercut banks. Watercress is present throughout the downstream section of the channel indicating groundwater inputs. Substrates and channel dimensions are similar to the upstream section discussed above. The channel consists of riffles and runs, and no pools were identified within the downstream section investigated.

2.3.3 Species at Risk

No aquatic species at risk are known to be present in Shaw's Creek or its tributary within the vicinity of the study area.

2.4 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of the vegetation communities were identified through air photo interpretation and a field investigation. Air photos were interpreted to determine the limits and characteristics of the vegetation communities in the study area. A field investigation of the natural/semi-natural vegetation communities within and immediately adjacent to the existing Queen Street right-of-way (ROW) within the study area was conducted by LGL Limited on July 4, 2016. The field investigation was done to field verify the boundaries of the vegetation communities, to conduct a botanical survey and to confirm the presence/absence of any plant species at risk.

Vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee *et al.* 1998). Vegetation communities were sampled using a plotless method for the purpose of determining general composition and structure of the vegetation. Plant species status was reviewed for Ontario (Oldham 1999), Credit Valley Conservation Authority (CVC 2002) and for Region of Peel (Riley 1989; Varga *et al.* 2000). Vascular plant nomenclature follows Newmaster *et al.* (1998) with a few exceptions that have been updated to Newmaster and Raguphathy (2008).

2.4.1 Vegetation Communities

The study area consists of a mixture of cultural and wetland vegetation communities, including portions of vegetation communities that are already in a disturbed state as a result of land uses. Evidence of disturbance includes a high proportion of non-native plant species that are well adapted to persist in areas that experience regular disturbances. This includes species that are adapted to high light conditions, limited soil moisture, and species that are tolerant of salt spray.

There were four Ecological Land Classification (ELC) community types identified within the study limits during LGL's botanical surveys: Dry-Moist Old Field Meadow (CUM1-1); Coniferous Plantation (CUP3), Alder Swamp Thicket (SWT2-1); Cattail Mineral Marsh (MAS2-1); Mixed Forest (FOM). Cultural meadow communities were identified immediately adjacent to Queen Street within the ROW, and within several of these communities, small clusters of cattails (*Typha* sp.) had established within ditches.

The vegetation communities identified within the study area are considered widespread and common in Ontario and secure globally. These communities are delineated in **Figure 2** and are described in **Table 2**. Refinements to the ELC were made based on the wetland staking completed with the MNRF in the summer of 2016.

There are several areas that are not identified by an ELC classification; namely, areas of manicured grass (M) which include mown lawns, gardens and planted trees (refer to **Figure 2**).

2.4.2 Flora

A total of 55 vascular plant taxa were recorded within the study area. Four of these plants could only be identified to genus and thus are not included in the following discussion. Of the 51 plants identified to species, 25 (50%) plant species identified are native to Ontario and 26 (51%) plant species are considered introduced and non-native to Ontario. The vascular plant list is presented in **Appendix B**. None of the plant species identified are of provincial concern. Definitions of the acronyms and species ranks used in **Appendix B** are described in **Appendix C**.

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	ELC
Terrestrial – Cultural			
CUM	CULTURAL MEADOW		
CUM1-1	Dry-Moist Old Field Meadow	Ground Cover: awnless brome (<i>Bromus inermis</i> ssp. <i>inermis</i>), wild carrot (<i>Daucus carota</i>), bird's-foot trefoil (<i>Lotus corniculata</i>), Kentucky bluegrass (<i>Poa pratensis</i>), white sweet-clover (<i>Melilotus alba</i>) and Canada goldenrod (<i>Solidago canadensis</i>).	<ul style="list-style-type: none"> • Cultural communities (CU) • Tree cover and shrub cover < 25 % (M). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). • Pioneer community resulting from, or maintained by, anthropogenic-based influences. • Dominated by grasses and forbs.
CUP3	Coniferous Plantation	Canopy: includes spruce species (<i>Picea</i> sp.), Austrian pine (<i>Pinus nigra</i>). Understorey: includes Austrian pine and spruce species.	<ul style="list-style-type: none"> • Cultural communities (CU). • Plantation (P). • Coniferous tree cover >75% of canopy cover (3).
FOM	MIXED FOREST		
FOM	Mixed Forest	Canopy: includes trembling aspen, eastern white cedar (<i>Thuja occidentalis</i>), black walnut (<i>Juglans nigra</i>), Austrian pine and white pine (<i>Pinus strobus</i>). Understorey: includes Eastern white cedar, choke cherry, and willow (<i>Salix</i> sp.) Ground Cover: includes blue grasses and goldenrods (<i>Solidago</i> spp.).	<ul style="list-style-type: none"> • Tree cover > 60 % (FO). • Conifer tree species > 25% and deciduous tree species > 25% of canopy cover (C).
Wetland			
SWT	THICKET SWAMP		
SWT2-1	Alder Mineral Thicket Swamp	Canopy: includes speckled alder (<i>Alnus incana</i>), and trembling aspen. Understorey: includes red-osier dogwood (<i>Cornus sericea</i> ssp. <i>sericea</i>), willow, sedge (<i>Carex</i> sp.)	<ul style="list-style-type: none"> • Standing water > 20% of ground coverage dominated by hydrophytic shrub and tree species. Tree or shrub cover > 25% (SW). • Tree cover ≤ 25% and shrub cover ≥ 25% (T). • Mineral soil (2).
MAS	SHALLOW MARSH		
MAS2-1	Cattail Mineral Shallow Marsh	Canopy: includes some emergent Eastern white cedar. Ground Cover: dominated by cattails (<i>Typha</i> sp.)	<ul style="list-style-type: none"> • Tree and shrub cover < 25%; Hydrophytic emergent macrophyte cover > 25% • Standing or flowing water for much or all of growing season. • Variable flooding regimes
OTHER			

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	ELC
Manicured M)	Manicured grasses/ shrubs/trees	Areas where large expanses of grass/shrubs/trees are maintained and/or planted, or trees are planted for screening. Planted trees/shrubs: includes Norway maple, blue spruce (<i>Picea pungens</i>), Norway Spruce (<i>Picea abies</i>), Eastern white cedar. Ground Cover: bluegrasses (<i>Poa</i> sp.) and fescues (<i>Festuca</i> sp.).	

2.4.3 Species at Risk

No plant species that are regulated under the Ontario *Endangered Species Act* (ESA) or the Canada *Species at Risk Act* (SARA) (i.e., those plant species regulated as Endangered, Threatened, or Special Concern) were encountered during LGL’s botanical investigation within the subject area. A description of provincial species ranks is provided in **Appendix C**.

2.5 Wildlife and Wildlife Habitat

LGL Limited undertook field investigations within the study area on June 6 and June 24, 2016 to confirm background information, to document the natural heritage features and wildlife and wildlife habitat, and to determine the nature, extent and significance of wildlife usage within the study area. Direct observations, calls and tracks were used to record wildlife present within the study area. The study area was examined for significant wildlife corridors and culverts/structures being used for bird nesting. Special emphasis was placed on finding wildlife species at risk and confirming the presence of species at risk previously recorded in the vicinity of the study area.

Weather conditions on June 6, 2016 were overcast with a temperature of 17°C and calm winds. Weather conditions on June 24, 2016 were clear with a temperature of 19°C and calm winds.

2.5.1 Wildlife Habitat

The study area was comprised of a mix of anthropogenic, semi-natural and natural features in a landscape that varied from rural-residential properties to natural area (see **Figure 2**). Rural-residential properties were scattered throughout much of the study area, particularly outside of the natural areas associated with Shaw’s Creek and the tributary of Shaw’s Creek. Rural-residential areas generally contained low quality wildlife habitat consisting of manicured lawns, gardens and scattered road-side trees.

Wildlife and wildlife habitat was found to be distributed across the entire study area; however, core wildlife habitat areas were associated with Shaw’s Creek and its tributary, and adjacent natural areas. Meadow, swamp and mixed forest habitats found along Queen Street East within the study area contribute to the higher quality wildlife habitats identified within the lands examined. The natural areas surrounding the study area are also relatively intact and have experienced only modest fragmentation from roads and other infrastructure development. On the local landscape scale, this natural area is likely to provide significant wildlife movement opportunity and function.

Swamp and marsh communities are located in the vicinity of Shaw's Creek and its tributary. Anuran (frogs and toads) breeding habitat is expected to be present within these aquatic habitats and they likely function as habitat for aquatic and semi-aquatic bird and mammal species.

Mixed forest habitats were found to be distributed across much of the study area. These communities provide interior forest (where units are large enough) and forest edge habitat for a number of species and also serve as corridor/movement habitat for wildlife species.

Cultural meadow and manicured habitats were found across the study area and were generally associated with road-side areas and rural-residential settings. These areas were found to be more highly disturbed and as a consequence wildlife species identified within these areas were generally species considered to be urban or tolerant of anthropogenic features and disturbance, or non-native species.

2.5.2 Wildlife

Based on field observations, 33 species of wildlife could be verified in the study area and the majority of these recordings came from identification (through calls and sightings) of bird species with more modest numbers of herpetofauna and mammal species identified. A summary of wildlife species documented in the study area during field investigations is presented in **Table 3**.

Mammal Species

Three mammal species were identified during field investigations in the study area. Northern raccoon (*Procyon lotor*) tracks were commonly identified along the roadside, while eastern chipmunk (*Tamias striatus*) was identified in association with a residence. A single road-killed American mink (*Neovision vison*) was also identified in the vicinity of the Shaw's Creek crossing. The mammal species documented represent an assemblage that readily utilizes human influenced landscapes. Other mammal species which inhabit forest, open-county, aquatic and anthropogenic habitat types are expected to be found within the study area.

Herpetofauna Species

Two herpetofauna species (one reptile and one amphibian) were observed in the study area during field investigations. A number of Green Frogs (*Lithobates clamitans*) were identified within aquatic habitats in the study area and tracks from a Snapping Turtle (*Chelydra serpentina*) were identified in proximity to the bridge structure at Shaw's Creek. Additional herpetofauna species which inhabit forest, open-county, aquatic and anthropogenic habitat types are expected to be found within the study area.

Bird Species

Breeding bird surveys were conducted on two mornings during the 2016 breeding bird season to document breeding bird evidence (BBE) and to characterize the nature, extent and significance of breeding bird usage of the habitats within the study area (see **Table 3**). Breeding bird survey methodology and breeding bird behaviours used as evidence of breeding status were categorized according to the Breeding Bird Atlas five-year surveys organized by Bird Studies Canada (Cadman *et al.*, 2007). A single breeding bird point count stations was selected in proximity to the Shaw's Creek bridge structure, but wandering transects across the study area were also used to record bird species.

The study area contained a low to moderate number of breeding bird species representing several habitat types. Breeding evidence was obtained for 28 species of birds. Breeding evidence was confirmed in four species and was found to be probable for 15 species. An additional nine species were identified as having the potential to breed within the study area. Confirmed breeding by bird species was documented based on adults carrying food for young and active nests observed, including species such as Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospica melodia*), Eastern Phoebe (*Sayornis phoebe*)

and Common Yellowthroat (*Geothlypis trichas*). Other species were classified as probable breeders due to behaviours such as territory established or agitated behaviour including American Robin (*Turdus migratorius*), Tree Swallow (*Tachycineta bicolor*), Northern Cardinal (*Cardinalis cardinalis*) and Eastern Kingbird (*Tyrannus tyrannus*).

An Eastern Phoebe nest was found under the bridge at Shaw's Creek (this was previously reported as a Barn Swallow nest in GHD/Beacon 2015). The Eastern Phoebe is afforded protection under the *Migratory Birds Convention Act*. Species which were most commonly encountered across the study area were generally species associated with forest/forest edge, swamp/marsh, open-country and anthropogenic habitat types. Two bird species identified are considered area-sensitive and/or interior species according to the Significant Wildlife Habitat Technical Guide (MNR 2000) as indicated in **Table 3**.

2.5.3 Species at Risk

Twenty-two recorded species of bird are protected under the *Migratory Birds Convention Act* (MBCA) and a single bird species is protected under the Fish and Wildlife Conservation Act (FWCA). Three mammals and a single herpetofauna species are also afforded protection under the FWCA.

Of the 33 wildlife species recorded within the study area, one is listed under the species at risk in Ontario list (Snapping Turtle-SC). Tracks from a Snapping Turtle were identified in proximity to Shaw's Creek. Consultation with MNR Aurora District on March 4, 2016 (M. Heaton, pers. comm.) indicated that no known records for species at risk exist within proximity to the study area.

The one species at risk identified above, respective legal status, biological requirements, habitat suitability of the study area, and likelihood of presence within the study area are discussed below.

Snapping Turtle

The Snapping Turtle is listed as 'Special Concern' under the ESA and SARA; however, this species is not a regulated species (Endangered or Threatened) under the ESA. Snapping Turtle tracks and evidence of potential nesting were noted in the gravel road shoulder near Shaw's Creek. The Snapping Turtle is generally associated with aquatic setting such as lakes, ponds, bays and inlets. This is an aquatic species but Snapping Turtles may leave the water to seek out new aquatic habitats or to lay eggs. Suitable habitat for Snapping Turtle within the study area would generally be limited to Shaw's Creek and associated aquatic communities identified across the site. As noted above, Snapping Turtles may use gravel road shoulders present within the study area as nesting habitat. Similarly, Snapping Turtles from surrounding areas may use habitats within the study area during movements from one aquatic area to another.

**TABLE 3.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA BY LGL (2016)**

Wildlife	Scientific Name	Common Name	SARA	ESA	Legal Status	Other
Herpetofauna	<i>Lithobates clamitans</i>	Green Frog				
	<i>Chelydra serpentina</i>	Snapping Turtle	SC	SC	FWCA(G)	
Birds	<i>Columba livia</i>	Rock Dove				
	<i>Zenaida macroura</i>	Mourning Dove			MBCA	
	<i>Colaptes auratus</i>	Northern Flicker			MBCA	
	<i>Empidonax traillii</i>	Willow Flycatcher			MBCA	
	<i>Sayornis phoebe</i>	Eastern Phoebe			MBCA	
	<i>Myiarchus crinitus</i>	Great-crested Flycatcher			MBCA	
	<i>Tyrannus tyrannus</i>	Eastern Kingbird			MBCA	
	<i>Cyanocitta cristata</i>	Blue Jay			FWCA (P)	
	<i>Corvus brachyrhynchos</i>	American Crow			MBCA	
	<i>Tachycineta bicolor</i>	Tree Swallow			MBCA	
	<i>Poecile atricapillus</i>	Black-capped Chickadee			MBCA	
	<i>Troglodytes aedon</i>	House Wren			MBCA	
	<i>Turdus migratorius</i>	American Robin			MBCA	
	<i>Dumetella carolinensis</i>	Gray Catbird			MBCA	
	<i>Sturnus vulgaris</i>	European Starling				
	<i>Bombycilla garrulus</i>	Cedar Waxwing			MBCA	
	<i>Dendroica petechia</i>	Yellow Warbler			MBCA	
	<i>Dendroica virens</i>	Black-throated Green Warbler			MBCA	SWH
	<i>Seiurus auropilla</i>	Ovenbird			MBCA	SWH/INT
	<i>Geothlypis trichas</i>	Common Yellowthroat			MBCA	
	<i>Spizella passerina</i>	Chipping Sparrow			MBCA	
	<i>Melospica melodia</i>	Song Sparrow			MBCA	
	<i>Zonotrichia albicollis</i>	White-throated Sparrow			MBCA	
	<i>Cardinalis cardinalis</i>	Northern Cardinal			MBCA	
	<i>Agelaius phoeniceus</i>	Red-winged Blackbird				
	<i>Quiscalus quiscula</i>	Common Grackle				
	<i>Carduelis tristis</i>	American Goldfinch			MBCA	
(continued)	<i>Passer domesticus</i>	House Sparrow				
Mammals	<i>Tamias striatus</i>	Eastern Chipmunk			FWCA(P)	
	<i>Neovison vison</i>	American Mink			FWCA(F)	
	<i>Procyon lotor</i>	Northern Raccoon			FWCA(F)	

SARA – federal *Species at Risk Act*:
END - Endangered
THR - Threatened
SC - Special Concern

ESA - *Ontario Endangered Species Act*, 2007
END - Endangered
THR - Threatened
SC - Special Concern

Other:
Significant Wildlife Habitat Technical
Guide:
SWH – Area Sensitive Species
INT - Interior Species

For definitions of species ranks, refer to
Appendix C.

Legal Status:
MBCA - *Migratory Birds Convention Act*
ESA - *Endangered Species Act*
SARA - *Species at Risk Act*
FWCA - *Fish and Wildlife Conservation Act*
(P) Protected Species (G) Game species (F)
Furbearing mammals

2.6 Designated Natural Areas

Designated natural areas include areas identified for protection by the Ontario Ministry of Natural Resources and Forestry, Credit Valley Conservation, Regional Municipality of Peel and the Town of Caledon. A review of the MNRF Natural Heritage Information Centre (NHIC 2016) indicates that there is one Provincially Significant Wetlands (PSWs) and one Environmentally Significant/Sensitive Areas (ESAs) identified within 120 m of the study area, but no Areas of Natural and Scientific Interest (ANSIs).

The Credit River at Alton Wetland Complex is a PSW that exists both north and south of Queen Street within the study area. The exact boundaries of this wetland were marked by Mark Heaton of the MNRF and surveyed in 2016.

The Credit River at Alton ESA also lies within the study area and includes the Shaw's Creek valley on the south side of Queen Street.

Greenbelt Plan Area

The entire study area is identified as "Protected Countryside" within the Greenbelt Plan Area and specifically "Natural Heritage System".

Peel Region Official Plan

The study area is identified as "Core Area of the Greenlands System in the Region of Peel Official Plan".

3.0 PROJECT DESCRIPTION

The preferred alternative recommends the replacement of the current 9 m span bridge over Shaw's Creek with a 25 m span and the 3 m x 1.35 m concrete box with a 10 m x 3 m open bottom culvert. This will raise the road profile by a minimum of 1.4 m. The road will become a two-lane urban roadway.

The potential effects of the preferred alternative on fish and fish habitat, vegetation and vegetation communities, wildlife and wildlife habitat, and designated natural areas are discussed in **Section 4.0**.

4.0 IMPACT ASSESSMENT AND ENVIRONMENTAL PROTECTION

4.1 Soil Disturbance and Potential for Erosion

Soil disturbance within the Queen Street East study area will be limited to previously disturbed areas within the road right-of-way, with some exceptions, where grading will be required in natural areas. Impacts resulting from any excavating or cut and fill operations will be temporary in nature. Erosion and sedimentation mitigation measures will be implemented prior to and during the construction phase.

A Sediment and Erosion Control Plan will be prepared during detail design. These control measures will include:

- limiting the geographical extent and duration that soils are exposed to the elements;
- implementing standard erosion and sedimentation control measures in accordance with Ontario Provincial Standard Specification (OPSS) 805 Construction Specification for Temporary Erosion and Sediment Control Measures. These standard measures include: silt fence placed along the margins of areas of soil disturbance; applying conventional seed and mulch and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization; and,
- managing surface water outside of work areas to prevent water from coming in contact with exposed soils.

Monitoring of these erosion and sedimentation control measures during and after construction will be implemented to ensure their effectiveness. These environmental measures will greatly reduce/minimize adverse environmental impacts.

4.2 Aquatic Habitats and Communities

Both of the watercourses being affected by bridge/culvert works support direct fish habitat. **Figure 2** presents the locations of all crossings. As the watercourses provide fish habitat, the proposed bridge/culvert works along with works in riparian areas may have the potential to impact fish habitat due to the following effects:

- temporary disruption of site-specific habitat;
- changes to water quality and quantity;
- changes in water temperature; and,
- barriers to fish passage.

As a result of recent changes to the *Fisheries Act*, DFO has introduced a self-assessment process for proponents to determine if *Serious Harm* to fish or fish habitat is expected as a result of activities from the project. Previously, all screenings under the *Fisheries Act* in the TRCA jurisdiction were undertaken by the Conservation Authority in accordance with an agreement with DFO. With the new process, proponents use DFO screening criteria to determine if a review of the project by DFO is required.

The works proposed at the watercourses summarized below do not meet the self-assessment criteria and serious harm to fish or fish habitat may occur. Further details regarding works, net environmental effects and site-specific mitigation proposed at the crossings can be found in **Sections 4.2.1 and 4.2.2**, and are summarized in **Table 4**.

The designs of both crossings include replacements of existing structures which will be shorter or longer than the existing structures. The bridge structure length will be increased from 11.9 m to 14.7 m, which will cause enclosures of fish habitat and increases in footprints below the high water mark. The culvert length will decrease from 19 m to 15.4 m. The enclosure at the bridge within the channel footprint will necessitate a review of the project by DFO.

A 'Request for Review' will be submitted to DFO during detail design to determine if an authorization under the *Fisheries Act* is required. If it is required, the completed 'Application Form for Paragraph 35(2)(b) *Fisheries Act* Authorization (Normal Circumstances)' should be submitted to DFO for review.

4.2.1 Temporary Disruption or Permanent Loss of Site-Specific Habitat

The works at the two locations mentioned above have the potential to result in the permanent loss of localized fish habitat. In order to minimize the potential for serious harm, the new bridge and culvert will be as short as possible and all works will be performed in-the-dry by not impacting the channel at the bridge or using temporary flow bypass systems and cofferdams to isolate the culvert work area. Construction will also be staged such that water flow will be maintained. The road will be temporarily closed during construction.

The existing bridge at Shaw's Creek will be 2.8 m longer, resulting in additional 23.8 m² of bankfull channel enclosure based on an average bankfull channel width of 8.5 m. This will result in serious harm to fish. However, this enclosure is relatively small and is not considered to be significant, especially because the channel will not become connected to the surrounding riparian habitat and floodplain (it is currently restricted by the bridge). As such it can likely be mitigated with the implementation of the environmental protection measures presented below.

The existing box culvert at the Tributary of Shaw's Creek is being replaced by a larger open bottom culvert that will be 3.6 m shorter, resulting in an increase of 6.5 m² of bankfull channel based on an average bankfull channel width of 1.8 m. This will result in a net increase in fish habitat.

**TABLE 4.
SUMMARY OF CULVERT MODIFICATIONS AND SITE-SPECIFIC MITIGATION**

Name	Fish Habitat	Existing	Proposed	Net Environmental Effects	Site Specific Mitigation
Shaw's Creek	<ul style="list-style-type: none"> • Permanent Flow • Direct Fish Habitat • Coldwater Fishery 	11.9 m span bridge	<ul style="list-style-type: none"> • Replacement with 25 m span bridge 	<ul style="list-style-type: none"> • 2.8 linear m of channel will be enclosed • Based on an average bankfull channel width of 8.5 m, approximately 23.8 m² of channel will be enclosed • Increase in riparian vegetation growth under structure (more light penetration with larger structure) • Greater connectivity to riparian habitats and floodplain • Natural channel through structure 	<ul style="list-style-type: none"> • All works to be conducted within the Coldwater timing window (June 15 - September 15). • Work will be done "in the dry" • Vegetation removals will require replacement
Tributary of Shaw's Creek	<ul style="list-style-type: none"> • Permanent Flow • Potential Direct Fish Habitat • Coldwater Fishery 	3 m x 1.35 m concrete box culvert	<ul style="list-style-type: none"> • Replacement with a 10 m x 3 m open bottom concrete culvert 	<ul style="list-style-type: none"> • 3.6 linear m of channel will be "opened" • Based on an average bankfull channel width of 1.8 m, approximately 6.5 m² of channel will be "opened" • Natural channel through structure due to open bottom culvert 	<ul style="list-style-type: none"> • All works to be conducted within the Coldwater timing window (June 15 - September 15) • Work will be done "in the dry" • Vegetation removals will require replacement

To reduce the potential for serious harm to fish habitat, the following environmental protection measures will be implemented:

- an in-water work/work within riparian habitat construction timing restriction should be implemented to protect spawning fish, incubating eggs and fry emergence: because of the Coldwater habitat designation, in-water work/work within riparian habitat should be permitted from June 15 to September 15. If works are proposed outside of this window, approval by permitting agencies needs to be pursued;
- work areas will be delineated with construction fencing to minimize the area of disturbance;
- appropriate sediment control structures will be installed prior to and maintained during construction to prevent entry of sediments into the watercourse;
- where cofferdams are to be employed, unwatering effluent will be treated prior to discharge to receiving watercourse;
- cofferdams will be constructed using pea gravel bags or equivalent to isolate the work area and maintain flow;
- fish isolated by construction activities will be captured and safely released to the watercourse;
- good housekeeping practices related to materials storage/stockpiling, equipment fuelling/maintenance, etc. will be implemented during construction; and
- disturbed riparian areas will be vegetated and/or covered with an erosion control blanket as quickly as possible to stabilize the banks and minimize the potential for erosion and sedimentation.

These environmental protection measures will greatly reduce the potential adverse effects to fish and fish habitat resulting from construction activities.

4.2.2 Temporary Change to Water Quality

The construction associated with the proposed works has the potential to alter water quality through on-site erosion of exposed materials and the subsequent impairment of downstream water quality with sediments and other contaminants.

Changes to water quality will be mitigated through the isolation of the work areas behind cofferdams, the treatment of effluent from unwatering prior to its release back into the receiving watercourses, and the deployment and maintenance of erosion and sediment controls (silt fencing, flow checks, etc.) which will prevent sediments from reaching the watercourses from exposed soils upslope. To improve storm water quality, roadway runoff will be directed to new storm water management facilities. Oil grit separators will be installed to treat water prior to it entering the watercourse and, where space permits, infiltration of runoff will be encouraged to divert flows from storm sewers. In addition, all exposed areas will be vegetated as quickly as possible once work is completed.

The implementation of these mitigation measures should eliminate potential changes to water quality to the receiving watercourses.

4.2.3 Changes in Water Temperature

The thermal regime of a receiving watercourse may be altered by storm water runoff or removal of riparian vegetation that shades the watercourse. In the summer, runoff temperatures can be increased through contact with paved surfaces, which, when discharged to a receiving watercourse can result in

thermal shock, thereby injuring or killing aquatic organisms. Coldwater or coolwater streams are usually considered more sensitive to changes in water temperature than warmwater streams.

It is expected that there will be no significant increase in temperature as a result of the proposed works as long as appropriate storm water management strategies are implemented (see **Section 4.2.2**).

4.2.4 Barriers to Fish Passage

No barriers to fish passage will result from this project.

4.2.5 Restoration/Enhancement

Proposed works at Shaw's Creek and the Tributary of Shaw's Creek are expected to result in "Serious Harm" to fish due to the proposed channel enclosure at Shaw's Creek and works within the high water mark at both crossings. In addition, the riparian areas at these crossings may be affected by the bridge/culvert works. Restoration and enhancement will focus on these main areas of impact.

The goal of the restoration/enhancement plan is to provide an overall benefit to the watercourse at these locations through restoration of riparian habitat. Restoration of disturbed riparian areas should focus on the replacement and enhancement of the riparian vegetation that will be affected by the proposed works. These restoration and enhancement works will increase the diversity of habitat in relation to what is present by increasing riparian cover, increase habitat diversity and provide good floodplain connectivity.

At a minimum, the following should be employed as restoration/enhancement during the detail design phase of the project for all crossings where works (in-water or riparian) are proposed. Banks and riparian areas should be planted with native grasses and shrubs to provide increased shading and allochthonous inputs to the watercourse.

4.3 Vegetation and Vegetation Communities

Improvements to Queen Street East have the potential to result in impacts to vegetation and vegetation communities. Effects on vegetation related to these modifications could include:

- displacement of / disturbance to vegetation and vegetation communities; and,
- displacement of rare, threatened or endangered vegetation or significant vegetation communities.

4.3.1 Displacement and/or Disturbance to Vegetation Communities/Vegetation

Clearing of vegetation will be required to accommodate the proposed improvements to Queen Street East. The improvements to Queen Street East will result in the removal of approximately 0.709 ha of naturalized and/or planted areas. The largest area of impact will be to lands that have been anthropogenically influenced, including cultural vegetation communities and manicured areas. A total of 0.638 ha of anthropogenically influenced lands (e.g., manicured grass) and cultural vegetation communities will be removed as a result of the proposed improvements. In addition, a total of 0.067 ha and 0.003 ha of forest and wetland communities will be removed, respectively. **Table 5** provides a summary of the total area of vegetation communities that will be removed for the improvements to Queen Street East.

**TABLE 5.
IMPACTS TO VEGETATION COMMUNITIES WITHIN THE STUDY AREA**

Vegetation Community Type	Vegetation Community	Total Area (ha) to be Impacted
Cultural	Dry-Moist Old Field Meadow (CUM1-1)	0.456
	Coniferous Plantation (CUP3)	0.000
	Sub-total	0.456
Forest	Mixed Forest (FOM)	0.067
	Sub-total	0.067
Wetland	Cattail Mineral Shallow Marsh (MAS2-1)	0.003
	Alder Mineral Thicket Swamp (SWT2-1)	0.000
	Sub-total	0.003
Human Influenced Lands	Manicured	0.182
	Sub-total	0.182
Total Area		0.709

Cultural Vegetation Communities

The proposed works will result in the removal of approximately 0.456 ha of Dry-Moist Old Field Meadow (no impacts will occur in the Coniferous Plantation community). Overall, impacts resulting in the loss of vegetation within these cultural communities are considered to be minor. Cultural vegetation communities typically persist in areas that are regularly disturbed, and as a result, generally contain a high proportion of invasive and non-native plant species that are tolerant of these conditions.

It is expected that plant species displaced and/or disturbed within the cultural vegetation communities due to the road improvements will re-colonize available lands adjacent to the new right-of-way post-construction. Disturbance activities often serve to promote the establishment and / or spread of certain plant species (including the disturbance tolerant species identified within the existing right-of-way).

Forest Communities

As a result of the proposed works impacts to the Mixed Forest (FOM) will result in the removal of approximately 0.067 ha of the community. Impacts to the forest community will result in the removal of a small portion of the community edge adjacent to the existing Queen Street East right-of-way. Mixed Forest communities are widespread and common throughout Ontario and, as a result impacts are considered to be minor.

Wetland Communities

Impacts to the Cattail Mineral Shallow Marsh and Alder Mineral Swamp Thicket will result in the removal of a very small area of the cattail marsh (0.003 ha) community (no impacts to the Alder Mineral Thicket Swamp community) adjacent to the existing Queen Street East right-of-way within the Credit River at Alton Wetland Complex. These communities are widespread and common in Ontario and the loss of a portion of the community adjacent to the proposed improvements is not expected to have any negative impacts to the remaining portions of wetland communities within the study area. In addition, earth retaining walls will be used to minimize any encroachment into these wetland habitats.

Human Influenced Lands

As noted in **Table 5**, a total of 0.182 ha of manicured lands will be removed as a result of the proposed works. The overall significance of the impact to these lands is considered low.

4.3.2 Displacement of rare, threatened or endangered vegetation of significant vegetation

All of the vegetation communities identified within the study area are considered to be widespread and common in Ontario and secure globally. As a result, there will be no impacts on rare, threatened or endangered vegetation communities.

As noted in **Section 2.3.3**, no plant species at risk were identified during LGL's botanical investigation.

4.4 Wildlife and Wildlife Habitat

The proposed works on Queen Street East have the potential to result in the displacement of and disturbance to wildlife and wildlife habitat.

Effects on wildlife related to these modifications may include:

- displacement of wildlife and wildlife habitat;
- barrier effects on wildlife passage;
- wildlife/vehicle conflicts;
- disturbance to wildlife from noise, light and visual intrusion;
- potential impacts to migratory birds; and,
- displacement of rare, threatened or endangered wildlife and significant wildlife habitat

4.4.1 Displacement of Wildlife and Wildlife Habitat

The proposed works will take place within and beyond the existing right-of-way. Portions of the right-of-way and lands immediately adjacent consist of highly disturbed low-quality wildlife habitat, with higher quality habitats generally restricted to the valleylands of the Shaw's Creek and its tributary. These valleylands support riparian areas and wetland habitat types. Valleylands adjacent to the study area support additional wetlands and forested habitats and are expected to contribute to the wildlife assemblage identified within the lands examined.

Only minimal infringement to the edge of the above-mentioned natural heritage features will occur as a result of the proposed works. The works within and beyond the right-of-way are not expected to have any significant impact on wildlife and/or wildlife habitat. Displacement of species at risk habitat is not anticipated (see **Section 4.4.6**).

The proposed activities at this site should occur outside of the breeding bird window (see **Section 4.4.5**), to minimize disturbance to birds and other wildlife species utilizing habitats within the study area.

An analysis of vegetation removal per vegetation (wildlife habitat) community is presented in **Section 4.3** (above).

4.4.2 Barrier Effects on Wildlife Passage

No new permanent migratory barriers to wildlife will be created as a result of the proposed works. The existing barrier posed by the existing road right-of-way will be similar due to proposed works. However,

with the construction of the 2.0-3.5 m high earth retaining walls along the wetland boundary, small wildlife will be directed to cross Queen Street East through the two increased-span watercourse crossing structures, thus providing safer passage across the roadway. In general, the modifications are not expected to have a significant impact on wildlife passage other than to provide safer passage via directing wildlife to cross under rather than over the road.

4.4.3 Wildlife/Vehicle Conflicts

The proposed road modifications will not significantly increase the width of the travelled surface that could potentially result in an increased risk of mortality for wildlife crossing the road. The existing Queen Street East right-of-way poses a potential barrier to wildlife movement. While the increase in height of the road would normally increase exposure of wildlife to vehicle conflicts, the potential increase in wildlife mortality above existing conditions is considered very minor due to the proposed construction of retaining walls and much bigger watercourse crossing structures. Where natural areas are found abutting, and in particular, on opposite sides of Queen Street East (e.g., Credit River at Alton Wetland Complex) it is likely than a decrease in wildlife/vehicle conflicts may be expected once the project is completed. Construction duration and disturbance in the vicinity of culverts and bridges should be minimized due to the road closure to reduce the potential for increase in road mortality caused by wildlife avoidance of these structures.

4.4.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities and patterns. In human-influenced settings, such as the study area, wildlife has become acclimatized to anthropogenic conditions and only those fauna that are tolerant of human activities remain. Minor edge effect to natural areas (e.g., the wetland) may occur as road improvements will result in an increase in noise, light, and visual intrusion. Given that wildlife are acclimatized to the presence of the existing Queen Street East right-of-way in the study area, the tolerance of the wildlife assemblage to human activities and the limited zone of influence of the proposed widening, disturbance to wildlife from noise, light and visual intrusion will have no significant adverse effects. However, it is good practice to choose streetlighting that does not cause light spillage into the natural areas.

4.4.5 Potential Impacts to Migratory Birds

As identified above (Section 2.5.2), numerous bird species listed under the *Migratory Birds Convention Act* (MBCA) were identified within the study area. In addition, and Eastern Phoebe was observed nesting under the Shaw's Creek bridge. The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests. While migratory insectivorous and non-game birds are protected year-round, migratory game birds are only protected from March 10 to September 1. The study area lands fall within Environment Canada's Nesting Zone C2 (Nesting Period: end of March – end of August).

Consequently, to comply with the requirements of the MBCA, it is recommended that disturbance, clearing or disruption of vegetation where birds may be nesting should be completed outside the window of April 1 to August 31 to avoid the breeding bird season for the majority of the bird species protected under the act. In the event that these activities must be undertaken from April 1 to August 31, a nest screening survey will be conducted by a qualified avian biologist. If an active nest is located, a mitigation plan shall be developed and provided to Environment Canada – Ontario Region for review prior to implementation.

4.4.6 Displacement of Rare, Threatened or Endangered Wildlife or Significant Wildlife Habitat

A single species at risk was found within the study area (see **Section 2.5.3**). The following section provides a review of the species status, the results of field surveys carried out, and the potential impacts to the species at risk and their habitat within the vicinity of the study area.

4.4.6.1 Snapping Turtle

The Snapping Turtle is listed as 'Special Concern' under the ESA and SARA; however, this species is not a regulated species (Endangered or Threatened) under the ESA. As previously noted (see **Section 2.5.3**) evidence of Snapping Turtle potential nesting was identified within the study area. No permitting requirement under the ESA or SARA is necessary.

However, this species will likely benefit from the provision of the new watercourse crossing structures and the construction of the earth retaining walls as Snapping Turtles will likely be kept from attempting to cross the road to find suitable habitats due to inaccessibility.

4.5 Designated Natural Areas

As noted in **Section 2.6**, there is one Provincially Significant Wetlands and one Environmentally Significant/Sensitive Areas identified within 120 m of the study area, but no Areas of Natural and Scientific Interest. Only very minor infringements into these areas are expected as a result of this project. The use of earth retaining walls will minimize impacts to these natural areas and thus any impacts to the PSW and ESA are considered to be minor.

Greenbelt Plan Area

As noted in **Section 2.6**, the entire study area is identified as "Protected Countryside" within the Greenbelt Plan Area and specifically "Natural Heritage System". Minor impacts occur to vegetation communities within the Greenbelt Plan Area. Vegetation removals within these communities will occur to a small portion of the community adjacent to the Queen Street East right-of-way. Consequently, impacts to the Greenbelt Plan Area designated lands are considered to be minor in nature.

Peel Region Official Plan

The study area is identified as "Core Area of the Greenlands System in the Region of Peel Official Plan". Minor vegetation removals will occur to the vegetation communities within this area. Overall, the vegetation removals are considered minor in significance and are anticipated to impact the remaining portions of these communities within the study area. Consequently, impacts to the "Core Area of the Greenlands System" of Peel Region are considered to be minor.

4.6 Potential Permit Requirements

4.6.1 Fisheries Act

As discussed above in **Section 4.2** the bridge/culvert works at Shaw's Creek and its tributary will cause "Serious Harm" to fish via enclosure of habitat and works within the high water mark. As such, this project does not meet the self-assessment criteria for self-screening. A 'Request for Review' will be submitted to DFO to determine if an authorization under the *Fisheries Act* is required. If it is required, the completed 'Application Form for Paragraph 35(2)(b) *Fisheries Act* Authorization (Normal Circumstances)' should also be submitted to DFO for review.

4.6.2 Endangered Species Act

The Ontario *Endangered Species Act*, 2007 (ESA) enables the identification of species at risk through an independent body, the Committee on the Status of Species at Risk in Ontario. This Committee submits annual reports to the Ministry of Natural Resources for review, and the Ministry has the authority to add species to the Species at Risk in Ontario (SARO) List. Species on the SARO list are classified as 'Extirpated', 'Endangered', 'Threatened' or 'Special Concern'.

Section 9 of the ESA prohibits anyone from killing, harming, harassing or capturing a species on the SARO list, and any damage or destruction to the habitat of 'Endangered' or 'Threatened' species is prohibited in Section 10 of the Act. A Permit for activities that would be prohibited under Sections 9 and 10 of the Act, may be permitted under the provisions of Section 17 of the ESA.

No aquatic, plant or wildlife species at risk that are regulated under the Ontario ESA are known to be present within the study area. While Snapping Turtle was noted as present within the study area, this species is not regulated under the ESA. Consideration has been made to ensure that this species is protected from potential vehicle conflicts within the study area (see **Sections 4.4.3 and 4.4.6.1**).

4.6.3 CVC Ontario Regulation 160/06

Shaw's Creek and its tributary are located within the area subject to Ontario Regulation 160/06 *CVC Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. A permit from the CVC under O. Reg. 160/06 will be required for work within these areas.

5.0 MONITORING

To ensure that erosion and sediment controls are installed prior to and maintained during construction, an Erosion and Sediment Control (ESC) Plan will be prepared. The ESC Plan will provide details regarding the inspection, maintenance (e.g., need for repair), and documentation procedures during all stages of construction. An environmental inspector will monitor the site during construction to confirm that construction fencing, tree protection barriers and erosion and sedimentation control measures are installed correctly and are functional.

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**APPENDIX A
PHOTOGRAPHIC RECORD**

PROJECT # TA8612
May 2016

PHOTO APPENDIX

Queen Street East, Alton



Shaw's Creek: Looking north (upstream) from Queen Street East.



Shaw's Creek: Looking south downstream) from north of Queen Street East.

PROJECT # TA8612
May 2016

PHOTO APPENDIX

Queen Street East, Alton



Shaw's Creek: Looking north (upstream) from north of Queen Street East.



Shaw's Creek: Looking north (upstream) from north of Queen Street East.

PROJECT # TA8612
May 2016

PHOTO APPENDIX

Queen Street East, Alton



Shaw's Creek: Looking south (downstream) from Queen Street East.



Shaw's Creek: Looking north (upstream) from south of Queen Street East.

PROJECT # TA8612
May 2016

PHOTO APPENDIX

Queen Street East, Alton



Shaw's Creek: Looking west (upstream) from south of Queen Street East.



Shaw's Creek: Looking east (downstream) from south of Queen Street East.

PROJECT # TA8612
May 2016

PHOTO APPENDIX

Queen Street East, Alton



Shaw's Creek: Looking east (downstream) from south of Queen Street East, where the tributary of Shaw's Creek flows into Shaw's Creek.



Tributary of Shaw's Creek: Looking south (downstream) from Queen Street East.

PROJECT # TA8612
May 2016

PHOTO APPENDIX

Queen Street East, Alton



Tributary of Shaw's Creek: Looking north (upstream) from south of Queen Street East.



Tributary of Shaw's Creek: Looking north (upstream) from Queen Street East.

PROJECT # TA8612
May 2016

PHOTO APPENDIX

Queen Street East, Alton



Tributary of Shaw's Creek: Looking south (downstream) from north of Queen Street East.



Tributary of Shaw's Creek: Looking north (upstream) from north of Queen Street East.

APPENDIX B
WORKING VASCULAR PLANT CHECKLIST

**Appendix B.
VASCULAR PLANT LIST**

Scientific Name	Common Name	GRank	SRank	MNR	Peel	Manicured	CUM1-1	CUP3	FOM	MAS2-1	SWT2-1
PINACEAE	PINE FAMILY										
<i>Larix laricina</i>	tamarack	G5	S5		X				X		
* <i>Picea abies</i>	Norway spruce	G?	SE3		X	X	X				
<i>Picea glauca</i>	white spruce	G5	S5		R3				X		
* <i>Picea pungens</i>	Colorado spruce	G5	SE1			X			X		
<i>Pinus strobus</i>	Eastern white pine	G5	S5		X		X		X		
<i>Pinus nigra</i>	Austrian pine							X			
CUPRESSACEAE	CEDAR FAMILY										
<i>Thuja occidentalis</i>	Eastern white cedar	G5	S5		X	X	X		X	X	X
RANUNCULACEAE	BUTTERCUP FAMILY										
<i>Anemone canadensis</i>	Canada anemone	G5	S5		X		X				
JUGLANDACEAE	WALNUT FAMILY										
<i>Juglans nigra</i>	black walnut	G5	S4		X				X		
BETULACEAE	BIRCH FAMILY										
<i>Alnus incana</i> spp. <i>rugosa</i>	speckled alder	G5T5	S5		X					X	X
CARYOPHYLLACEAE	PINK FAMILY										
* <i>Silene vulgaris</i>	catchfly	G?	SE5		X	X	X				
POLYGONACEAE	SMARTWEED FAMILY										
* <i>Rumex crispus</i>	curly-leaf dock	G?	SE5		X		X				
GUTTIFERAE	ST. JOHN'S-WORT FAMILY										
<i>Hypericum ellipticum</i>	elliptic-leaved St. John's-wort	G5	S5						X		
* <i>Hypericum perforatum</i>	common St. John's-wort	G?	SE5		X		X				

**Appendix B.
VASCULAR PLANT LIST**

Scientific Name	Common Name	GRank	SRank	MNR	Peel	Manicured	CUMI-1	CUP3	FOM	MAS2-1	SWT2-1
SALICACEAE	WILLOW FAMILY										
<i>Populus balsamifera</i> ssp. <i>balsamifera</i>	balsam poplar	G5T?	S5		X		X				
<i>Populus tremuloides</i>	trembling aspen	G5	S5		X				X		X
* <i>Salix fragilis</i>	crack willow	G?	SE5		X				X		
<i>Salix</i> sp.	willow		?			X					
ROSACEAE	ROSE FAMILY										
<i>Prunus serotina</i>	black cherry	G5	S5		X				X		
<i>Prunus virginiana</i> var. <i>virginiana</i>	choke cherry	G5T?	S5		X		X		X	X	
FABACEAE	PEA FAMILY										
* <i>Lotus corniculatus</i>	bird's-foot trefoil	G?	SE5		X	X	X				
* <i>Vicia cracca</i>	tufted vetch	G?	SE5		X		X		X		
CORNACEAE	DOGWOOD FAMILY										
<i>Cornus sericea</i> ssp. <i>sericea</i>	red-osier dogwood	G5	S5		X		X				
RHAMNACEAE	BUCKTHORN FAMILY										
* <i>Rhamnus cathartica</i>	common buckthorn	G?	SE5		X		X				
VITACEAE	GRAPE FAMILY										
<i>Vitis riparia</i>	riverbank grape	G5	S5		X		X		X		
ACERACEAE	MAPLE FAMILY										
<i>Acer negundo</i>	manitoba maple	G5	S5		X	X	X		X		
* <i>Acer platanoides</i>	norway maple	G?	SE5		X	X					
<i>Acer saccharum</i> var. <i>saccharum</i>	sugar maple	G5T?	S5		X	X					
ANACARDIACEAE	SUMAC FAMILY										
<i>Rhus hirta</i>	staghorn sumac	G5	S5		X	X					

**Appendix B.
VASCULAR PLANT LIST**

Scientific Name	Common Name	GRank	SRank	MNR	Peel	Manicured	CUM1-1	CUP3	FOM	MAS2-1	SWT2-1
APIACEAE	PARSLEY FAMILY										
* <i>Daucus carota</i>	wild carrot	G?	SE5		X	X	X				
ASCLEPIADACEAE	MILKWEED FAMILY										
<i>Asclepias syriaca</i>	common milkweed	G5	S5		X		X				
BORAGINACEAE	BORAGE FAMILY										
* <i>Echium vulgare</i>	blueweed	G?	SE5		X		X				
PLANTAGINACEAE	PLANTAIN FAMILY										
* <i>Plantago lanceolata</i>	ribgrass	G5	SE5		X	X	X				
* <i>Plantago major</i>	common plantain	G5	SE5		X	X	X				
OLEACEAE	OLIVE FAMILY										
* <i>Syringa vulgaris</i>	common lilac	G?	SE5		X	X					
RUBIACEAE	MADDER FAMILY										
<i>Galium asprellum</i>	rough bedstraw	G5	S5		U		X				
DIPSACACEAE	TEASEL FAMILY										
* <i>Dipsacus fullonum</i> ssp. <i>sylvestris</i>	wild teasel	G?T?	SE5		X		X				
ASTERACEAE	ASTER FAMILY										
* <i>Cichorium intybus</i>	chicory	G?	SE5		X		X				
* <i>Cirsium arvense</i>	Canada thistle	G?	SE5		X		X				
* <i>Cirsium vulgare</i>	bull thistle	G5	SE5		X		X				
<i>Erigeron annuus</i>	daisy fleabane	G5	S5		X		X				
<i>Eupatorium maculatum</i> var. <i>maculatum</i>	spotted joe-pye-weed	G5T5	S5		X		X				
* <i>Leucanthemum vulgare</i>	ox-eye daisy	G?	SE5		X		X				

Appendix C. Species Rank

SRANK Provincial Rank

Provincial (or Sub-national) ranks are used by the Ontario Ministry of Natural Resources Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be ascertained. The NHIC evaluates provincial ranks on a continual basis and produces updated lists at least annually.

- S1 **Critically Imperiled** in Ontario because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation.
- S2 **Imperiled** in Ontario because of rarity due to very restricted range, very few populations (often 20 or fewer occurrences) steep declines or other factors making it very vulnerable to extirpation.
- S3 **Vulnerable** in Ontario due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
- S4 **Apparently Secure**—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- S5 **Secure**—Common, widespread, and abundant in Ontario.
- SX **Presumed Extirpated** – Species or community is believed to be extirpated from Ontario.
- SH **Possibly Extirpated** – Species or community occurred historically in Ontario and there is some possibility that it may be rediscovered.
- SNR **Unranked**—Conservation status in Ontario not yet assessed
- SU **Unrankable**—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- SNA **Not Applicable**—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
- S#S# **Range Rank**—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

COSEWIC (Committee on the Status of Endangered Wildlife in Canada):		OMNR (Ontario Ministry of Natural Resources):	
END	Endangered	END	Endangered
THR	Threatened	THR	Threatened
SC	Special Concern	SC	Special Concern
Local Status: York		Legal Status:	
U	Uncommon	SARA	<i>Species at Risk Act</i> – Schedules (1), (2), (3)
R1-R10	Rarity Status (1-10 denotes number of stations at which a locally rare species is found) (Varga <i>et al.</i> 2000)	ESA	<i>Endangered Species Act</i>
Toronto Region Conservation Authority			
L1-L3	Species of Concern (see below)		

RANK	LEVEL OF CONSERVATION CONCERN OF FLORA AND FAUNA IN TRCA REGION (TRCA 2003)
L5	Able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix. May be of very localized concern in highly degraded areas.
L4	Able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix.
L3	Able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern.
L2	Unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally.
L1	Unable to withstand disturbance; many criteria are limiting factors; generally occur in high-quality natural areas in natural matrix; almost certainly rare in the TRCA jurisdiction; of concern regionally.
LX	Extirpated from our region with remote chance of rediscovery. Presumably highly sensitive.
LH	Hybrid between two native species. Usually not scored unless highly stable and behaves like a species (e.g. <i>Equisetum x nelsonii</i>)
L+	Exotic. Not native to TRCA jurisdiction. Includes hybrids between a native species and an exotic
L+?	Origin uncertain or disputed, i.e. may or may not be native.

APPENDIX D

**HYDRAULIC ASSESSMENT AND
TRIBUTARY CROSSING ASSESSMENT
TECHNICAL MEMORANDA**



Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

**SHAW CREEK AND TRIBUTARY CROSSINGS
HYDRAULIC ASSESSMENT REPORT
QUEEN STREET (HIGHWAY 136)
147162-23166-522**

Report Prepared for:
R.V. ANDERSON ASSOCIATES LTD.

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March 2017
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**SHAWS CREEK AND TRIBUTARY
QUEEN STREET EAST (HIGHWAY 136)
147162-23166-522**

Report prepared for R.V. Anderson Associates Ltd., March 2017

Asif Quader, Ph.D., P.Eng.
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reviewed by
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DISCLAIMER

We certify that this report is accurate and complete and accords with the information available during the site investigation. Information obtained during the site investigation or provided by third parties is believed to be accurate but is not guaranteed. We have exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

This report was prepared for R.V. Anderson Associates Ltd. The report may not be relied upon by any other person or entity without our written consent and that of R.V. Anderson Associates Ltd. Any uses of this report by a third party, or any reliance on decisions made based on it, are the responsibility of that party. We are not responsible for damages or injuries incurred by any third party, as a result of decisions made or actions taken based on this report.

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APPENDICES

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APPENDIX B	HEC-RAS Output Files - Proposed Conditions
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2. According to Standards WC-2 for bridges and WC-7 for culverts, a 'desirable freeboard' of at least 1 m should be maintained, which is measured vertically from the energy grade line (EGL) elevation for the design flow to the edge of the travelled lane. If it is not possible to maintain the 'desirable freeboard,' a 'minimum freeboard' of at least 1 m should be maintained, which is measured vertically from the high water level (HWL) for the design flow to the edge of travelled lane. The acceptability of the desirable or minimum criteria of standards WC-2 and WC-7 is at the discretion of the approving agency.
3. According to Standard WC-2 for bridges, the soffit clearance is measured vertically from the HWL for the design flow to the lowest point on the soffit and should be greater than or equal to 1 m.
4. According to Standard WC-7, there are no soffit clearance requirements for closed bottom culverts.
5. According to Standard WC-7, for open-footing culverts with irregular cross-sections, the minimum soffit clearance is 0.3 m below the effective rise of the culvert. The effective rise refers to the height of an equivalent rectangular opening with the same area as the irregular section.
6. According to Standard WC-7, for culverts with diameter or rise < 3 m, the ratio of the flood depth (HW) to the rise or diameter of the culvert (D) or HW/D should be less or equal to 1.5.

The hydraulic implications of the proposed bridge and culvert works during the Regional storm event, including avoidance of road overtopping, was also determined in this study.

As per direction from the RVA's Bridge Design group, a soffit clearance was maintained for protecting the bridge girder during the Regional event.

According to the Region of Peel standards (Public Works, Design, Specifications, and Procedures Manual - Linear Infrastructure, Revised February 2010), bridges should be designed for a Regional storm event and HEC-II analysis would be required. CVC's Fact Sheet III on geomorphological considerations with regards to crossing design (CVC, 2015) was also followed in this study.

3 EXISTING CONDITION

The study area is located along Queen Street East (Highway 136) in Alton, between Main Street and Pottersfield Road. The main channel of Shaw's Creek and its tributary cross Queen Street East in a south-easterly direction through a 9 m span bridge and 3 m span box culvert, respectively. The main channel of Shaw's Creek was investigated between the rail bridge downstream to its confluence with the tributary. The tributary was also investigated from the upstream rail line to its confluence with the main Shaw's Creek watercourse (see Figure 1). These study limits were set to ensure that the predicted hydraulic effects of proposed bridge and culvert works at Queen Street East could be adequately determined.

The existing HEC-RAS models for the main channel and tributary of Shaw's Creek were obtained from CVC. In the existing HEC-RAS model, the Queen Street East crossings for both the main channel and the tributary are located between Sections 110.5469 and 78.35018, as part of the 'Main Branch 2' channel reach. The existing bridge and the culvert crossing are located at Section 91.92054 (see Figure 2). Figure 2 shows that both the bridge and culvert crossings are located within the same valley corridor and have been modelled as a multi-opening section.

Table 1 shows the peak flow values used in the 'Main Branch 2' channel reach of the HEC-RAS model.

TABLE 1 Peak Flow Values in Existing HEC-RAS Model

Return Period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	Regional
Peak Flow (m ³ /s)	13.1	19	24.1	30.1	34.6	39.2	112.4

The water surface elevations (WSEL) corresponding to the flow rates (shown in Table 1) reported in the existing HEC-RAS model are shown in Table 2 at both upstream and downstream of the Queen Street East crossing. Figure 2 shows the existing road profile as modelled in the existing original HEC-RAS model. However, the topographical survey provided by the Region of Peel (2016) showed that the existing road profile in the existing original HEC-RAS model needed to be updated. Hence, an existing modified HEC-RAS model was created with updated Queen Street road profile information. Figure 3 shows the updated existing Queen Street road profile as modelled in the existing modified HEC-RAS model. The existing modified HEC-RAS model was used as the base condition and for the purpose of future comparisons.

According to the topographic survey information obtained from the Region of Peel (2016), the channel bottom elevations upstream and downstream of the bridge were 390.72 m and 390.83 m, respectively. In the existing HEC-RAS model similar reverse sloping (upstream and downstream elevations of 390.63 m and 390.85 m) was observed. The higher gradient of reverse sloping, observed in the existing HEC-RAS model is indicative of a more conservative hydraulic conditions and was maintained in this study.

The hydraulic performance of the existing crossing structures in terms of MTO criteria are listed in Table 3. As shown in Figure 3 and Table 3, the existing road low point elevation is approximately 393.10 m. The existing bridge and culvert soffits were 392.6 m and 391.78 m, respectively (see Figure 3 and Table 3). The hydraulic performance of the existing crossing structures are determined with respect to the abovementioned key reference elevations.

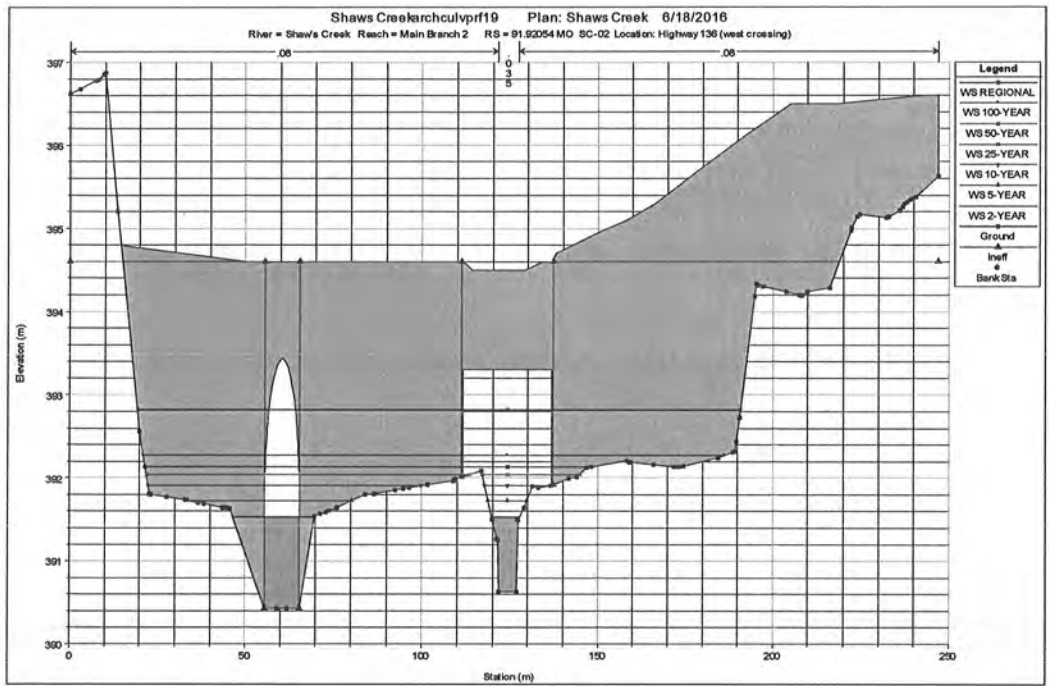


FIGURE 4 Proposed 25 m span Bridge and Culvert at Section 91.92054 (Queen Street East Crossing)

TABLE 2 Existing and Proposed Water Surface Elevations and Velocities from HEC-RAS Model

Section	Condition	Water Surface Elevations (m)							Velocity (m/s)						
		2-year	5-year	10-year	25-year	50-year	100-year	Regional	2-year	5-year	10-year	25-year	50-year	100-year	Regional
250.502	Existing (org)	392.72	392.84	392.93	393.04	393.11	393.18	394.1	2.06	2.34	2.53	2.73	2.85	2.98	4.25
	Existing (mod)	392.72	392.84	392.93	393.04	393.11	393.18	394.1	2.06	2.34	2.53	2.73	2.85	2.98	4.25
	Proposed	392.72	392.84	392.93	393.04	393.11	393.18	394.1	2.06	2.34	2.53	2.73	2.85	2.98	4.25
	Diff	0	0	0	0	0	0	0	0	0	0	0	0	0	0
221.968	Existing (org)	392.38	392.41	392.51	392.69	392.79	393.09	393.82	1.83	2.52	2.75	0.93	0.83	0.55	0.74
	Existing (mod)	392.38	392.41	392.51	392.69	392.79	393.09	393.68	1.83	2.52	2.75	0.93	0.83	0.55	0.83
	Proposed	392.4	392.41	392.51	392.54	392.54	392.63	393.52	1.78	2.52	2.75	2.8	3.21	1.45	0.95
	Diff	0.02	0	0	-0.15	-0.25	-0.46	-0.16	-0.05	0	0	1.87	2.38	0.9	0.12
199.346	Existing (org)	392.22	392.37	392.53	392.68	392.78	393.08	393.81	1.89	0.93	0.76	0.7	0.67	0.5	0.77
	Existing (mod)	392.22	392.37	392.53	392.68	392.78	393.08	393.68	1.89	0.93	0.76	0.7	0.67	0.5	0.84
	Proposed	392.16	392.25	392.28	392.42	392.51	392.6	393.51	2.18	1.49	1.66	1.29	1.13	1.07	0.95
	Diff	-0.06	-0.12	-0.25	-0.26	-0.27	-0.48	-0.17	0.29	0.56	0.9	0.59	0.46	0.57	0.11
110.547	Existing (org)	391.71	391.99	392.16	392.24	392.25	392.74	393.76	1.71	1.93	2.14	2.53	2.89	2.42	1.15
	Existing (mod)	391.71	391.99	392.16	392.24	392.25	392.74	393.64	1.71	1.93	2.14	2.53	2.89	2.42	0.95
	Proposed	391.53	391.72	391.91	392.04	392.11	392.25	393.03	1.17	1.42	1.55	1.86	2.18	2.15	3.4
	Diff	-0.18	-0.27	-0.25	-0.2	-0.14	-0.49	-0.61	-0.54	-0.51	-0.59	-0.67	-0.71	-0.27	2.45
Queen Street East Crossing															
78.3502	Existing (org)	391.52	391.69	391.82	391.96	392.06	392.16	392.53	2.25	2.53	2.78	2.16	1.97	1.8	2.58
	Existing (mod)	391.52	391.69	391.82	391.96	392.06	392.16	392.53	2.25	2.53	2.78	2.16	1.97	1.8	2.58
	Proposed	391.47	391.66	391.81	391.95	392.05	392.16	392.5	1.32	1.54	1.94	2.02	2.06	2.06	4.37
	Diff	-0.05	-0.03	-0.01	-0.01	-0.01	0	-0.03	-0.93	-0.99	-0.84	-0.14	0.09	0.26	1.79

Notes:

- Existing (org) refers to the existing original HEC-RAS model.
- Existing (mod) refers to the existing modified HEC-RAS model.
- Proposed refers to the proposed condition with 25 m span bridge, 10 m span by 3 m rise concrete arch culvert, and proposed road profile raised by 1.4 m.
- Diff refers to the difference in values between Proposed and Existing (mod) conditions.

TABLE 3 Hydraulic Performance of Queen Street East Crossings

Condition	WSEL (m)		EGL (m)		Road Elevation (m)		Bridge	Culvert	Precast Arched	Bridge Freeboard			Bridge Soffit Clearance		Conspan Clearance	HW/D Ratio	Road	Criteria Satisfied? (Bridge)		Criteria Satisfied? (Conspan)	HW/D Ratio Criteria Satisfied?
	100yr	Reg	100yr	LPE	EOTL	Soffit				Soffit	Eqv Soff	Desired	Min	Regional				HWL	Regional		
Existing (mod)	392.74	393.64	392.97	393.1	392.95	392.6	391.78	-	-0.02	0.21	-0.69	-0.14	-1.04	-	1.71	Y	N	N	-	N	
Proposed	392.25	393.03	392.38	394.5	394.35	393.3	393.58	392.56	1.97	2.1	1.32	1.05	0.27	0.31	0.61	N	Y	Y	Y	Y	

Note:

1. WSEL refers to water surface elevation
2. EGL refers to energy grade line
3. LPE refers to road low point elevation
4. HWL refers to high water level or the water level at design flow
5. EOTL refers to edge of travelled lane
6. Desired freeboard measured with respect to EGL at design flow
7. Minimum freeboard measured with respect to HWL at design flow
8. "Precast Arched Eqv Soff" refers to the soffit elevation of equivalent rectangular opening
9. For arched structure, 0.3 m of soffit clearance is required
10. See Table 2 notes for additional information

5 RESULTS AND DISCUSSIONS

A comparison of the existing and proposed WSELs is provided in Table 2 which demonstrates that the proposed bridge, culvert and road profile changes are predicted to have no hydraulic impacts upstream of the Queen Street East crossing. Table 2 shows that in the upstream sections, the WSELs are reduced, primarily because of the larger opening sizes of the proposed bridge and proposed precast arched shaped culvert structure. Immediately downstream of the proposed Queen Street East crossing (Section 78.3502), the WSELs are less than under existing conditions.

Under the proposed condition, average flow velocities are increased upstream of the Queen Street East crossing at channel Sections 199.346 and 221.968 compared to existing conditions (see Table 2). This can be attributed to the increased area of opening provided by the upgraded conveyance structures at Queen Street East that relieves the current hydraulic backup. It should be noted that the predicted increase in velocities upstream of the Queen Street East Bridge can be seen to be more in line with average velocities the watercourse experiences, particularly at 'Shaw's Creek Main Branch 2.' Furthermore, despite the predicted increase in velocities, the flow regime remains in a subcritical condition. Channel erosions at the bed and banks are primarily associated to the channel-forming discharge or the bankfull discharge or discharges corresponding to return periods of 1.5 or 2-years. Under the proposed conditions, the velocity for the 2-year event only increases at Section 199.346 marginally. For the remaining sections, the 2-year velocities either reduce or remain the same. Hence, under the proposed conditions, considerable erosive tendencies are not anticipated.

Immediately downstream of the proposed Queen Street East crossing (HEC-RAS Section 78.3502), the flow velocities are reduced, except for the 100-year and the Regional event. The flow regime for the 100-year event remains in a subcritical condition. Remaining HEC-RAS sections further downstream are located downstream of the confluence between the main channel and the tributary. There are no hydraulic impacts at these downstream channel sections in terms of WSEL and velocity.

Table 3 shows that under the existing condition, the 9 m open span bridge does not satisfy the freeboard and soffit clearance criteria. Table 3 also shows that the existing 3 m span box culvert does not satisfy freeboard and HW/D ratio criteria. Furthermore, the Regional event overtops the existing low point elevation of Queen Street East.

Under the proposed condition the existing crossings are replaced by a 25 m span bridge and a 10 m span by 3 m rise precast concrete arch structure. Furthermore, the existing road profile is raised by minimum 1.4 m. Under the proposed condition the proposed Queen Street Bridge satisfies both the freeboard and soffit clearance criteria (see Table 3). The raised soffit of the proposed Queen Street Bridge also ensures that there is approximately 0.3 m soffit clearance for the Regional event. Similarly the upgraded precast arched structure satisfies both freeboard and HW/D ratio criteria (see Table 3). Under the proposed condition, the Regional event does not overtop the road low point elevation.

6 CONCLUSIONS AND RECOMMENDATIONS

Hydraulic assessment of Shaw's Creek at the Queen Street East crossing revealed that the existing open span bridge and box culvert are undersized, causing backwater effects. Furthermore, the existing open span bridge and box culvert do not satisfy current design criteria. Under the existing condition, the Regional event also overtops the roadway.

Under the proposed condition, as a part of the Queen Street East improvement and Queen Street Bridge replacement works, the existing Queen Street East crossings will be upgraded to enhance the overall hydraulic conditions of Shaw's Creek. The span of the existing Queen Street Bridge is proposed to be increased to 25 m and the existing box culvert be replaced by a precast concrete arch structure (10 m span and 3 m rise). In addition, the existing road profile at the Queen Street East crossing is proposed to be raised by a minimum 1.4 m for the 25 m span bridge. These proposed changes improve the overall hydraulic conditions for both the main channel and the tributary of Shaw's Creek. The proposed changes reduce the backwater effects on the main channel of Shaw's Creek. The proposed Queen Street Bridge satisfies both the freeboard and soffit clearance criteria. The proposed precast arched structure also satisfies relevant design criteria. Under the proposed condition, the Regional event does not overtop the proposed new roadway profile for Queen Street East. There is a marginal increase in channel velocity in the upstream channel reach due to the removal of backwater ponding condition; however the overall hydraulic regime still remains in a subcritical flow condition.

It is recommended that existing Queen Street Bridge be replaced by 25 m open span bridge, the existing box culvert be replaced with a precast concrete arch structure (10 m span and 3 m rise), and the existing road profile be raised by a minimum 1.4 m for the 25 m span bridge.

7 REFERENCES

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APPENDIX A
HEC-RAS Output File – Existing Condition

Table A1: Existing Hydraulic assessment (Revised Queen St road profile based on survey data)

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch 2	250.5018	2-YEAR	13.1	391.96	392.72	392.72	392.93	0.016346	2.06	6.48	115.94	0.99
Main Branch 2	250.5018	5-YEAR	19	391.96	392.84	392.84	393.11	0.015229	2.34	8.3	163.21	0.99
Main Branch 2	250.5018	10-YEAR	24.1	391.96	392.93	392.93	393.26	0.014378	2.53	9.76	172.42	0.99
Main Branch 2	250.5018	25-YEAR	30.1	391.96	393.04	393.04	393.41	0.013849	2.73	11.29	180.58	1
Main Branch 2	250.5018	50-YEAR	34.6	391.96	393.11	393.11	393.52	0.013337	2.85	12.42	206.91	0.99
Main Branch 2	250.5018	100-YEAR	39.2	391.96	393.18	393.18	393.63	0.013006	2.98	13.5	217.13	1
Main Branch 2	250.5018	REGIONAL	112.4	391.96	394.1	394.1	395	0.010496	4.25	27.18	228.29	1
Main Branch 2	221.9676	2-YEAR	13.1	391.69	392.38	392.27	392.53	0.007332	1.83	8.79	17.36	0.72
Main Branch 2	221.9676	5-YEAR	19	391.69	392.41	392.41	392.71	0.012969	2.52	9.36	17.75	0.97
Main Branch 2	221.9676	10-YEAR	24.1	391.69	392.51	392.55	392.86	0.012963	2.75	11.17	18.95	0.99
Main Branch 2	221.9676	25-YEAR	30.1	391.69	392.69	392.54	392.7	0.00112	0.93	103.97	250.39	0.3
Main Branch 2	221.9676	50-YEAR	34.6	391.69	392.79	392.54	392.8	0.000787	0.83	128.85	251.17	0.26
Main Branch 2	221.9676	100-YEAR	39.2	391.69	393.09	392.54	393.09	0.000245	0.55	204.57	253.65	0.15
Main Branch 2	221.9676	REGIONAL	112.4	391.69	393.68	392.73	393.69	0.000344	0.83	357.56	258.1	0.19
Main Branch 2	199.3464	2-YEAR	13.1	391.47	392.22	392.16	392.35	0.008244	1.89	13.05	50.63	0.75
Main Branch 2	199.3464	5-YEAR	19	391.47	392.37	392.25	392.39	0.001527	0.93	64.66	193.16	0.33
Main Branch 2	199.3464	10-YEAR	24.1	391.47	392.53	392.25	392.54	0.000803	0.76	95.53	201.12	0.25
Main Branch 2	199.3464	25-YEAR	30.1	391.47	392.68	392.27	392.68	0.000555	0.7	125.6	206.89	0.21
Main Branch 2	199.3464	50-YEAR	34.6	391.47	392.78	392.29	392.78	0.000454	0.67	146.54	207.63	0.19
Main Branch 2	199.3464	100-YEAR	39.2	391.47	393.08	392.31	393.09	0.000186	0.5	210.38	209.91	0.13
Main Branch 2	199.3464	REGIONAL	112.4	391.47	393.68	392.53	393.68	0.000342	0.84	336.55	214.76	0.19
Main Branch 2	110.5469	2-YEAR	13.1	390.63	391.71	391.26	391.83	0.004165	1.71	10.72	55.41	0.54
Main Branch 2	110.5469	5-YEAR	19	390.63	391.99	391.49	392.14	0.003878	1.93	14.17	111.69	0.54
Main Branch 2	110.5469	10-YEAR	24.1	390.63	392.16	391.66	392.35	0.004025	2.14	16.39	142.2	0.56
Main Branch 2	110.5469	25-YEAR	30.1	390.63	392.24	391.82	392.49	0.005292	2.53	17.32	163.04	0.65
Main Branch 2	110.5469	50-YEAR	34.6	390.63	392.25	391.92	392.58	0.006816	2.89	17.46	163.92	0.74
Main Branch 2	110.5469	100-YEAR	39.2	390.63	392.74	392.03	392.97	0.003338	2.42	23.7	171.14	0.54
Main Branch 2	110.5469	REGIONAL	112.4	390.63	393.64	393.1	393.65	0.00032	0.95	314.61	175.99	0.18
Main Branch 2	91.92054 SC-02		Mult Open									
Main Branch 2	78.35018	2-YEAR	13.1	390.85	391.52	391.42	391.77	0.014666	2.25	7.54	17.32	0.97
Main Branch 2	78.35018	5-YEAR	19	390.85	391.69	391.59	391.96	0.012726	2.53	9.79	47.73	0.95
Main Branch 2	78.35018	10-YEAR	24.1	390.85	391.82	391.71	392.14	0.01239	2.78	11.37	117.74	0.96
Main Branch 2	78.35018	25-YEAR	30.1	390.85	391.96	391.96	392.1	0.006154	2.16	38.83	133.94	0.69
Main Branch 2	78.35018	50-YEAR	34.6	390.85	392.06	391.99	392.16	0.00452	1.97	51.45	155.52	0.6
Main Branch 2	78.35018	100-YEAR	39.2	390.85	392.16	392.02	392.23	0.003329	1.8	66.66	178.22	0.53
Main Branch 2	78.35018	REGIONAL	112.4	390.85	392.53	392.35	392.65	0.004749	2.58	124.82	187.03	0.66

APPENDIX B
HEC-RAS Output Files – Proposed Conditions

Table B: Proposed 1.4m rise in road profile, 25m span bridge, 10x3m arched culvert

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch 2	250.5018	2-YEAR	13.1	391.96	392.72	392.72	392.93	0.016346	2.06	6.48	115.94	0.99
Main Branch 2	250.5018	5-YEAR	19	391.96	392.84	392.84	393.11	0.015229	2.34	8.3	163.21	0.99
Main Branch 2	250.5018	10-YEAR	24.1	391.96	392.93	392.93	393.26	0.014378	2.53	9.76	172.42	0.99
Main Branch 2	250.5018	25-YEAR	30.1	391.96	393.04	393.04	393.41	0.013849	2.73	11.29	180.58	1
Main Branch 2	250.5018	50-YEAR	34.6	391.96	393.11	393.11	393.52	0.013337	2.85	12.42	206.91	0.99
Main Branch 2	250.5018	100-YEAR	39.2	391.96	393.18	393.18	393.63	0.013006	2.98	13.5	217.13	1
Main Branch 2	250.5018	REGIONAL	112.4	391.96	394.1	394.1	395	0.010496	4.25	27.18	228.29	1
Main Branch 2	221.9676	2-YEAR	13.1	391.69	392.4	392.27	392.54	0.006668	1.78	9.1	17.57	0.69
Main Branch 2	221.9676	5-YEAR	19	391.69	392.41	392.41	392.71	0.012969	2.52	9.36	17.75	0.97
Main Branch 2	221.9676	10-YEAR	24.1	391.69	392.51	392.55	392.86	0.012963	2.75	11.17	18.95	0.99
Main Branch 2	221.9676	25-YEAR	30.1	391.69	392.54	392.54	392.85	0.012754	2.8	20.03	55.55	0.99
Main Branch 2	221.9676	50-YEAR	34.6	391.69	392.54	392.54	392.95	0.016852	3.21	20.03	55.55	1.14
Main Branch 2	221.9676	100-YEAR	39.2	391.69	392.63	392.54	392.67	0.002985	1.45	88.69	249.93	0.49
Main Branch 2	221.9676	REGIONAL	112.4	391.69	393.52	392.73	393.53	0.000514	0.95	315.13	256.86	0.23
Main Branch 2	199.3464	2-YEAR	13.1	391.47	392.16	392.16	392.34	0.012639	2.18	10.39	30.35	0.91
Main Branch 2	199.3464	5-YEAR	19	391.47	392.25	392.25	392.3	0.004809	1.49	41.7	185.01	0.57
Main Branch 2	199.3464	10-YEAR	24.1	391.47	392.28	392.25	392.34	0.005669	1.66	47.18	186.87	0.63
Main Branch 2	199.3464	25-YEAR	30.1	391.47	392.42	392.27	392.44	0.002704	1.29	73.18	195.41	0.45
Main Branch 2	199.3464	50-YEAR	34.6	391.47	392.51	392.29	392.53	0.001803	1.13	92.77	200.37	0.37
Main Branch 2	199.3464	100-YEAR	39.2	391.47	392.6	392.31	392.61	0.001431	1.07	109.31	204.47	0.34
Main Branch 2	199.3464	REGIONAL	112.4	391.47	393.51	392.53	393.52	0.000491	0.95	300.56	213.38	0.22
Main Branch 2	110.5469	2-YEAR	13.1	390.63	391.53	390.93	391.57	0.002547	1.17	16.13	31.05	0.41
Main Branch 2	110.5469	5-YEAR	19	390.63	391.72	391.06	391.79	0.002861	1.42	19.94	56.96	0.45
Main Branch 2	110.5469	10-YEAR	24.1	390.63	391.91	391.17	391.98	0.002733	1.55	24.23	96.42	0.45
Main Branch 2	110.5469	25-YEAR	30.1	390.63	392.04	391.27	392.14	0.00341	1.86	28.23	119.3	0.51
Main Branch 2	110.5469	50-YEAR	34.6	390.63	392.11	391.36	392.25	0.004403	2.18	30.63	124.92	0.58
Main Branch 2	110.5469	100-YEAR	39.2	390.63	392.25	391.45	392.38	0.003785	2.15	35.47	163.77	0.55
Main Branch 2	110.5469	REGIONAL	112.4	390.63	393.03	392.56	393.33	0.005501	3.4	63.8	172.7	0.71
Main Branch 2	91.92054	SC-02	Mult Open									
Main Branch 2	78.35018	2-YEAR	13.1	390.85	391.47	391.12	391.53	0.005663	1.32	13.27	31.91	0.59
Main Branch 2	78.35018	5-YEAR	19	390.85	391.66	391.24	391.73	0.005086	1.54	17.52	36.13	0.59
Main Branch 2	78.35018	10-YEAR	24.1	390.85	391.81	391.31	391.93	0.006173	1.94	21.56	116.42	0.68
Main Branch 2	78.35018	25-YEAR	30.1	390.85	391.95	391.41	392.07	0.00544	2.02	26.39	132.8	0.65
Main Branch 2	78.35018	50-YEAR	34.6	390.85	392.05	391.49	392.17	0.005003	2.06	29.89	153.92	0.63
Main Branch 2	78.35018	100-YEAR	39.2	390.85	392.16	391.56	392.29	0.004359	2.06	34.05	179.47	0.6
Main Branch 2	78.35018	REGIONAL	112.4	390.85	392.5	392.45	393.05	0.014095	4.37	46.17	186.32	1.13

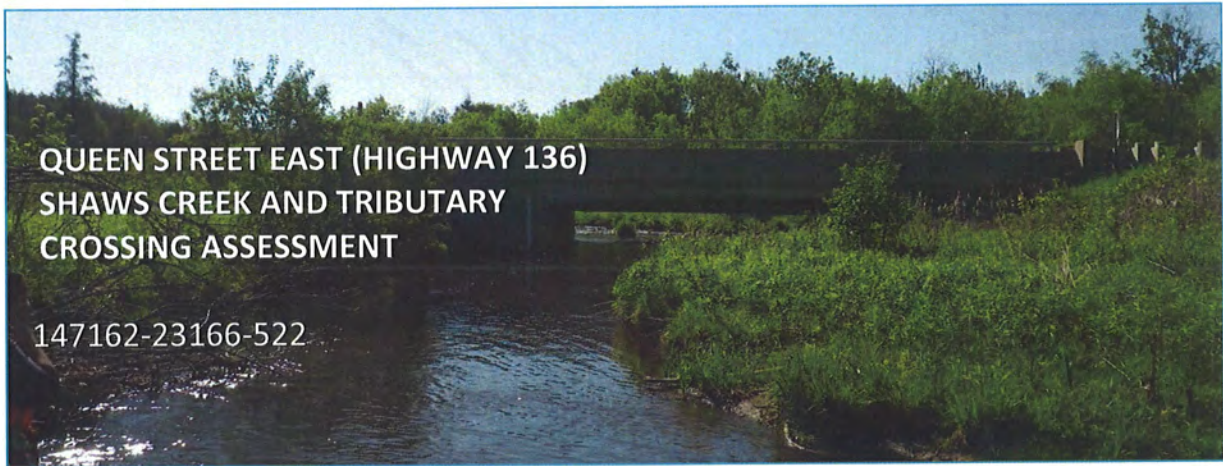
APPENDIX C
Detailed Assessment Results
(Existing and Proposed Options)

Table C: Detailed Assessment Results (Existing and Proposed Conditions)

Condition	Scenarios	WSEL (m)		EGL (m)		Road Elv (m)		Bridge Soffit	Culvert Soffit	Conspan Eqv Soff	Bridge Freeboard			Bridge Clearance HWL	Bridge Clearance Regional	Conspan Clearance HWL	Road Overtopping	Criteria Satisfied? (Bridge)		Criteria Satisfied? (Conspan)	Comments
		Span (m)	100yr	Reg	100yr	LPE	EOTL				Desired	Min	Regional					Freeboard	Clearance		
Existing (org)	9.6	392.74	393.76	392.58	393.09	392.94	392.6	391.78	-	0.36	0.2	-0.82	-0.14	-1.15	-	Y	N	N	-		
Existing (mod)	9.6	392.74	393.64	392.97	393.1	392.95	392.6	391.78	-	-0.02	0.21	-0.69	-0.14	-1.04	-	Y	N	N	-		
(Analyses involving Multiple Alternatives)	30	392.61	393.31	392.52	393.09	392.94	392.6	391.78	-	0.42	0.33	-0.37	-0.01	-0.71	-	Y	N	N	-	High Regional backwater Effect	
	20 & 0.5m raise	392.49	394.05	392.73	393.59	393.44	392.39	391.78	-	0.71	0.95	-0.61	-0.1	-1.66	-	Y	N	N	-	High Regional backwater Effect	
	20 & 1m raise	392.34	394.26	392.66	394.09	393.94	392.89	391.78	-	1.28	1.6	-0.32	0.55	-1.37	-	Y	Y	N	-	High Regional backwater Effect	
	20 & Conspan(6)	392.25	393.43	392.33	393.09	392.94	391.89	392.37	391.74	0.61	0.69	-0.49	-0.36	-1.54	-0.51	Y	N	N	N	No backwater effect	
	20 & Conspan(6)1m raise	392.23	393.32	392.31	394.09	393.94	392.89	392.37	391.74	1.63	1.71	0.62	0.66	-0.43	-0.49	N	Y	N	N	No backwater effect	
	20 & Conspan(6a)1m raise	392.29	393.34	392.41	394.09	393.94	392.89	392.33	391.72	1.53	1.65	0.6	0.6	-0.45	-0.57	N	Y	N	N	No backwater effect	
	20 & Conspan(6)1.3m raise	392.23	393.4	392.31	394.39	394.24	393.19	392.37	391.74	1.93	2.01	0.84	0.96	-0.21	-0.49	N	Y	N	N	No backwater effect	
	20 & Conspan(6a)1.3m raise	392.29	393.57	392.41	394.39	394.24	393.19	392.33	391.72	1.83	1.95	0.67	0.9	-0.38	-0.57	N	Y	N	N	Low backwater effect	
	20 & Conspan(6)1.6m raise	392.23	393.32	392.31	394.69	394.54	393.49	392.37	391.74	2.23	2.31	1.22	1.26	0.17	-0.49	N	Y	Y	N	No backwater effect	
	20 & Conspan(6a)1.6m raise	392.29	393.71	392.41	394.69	394.54	393.49	392.33	391.72	2.13	2.25	0.83	1.2	-0.22	-0.57	N	Y	Y	N	Low backwater effect	
	20 & Conspan(6b)1.6m raise	392.26	393.6	392.39	394.69	394.54	393.49	392.83	392.1	2.15	2.28	0.94	1.23	-0.11	-0.16	N	Y	Y	N	Low backwater effect	
	20 & Conspan(6c)1.6m raise	392.25	393.13	392.38	394.69	394.54	393.49	393.23	392.41	2.16	2.29	1.41	1.24	0.36	0.16	N	Y	Y	N	No backwater effect	
	20 & Conspan(6d)1.6m raise	392.22	393.22	392.31	394.69	394.54	393.49	392.33	391.72	2.23	2.32	1.32	1.27	0.27	-0.5	N	Y	Y	N	No backwater effect	
	20 & Conspan(6e)1.6m raise	392.24	393.09	392.37	394.69	394.54	393.49	393.58	392.56	2.17	2.3	1.45	1.25	0.4	0.32	N	Y	Y	Y	No backwater effect	
	20 & Conspan(6e)1.5m raise	392.24	393.09	392.37	394.6	394.45	393.4	393.58	392.56	2.08	2.21	1.36	1.16	0.31	0.32	N	Y	Y	Y	No backwater effect	
25 & Conspan(6e)1.4m raise	392.25	393.03	392.38	394.5	394.35	393.3	393.58	392.56	1.97	2.1	1.32	1.05	0.27	0.31	N	Y	Y	Y	No backwater effect		

Note:

1. WSEL refers to water surface elevation
2. EGL refers to energy grade line
3. LPE refers to road low point elevation
4. HWL refers to high water level
5. EOTL refers to edge of travelled lane
6. Conspan structure 14m span and 1.94m rise
- 6a. Conspan structure 10m span and 1.9m rise
- 6b. Conspan structure 10m span and 2.4m rise
- 6c. Conspan structure 10m span and 2.8m rise
- 6d. Twin conspan structure 7m span and 1.9m rise
- 6e. Conspan structure 10m span and 3m rise
7. Desired freeboard measured wrt EGL at design flow
8. Min freeboard measured wrt HWL at design flow
9. Col 8 refers to the soffit elevation for the eqv rectangular opening
10. Col 14 refers to the soffit clearance wrt to col 8 for HWL at design flow (0.3m clearance required)



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QUEEN STREET EAST (HIGHWAY 136)
SHAWS CREEK AND TRIBUTARY
CROSSING ASSESSMENT

Report prepared for R.V. Anderson Associates Limited, March 2017



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DISCLAIMER

We certify that this report is accurate and complete and accords with the information available during the site investigation. Information obtained during the site investigation or provided by third parties is believed to be accurate but is not guaranteed. We have exercised reasonable skill, care and diligence in assessing the information obtained during the preparation of this report.

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1 INTRODUCTION

Road improvements are planned for Queen Street East (Highway 136) in the Village of Alton. In support of the design improvements for two crossing structures, Matrix Solutions Inc. has completed an assessment in order to provide input on the size and placement of the structures from a fluvial geomorphic perspective. Credit Valley Conservation (CVC) *Fact Sheet III: Geomorphological Considerations with Regards to Crossing Design* (2015) was reviewed in order to provide the framework for the assessment.

This report documents the considerations that were taken in developing the recommendations for the bridge and culvert improvements. The process included a review of previously completed reports, field investigations upstream and downstream of the existing crossings, a meander belt analysis, and data integration.

2 BACKGROUND INFORMATION

2.1 Study Area

The study area is located along Queen Street East (Highway 136) in Alton, between Main Street and Porterfield Road (Figure 1). The main channel and a Tributary of Shaws Creek cross Queen Street in a southeasterly direction through a 9 m span bridge and 3 m span box culvert, respectively. The sections of watercourse investigated include the main channel of Shaws Creek between the rail bridge to the northwest and the confluence with the Tributary to the southeast. The Tributary was also investigated from the rail line to the confluence with Shaw Creeks. These study limits were set by existing structures (i.e., railway crossings) that generally fix the position of the watercourses at the upstream extents.

A subwatershed characterization report was completed for Shaws Creek by CVC in 2014. Subwatershed characteristics presented in that report are summarized below while further detail regarding the stream geomorphology in the current study area is presented in Section 2.2. The Shaws Creek subwatershed is a large headwater area of the Credit River system, draining 77.8 km². The main branch of Shaws Creek is approximately 16 km in length, with an average slope of 0.8%. The area is characteristic of a headwater area, with undulating and hummocky terrain and contains several significant wetland features and several coldwater reaches of creek. The majority of the subwatershed lies on the Amabel and Guelph bedrock formations which consist of crystalline dolostone with widespread secondary porosity features such as fractures and cavities that yield large quantities of groundwater. Surficial geology is variable, but generally dominated by large deposits of coarse grained deposits, dominated by the Orangeville Moraine. Based on a physiography map provided in the document, the study area is at the interface of two physiographic regions: Guelph Drumlin Fields and Hillsburg Sandhills (Orangeville Moraine).

The latter is composed of moderately to highly permeable stratified drift deposits and encourages groundwater recharge due to the hummocky topography.



FIGURE 1 Study area map

2.2 Existing Geomorphology Data

A number of previously completed studies contain information on the watercourses and were reviewed for information regarding fluvial geomorphology and hydraulics, with an emphasis on channel adjustments. Relevant information is presented below.

Shaws Creek Subwatershed Study Background Report (Draft) - CVC, 2006

A background report was prepared to summarize existing available data and information pertinent to the subwatershed. Included was a review of previous studies of stream geomorphology. A study undertaken in 1987 by CVC reported that sections of highly unstable banks were located mostly in Alton downstream of Main Street to the mouth, although it is also reported that banks were stable from

Millcroft Inn Dam to Highway 136. Dams on Shaws Creek and its tributaries were reported to act as upstream base level controls, disrupting sediment transport processes and crossings were noted to have an impact on natural channel form. Detailed field data from a monitoring site upstream of Highway 136 is provided. The average values for select parameters are presented in Table 1. Note that the discrepancy in Entrenchment Ratio (shown with asterisk) between 1999 and 2001 was attributed to differing methodology as opposed to channel adjustment.

TABLE 1 Summary of select CVC monitoring data - average values (CVC, 2006)

Characteristic	Year		
	1999	2001	2002
Bankfull Width (m)	9.50	9.65	9.87
Mean Bankfull Depth (m)	0.45	0.42	0.44
Width/Depth	21	23.5	22.6
Entrenchment Ratio*	4.1	10.5	11.4
Particle Size (mm)	95	75	67
Bank Height (m)	0.7	0.5	0.6
Bank Angle (degrees)	43.8	58.7	31.2
Undercut Amount (m)	0.17	0.18	0.19
Undercut Height (m)	0.21	0.16	0.16
Banks with Undercuts (%)	65.0	50.0	60.0
Embeddedness (%)	44.0	56.5	61.3

Subwatershed 17 Characterization Report Phase 1 - CVC, 2014

In the Characterization Report for Subwatershed 17 (Shaws Creek), CVC reported that the fluvial geomorphology is diverse. Geomorphic reaches were established and within the current study area the reaches include Reaches R1, R2, and R4. Note that portions of these reaches delineated by CVC extend outside of the current study area.

Reach R1 encompasses Shaws Creek downstream of the confluence with the Tributary. It was classified as Strahler Stream Order 5 and noted to have a gradient of 0.47%. Downstream of the confluence, the gradient is relatively low, allowing the channel to function as a deposition zone. R1 is predominantly comprised of fine-grained materials (e.g., sand and silt), reflecting the underlying geology and channel gradient and was reported as stable in the Downs Evolution Model.

Reach R2 is the Tributary between the confluence with Shaws Creek and extending upstream to 25th Side Road. It was classified as Stream Order 3 and noted to have a gradient of 0.57%. The existing shallow, natural channel meanders through a broad to narrow, well-defined valley. The floodplain is densely wooded with some light patches. The area along the periphery is predominantly rural agriculture. It was noted that the most sensitive headwater channel types observed are those that flow through wetland areas, including R2. The morphology of these channels is strongly influenced by streamside vegetation. This reach was reported as enlarging in the Downs Evolution Model, which indicated enlarging or initiation of continuous erosion, often at the channel toe.

Reach R4 is Shaws Creek as it runs through Alton. It was classified as Strahler Stream Order 5 and noted to have a gradient of 2.53%. The high gradient is mitigated by the presence of dam structures. Through this reach the channel reworks its own alluvium and the bed is relatively coarse (e.g., gravel to cobble). The bed is generally more resistant to erosion than the banks, causing lateral adjustments to be the primary channel response. This reach was reported as enlarging in the Downs Evolution Model, which indicated enlarging or initiation of continuous erosion, often at the channel toe. Reach characteristics are summarized in Table 2.

TABLE 2 Summary of reach characteristics (adapted from CVC, 2014)

Reach	Parameter						Downs Evolution Model
	Bankfull Width (m)	Bankfull Depth (m)	Substrate Pool	Substrate Riffle	RGA	RSAT	
R1 (Shaws Creek)	7 to 15	0.5 to 1.0	Sand	Sand/gravel	0.22 (In transition)	30 (Good)	S - 'Stable'
R2 (Tributary)	1 to 2	0.2 to 0.5	Sand - gravel	Sand/gravel	0.21 (In transition)	26 (Good)	e - 'Enlarging'
R4 (Shaws Creek)	8 to 15	0.2 to 1.5	Gravel	Small-large cobble	0.25 (In transition)	32 (Good)	e - 'Enlarging'

Queen Street Bridge Rehabilitation Design Brief - GHD and Beacon Environmental, 2015

A design brief was prepared for the environmental works to occur as part of a proposed structural rehabilitation of the Queen Street Bridge. A field investigation was undertaken at the site to direct the design. It was reported that the channel setting is unconfined upstream of Queen Street, with moderate sinuosity and gradient. The bed morphology is characterized by riffle-pool sequences. Migration of the channel upstream of the bridge has resulted in the channel becoming misaligned with the bridge opening and scour was evident along the east bridge abutment. Surveyed parameters include an average bankfull width of 11.2 m, an average bankfull depth of 0.5 m, and a channel bed gradient of 0.53%. Substrate is characterized by a d_{50} of 22.7 mm (gravel) and a d_{84} of 64.1 mm (gravel/cobble). Bankfull discharge was estimated to be 6.5 m³/s, with an average velocity of 1.2 m/s.

A channel restoration design was prepared that involves reducing erosion and scour along the east abutment. Approximately 8 m of offset scour protection was proposed along the northeast bank to address future channel migration with the extent of protection limited to the existing channel bank and immediately in front of the abutment. The proposed restoration design presented in this brief was not implemented.

Hydraulic Modelling - Matrix, 2016

A hydraulic study was undertaken to examine numerous alternatives and combinations to ensure that potential replacement structures satisfy relevant design criteria associated with watercourse crossings and does not cause undesirable hydraulic impacts upstream of the proposed crossing. The hydraulic model was updated to account for a survey of the existing road profile.

A summary of the results is provided below:

- A combination of a 20 m span bridge and a 10 m span, 3 m rise concrete arch culvert, and the road profile raised by 1.5 m is required to satisfy all the criteria including soffit clearance for the Regulatory event.
- With the same combination as above but by raising the road profile by 1.4 m, there is no soffit clearance for the Regulatory event.
- By using a 25 m span bridge and a 10 m span, 3 m rise concrete arch culvert and raising the road profile by 1.4 m, all the criteria including the soffit clearance for the Regulatory event are satisfied.

3 FIELD WORK

Rapid assessment techniques including Rapid Geomorphic Assessments (RGA; MOE, 2003) and the Rapid Stream Assessment Technique (RSAT; Galli, 1996) were applied during a site visit in May 2016 to characterize the geomorphic processes occurring in the study area. The scores are summarized in Table 3. Please see Appendix A for further information regarding the rapid assessment protocols and scoring methodology and Appendix B for site photos. Note that all references to left or right banks are looking downstream.

3.1 Shaws Creek

Shaws Creek was assessed over 170 m between the railway bridge and Highway 136, and also 200 m downstream of Highway 136. For the purposes of this study, the length between the rail bridge and the confluence with the Tributary is considered one study reach. This reach corresponds to a portion of Reach R4 as delineated in the 2014 CVC study.

Immediately upstream of the railway bridge, bankfull cross-sectional dimensions were measured to be a width of 12 m and depth of 0.5 m, with wetted dimensions of 11.7 m by 0.15 m at the time of survey. The bed at this location is highly armoured with angular cobble- and gravel-sized material (5 to 20 cm). Bank material consists of silt and sand and there is good access to the floodplain along both sides of the channel. Minor undercutting was observed along both toes. At the 15 m span rail bridge, the left abutment is exposed, the channel width is 8 m, and there is 7 m of floodplain along the right side of the channel.

Downstream of the railway bridge the channel has adjusted, potentially due to flow expansion and perpetuated by in-stream woody debris. The overall channel widens out to approximately 20 m, with an island present along the left side of the channel. The island is vegetated with grass, coniferous trees, and deciduous saplings. The channel along the left bank resembles a chute and there is major instream woody debris (fallen trees).

Downstream of the island, the flow confluences and is directed towards the left bank at the bend (115 m upstream of Highway 136) which is eroding and is undercut by 0.5 m. The depth at the pool is 0.6 to 0.7 m and substrate is cobble. There is large woody debris in the pool. A sand point bar with erratic cobble has developed and is vegetated with grass along the opposite (inside) bank. Downstream of the bend, the channel straightens out and the bankfull channel measures 8 m wide with a depth of 0.52 m, with wetted dimensions of 7.5 m by 0.13 m at the time of survey. Along the right bank in this section, historic bank slumping is observed with vegetated slumped material along the right bank. Outside of the areas with the slumped banks, there is undercutting (0.1 to 0.25 m) throughout, including along the inside bend. A riffle-pool sequence with riffles approximately 16 to 17 m in length and pools 17 to 23 m in length is present along this section.

At the bend immediately 25 m upstream of the Highway 136 bridge, bank erosion is widespread, with undercut banks and failed/falling shrubs. This is the location at which migration measurements were taken for the current assignment (Section 4). A pool with a back eddy at the bend has a bankfull depth of approximately 0.75 m and gravel substrate. Undercutting to 0.25 m was measured. Along the inside bend across from this bank, there is no evidence of erosion as a silty point bar has developed and the floodplain is vegetated with cattails. As this inside bank builds up, energy is directed towards the outside bank.

As the channel turns to run perpendicular to Highway 136 and under the bridge, there is scour along both banks. A drainage channel running perpendicular to the roadway enters the channel along the right bank at the bridge. At the 9 m span bridge, the left abutment is exposed over a width of 2.3 m at water level. Asphalt, debris, and pit-run material line the left bank. The right bank/floodplain extends 3.6 m laterally into the structure span at the upstream extent of the bridge, however it does not continue under the structure. Substrate immediately upstream of the bridge is smaller than substrate observed further upstream, with cobble-sized material in the 10 cm range present. Under the bridge, the bed is well-armoured and there are large boulders (30 cm+ diameter) present, particularly along the left half of the structure, acting to backwater the channel slightly. The thalweg runs along the right abutment before centering at the downstream edge of the bridge.

A cross-section measured immediately downstream of the bridge revealed dimensions of 9 m width by 0.7 m depth, with a wetted width of 8 m and wetted depth of 0.3 m at the time of survey. Overall, substrate remains in the cobble and gravel size ranges, but is smaller overall than observed upstream, generally being between 2 to 15 cm in diameter. There is also some minor concrete debris in the channel. Along the outside bend downstream of the bridge there is a pool approximately 0.6 to 0.75 m deep with undercutting along the bank. Logs in the channel direct flow towards the bank, scouring it out with sand and gravel present along the bed. The opposite bank consists of a gravel/sand point bar with little erosion noted. As Shaws Creek continues towards the confluence with the Tributary, bank undercutting (0.3 m) is prevalent in the straight section of channel and bank slumping was noted for a short section along the right bank. The confluence is generally stable, with some minor evidence of impinging flows on the opposite (right) bank.

For the overall study reach, evidence of widening was most prominent. Erosion was noted at the toe of the bank throughout the majority of the reach, with higher rates of erosion occurring along the outside bank of meander bends. There was evidence of fallen and leaning trees as well as occurrence of large organic debris in the channel. The presence of cobble/gravel substrate prevents the channel from incising (eroding downwards) and directs energy towards the channel margins. The riffle-pool sequence was well defined upstream of the bridge, as was the formation and placement of bars. There was some island formation within the channel; with one island upstream of Queen Street that displays high permanency due to being fully vegetated. The processes noted have resulted in an RGA score of 0.38 (transitional) and an RSAT score of 34 (moderate stream health).

3.2 Tributary

The Tributary was assessed between the confluence with Shaws Creek and the railway crossing located upstream. This section of channel corresponds to a portion of reach R2, as delineated in the CVC (2014) study. Along this distance, two reaches were delineated, with a pond feature 250 m upstream of Highway 136 marking the delineation between the two reaches. The focus of the current study is the downstream reach and is herein referred to as the Tributary.

At the confluence with Shaws Creek, a soft sand deposit is present at the mouth of the Tributary and extends down along the left bank of Shaws Creek for 2 to 3 m. Further upstream, the bed substrate is coarse, consisting of gravel and round cobble. Toe erosion is prevalent with minor slumps developing. The channel measures 1.5 to 2.5 m wide with depths of 0.5 to 0.6 m. At the time of survey, wetted channel widths measured 1.6 to 2.3 m and depth of 0.1 to 0.15 m.

At the downstream end of the 3 m wide culvert, the right bank extends out approximately 1.6 m; however through the culvert a silt/sand flat 1 to 1.5 m wide has developed along the left side of the structure. At the entrance to the culvert, upstream of Highway 136, the channel is skewed entering the structure and there is a soft deposit of silt and gravel. Banks are undercut 0.1 to 0.2 m and there is small woody debris in the channel, serving as cross-logs. Bankfull measurements of 2.2 m width, 0.5 m depth were observed, with a wetted depth of 0.2 m at the time of the field visit. Further upstream a second bankfull cross-section measured 1.4 m wide and a depth of 0.4 m, with a wetted depth of 0.12 m. Gravel and sand were the predominant substrate sizes observed throughout. The exception is areas that have been impacted by minor debris jams and historic beaver dams, with the backwatering acting to silt up the channel. Local widening from the backwatering has resulted in channel widths of approximately 3.5-4 m. At the upstream extent of the study reach is a relatively large beaver dam that acts to backwater a human-created pond. A second Tributary reach was delineated upstream of the beaver dam, encompassing the pond feature.

The dominant geomorphic process noted along the reach of the Tributary to Shaws Creek is widening. The entirety of the reach has leaning trees and exposed tree roots. Some scour was observed in the area of exposed roots, however it has created valuable habitat for aquatic species. Bar formations throughout the Tributary were sporadic and not well formed showing evidence of planimetric form adjustment. The area around the Queen Street culvert has coarse substrate, while many sections in the upstream portion have a soft unconsolidated bed. The soft unconsolidated bed is most likely due to the multiple dams located throughout the reach causing multiple changes in flow and sediment transport. The RGA score of 0.43 indicates that the channel is 'in adjustment' and the RSAT score of 26 indicates 'moderate' channel health. The high RGA score may be reflective of the channel setting (wide open floodplain that allows for generally unrestrained migration) and multiple contributing channels within the floodplain, as well as the presence of numerous beaver dams that can cause major geomorphic adjustments (e.g., siltation, development of chutes, etc.).

TABLE 3 Rapid assessment results

Reach	RGA	RSAT	Dominant Geomorphic Process
Shaws Creek	0.38 (high transitional)	34 (moderate)	Widening
Tributary	0.43 (in adjustment)	26 (moderate)	Widening

4 MEANDER BELT ANALYSIS

Streams are dynamic features that change their configuration and position within a floodplain by means of erosion, meander evolution, and migration processes. When meanders change shape and position, the associated erosion and depositional processes that occur can cause loss or damage to property and infrastructure. In the past, watercourse form and function and stream corridor continuity were not often considered in crossing design, often leading to disruption of natural channel processes (e.g., sediment transport, hamper channel migration, etc.) and increased risk to the infrastructure. Therefore, it is beneficial to forecast potential future planform extent to assist in the sizing and siting of infrastructure.

4.1 Preliminary Belt Widths

The Belt Width Delineation Procedures document (Parish, 2004) was used to guide the development of meander belts for reaches of the watercourses situated within unconfined systems. Using available mapping and digital aerial photography, a preliminary belt width was delineated for study reaches by drawing lines parallel to the governing outermost meander or historic extent of channel and following the meander axis.

The preliminary belt width for Shaws Creek was measured to be 58 m. Note that the 1971 aerial photo displays what appears to be the development of a chute immediately downstream of the bridge; however, the resolution of the photo is not ideal and difficult to interpret, therefore it was not included in the preliminary width. The location was investigated during the field visit and no evidence of a historic channel was observed.

Along the Tributary, a preliminary belt width is measured to be 19.5 m. Due to the unconfined nature of the floodplain, a secondary meander pattern can be measured to have a preliminary belt width of 56.6 m. However, for the purposes of the current study, analyses going forward will be limited to the primary meander pattern. A preliminary belt width was also delineated for the Tributary reach that encompasses the extent of the pond and measures 37.2 m. The width of the pond (and subsequent belt width) has little bearing on the morphology of the Tributary at the Highway 136 crossing.

4.2 Empirical Analysis

Empirical analyses based on relationships established by Williams ($MBW = 4.3W^{1.12}$ (m); 1986) and Ward ($MBW = 6.0W^{1.12}$ (ft); 2002) were undertaken to corroborate the results of the mapping exercise. Note that the Ward relationship provides conservative results. For Shaws Creek, the bankfull width measured in the vicinity of the Highway 136 bridge during a detailed survey by GHD (2015) represents an average of the widths observed in the current field assessment and was used in the calculations. Based on an average bankfull width of 11 m, the calculated meander belt width for Shaws Creek is 88.7 m, based on the average of the two relationships. An average stream width of 2 m was applied for the Tributary. The average calculated meander belt width for the Tributary is 12.2 m.

4.3 Migration Analysis and Setback

The process of developing a final meander belt width for each of the reaches involves consideration of the stability of the reach and the addition of an erosion setback. From a geomorphic perspective, the 100-year migration rate typically represents the erosion setback to be applied to either side of the meander belt width in order to account for bank erosion and channel migration.

Using aerial photography, channel erosion/migration was measured at the north east bank of Shaws Creek upstream of the existing Highway 136 bridge. Measurements were made of bank positions between 1971 and 2005, and between 2005 and 2015. The average migration rate over the entire period was determined to be 0.1 m per year. Multiplied over a 100-year time frame, this results in a 10 m setback on each side of the channel. Due to issues regarding scale and resolution, a migration analysis was not possible for the Tributary. In lieu of a migration rate, a standard setback equivalent to 10% of the preliminary meander belt width is applied to each side of the channel.

4.4 Final Belt Width

For Shaws Creek, the empirical results are greater than the preliminary belt width measured from aerial photography. As direct measurements are preferred, the final belt width is based on the measured preliminary belt width of 58 m plus a setback of 10 m on each side for a value of 78 m. This value matches well with the result from the Williams (1986) relationship.

For the Tributary, the belt width calculated using empirical equations is approximately half of the primary meander pattern belt width measured from aerial photography. The meander pattern at the downstream extent of the reach, closer to the roadway is closer to the empirically-derived results. The larger planform-derived belt width is governed by meanders further upstream, where beaver activity was prevalent and may have caused greater channel adjustments. Using a conservative approach, the final belt width for the Tributary will be the measured preliminary belt width of 19.5 m plus a standard set back of 10% on each side for a final value of 23.4 m. The results of the meander belt analysis are summarized in Table 4 and are presented in Figure 2.

TABLE 4 Meander belt width analysis results

Reach	Prelim. Measured MBW	BF Width	Relationship	Calculated MBW	Avg. Calculated	Avg. 100-Year Migration Rate	Setback	Final Meander Belt Width
Shaws Creek	58 m	11 m	Williams (1986)	76 m	88.7 m	0.1 m/year	10 m	78 m
			Ward (2002)	101.5 m				
Tributary	19.5 m	2 m	Williams (1986)	9.3 m	12.2 m	N/A	1.95 m (10% of prelim.)	23.4 m
			Ward (2002)	15.0 m				

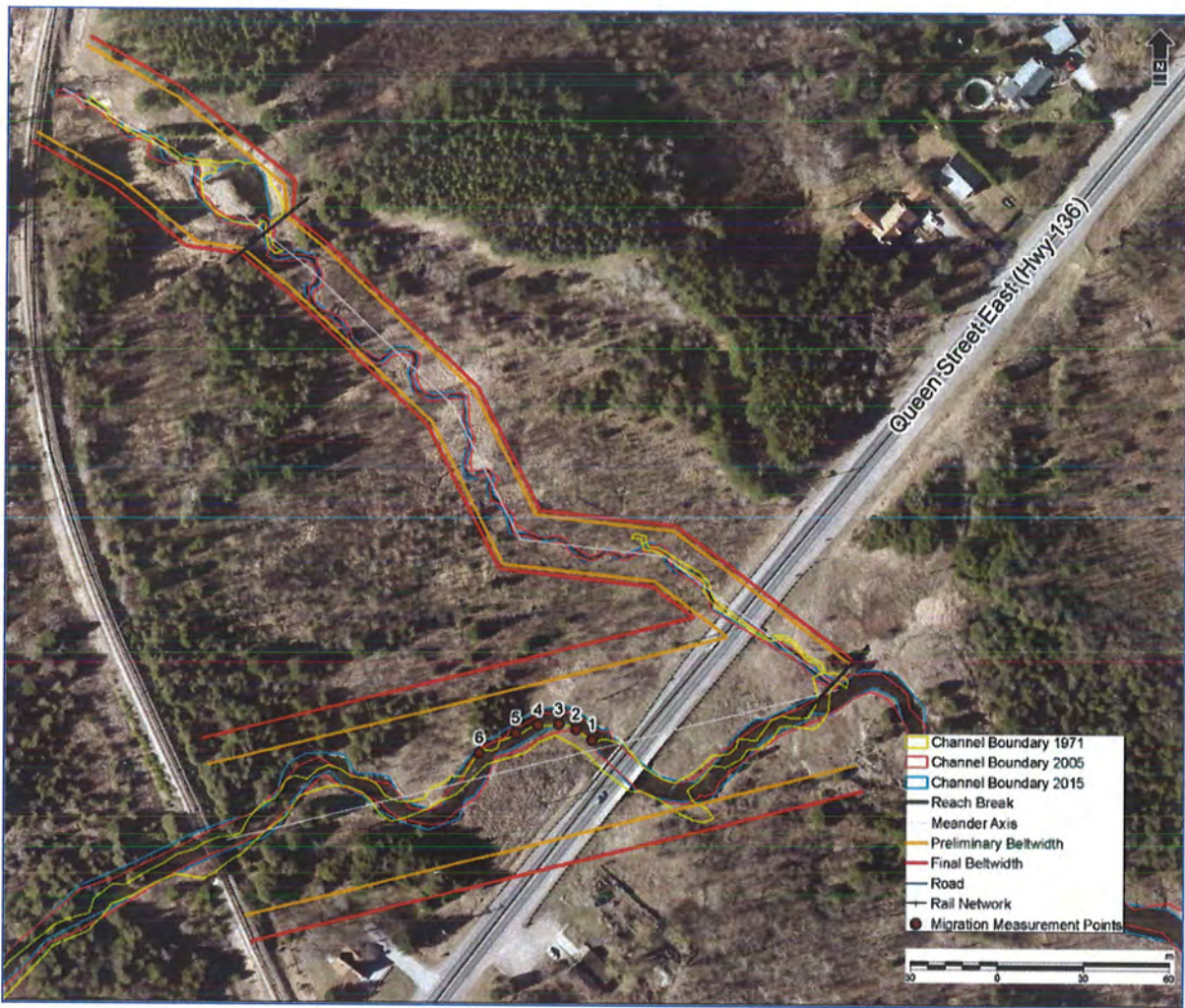


FIGURE 2 Meander belt width extents

5 CROSSING ASSESSMENT - DATA INTEGRATION

5.1 Risk-Based Procedure

To provide insight towards the design of watercourse crossings, a risk-based procedure is followed using the results of the field investigations and geomorphic analyses. In general, the two primary factors that must be considered from a geomorphic perspective are the potential for channel migration and channel incision. These two risk factors are affected by the following structural design parameters:

1. Channel migration/erosion (lateral instability): Length, span, and skew.
2. Channel incision (vertical instability): Invert (footing or bed) and length.

In order to evaluate these risk factors, a procedure is followed that provides a site-specific process to evaluate and determine whether a crossing structure size is appropriate from a geomorphic perspective. The following factors are considered:

Channel Size: The potential for lateral channel movement and erosion tends to increase with stream size. Headwater streams tend to exhibit low rates of lateral migration due to the stabilizing influence of vegetation on the channel bed and banks. Erosive forces in larger watercourses tend to exceed the stabilizing properties of vegetation and result in higher migration rates.

Valley Setting: Watercourses with wide, flat floodplains and with low valley and channel slopes tend to migrate laterally across the floodplain over time. Watercourses that are confined in narrow, well drained valleys are less likely to erode laterally but are more susceptible to down-cutting and channel widening, particularly where there are changes to upstream land use. Typically the classification of the valley will fall into one of three categories: confined, partially confined, and unconfined.

Meander Belt Width: The meander belt width represents the maximum expression of the meander pattern within a channel reach. Therefore, this width/corridor covers the lateral area that the channel could potentially occupy over time. This value has been used by regulatory agencies for corridor delineation associated with natural hazards and the meander belt width is typically of a similar dimension to the regulatory floodplain.

Meander Amplitude: The meander amplitude and wavelength are important parameters to ensure that channel processes and functions can be maintained within the crossing. The number of wavelengths upstream of the structure to be considered is dependent on the scale of the watercourse, rates of migration, and the degree of valley confinement.

100-year Migration Rates: Using historical aerial photographs, migration rates may be quantified (where possible) for each crossing location. A higher migration rate indicates a higher geomorphic risk.

RGA Score: An RGA score provides a measure of the stability and health of the channel. Channels that are unstable tend to be actively adjusting and thus are sensitive to the possible effects of the proposed crossing. Accordingly, there is more risk associated with unstable channels.

A chart showing the general work flow for assessing new crossing structures is shown in **Figure 3**.

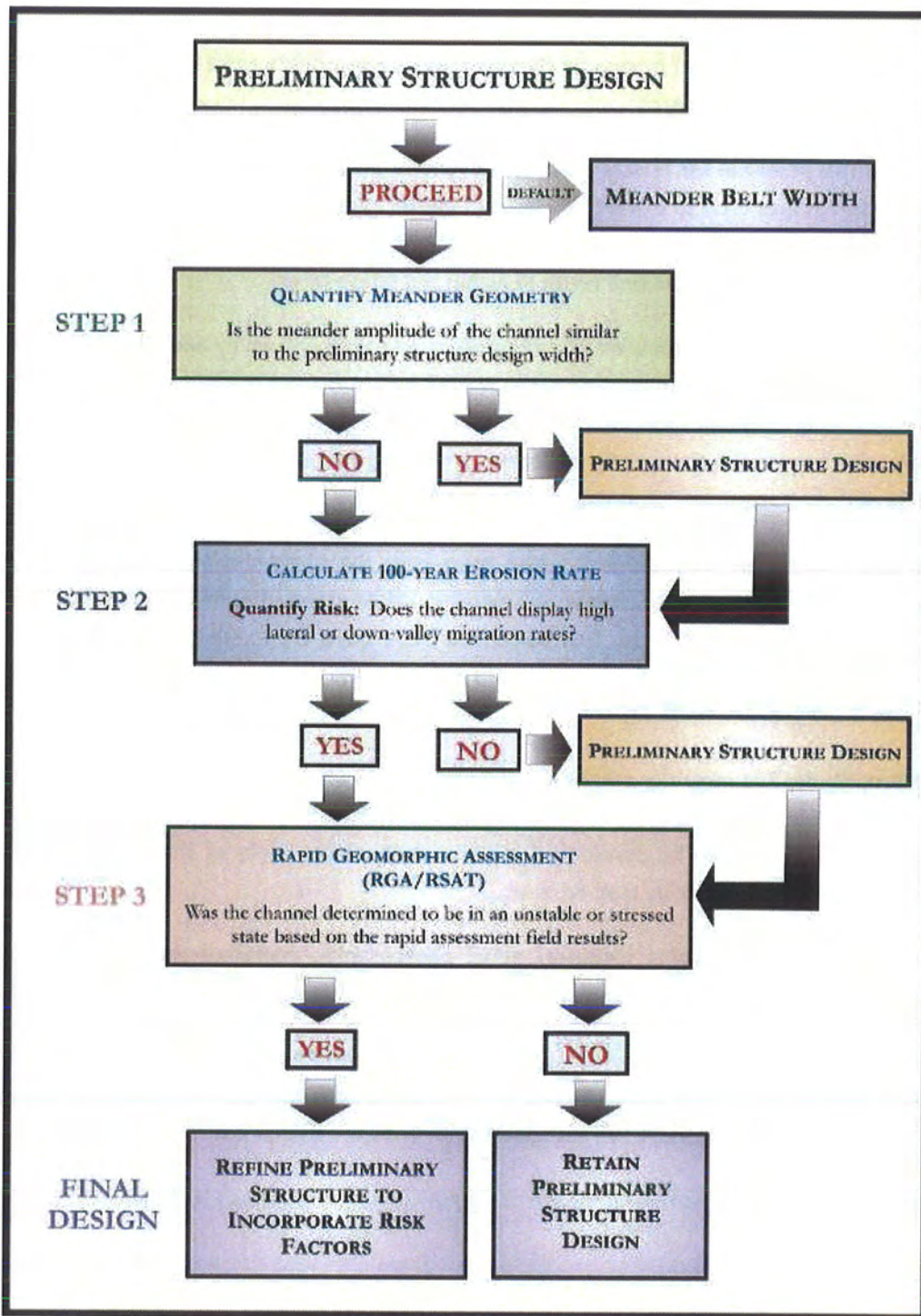


FIGURE 3 Geomorphic risk assessment protocol for span recommendations

5.2 Risk Factors for Structure Selection

5.2.1 Preliminary Structure Design

In reference to the starting point for the geomorphic risk assessment process outlined in the previous section, the preliminary structure design for the current project will be set per the preliminary hydraulic analysis completed by Matrix (2016). The results of the hydraulic analysis indicate that the necessary minimum structure sizes for the bridge and culvert are 20 m and 10 m, respectively. These sizes are required in order to satisfy roadway safety flooding regulations. It is assumed that structures larger than this will also satisfy flooding regulations and therefore these values are used as the minimum for consideration of design options.

For reference to the recommendations being proposed, Highway 136 is considered to be in an east-west direction, with Main Street being north-south.

5.2.2 Shaws Creek

At the current crossing location, Shaws Creek has a bankfull width of 11 m and an average bankfull depth of 0.5 m. The bed, consisting of gravel and cobbles, is generally more resistant to erosion than the banks, causing widening and lateral adjustments to be the primary channel response to flows. The channel sits within an unconfined setting, although the Highway 136 roadway embankment introduces a semi-confined valley-type setting along the south bank upstream of the road. This setting, in addition to the coarse bed substrate, causes the channel to erode laterally across the floodplain as opposed to incising. The railway bridge approximately 170 m upstream of Highway 136 acts as a constraint to the translation of meanders from upstream. Upstream of the railway bridge, the channel is heavily modified, armoured with large stone and with mills/ponds built along the watercourse, segmenting natural stream processes. As such, the natural meandering tendency of the creek only begins downstream of the rail bridge. The final meander belt width for Shaws Creek was determined to be 78 m. Rapid assessments indicate that the channel is in a high transitional state.

The starting point for a bridge structure is to span the meander belt width. At the Shaws Creek crossing, this would require a structure span of 78 m skewed to the orientation of the meander axis (approximately 45 degrees to the roadway). This ideal scenario would allow for all potential future creek adjustments to be accommodated without risk to the proposed structure. It is recognized that the implementation of a structure of this size is likely not possible for a variety of reasons (e.g., extensive disturbance to floodplain) and that other options should be considered.

A bridge span of 20 m, with the west abutment remaining in its current position (with no skew), theoretically provides the necessary floodplain space to allow for erosion of the northeast bank over a 100-year time period; however, this option doesn't provide for a buffer between the structure and the creek if it does migrate/erode over this distance. A buried stone treatment can be installed along the channel margins to protect the abutment from future channel erosion/migration.

A bridge span of 25 m with the west abutment remaining in its current position (with no skew) could provide buffer space between the future potential planform and the bridge structure. This span could accommodate the meander amplitude located immediately upstream of the highway (24.6 m). RVA has indicated that positioning the proposed new west abutment approximately 3 to 4 m behind the existing west abutment is preferred as it improves constructability of the structure (i.e., pile driving behind existing piles to avoid conflict). With a span of 25 m, a wider floodplain could be established along both sides of the creek, providing continuity for the creek corridor and improvement to terrestrial passage.

Either of the above options (20 m or 25 m) provides improvement over the existing condition and is suitable with regards to fish passage, bedload conveyance, ice jams, and woody debris considerations. The current design iteration (60% submission) includes a bridge with a 25 m span that has the west abutment situated approximately 2 m to the west of the existing. This is an ideal scenario when comparing the two options that were evaluated.

5.2.3 Tributary

The Tributary is a smaller channel, with a bankfull width of 2 m. The RGA score indicates that the channel is in adjustment. Based on the preliminary hydraulic analysis, a structure size of 10 m is proposed for this crossing. According to the *CVC Geomorphological Considerations with Regards to Crossing Design* (2015), for channels less than 4 m wide, a minimum three times the bankfull width is required for new structures, which is provided. Where a replacement crossing is proposed that is three times the bankfull channel width or larger, it is assumed to provide an improvement over the existing condition (CVC, 2015). This is supported by an evaluation of the meander geometry near the crossing. The final meander belt width of 23.4 m is based on the historic planform of the watercourse and a meander located approximately 200 m upstream of the existing culvert. However, within the first 100 m upstream of the culvert, the meander amplitudes are lesser (approximately 6 m) and could be accommodated within a span of 10 m. Furthermore, this span allows for the establishment of natural channel characteristics (bankfull channel and substrate) and floodplain through the structure, providing improvements to aquatic habitat and terrestrial passage. The use of an open bottom structure allows for natural bottom substrate within the crossing that matches the upstream and downstream substrates and provides improvement of bed load and continuity of geomorphic processes. Additionally, incision risks are minimized with the introduction of natural bottom substrates.

The new culvert length will not be longer than the existing structure, and the current position of the culvert is generally appropriate. The current design iteration (60% submission) positions the new 10 m structure centred on the existing centreline with a similar skew. This provides for an ideal channel planform configuration as it enters the new structure, facilitates construction, and will also allow for the development of an overbank zone on both sides of the channel through the structure; the overbank zone accommodates future channel adjustments and facilitates terrestrial passage.

6 SUMMARY

Geomorphic analyses were undertaken in order to provide recommendations concerning the replacement of structures along Highway 136 in Alton. Shaws Creek was identified to be actively adjusting at the crossing with Highway 136 based on a field investigation and historic migration analysis. Possible new span sizes of 20 m and 25 m were examined for the bridge. A high-level evaluation of the options with consideration of geomorphic processes and risk to the structure, riparian conditions, aquatic habitat opportunities, and terrestrial passage was completed. These sizes are feasible, but a greater factor of safety and ecological enhancements are achieved with increasing bridge span, therefore the 25 m span is recommended as presented in the 60% design submission. The position of the bridge is most appropriate with the west abutment slightly behind to allow for constructability; however, a natural overbank zone/floodplain will be established underneath the structure along both sides of the channel.

At the Tributary, the preliminary replacement culvert size of 10 m, established based on hydraulic modelling, was determined to be appropriate from a fluvial geomorphic perspective and will provide improvements to aquatic habitat and terrestrial passage. Centred on the existing structure, the new culvert will appropriately accommodate the meander pattern of the Tributary.

The recommendations are strictly from a fluvial geomorphic and hydraulic perspective. It is recognized that a much larger structure spanning the meander belt width would be relatively costly and could potentially result in extensive disturbance to a vast floodplain area. Structural design constraints (i.e., bridge type), construction and maintenance costs, service life of the bridge, and ecological disturbance, among other factors, must be considered collectively in determining the appropriate final bridge size and positioning.

7 REFERENCES

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APPENDIX A

Rapid Assessment Protocols

Rapid Geomorphic Assessment (MOE, 2003)

The Rapid Geomorphic Assessment (RGA) was designed by the Ontario Ministry of Environment (2003) to assess channel reaches in urban channels. This qualitative technique is purely a presence/absence methodology designed to document evidence of channel instability such as exposed tree roots, undercut branches, etc. The various indicators are grouped into four categories indicating a specific geomorphic process:

- Aggradation
- Degradation
- Channel Widening
- Planimetric Form Adjustment

Over the course of the survey, the existing geomorphic conditions of each reach are noted and individual geomorphic indicators are documented. Upon completion of the field inspection, these indicators are tallied by category and used to calculate an overall reach stability index, which corresponds to one of three stability classes related to sensitivity to altered sediment and flow regimes:

- ≤ 0.20 In Regime or Stable (Least Sensitive)
- 0.21 to 0.40 Transitional or Stressed (Moderately Sensitive)
- ≥ 0.41 In Adjustment (Most Sensitive)

Rapid Stream Assessment Technique (Galli, 1996)

The Rapid Stream Assessment Technique (RSAT) was developed by John Galli at the Metropolitan Washington Council of Governments (Galli, 1996). When compared with the RGA, the RSAT provides a more qualitative assessment of the overall health and functions of a reach in order to provide a quick assessment of stream conditions and the identification of restoration needs on a watershed scale. This system integrates visual estimates of channel conditions and numerical scoring of stream parameters using six categories:

- Channel Stability
- Erosion and Deposition
- Instream Habitat
- Water Quality
- Riparian Conditions
- Biological Indicators

Once a condition has been assigned a score, these scores are totaled to produce an overall rating that is based on a 50 point scoring system, divided into three classes:

- <20 Low
- 20-35 Moderate
- >35 High

While the RSAT does score streams from a more biological and water quality perspective than the RGA, this information does have relevance within a geomorphic context. This is based on the fundamental notion that, in general, the types of physical features that generate good fish habitat tend to represent good geomorphology as well (i.e., fish prefer a variety of physical conditions - pools provide resting areas while riffles provide feeding areas and contribute oxygen to the water - good riparian conditions provide shade and food - woody debris and overhanging banks provide shade). From a water quality perspective, the concentration of chemicals may not be a concern with respect to geomorphic conditions, but the turbidity of the stream is certainly an issue, as it implies active sediment transport and can contribute to substrate embeddedness.

APPENDIX B
Site Investigation Photographs



Photo 1: Shaws Creek - View downstream of railway crossing at upstream extent of study reach; left abutment exposed and floodplain extends 7 m into bridge span.



Photo 2: Shaws Creek - View of widened channel downstream of the railway crossing; leaning trees along left bank in the foreground and island feature visible in the background.



Photo 3: Shaws Creek - View downstream of island feature at flow impinging the left bank on bend; woody debris and coarse substrate visible.



Photo 4: Shaws Creek - View of slumping along the right bank and coarse substrate in the channel at a riffle feature.



Photo 5: Shaws Creek - View downstream of left bank with major undercutting below water level; note that this is the location where migration rates were measured from aerial imagery.



Photo 6: Shaws Creek - View downstream of bridge at Highway 136; note the leaning /failed shrubs along left bank due to erosion and the misalignment of the channel with the bridge opening.



Photo 7: Shaws Creek - View downstream of bridge at Highway 136; coarse material in channel and bank erosion/undercutting along banks visible.



Photo 8: Shaws Creek - View downstream at bend where creek runs adjacent to Highway 136; bank scouring along outside bank of channel and bar development on inside bend.



Photo 8: View east towards confluence of Shaws Creek and Tributary; sand deposit at mouth of the Tributary and along left bank of Shaws Creek



Photo 10: Tributary - View downstream of Tributary towards the confluence with Shaws Creek; undercut banks along entire channel and minor slumping at upstream extent visible.



Photo 11: Tributary - view downstream towards entrance of culvert at Highway 136.



Photo 12: Tributary - view of undercut banks and minor woody debris at a typical Tributary cross-section.

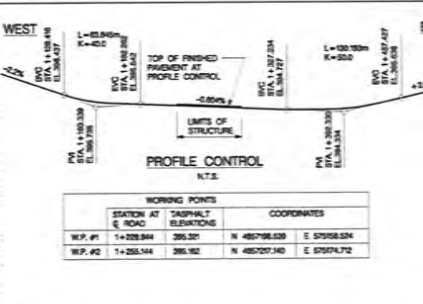
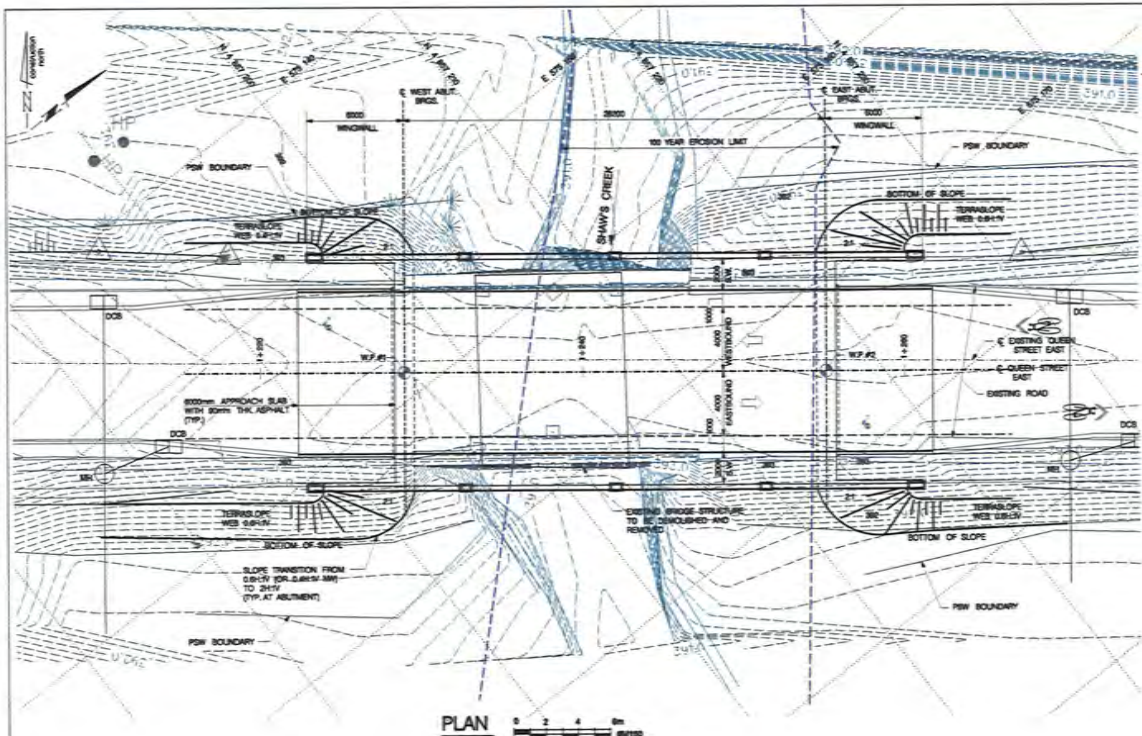


Photo 13: Tributary - View upstream at beaver dam acting to backwater Tributary channel.



Photo 14: Tributary - Backwatered pond upstream of large beaver dam; berms around pond built.

APPENDIX C
60% Bridge and Culvert General
Arrangement Drawings (RVA)



- GENERAL NOTES**
- CLASS OF CONCRETE:
 - PRECAST CONCRETE: 30 MPa
 - REMAINER: 25 MPa
 - CLEAR COVER TO REINFORCING STEEL:
 - FOOTINGS: 300±25
 - DECK: TOP: 75±20
 - BOTTOM: 45±10
 - REMAINER: 70±20 UNLESS OTHERWISE NOTED
 - COMPLY WITH CANADIAN HIGHWAY BRIDGE DESIGN CODE (C400-C6-M), DESIGN LINE LOAD C-105 ONE.
 - REINFORCING STEEL:
 - REINFORCING STEEL SHALL BE GRADE 400X UNLESS OTHERWISE SPECIFIED.
 - STAINLESS REINFORCING STEEL SHALL BE TYPE A304 OR A316 AND HAVE A MINIMUM YIELD STRENGTH OF 520 MPa UNLESS OTHERWISE SPECIFIED.
 - BAR MARKING WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
 - UNLESS SHOWN OTHERWISE DESIGN LAP SPLICES FOR BLACK OR COATED REINFORCING STEEL SHALL BE CLASS B.
 - BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BOND DIAMETER WHILE STAINLESS STEEL SHALL HAVE MINIMUM HOOK DIMENSIONS ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS S20-1 AND S20-2 UNLESS NOTICED OTHERWISE.

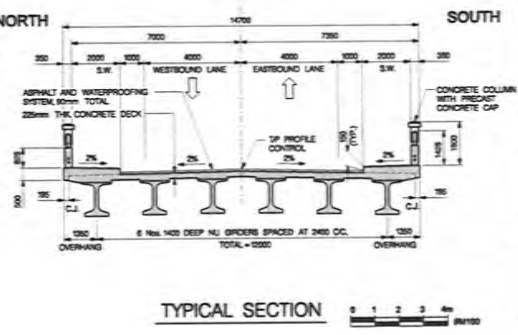
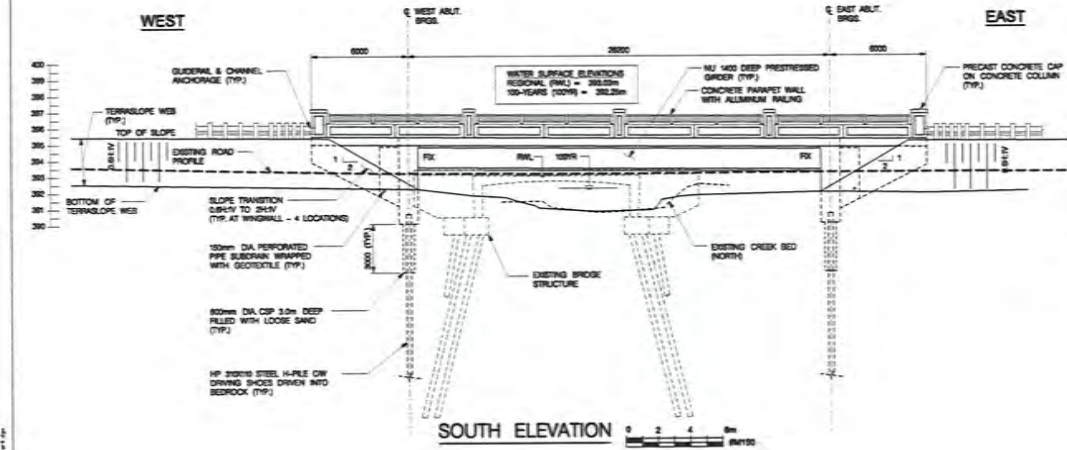
- CONSTRUCTION NOTES**
- NO DEBRIS MAY ENTER THE WATERCOURSE PROTECT THE WATERCOURSE AT ALL TIMES.
 - REINFORCEMENT OF THE WATERCOURSE SHALL BE CARRIED OUT IN ACCORDANCE WITH GREAT VALLEY CONSERVATION (GVC) AND WRAP PERMIT REQUIREMENTS.
 - SEGMENT CONTROL AND CONSTRUCTION SILT FENCES TO BE INSTALLED PRIOR TO THE START OF CONSTRUCTION AND REMOVED FOLLOWING THE RESTORATION OF VEGETATION DURING THE CONSTRUCTION PERIOD SEGMENT CONTROL MEASURES ARE TO BE MAINTAINED IN GOOD WORKING CONDITION THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL THE EROSION CONTROL MEASURES HAVE TAKEN HOLD AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
 - THE CONTRACTOR SHALL ESTABLISH THE BEARING SEAT ELEVATIONS BY DEDUCTING THE ACTUAL BEARING THICKNESSES FROM THE TOP OF BEARING ELEVATIONS IF THE ACTUAL BEARING THICKNESSES ARE DIFFERENT FROM THOSE GIVEN WITH THE BEARING DESIGN DATA, THE CONTRACTOR SHALL ADJUST THE REINFORCING STEEL TO SUIT.
 - CONCRETE PARAPET WALLS ON THE WINDWALLS SHALL NOT BE CAST UNTIL THE WINDWALLS BACKFILL HAS BEEN COMPLETED.
 - NO BACKFILL SHALL BE PLACED BEHIND ABUTMENTS UNTIL THE DECK CONCRETE HAS REACHED 75% OF ITS SPECIFIED STRENGTH.

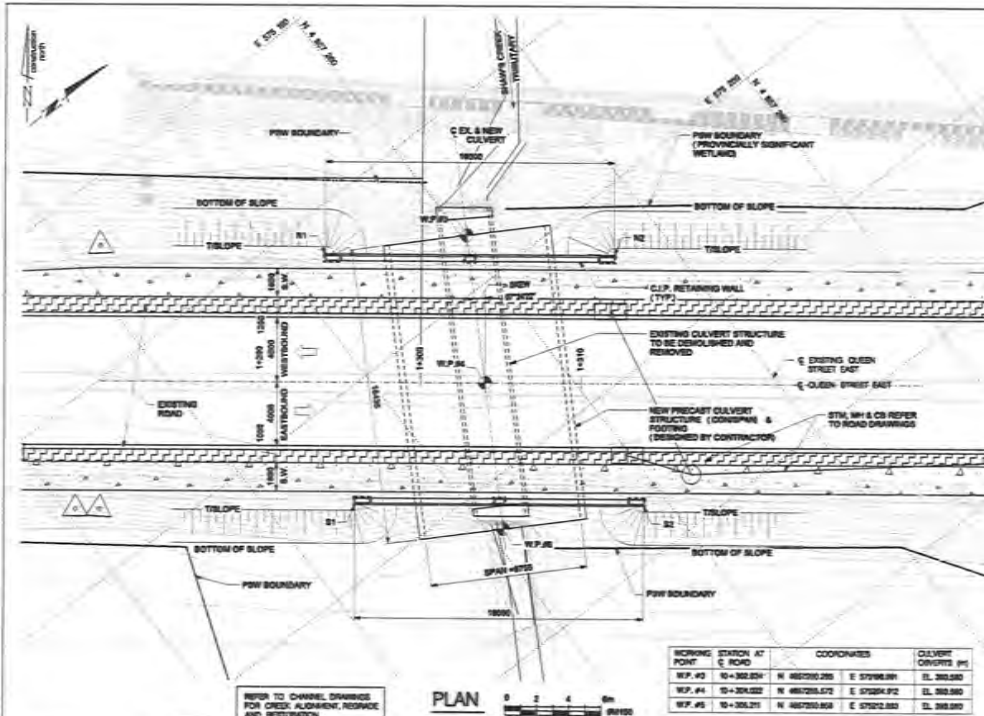
REVISIONS			
NO.	DATE	BY	DETAILS
1	20 SEP 2016	RVA	25% SUBMISSION
2	10 JAN 2017	RVA	80% SUBMISSION

KEY PLAN (N.T.S.)

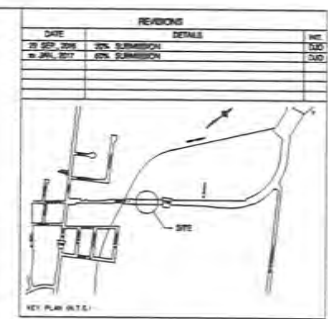
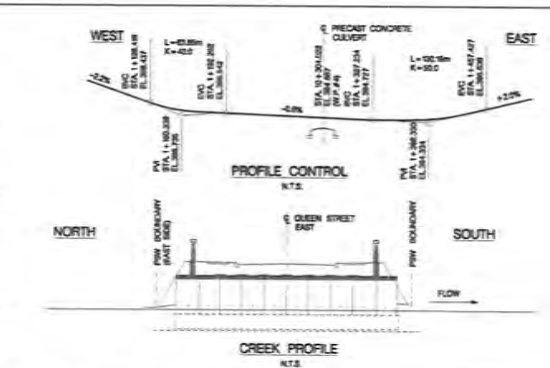
- CONSTRUCTION NOTES (CONTINUED)**
- DEWATERING AND SHORING:
 - THE CONTRACTOR SHALL DESIGN AND CONSTRUCT DEWATERING AND SHORING SYSTEMS INCLUDING SHEET PILING, TEMPORARY COFFERDAMS ETC. FOR CONSTRUCTION IN DRY CONDITIONS FOR AT LEAST THE 5-HOUR STORM EVENT.
 - SHORING DRAWINGS WILL REQUIRE REVIEW AND APPROVAL BY THE CONSTRUCTION AUTHORITY. THIS REVIEW AND APPROVAL MAY TAKE 4 TO 8 WEEKS AND MAY INVOLVE A PERMIT REVIEW AND PERMIT REVIEW FEE.
 - REMOVE ALL DEWATERING AND TEMPORARY SHORING UPON COMPLETION OF WORK.
 - ORDER OF CONSTRUCTION:
 - INSTALL SEGMENT CONTROL.
 - COMPLETE DEWATERING AND SHORING SYSTEM IN ACCORDANCE WITH THE APPROVED DESIGN OF THE CONTRACTOR.
 - REMOVE FISH IN WORK AREA AND RELOCATE DOWNSTREAM.
 - DE-WATER THE BRIDGE CONSTRUCTION AREA DOWNSTREAM FROM THE DE-WATERING PILES TO DISCHARGE INTO A HEAVILY VEGETATED AREA A MINIMUM OF 20 METRES FROM THE WATERCOURSE INTO AN APPROPRIATE SILT CONTROL DEVICE.
 - GEOTEXTILE FILTER BAGS TEMPORARY BRIDGE SILL ETC. DIRECT DISCHARGE OF DE-WATERING EFFLUENT INTO THE WATERCOURSE IS NOT PERMITTED.
 - COMPLETE ALL BRIDGE AND ROADWORK.
 - COMPLETE SITE DRAINAGE AND SURFACE RESTORATION.
 - REMOVE SEGMENT CONTROL, TEMPORARY COFFERDAMS IN CONTROLLED MANNER AND RESTORE WATERCOURSE.

- APPLICABLE STANDARD DRAWINGS**
- OSRD 3002.00 FOUNDATION, PILE STEEL W-PILE DRIVING SHOES
 - OSRD 3003.00 BRIDGE, MINIMUM BACKFILL MINIMUM SPALLULAR REQUIREMENT
 - OSRD 3005.00 DECK, WATERPROOFING, HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
 - OSRD 3010.00 DECK, WATERPROOFING, HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CORNERS, CRACKS, THIN 2mm WEEL AND CONSTRUCTION JOINTS
 - OSRD 3012.00 DECK, DROP CHANNEL
 - OSRD 3015.00 BARRIERS AND RAILING, STEEL BEAM, GUIDE RAIL AND CHANNEL ANCHORAGE
 - OSRD 3018.00 JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE
- LIST OF DRAWINGS**
- 5011 GENERAL ARRANGEMENT
 - 5012 FOUNDATION AND PILES LAYOUT
 - 5013 WEST ABUTMENT 1
 - 5014 WEST ABUTMENT 2
 - 5015 EAST ABUTMENT 1
 - 5016 EAST ABUTMENT 2
 - 5017 WINDWALLS
 - 5018 PRESTRESSED ORDERS AND BEARINGS
 - 5019 DECK SIZED ELEVATIONS AND TYPICAL SECTIONS
 - 5020 DECK REINFORCEMENT
 - 5021 PARAPET WALL WITH SIDEWALK AND RAILING
 - 5022 RAILING FOR PARAPET WALL
 - 5023 6000mm APPROACH SLAB
 - 5024 STANDARD DRAWINGS - SHEET 1
 - 5025 STANDARD DRAWINGS - SHEET 2
- PRELIMINARY**



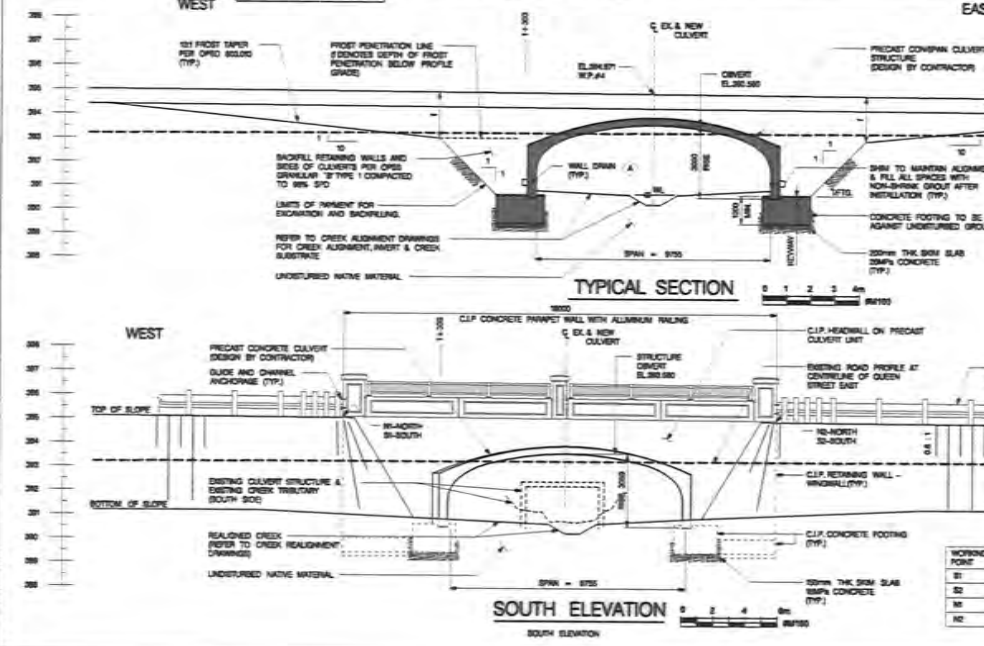


SCORING STATION AT POINT	COORDINATES	CULVERT ELEVATIONS (M)
W.P. #0	10+302.254 N 462720.225 E 57298.981	EL. 302.550
W.P. #1	10+304.252 N 462720.572 E 57298.972	EL. 302.550
W.P. #5	10+304.271 N 462720.628 E 57292.283	EL. 302.550



- GENERAL NOTES**
- CLASS OF CONCRETE
 - PRECAST CONCRETE - 35 MPa
 - REINFORCER - 30 MPa
 - CLEAR COVER TO REINFORCING STEEL
 - PRECAST CONCRETE - 20-25
 - FOOTING - 50-75
 - REINFORCER - 75-100 UNLESS OTHERWISE NOTED
 - REINFORCING STEEL
 - REINFORCING STEEL SHALL BE GRADE 40M UNLESS OTHERWISE SPECIFIED.
 - BAR MARKS WITH PREFIX 'C' DENOTE COATED BARS.
 - BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
 - STAINLESS REINFORCING STEEL SHALL BE TYPE 316L DUPLEX 225 OR 304-18 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa UNLESS OTHER SPECIFIED.
 - UNLESS SHOWN OTHERWISE, TENSION LAP LENGTHS NOT INDICATED ON THE CONTRACT DRAWINGS SHALL BE CLASS B HOOKS AND SPICES FOR REINFORCING STEEL SHALL BE DETAILD ACCORDING TO C-800-58-18.
 - UNLESS SHOWN OTHERWISE, THE FOLLOWING SHALL APPLY:
 - STANDARD HOOKS WITH MINIMUM BEND DIAMETERS SHALL BE USED FOR STIRRUPS AND TIE.
 - ACCORDING TO C-800-58-14.
 - OTHER BARS SHALL HAVE STANDARD HOOKS WITH BEND DIAMETERS ACCORDING TO C-800-58-14.
- CULVERT DESIGN**
- DESIGN CONFORMS TO CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S16-M, C-800-58-1.
 - CONTRACT CULVERT IN ACCORDANCE WITH OTHER A/E/ENGINEER'S DESIGN AND CONTRACT SPECIFICATIONS.
 - CHAMFER ALL EXPOSED CONCRETE EDGES WITH A 25mm UNLESS INDICATED ON THE DRAWINGS.
 - ALL DIMENSIONS ARE TO BE ACCURATELY LOCATED PRIOR TO CONSTRUCTION AND PROTECTION PROVIDED AT ALL TIMES ANY INTERFERENCE OF EXISTING SERVICES WITH PROPOSED STRUCTURE OR CONSTRUCTION OPERATION IS TO BE REPORTED TO THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.
 - SCAFFOLD ON EACH SIDE OF THE CULVERT SHALL BE COMPLETED IMMEDIATELY AT NO TIME SHALL THE SCAFFOLD LEGS ON EACH SIDE EXCEED BY MORE THAN 25mm.
 - FOOTINGS SHALL BE CAST AGAINST UNDISTURBED SOIL.
 - NO CONCRETE OR BRICKS SHALL BE PLACED UNTIL THE EXCAVATION HAS BEEN APPROVED BY THE CONTRACT ADMINISTRATOR.
 - ALL ACTIVITIES SHALL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, OTHER HAZARDOUS SUBSTANCES OR OTHER DESTRUCTIVE SUBSTANCES INTO THE WATER COURSE.

- CONSTRUCTION NOTES**
- NO DEBRIS MAY ENTER THE WATERCOURSE, PROTECT THE WATERCOURSE AT ALL TIMES. REINSTATEMENT OF THE WATERCOURSE SHALL BE CARRIED OUT IN ACCORDANCE WITH CREDIT RULY CONSERVATION GUID AND MAINT PERMIT REQUIREMENTS.
 - SEDIMENT CONTROL AND CONSTRUCTION SIFT FENCES TO BE INSTALLED PRIOR TO THE START OF CONSTRUCTION AND REMOVED FOLLOWING THE RESTORATION OF VEGETATION DURING THE CONSTRUCTION PERIOD. SEDIMENT CONTROL MEASURES ARE TO BE MAINTAINED IN GOOD WORKING CONDITION THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL THE EROSION CONTROL MEASURES HAVE BEEN HOLD AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
 - SCAFFOLD SHALL BE PLACED UNIMMEDIATELY BEHIND BOTH ABUTMENTS KEEPING THE HEIGHT OF THE SCAFFOLD APPROXIMATELY THE SAME AT NO TIME SHALL THE DIFFERENCE IN THE SCAFFOLD ELEVATIONS BE GREATER THAN 200mm.
 - SCAFFOLDING AND SHORING
 - THE CONTRACTOR SHALL DESIGN AND CONSTRUCT SCAFFOLDING AND SHORING SYSTEMS INCLUDING SHEET PILING, TEMPORARY COFFERDAMS ETC. FOR CONSTRUCTION IN DRY CONDITIONS FOR AT LEAST THE 4-HOUR STORM DRAIN.
 - DESIGN ENGINEER SEALED SHOP DRAWINGS OUTLINES SCAFFOLDING DETAILS.
 - SHOP DRAWINGS WILL REQUIRE REVIEW AND APPROVAL BY THE CONTRACTOR AUTHORITY THIS REVIEW AND APPROVAL MAY TAKE 4 TO 6 WEEKS AND MAY INVOLVE A PERMIT REVIEW AND POINT REVIEW FEE.
 - REMOVE ALL SCAFFOLDING AND TEMPORARY SHORING UPON COMPLETION OF WORK.
 - ORDER OF CONSTRUCTION
 - INSTALL SEDIMENT CONTROL, SEDIMENTATION FENCES AND ROCK CHECK DAMS.
 - CONSTRUCT SCAFFOLDING AND SHORING SYSTEM IN ACCORDANCE WITH THE APPROVED DESIGN OF THE CONTRACTOR.
 - REMOVE FISH IN WORK AREA AND RELOCATE DOWNSTREAM.
 - DE-WATER THE BRIDGE CONSTRUCTION AREA EFFLUENT FROM THE DE-WATERING PUMPS TO DISCHARGE INTO A HEAVILY VEGETATED AREA A MINIMUM OF 30 METRES FROM THE WATERCOURSE INTO AN APPROPRIATE SILT CONTROL DEVICE (S SEDIMENTABLE FILTER BAG) TEMPORARY SEDIMENT BAGS ETC.) DIRECT DISCHARGE OF DE-WATERING EFFLUENT INTO THE WATERCOURSE IS NOT PERMITTED.
 - INSTALL BRIDGE AND SCAFFOLD.
 - COMPLETE REINFORCING AND OPEN ROAD TO TRAFFIC.
 - COMPLETE SITE GRADING AND SURFACE RESTORATION.
 - REMOVE SEDIMENT CONTROL, TEMPORARY COFFERDAMS IN CONTROLLED MANNER AND RESTORE WATERCOURSE.
- LIST OF DRAWINGS**
- 200 GENERAL ARRANGEMENT
 - 202 SECTION, PLAN AND DETAILS



WORKING STATION AT POINT & ROAD	COORDINATES	ELEVATIONS (M)
S1	10+295.580 N 462724.230 E 57292.240	EL. 302.000
S2	10+295.585 N 462723.800 E 57292.270	EL. 302.000
S3	10+294.401 N 462723.424 E 57292.424	EL. 302.000
S4	10+292.501 N 462726.799 E 57292.535	EL. 302.000

PRELIMINARY

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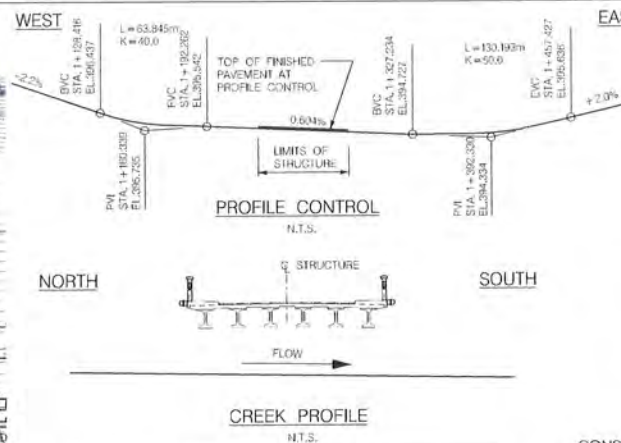
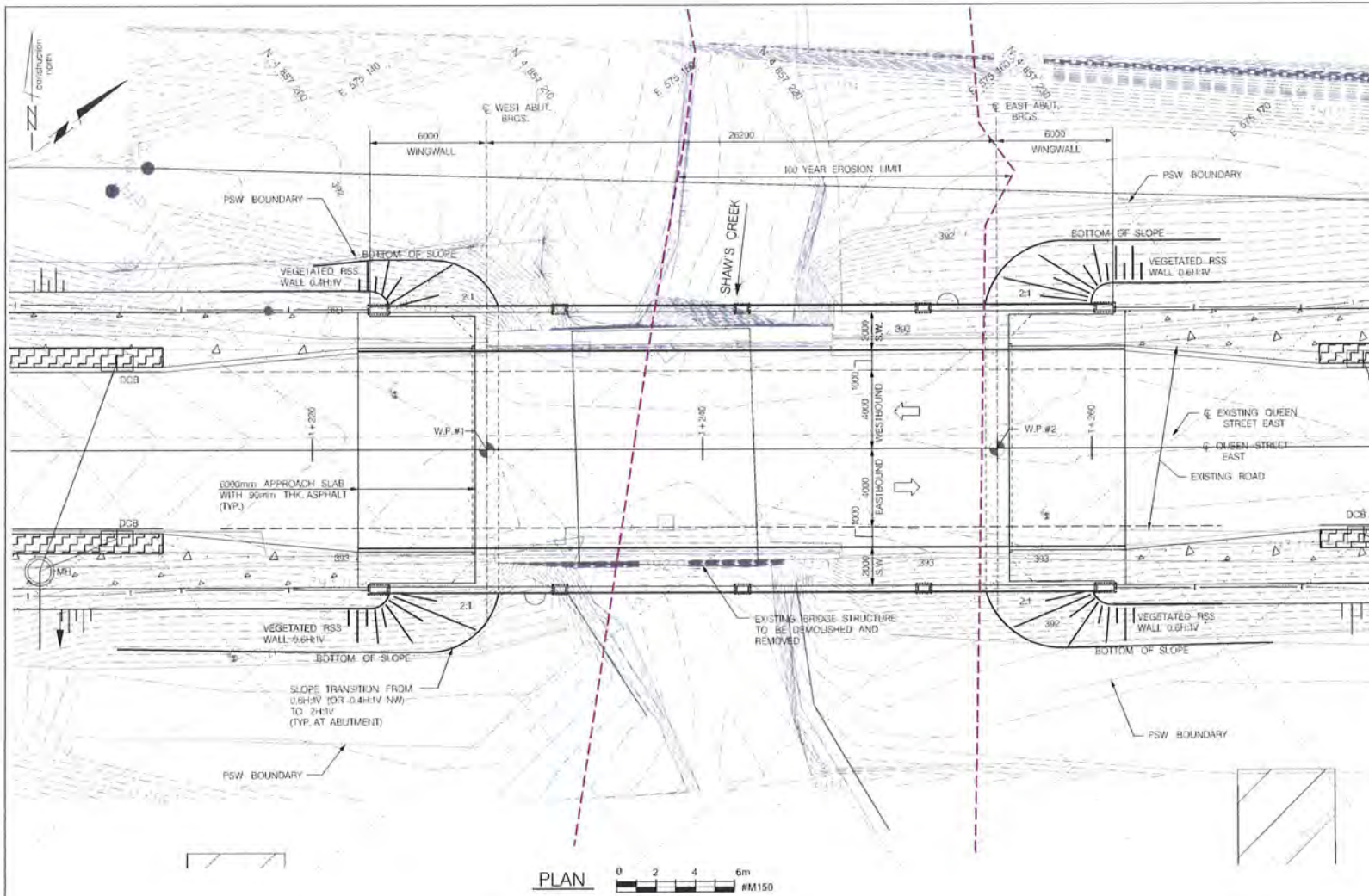
**QUEEN STREET EAST ROAD RECONSTRUCTION
 CULVERT REPLACEMENT
 GENERAL ARRANGEMENT**

DRAWING NOT TO BE SCALED
 50% FROM ORIGINAL DRAWING

Scale: AS SHOWN	Drawn by: RMC	Checked by: J.P.M.C.	Project No.: 14-0292-008
Date: SEPTEMBER 2014	Sheet: 200	Plan No.:	163254

APPENDIX E

**PRELIMINARY BRIDGE AND CULVERT
GENERAL ARRANGEMENT DRAWINGS**



STATION AT Q. ROAD	TASHPALT ELEVATIONS	COORDINATES
W.P. #1	1+229.94	395.321 N 4857195.539 E 575158.524
W.P. #2	1+255.144	395.162 N 4857217.140 E 575174.712

GENERAL NOTES

- CLASS OF CONCRETE:
 - PRECAST ORDERS: 30 MPa
 - REMAINDER: 35 MPa
- CLEAR COVER TO REINFORCING STEEL:
 - FOOTINGS: 100±25
 - DECK: TOP: 70±20
 - BOTTOM: 70±20
 - REMAINDER: 70±20 UNLESS OTHERWISE NOTED
- COMPLY WITH CANADIAN HIGHWAY BRIDGE DESIGN CODE (CHBDC-89-14) DESIGN LIVE LOAD: CL-625 OHT.
- REINFORCING STEEL:
 - REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
 - STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN, DUPLEX 2905 OR XM-28 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa UNLESS OTHERWISE SPECIFIED.
 - BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
 - UNLESS SHOWN OTHERWISE TENSION LAP SPICES FOR BLACK OR COATED REINFORCING STEEL SHALL BE CLASS B.
 - BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS WHILE STRUPLS AND TES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12-1 AND SS12-2 UNLESS INDICATED OTHERWISE.

CONSTRUCTION NOTES

- 1.6 m DIPS MAY ENTER THE WATERCOURSE. PROTECT THE WATERCOURSE AT ALL TIMES.
- REINSTATEMENT OF THE WATERCOURSE SHALL BE CARRIED OUT IN ACCORDANCE WITH CREDIT VALLEY CONSERVATION (CVC) AND MNR PERMIT REQUIREMENTS.
- SEDIMENT CONTROL AND CONSTRUCTION SILT FENCES TO BE INSTALLED PRIOR TO THE START OF CONSTRUCTION AND REMOVED FOLLOWING THE RESTORATION OF VEGETATION DURING THE CONSTRUCTION PERIOD. SEDIMENT CONTROL MEASURES ARE TO BE MAINTAINED IN GOOD WORKING CONDITION THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL THE EROSION CONTROL MEASURES HAVE TAKEN HOLD AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
- THE CONTRACTOR SHALL ESTABLISH THE BEARING SEAT ELEVATIONS BY DEDUCTING THE ACTUAL BEARING THICKNESSES FROM THE TOP OF BEARING ELEVATIONS IF THE ACTUAL BEARING THICKNESSES ARE DIFFERENT FROM THOSE GIVEN WITH THE BEARING DESIGN DATA THE CONTRACTOR SHALL ADJUST THE REINFORCING STEEL TO SUIT.
- CONCRETE PARAPET WALLS ON THE WINGWALLS SHALL NOT BE CAST UNTIL THE WINGWALLS BACKFILL HAS BEEN COMPLETED.
- NO BACKFILL SHALL BE PLACED BEHIND ABUTMENTS UNTIL THE DECK CONCRETE HAS REACHED 75% OF ITS SPECIFIED STRENGTH.

REVISIONS		
DATE	DETAILS	R/E/L
SEP 29 2016	ISSUED FOR 30% REVIEW	DJD
MAR 1 2017	ISSUED FOR 60% REVIEW	DJD

CONSTRUCTION NOTES (CONTINUED)

- BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN THE BACKFILL ELEVATIONS BE GREATER THAN 500mm.
- DEWATERING AND SHORING:
 - THE CONTRACTOR SHALL DESIGN AND CONSTRUCT DEWATERING AND SHORING SYSTEMS INCLUDING SHEET PILING, TEMPORARY COFFERDAMS ETC. FOR CONSTRUCTION IN DRY CONDITIONS FOR AT LEAST THE 5-YEAR STORM EVENT.
 - REMOVE ALL DEWATERING AND TEMPORARY SHORING UPON COMPLETION OF WORK.
 - SUBMIT ENGINEER SEALED SHOP DRAWINGS OUTLINING DEWATERING AND SHORING DETAILS.
 - SHOP DRAWINGS WILL REQUIRE REVIEW AND APPROVAL BY THE CONSERVATION AUTHORITY. THIS REVIEW AND APPROVAL MAY TAKE 4 TO 5 WEEKS AND MAY INVOLVE A PERMIT REVISION AND PERMIT REVISION FEE.
 - REMOVE ALL DEWATERING AND TEMPORARY SHORING UPON COMPLETION OF WORK.

ORDER OF CONSTRUCTION

- INSTALL SEDIMENT CONTROL.
- CONSTRUCT DEWATERING AND SHORING SYSTEM IN ACCORDANCE WITH THE APPROVED DESIGN OF THE CONTRACTOR.
- REMOVE FISH IN WORK AREA AND RELOCATE DOWNSTREAM.
- DE-WATER THE CONSTRUCTION AREA EFFICIENT FROM THE DE-WATERING PUMPS TO DISCHARGE INTO A HEAVILY VEGETATED AREA A MINIMUM OF 30 METRES FROM THE WATERCOURSE INTO AN APPROPRIATE SILT CONTROL DEVICE (I.E. GEOTEXTILE FILTER BAG, TEMPORARY SEDIMENT BASIN, ETC.) DIRECT DISCHARGE OF DE-WATERING EFFLUENT INTO THE WATERCOURSE IS NOT PERMITTED.
- COMPLETE ALL BRIDGE AND ROADWORK.
- COMPLETE SITE GRADING AND SURFACE RESTORATION.
- REMOVE SEDIMENT CONTROL TEMPORARY COFFERDAMS IN CONTROLLED MANNER AND RESTORE WATERCOURSE.

WARM WATER TIMING TABLE

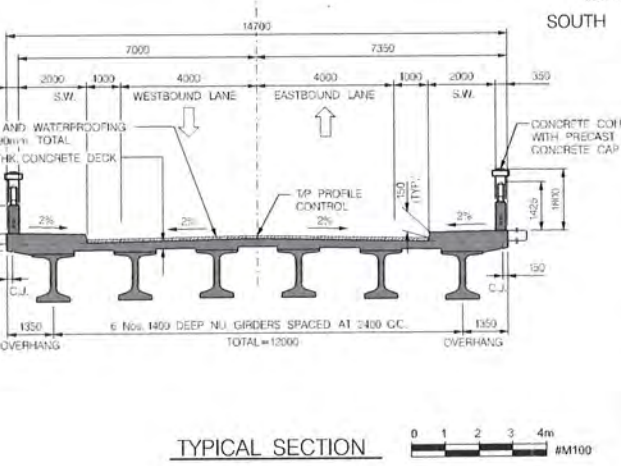
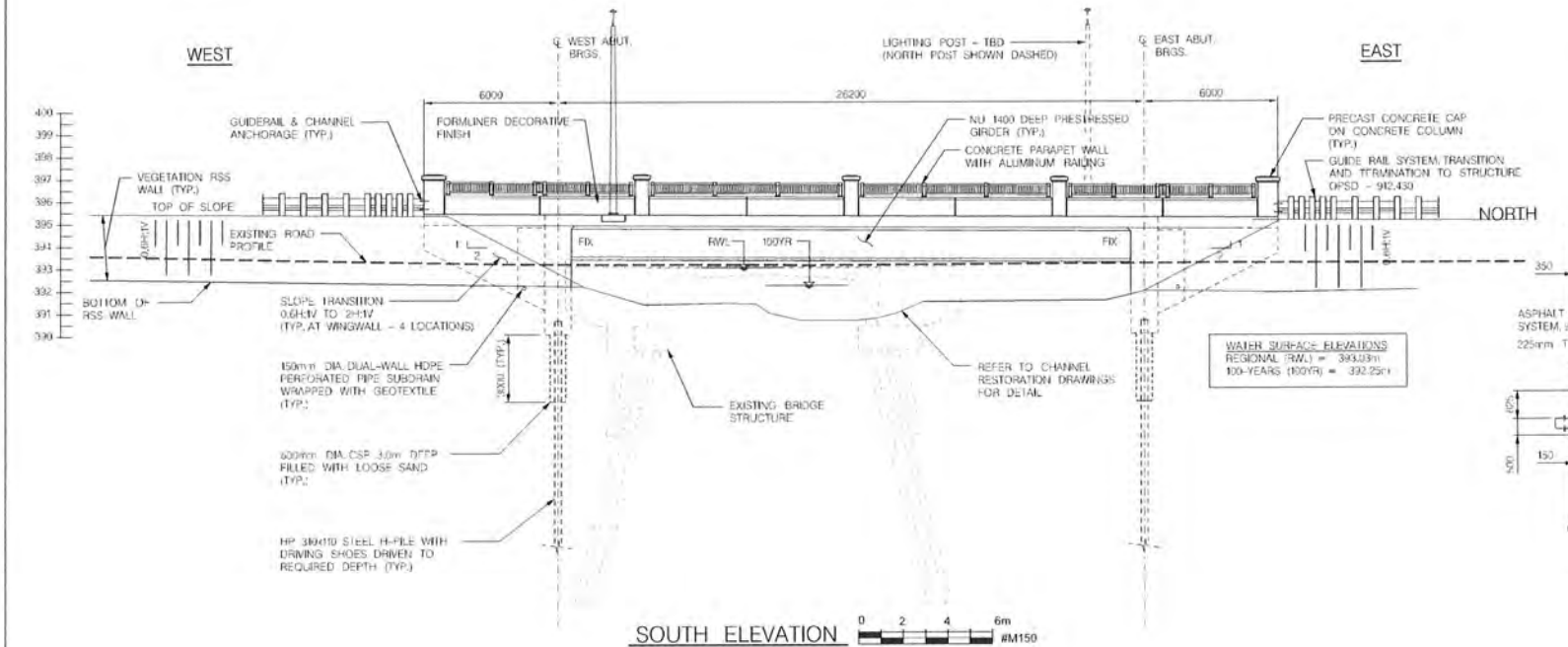
TO PROTECT LOCAL FISH POPULATION DURING THEIR SPAWNING AND NURSERY PERIODS NO IN-WATER NEAR WATER WORK ACTIVITY SHALL OCCUR BETWEEN APRIL 1 TO JUNE 30. IN-WATER NEAR WATER WORK INCLUDES CULVERT REMOVAL/INSTALLATION AND GRADING WORK WITHIN BANKS.

APPLICABLE STANDARD DRAWINGS

- OPSD 300.100 FOUNDATION PILES, STEEL I-PILE DRIVING SHOES
- OPSD 300.150 FOUNDATION PILES, STEEL H-PILE SPURCE
- OPSD 310.150 WALLS ABUTMENT BACKFILL MINIMUM GRANULAR REQUIREMENT
- OPSD 3370.100 DECK WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
- OPSD 3370.101 DECK WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS
- OPSD 3390.100 DECK DROP CHANNEL
- OPSD 3950.100 JOINTS, CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

LIST OF DRAWINGS

- S101 GENERAL ARRANGEMENT
- S102 FOUNDATION AND PILES LAYOUT
- S103 ABUTMENTS 1
- S104 ABUTMENTS 2
- S105 WINGWALLS
- S106 PRESTRESSED GRIDDERS AND BEARINGS 1
- S107 PRESTRESSED GRIDDERS AND BEARINGS 2
- S108 DECK SCREED ELEVATIONS AND TYPICAL SECTIONS
- S109 DECK REINFORCEMENT
- S110 PARAPET WALL WITH SIDEWALK AND RAILING
- S111 600mm APPROACH SLAB
- S112 STANDARD DRAWINGS - SHEET 1
- S113 STANDARD DRAWINGS - SHEET 2
- S114 STANDARD DRAWINGS - SHEET 3
- S115 STANDARD DRAWINGS - SHEET 4



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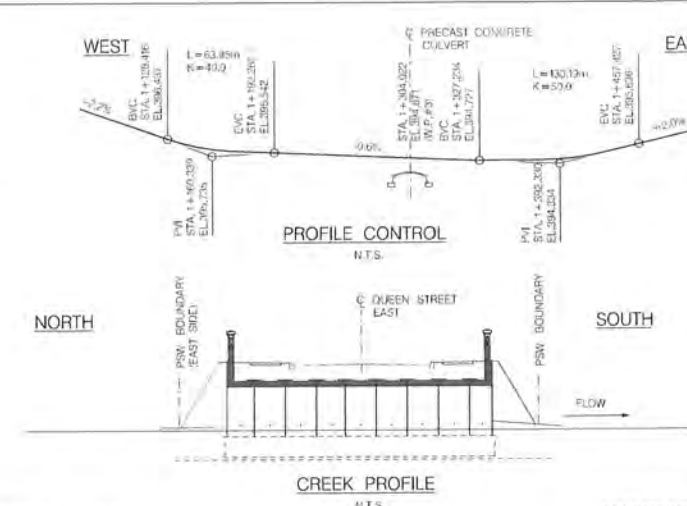
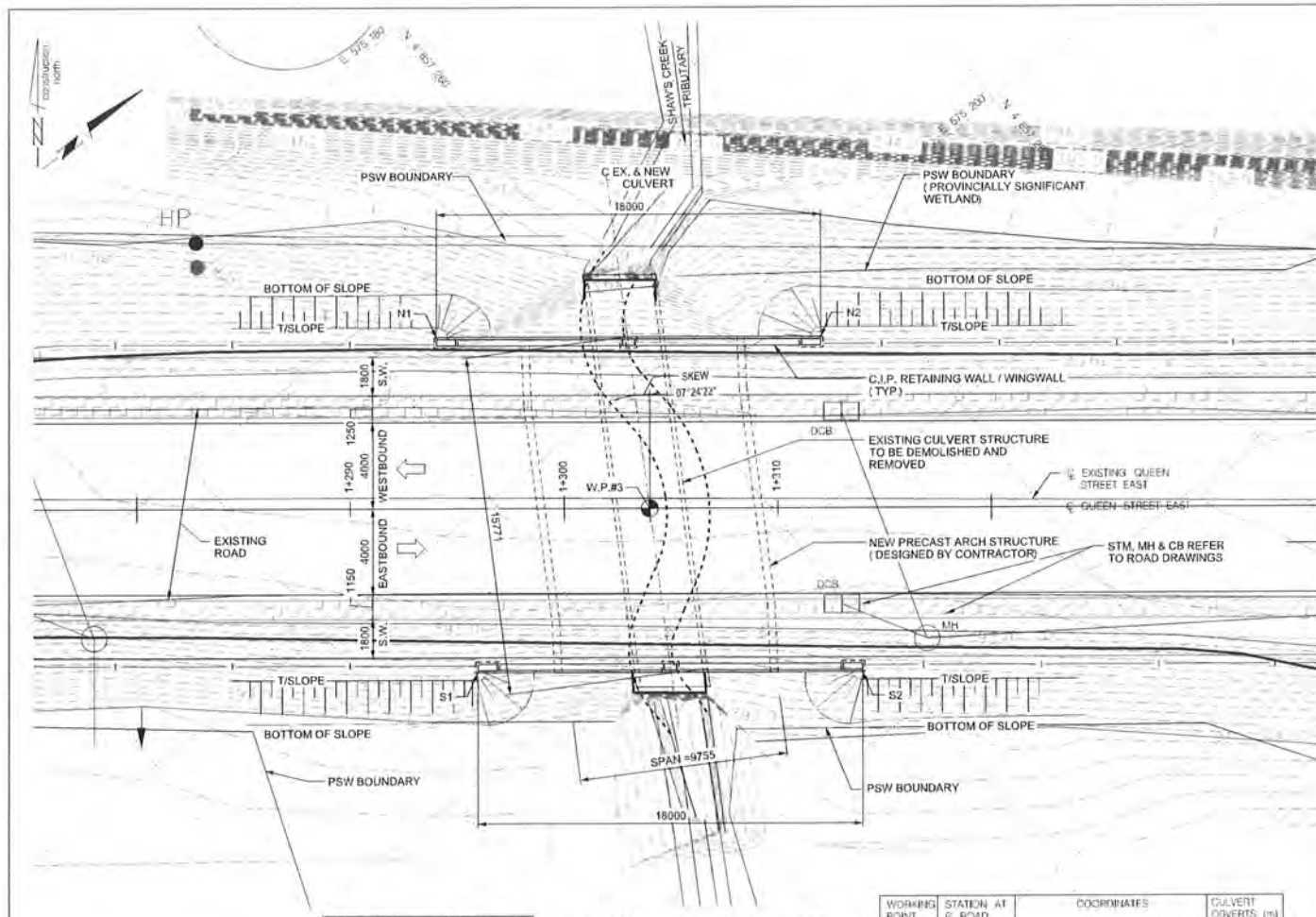
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QUEEN STREET EAST
ROAD RECONSTRUCTION
QUEEN STREET BRIDGE OVER SHAW'S CREEK
GENERAL ARRANGEMENT

Scale: AS SHOWN	Drawn By: MHC	Project No: 16-03101-0540
Date: SEPTEMBER 2016	Sheet: 501	Drawn By: J-FR/CJD
		File No:

MVA 10/16/16

DRAWINGS NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING



REVISIONS		
DATE	DETAILS	BY
SEP 25 2018	ISSUED FOR PERM REVIEW	DJO
MAR 01 2017	ISSUED FOR PERM REVIEW	DJO

- GENERAL NOTES**
- CLASS OF CONCRETE:
 - PRECAST CONCRETE: 35 MPa
 - REMAINDER: 30 MPa
 - CLEAR COVER TO REINFORCING STEEL:
 - PRECAST CONCRETE: 20 ± 10
 - FOOTING: 100 ± 25
 - REMAINDER: 70 ± 20 UNLESS OTHERWISE NOTED.
 - REINFORCING STEEL:
 - REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
 - BAR MARKS WITH PREFIX 'C' DENOTE COATED BARS.
 - BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
 - STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN, DUPLEX 2205 OR AM-28 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa UNLESS OTHERWISE SPECIFIED.
 - UNLESS SHOWN OTHERWISE TENSION LAP LENGTHS NOT INDICATED ON THE CONTRACT DRAWINGS SHALL BE CLASS B HOOKS AND BENDS FOR REINFORCING STEEL SHALL BE DETAILED ACCORDING TO CHBDC-S6-S6.
 - UNLESS SHOWN OTHERWISE THE FOLLOWING SHALL APPLY:
 - STANDARD HOOKS WITH MINIMUM BEND DIAMETERS SHALL BE USED FOR STIRRUPS AND TIES.
 - ACCORDING TO CHBDC-S6-14
 - OTHER BARS SHALL HAVE STANDARD HOOKS WITH BEND DIAMETERS ACCORDING TO CHBDC-S6-14.

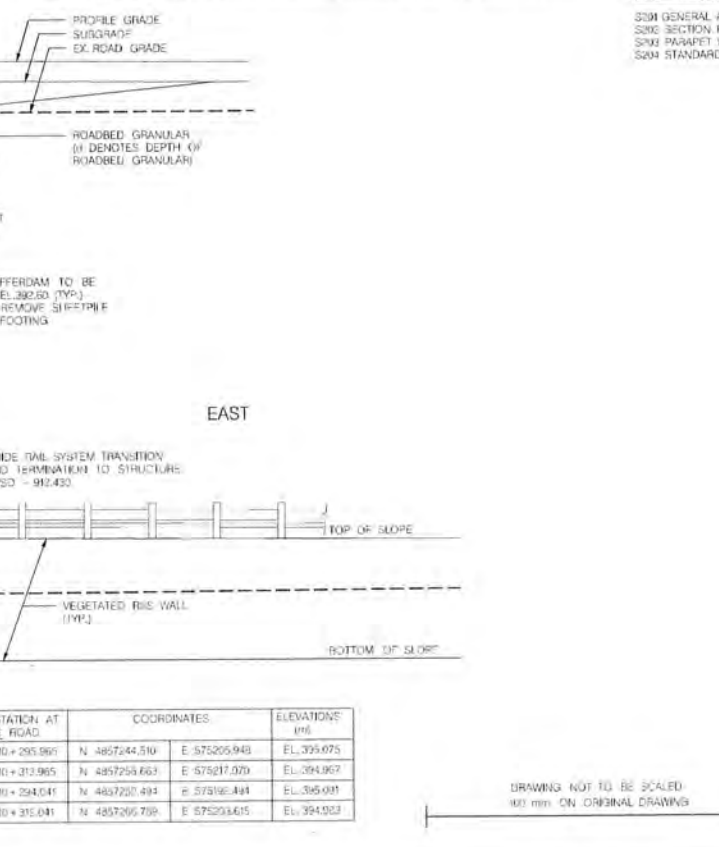
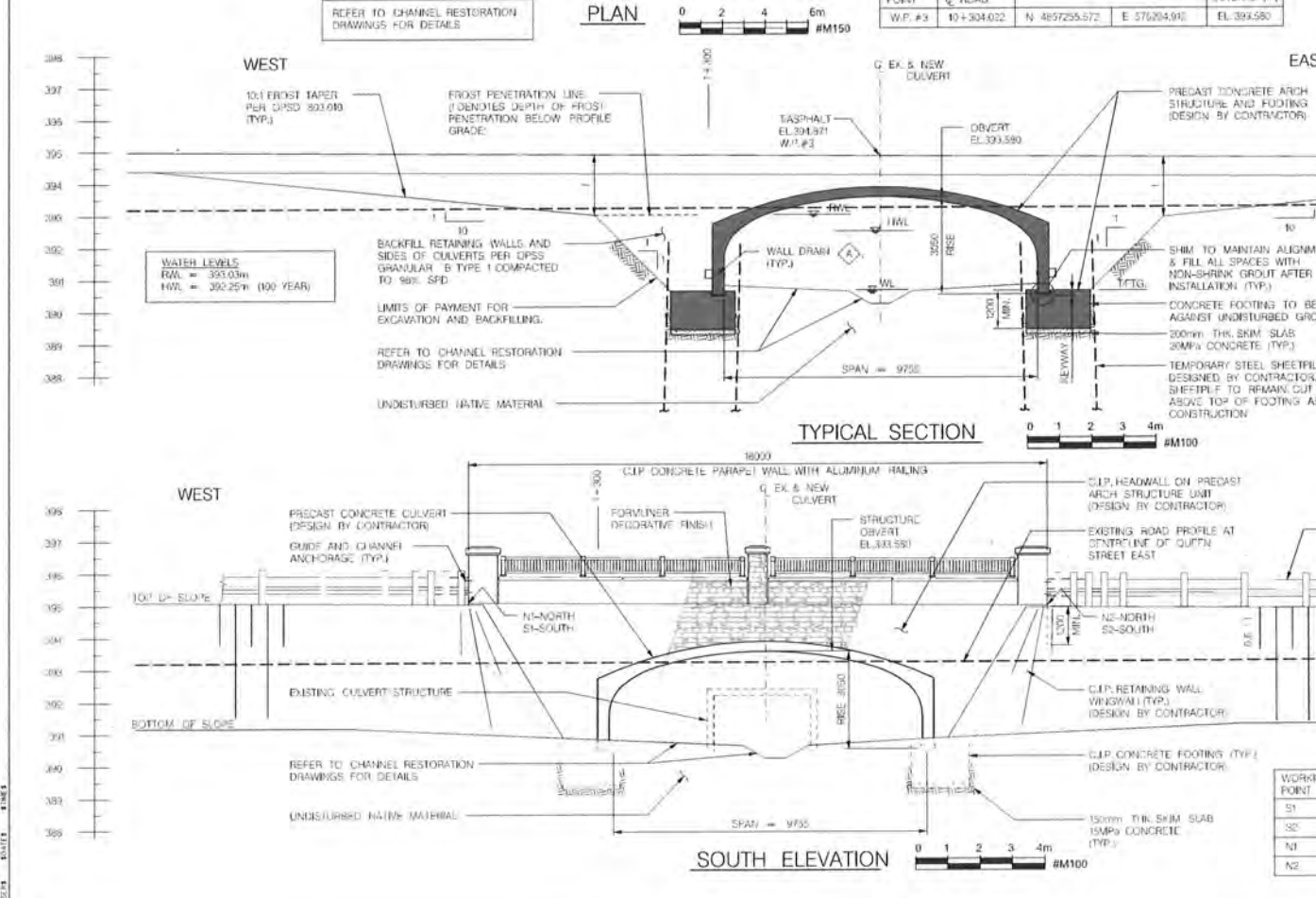
- CONSTRUCTION NOTES**
- NO DEBRIS MAY ENTER THE WATERCOURSE. PROTECT THE WATERCOURSE AT ALL TIMES.
 - REINSTATEMENT OF THE WATERCOURSE SHALL BE CARRIED OUT IN ACCORDANCE WITH CREDIT VALLEY CONSERVATION (CVC) AND MNRF PERMIT REQUIREMENTS.
 - SEDIMENT CONTROL AND CONSTRUCTION SITE FENCES TO BE INSTALLED PRIOR TO THE START OF CONSTRUCTION AND REMOVED FOLLOWING THE RESTORATION OF VEGETATION DURING THE CONSTRUCTION PERIOD. SEDIMENT CONTROL MEASURES ARE TO BE MAINTAINED IN GOOD WORKING CONDITION THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL THE EROSION CONTROL MEASURES HAVE TAKEN HOLD AS DIRECTED BY THE CONTRACT ADMINISTRATOR.
 - DEWATERING AND SHORING:
 - THE CONTRACTOR SHALL DESIGN AND CONSTRUCT DEWATERING AND SHORING SYSTEMS INCLUDING SHEET PILING TEMPORARY COFFERDAMS ETC. FOR CONSTRUCTION IN DRY CONDITIONS FOR AT LEAST THE 5-YEAR STORM EVENT.
 - SUBMIT ENGINEER SEALED SHOP DRAWINGS OUTLINING DEWATERING DETAILS.
 - SHOP DRAWINGS WILL REQUIRE REVIEW AND APPROVAL BY THE CONSERVATION AUTHORITY. THE REVIEW AND APPROVAL MAY TAKE 4 TO 6 WEEKS AND MAY INVOLVE A PERMIT REVISION AND PERMIT REVISION FEE.
 - REMOVE ALL DEWATERING AND TEMPORARY SHORING UPON COMPLETION OF WORKS.

- CULVERT DESIGN**
- DESIGN CONFORMS TO CANADIAN HIGHWAY BRIDGE DESIGN CODE, CANCSA-S6-14, CHBDC-2014.
 - CONSTRUCT CULVERT IN ACCORDANCE WITH OPS 422, OPS 1921 AND CONTRACT SPECIFICATIONS.
 - CHAMFER ALL EXPOSED CONCRETE EDGES 25mm x 25mm UNLESS INDICATED ON THE DRAWINGS.
 - ALL SERVICES/UTILITIES ARE TO BE ACCURATELY LOCATED PRIOR TO CONSTRUCTION AND PROTECTION PROVIDED AT ALL TIMES. ANY INTERFERENCE OF EXISTING SERVICES/UTILITIES WITH PROPOSED STRUCTURE OR CONSTRUCTION OPERATION IS TO BE REPORTED TO THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.
 - BACKFILL ON EACH SIDE OF THE CULVERT SHALL BE COMPLETED SIMULTANEOUSLY AT NO TIME SHALL THE BACKFILL LEVELS ON EACH SIDE DIFFER BY MORE THAN 300mm.
 - FOOTINGS SHALL BE CAST AGAINST UNDISTURBED SOIL.
 - NO CONCRETE OR BEDDING SHALL BE PLACED UNTIL THE EXCAVATION HAS BEEN APPROVED BY THE CONTRACT ADMINISTRATOR.
 - ALL ACTIVITIES SHALL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE CONCRETE OR OTHER DEleterious SUBSTANCES INTO THE WATER COURSE.

- ORDER OF CONSTRUCTION**
- INSTALL SEDIMENT CONTROL (SEDIMENTATION FENCES AND ROCK CHECK DAMS)
 - CONSTRUCT DEWATERING AND SHORING SYSTEM IN ACCORDANCE WITH THE APPROVED DESIGN OF THE CONTRACTOR
 - REMOVE FISH IN WORK AREA AND RELOCATE DOWNSTREAM.
 - DE-WATER THE CONSTRUCTION AREA EFFLUENT FROM THE DE-WATERING PUMPS TO DISCHARGE INTO A HEAVILY VEGETATED AREA A MINIMUM OF 30 METRES FROM THE WATERCOURSE INTO AN APPROPRIATE SILT CONTROL DEVICE (E.G. GEOTEXTILE FILTER BAG TEMPORARY SEDIMENT BASIN ETC.). DIRECT DISCHARGE OF DE-WATERING EFFLUENT INTO THE WATERCOURSE IS NOT PERMITTED.
 - INSTALL BRIDGE AND BACKFILL
 - COMPLETE ROADWORKS AND OPEN ROAD TO TRAFFIC
 - REMOVE SEDIMENT CONTROL TEMPORARY COFFERDAMS IN CONTROLLED MANNER AND RESTORE WATERCOURSE.

- WARM WATER TIMING TABLE**
- PREDICT LOCAL FISH POPULATION DURING THEIR SPawning AND NURSERY PERIODS. NO IN-WATER NEAR WATER WORK ACTIVITY SHALL OCCUR BETWEEN APRIL 1 TO JUNE 30. IN-WATER NEAR WATER WORK INCLUDES CULVERT REMOVAL/INSTALLATION AND GRADING WORKS WITHIN BANKS.

- LIST OF DRAWINGS**
- S01 GENERAL ARRANGEMENT
 - S02 SECTION PLAN AND DETAILS
 - S03 PARAPET WALL WITH RAILING
 - S04 STANDARD DRAWINGS



PRELIMINARY

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Region of Peel
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QUEEN STREET EAST
 ROAD RECONSTRUCTION
 CULVERT REPLACEMENT
 GENERAL ARRANGEMENT

WORKING POINT	STATION AT ROAD	COORDINATES		ELEVATION (m)
S1	10+205.967	N 487244.510	E 575205.948	EL. 395.075
S2	10+213.965	N 487255.663	E 575217.070	EL. 394.967
N1	10+294.041	N 487220.493	E 575316.484	EL. 395.091
N2	10+315.041	N 487265.709	E 575293.615	EL. 394.953

DRAWING NOT TO BE SCALED
 100 mm ON ORIGINAL DRAWING

SCALE: 1:100

APPENDIX F

ARCHAEOLOGY

ARCHEOWORKS INC.

**Stage 1 Archaeological Assessment:
Road Reconstruction, Bridge and Culvert Improvements
To Queen Street East
Within the Part of Lot 23, Concession 3 West of Centre Road
In the Geographic Township of Caledon
Former County of Peel
Now in the Town of Caledon
Regional Municipality of Peel
Ontario**

**Project #: 008-AL246B-17
Licensee (#): Kim Slocki (P029)
PIF#: P029-0912-2017**

Original Report

September 27th, 2017

Presented to:

R.V. Anderson Associates Ltd.
2001 Sheppard Avenue East, Suit 300
Toronto, Ontario
M2J 4Z8
T: 416.497.8600

Prepared by:

Archeoworks Inc.
16715-12 Yonge Street, Suite 1029
Newmarket, Ontario
L3X 1X4
T: 416.676.5597
F: 647.436.1938

EXECUTIVE SUMMARY

To address concerns with hydraulic capacity, the Regional Municipality of Peel is undertaking a Municipal Class Environmental Assessment (EA) for road reconstruction, bridge and culvert improvements to Queen Street East (hereafter referred to as the “study corridor”). The technically preferred design alternative includes replacing the existing bridge with a 25-metre span bridge, replacing the existing culvert with a 10-metre open-bottom structure, and raising the road profile by approximately 1.5-metres.

To facilitate this study, *Archeoworks Inc.* was retained by *R.V. Anderson Associates Ltd.* to conduct a Stage 1 Archaeological Assessment (AA) of the study corridor, up to the maximum limits of disturbance as defined by the proponent. The study corridor is located within part of Lots 23, Concession 3 West of Centre Road, in the Geographic Township of Caledon, former County of Peel, now in the Town of Caledon, Regional Municipality of Peel.

Stage 1 AA background research established elevated potential for the recovery of archaeologically significant materials within the study corridor. To determine if the archaeological potential classification of the study corridor is relevant, a desktop review of ground conditions was undertaken using historical aerial photography and satellite imagery. The desktop review identified parts of the study corridor as having archaeological potential removed and parts of the study corridor as having low to no archaeological potential. The remaining balance of the study corridor was identified as retaining archaeological potential.

Based on the findings within this Stage 1 AA study, the following recommendations are presented:

1. Parts of the study corridor that were identified as having archaeological potential removed (i.e., areas of identified deep and extensive disturbance) need to be confirmed through an on-site property inspection during a Stage 2 AA.
2. Parts of the study corridor that were identified as having low to no archaeological potential (i.e., areas of steeply sloping terrain and low-lying wet areas and watercourses) need to be confirmed through an on-site property inspection during a Stage 2 AA.
3. Parts of the study corridor that were identified as retaining archaeological potential must be subjected to a Stage 2 AA. These areas must be subjected to test pit survey at five metre intervals in accordance with *Section 2.1.2* of the *2011 S&G*.

No construction activities shall take place within the study corridor prior to the *Ministry of Tourism, Culture and Sport* (Archaeology Programs Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

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PROJECT PERSONNEL

Project Director Kim Slocki – MTCS licence P029

Report Preparation Lee Templeton – MTCS licence R454

Graphics Lee Templeton – MTCS licence R454

Report Review Nimal Nithiyantham – MTCS licence P390

1.0 PROJECT CONTEXT

1.1 Objective

The objectives of a Stage 1 Archaeological Assessment (AA), as outlined by the 2011 *Standards and Guidelines for Consultant Archaeologists* ('2011 S&G') published by the *Ministry of Tourism, Culture, and Sport (MTCS)* (2011), are as follows:

- To provide information about the property's geography, history, previous archaeological fieldwork and current land condition;
- To evaluate in detail the property's archaeological potential, which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

1.2 Development Context

To address concerns with hydraulic capacity, the Regional Municipality of Peel is undertaking a Municipal Class Environmental Assessment (EA) for road reconstruction, bridge and culvert improvements to Queen Street East (hereafter referred to as the "study corridor"). The technically preferred design alternative includes replacing the existing bridge with a 25-metre span bridge, replacing the existing culvert with a 10-metre open-bottom structure, and raising the road profile by approximately 1.5-metres.

To facilitate this study, *Archeoworks Inc.* was retained by *R.V. Anderson Associates Ltd.* to conduct a Stage 1 Archaeological Assessment (AA) of the study corridor, up to the maximum limits of disturbance as defined by the proponent. The study corridor is located within part of Lots 23, Concession 3 West of Centre Road, in the Geographic Township of Caledon, former County of Peel, now in the Town of Caledon, Regional Municipality of Peel (*see Appendix A – Map 1*). Currently, the Town of Caledon and the Regional Municipality of Peel do not have archaeological management plans.

This study was triggered by the Environmental Assessment Act in support of the Municipal Class Environmental Assessment regulatory process. This Stage 1 AA was conducted under the project direction of Ms. Kim Slocki, under the archaeological consultant licence number P029, in accordance with the *Ontario Heritage Act* (2009). Permission to investigate the study corridor was granted by *R.V. Anderson Associates Ltd.* on July 7th, 2017.

1.3 Historical Context

To establish the historical context and archaeological potential of the study corridor, *Archeoworks Inc.* conducted a review of Aboriginal and Euro-Canadian settlement history, and a review of available historic mapping.

The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research.**

1.3.1 Pre-Contact Period

The Pre-Contact Period of Southern Ontario includes numerous Aboriginal groups that continually progressed and developed within the environmental constraints they inhabited. **Table 1** includes a summary of the Pre-Contact Aboriginal history of Southern Ontario highlighting the three main Periods (Paleo-Indian, Archaic, Woodland and European Contact) and, where appropriate, the subperiods (Early Woodland, Middle Woodland, and Late Woodland: Early Ontario Iroquois, Middle Ontario Iroquois, and Late Ontario Iroquois).

Table 1: Pre-Contact Period

Periods	Date Range	Overview
Paleo-Indian	ca.11,000 to 7,500 B.C.	Small groups of nomadic hunter-gathers who utilized seasonal and naturally available resources; sites are rare; hunted in small family groups who periodically gathered into larger groups/bands during favourable periods in the hunting cycle; artifacts include fluted and lanceolate stone points, scrapers, dart heads. - Gainey, Barnes, Crowfield Fluted Points (Early Paleo-Indian) - Holcombe, Hi-Lo, Lanceolates (Late Paleo-Indian) (Ellis and Deller, 1990, pp.37-64; Wright, 1994, p.25).
Archaic	ca. 7,800 to 500 B.C.	Descendants of Paleoindian ancestors; lithic scatters are the most commonly encountered site type; trade networks appear; artifacts include reformed fluted and lanceolate stone points with notched bases to attach to wooden shaft; ground-stone tools shaped by grinding and polishing; stone axes, adzes and bow and arrow. - Side-notched, corner-notched, bifurcate (Early Archaic) - Stemmed, Otter Creek/Other Side-notched, Brewerton side and corner-notched (Middle Archaic) - Narrow Point, Broad Point, Small Point (Late Archaic) (Ellis et al., 1990, pp.65-124; Wright, 1994, pp.26-28; Ellis, 2013, pp.41-46).
Early Woodland	ca. 800 to 0 B.C.	Evolved out of Late Archaic Period; introduction of pottery (ceramic) where the earliest were coil-formed, under fired and likely utility usage; two primary cultural complexes: Meadowood (broad extent of occupation in southern Ontario) and Middlesex (restricted to Eastern Ontario); poorly understood settlement-subsistence patterns; artifacts include cache blades, and side-notched points that were often recycled into other tool forms; primarily Onondaga chert; commonly associated with Saugeen and Point Peninsula complexes. - Meadowood side-notched (Spence et al., 1990, pp.125-142; Wright, 1994, pp.29-30; Ferris and Spence, 1995, p.89-97; Williamson, 2013, pp.48-61).

**STAGE 1 AA FOR QUEEN STREET EAST RECONSTRUCTION, AND BRIDGE AND CULVERT IMPROVEMENTS
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL, ONTARIO**

Periods	Date Range	Overview
Middle Woodland	ca. 200 B.C. to A.D. 700	<p>Three primary cultural complexes: Point Peninsula (generally located throughout south-central and eastern Southern Ontario), Saugeen (generally located southwestern Southern Ontario), and Couture (generally located in southwestern-most part of Ontario); introduction of large "house" structures; settlements have dense debris cover indicating increased degree of sedentism; burial mounds present; shared preference for stamped, scallop-edged or tooth-like decoration, but each cultural complex had distinct pottery forms.</p> <ul style="list-style-type: none"> - Saugeen point (Saugeen) - Vanport point (Couture) - Snyder Point <p>(Spence et al., 1990, pp.142-170; Wright, 1994, pp.28-33; Ferris and Spence, 1995, p.97-102; Wright, 1999, pp.629-649; Williamson, 2013, pp.48-61).</p>
Late Woodland (Transitional)	ca. A.D. 600 to 1000	<p>Princess Point exhibits few continuities from earlier developments with no apparent processors; hypothesized to have migrated into Ontario; the settlement data is limited, but oval houses are present; artifacts include 'Princess Point Ware' vessel that are cord roughened, with horizontal lines and exterior punctation; smoking pipes and ground stone tools are rare; introduction of maize/corn horticulture; continuity of Princess Point and Late Woodland cultural groups.</p> <ul style="list-style-type: none"> - Triangular projectile points. <p>(Fox, 1990, pp.171-188; Ferris and Spence, 1995, pp.102-106).</p>
Late Woodland (Early Ontario Iroquois Stage)	ca. A.D. 900 to 1300	<p>Two primary cultures: Glen Meyer (located primarily in southwestern Ontario from Long Point on Lake Erie to southwestern shore of Lake Huron) and Pickering (encompassed north of Lake Ontario to Georgian Bay and Lake Nipissing); well-made and thin-walled clay vessels with stamping, incising and punctation; multi-family longhouses and some small, semi-permanent palisade villages; increase in corn-yielding sites; crudely made smoking pipes, and worked bone/antler present; evolution of the ossuary burials</p> <ul style="list-style-type: none"> - Triangular-shaped, basally concave points with downward projecting corners or spurs. <p>(Williamson, 1990, pp.291-320; Ferris and Spence, 1995, pp.106-109).</p>
Late Woodland (Middle Ontario Iroquois Stage)	ca. A.D. 1300 to 1400	<p>Fusion of Glen Meyer and Pickering caused by conquest and absorption of Glen Meyer by Pickering'; two primary cultures: Uren (A.D. 1300-1350) and Middleport (A.D. 1350-1400); decorated clay vessels decrease; well developed clay pipe complex that includes effigy pipes; increase in village sizes (0.5 to 1.7 ha) and campsites (0.1 to 0.6 ha) appear with some palisades; classic longhouse takes form; increasing reliance on maize and other cultigens such as beans and squash.</p> <ul style="list-style-type: none"> - Triangular and (side of corner or corner removed) notched projectile points - Middleport Triangular and Middleport Notched Points. <p>(Dodd et al., 1990, pp.321-360; Ferris and Spence, 1995, pp.109-115).</p>
Late Woodland (Late Ontario Iroquois Stage)	ca. A.D. 1400 to 1600	<p>Ontario Iroquoian sites describes two major groups east and west of the Niagara Escarpment: the ancestral Neutral Natives to the west, and the ancestral Huron-Wendat and to the east; Huron-Wendat "concentrations of sites occur in the areas of the Humber River valley, the Rouge and Duffin Creek valleys, the lower Trent valley, Lake Scugog, the upper Trent River and Simcoe County" (Ramsden, 1990, p.363); longhouse; villages enlarged to 100 longhouses clustered together as horticulture (maize, squash, and beans) gained importance in subsistence patterns; villages chosen for proximity to water, arable soils, available fire wood and defensible position; diet supplemented with fish; ossuaries; tribe/band formation; relocation to north of Lake Simcoe; pre-contact ancestral Neutral</p>

STAGE 1 AA FOR QUEEN STREET EAST RECONSTRUCTION, AND BRIDGE AND CULVERT IMPROVEMENTS
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL, ONTARIO

Periods	Date Range	Overview
		<p>(called Attiewandaron by the Huron-Wendat) Natives distributed west of the Niagara Escarpment; varying settlements include villages up to five acres in size to isolated fishing cabins; villages tend to be located along smaller creeks, headwaters and marshlands; diet dependent on hunting, gathering, fishing and farming; longhouses present; ossuaries; tribe/band formation; theorized that Credit River may have functioned as a boundary marker between the ancestral Neutral Natives and ancestral Huron-Wendat peoples; the Petun (Tionnontaté or Khionontateronon) were located along the Blue Mountains to the northwest, and arrived ca. 1580 from Neutral territory; since the Grand River headwaters are located in the northwest corner of Dufferin County, the Petun are believed to have utilized Dufferin County (north of the study corridor) as hunting territory.</p> <ul style="list-style-type: none"> - Huron-Wendat points are limited but change from predominantly side-notched to unnotched triangular. - Neutral points are typically small but long and narrow, frequently side-notched. <p>(Sawden, 1952, p.7; Heidenreich, 1978, pp.368-388; Lennox and Fitzgerald, 1990, pp.405-456; Ramsden, 1990, pp.361-384; Trigger, 1994, p.42-47; Ferris and Spence, 1995, pp.115-122; Warrick, 2000, p.446-454; Warrick, 2008, p.15; Brown, 2009, p.26; Garrad, 2014, pp.1, 147-148).</p>

1.3.2 Contact Period

The Contact Period of Southern Ontario is dominated by the European arrival, interaction and influence with those established Aboriginal communities of Southern Ontario. The Contact Period has been greatly documented by those early explorers, religious missionaries, fur traders and included in colonial administrative records. **Table 2** includes a summary of some of the main historical events and developments that occurred during the Contact Period of Southern Ontario.

Table 2: Contact Period

Periods	Date Range	Overview
European Contact	ca. A.D. 1600s	<p>The area “south of Lake Simcoe and along the north shore of Lake Ontario remained a no-man’s land, with no permanent settlements and traversed only by raiding parties from the north or from the south” (Robinson, 1965, p.11); Huron-Wendat villages north of Lake Simcoe; Neutral Native villages were clustered in the Niagara Peninsula; Credit River may have continued to function as a frontier boundary between groups; French arrival into Ontario; trade relationship with Huron-Wendat and French establish; Neutral Natives referred as <i>la Nation neutre</i> by Samuel de Champlain but limited European contact with Neutrals; no direct commercial trade relationship was formed between the French and Neutral natives; the Tionnontaté or Khionontateronon were called ‘Petun’ a term meaning tobacco; scant references to the Petun were made by fur traders leading to the belief that fur traders assumed they were similar to the Huron-Wendat; trade goods begin to replace traditional tools/items; Jesuit and Recollét missionaries; epidemics (Bricker, 1934, p.58; Jury, 1974, pp.3-4; Garrad and Heidenreich, 1978, pp.395-396; Heidenreich, 1978, pp.368-388; White, 1978, pp.407-411; Lennox and Fitzgerald, 1990, pp.405-456; Trigger, 1994, pp.47-55; Warrick, 2008, pp.12, 15, 80, 245; Garrad, 2014, pp.148, 167-168, 490).</p>

**STAGE 1 AA FOR QUEEN STREET EAST RECONSTRUCTION, AND BRIDGE AND CULVERT IMPROVEMENTS
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL, ONTARIO**

Periods	Date Range	Overview
Five Nation (Haudenosaunee) Arrival	ca. A.D. 1650s	The Five (later Six) Nations (or Haudenosaunee), originally located south of the Great Lakes, engaged in warfare with Huron-Wendat neighbours as their territory no longer yielded enough furs; Haudenosaunee attacked and destroyed numerous Huron-Wendat villages in 1649-50; the small groups that remained became widely dispersed throughout the Great Lakes region, ultimately resettling in Quebec; to prevent the revival of Huron-Wendat settlements, the Haudenosaunee attacked and destroyed the villages of the Huron-Wendat allies, the Tionnontaté; in 1650, what remained of the Tionnontaté migrated through Attiewandaron territory prior to resettlement in America; the Haudenosaunee attacked Neutrals ca.1650s and caused their dispersal; Haudenosaunee established settlements along the Lake Ontario shoreline at strategic locations along canoe-and-portage routes and used territory for extensive fur trade; European fur trade and exploration continues (Robinson, 1965, pp.15-16; Schmalz, 1991, pp.12-34; Trigger, 1994, p.53-59; Williamson, 2013, p.60; Garrad, 2014, pp.501-505).
Anishinaabeg Arrival	ca. A.D. 1650s to 1700s	Algonquin-speaking and cultural groups within the Anishinaabeg (Ojibway, Chippewa, Odawa and others) began to challenge the Haudenosaunee dominance in the region; by 1690s, Haudenosaunee settlements were abandoned; battles fought throughout Southern Ontario; by 1701, Haudenosaunee were defeated and the Anishinaabeg replaced the Haudenosaunee in Southern Ontario; gathered collectively as First Nations to participate in Great Peace negotiations; Mississauga granted land extending northward of Lake Ontario and Lake Erie; Mississauga focused on hunting/fishing/gathering with little emphasis on agriculture; temporary and moveable houses (wigwam) left little archaeological material behind; Credit River known as <i>Missinnihe</i> (or <i>Messinnike</i>) translated to 'trusting creek' and was a favoured location of trade between the Mississauga and European traders; the Mississauga who settled along the west shore of Lake Ontario became known as the Credit River Indians (Hathaway, 1930, p.433; Loverseed, 1987, p.17; Trigger, 1994, pp.57-59; Johnston, 2004, pp.9-10; McMillian and Yellowhorn, 2004, pp.110-111; Gibson, 2006, pp.35-41; Smith, 2013, pp.16-20; Williamson, 2013, p.60).
Fur Trade Continues	ca. A.D. 1750s	The Anishinaabeg continued to trade with both the English and the French; introduction of Métis people; Seven Years War between France and Britain resulted in French surrender of New France in 1763; Royal Proclamation of 1763; Beaver Wars between groups within the Haudenosaunee and groups within the Anishinaabeg against the British; fur trade continued until Euro-Canadian settlement (Schmalz, 1991, pp.35-62, 81; Surtees, 1994, pp.92-97; Johnston, 2004, pp.13-14).
British Colony/Land Treaties	ca. A.D. 1750s to 1800s	American Revolution caused large number of United Empire Loyalists, military petitioners, immigrants from the British Isle/European locations, and groups who face persecution in the United States arrived in Upper Canada; Treaty of Paris signed in 1784; in 1805 a tract of land was ceded from the Mississauga that included lands "reaching from the Etobicoke Creek on the East for twenty-six miles westward to the outlet of Burlington Bay, these lands stretching back from the Lake shore line for from five to six miles to what we now know as the Second Concession North of Dundas (or Eglinton Avenue)" (Fix, 1967, p.13); one mile on either side of the Credit River and the 'flat lands' bordering the Etobicoke Creek were to remain property of the Mississaugas; the Mississauga obtained £1000 worth of

Periods	Date Range	Overview
		goods and the right to retain their fishery sites at the mouths of the Credit River, Sixteen Mile Creek, and Twelve Mile Creek; A strip of land one-mile-wide on each side of the Credit River was reserved for the Mississauga Natives, with specific privileges for fishing; this treaty included lands in the southern parts of the Township of Toronto in Peel County and Trafalgar and Nelson Townships in Halton County (N.A., 1891, p.lv; Weaver, 1913, p.65; Loverseed, 1987, p.21; Surtees, 1994, p.110; Government of Ontario, 2014)

1.3.3 Euro-Canadian Settlement Period (1800s to present)

After the War of 1812, there was mounting pressure for new land to accommodate the “increasing number of new settlers from the British Isles, to meet the demands of the demobilized military personnel for their promised land grants, and to provide the necessary land for children of the United Empire Loyalists who had settled in eastern Ontario and on the Niagara Frontier in general earlier” (McKinney, 1967, p.244). To accommodate this influx of settlers, the remainder of the Mississauga Tract, within what is now part of Peel Region, was purchased by William Claus in 1818. The area belonged to the Credit River Mississauga who, despite efforts from the Indian Department officials to protect them, found themselves victim to encroachment on their lands and fisheries by Euro-Canadian settlers (Surtees, 1994, p.116). Ajetance, chief of the Credit River Mississauga, settled for goods in the value of £522.10 shilling annually per person in exchange for 648,000 acres of land (Surtees, 1994, p.117). This second purchase surrendered those lands within what would become the Township of Caledon (N.A., 1891, p.viii).

The Township of Caledon, was surveyed in 1818-1819, where six concessions were laid out on either side of Hurontario Street (or Centre Road), using the ‘New Survey’ technique where 200-acre lots were granted in square 100-acre parcels. The Township of Caledon was opened for settlement in 1820 and was the last Township in Peel County to be settled because early pioneers thought it would be impossible to live so far from civilization. By 1842, the northern part of the Township was described as hilly and broken, and contained a considerable quantity of pine. The southern part of the Township had better land and hardwood timber with few good farms. The Township of Caledon contained three grist-mills and one saw-mill. The population included 1,920 individuals who cultivated 9,307 acres (Walker & Miles, 1877, p.89; Town of Caledon, 2016a; Smith, 1846, p.27).

The community of Alton, located at Main Street and Queen Street East, was first settled by Thomas Russell who arrived with his family in 1834. The Russell family owned the land where the Village of Alton is located and were the only family in the community for approximately three years. By 1837, several other families arrived and settled in the area. In 1846, a church was established, and in 1851, a grist mill was constructed by Mr. Shringley and Farr, as well as a store opened by Robert Meek. Four years later, a post office opened under the name ‘Alton.’ By 1877, a school house, three churches, five stores, a tin shop, harness shop, shoe stores, blacksmith and waggon shop, two large patent lime kilns, three large grist and flour mills, a saw mill, a steam furniture factory, tanning business, a foundry, and two hotels was in the Village of Alton. The Toronto Grey & Bruce Railway opened a station in Alton and the Credit Valley Railway was under

construction through the village. The Village of Alton was noted to be “one of the smartest villages of its size in the County of Peel” (Walker & Miles, 1877, p.89).

1.3.4 Past Land Use

To further assess the study corridor’s potential for the recovery of historic pre-1900 remains, several documents were reviewed to gain an understanding of the land use history.

A review of the 1859 *Tremaine’s Map of the County of Peel* (*see Map 2*) reveals that the study corridor was situated within part of property owned by Wright Brothers. The historic village of Alton is depicted within 300 metres of the study corridor. Shaw’s Creek and its tributary are depicted within the study corridor

The 1877 *Illustrated Historical Atlas of the County of Peel* (*see Map 3*) reveals that the study corridor was situated within part of William Stevens’ and an unlisted individual’s property. The historic village of Alton is depicted in and within 300 metres of the study corridor. Shaw’s Creek and a tributary of Shaw’s Creek continued to traverse the study corridor as well as the foundations of Credit Valley Railway.

Review of the 1877 *Illustrated Historical Atlas of the County of Peel – Village of Alton* (*see Map 4*) depicted the study corridor encompassing the open road allowance of Queen Street East and lands subdivided as part of the village lots of Alton. No structures are depicted in or within 300 metres of the study corridor.

Additionally, the study corridor is located along present-day Queen Street East, which was originally laid out during the survey of the Village of Alton. The study corridor also traverses the present-day Orangeville Brampton Rail Development Corporation (OBRDC) Railway (formerly the Credit Valley Railway). In Ontario, the 2011 *S&G* considers areas of early Euro-Canadian settlements (e.g., pioneer homesteads, isolated cabins, farmstead complexes, early wharf or dock complexes, pioneer churches, and early cemeteries), early historic transportation routes (e.g., trails, passes, roads, railways, portage routes), and properties that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations are considered features or characteristics that indicate archaeological potential (per *Section 1.3.1* of the 2011 *S&G*). Therefore, based on the proximity of both early Euro-Canadian settlements and historic transportation routes, there is elevated potential for the location of Euro-Canadian archaeological resources (pre-1900) within portions of the study corridor which lie within 300 metres and 100 metres, respectively, of these historic features.

1.3.5 Present Land Use

The present land use of the study corridor is categorized as settlement area, rural lands, environmental policy area and a regional road (Town of Caledon, 2016).

1.4 Archaeological Context

To establish the archaeological context and further establish the archaeological potential of the study corridor, Archeoworks Inc. conducted a comprehensive review of designated and listed heritage properties, cultural heritage landscapes, commemorative markers and pioneer churches and early cemeteries in relation to the study corridor. Furthermore, an examination of registered archaeological sites and previous AAs within proximity to the study corridor limits, and a review of the physiography of the study corridor were performed.

The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research**.

1.4.1 Designated and Listed Cultural Heritage Resources

Per *Section 1.3.1* of the *2011 S&G*, property listed on a municipal register or designated under the *Ontario Heritage Act* or that is a federal, provincial, or municipal historic landmark or site are considered features or characteristics that indicate archaeological potential. The study corridor is located within 300 metres of two designated heritage properties (Town of Caledon, 2017a) (*see Table 3*). No designated or listed heritage properties are in the study corridor. Therefore, this feature further elevates archaeological potential within portions of the study corridor that fall within 300 metres of these designated heritage resources.

Table 3: Heritage Resources within 300 metres of the Study Corridor

Address	Description	Heritage Status
1565 Queen Street East	Wright-Didd House, ca.1860	Designated (By-Law No. 90-58)
42 Charles Street	Read-Fendley House, ca.1875	Designated (By-Law No.91-18)

1.4.2 Heritage Conservation Districts

Per *Section 1.3.1* of the *2011 S&G*, heritage resources listed on a municipal register or designated under the *Ontario Heritage Act* are considered features or characteristics that indicate archaeological potential. The study corridor is not located in or within 300 metres of a Heritage Conservation District (Town of Caledon, 2017b). Therefore, this feature does not contribute in establishing the archaeological potential of the study corridor.

1.4.3 Cultural Heritage Landscapes

The Town of Caledon has identified the Village of Alton and its Environs as a Candidate Cultural Heritage Landscape, as the village is an “organically evolved mill village landscape as defined by the Town of Caledon: Criteria for the Identification of Cultural Heritage Landscapes and is focused on the milling heritage which extends along Shaw’s Creek through the existing village” (Town of Caledon, 2009, p.1). The village of Alton fulfils many major historical themes determined to be of significance to the Town of Caledon including: being a pioneer settlement; has an early industry (grist and sawmills along the Credit River and Shaw’s Creek); and a railway. The Village of Alton was recommended as a Candidate Cultural Heritage Landscape as it represents an excellent example of a mill village with its primary focus included water-powered industries along Shaw’s

Company	Stage of Work	Relation to Current Study Corridor	Details + Recommendation
			inspection for the alternative design concept should be conducted and a Stage 2 AA is recommended on any undisturbed lands that may be used for alternative design concepts.

1.4.8 Physical Features

The study corridor is in the Guelph Drumlin Field physiographic region of Southern Ontario, which covers 320 square miles that includes parts of the Regional Municipalities of Hamilton-Wentworth, Waterloo, Peel and Halton, and a part of Wellington County. This area includes approximately 300 drumlins of varying sizes and is referable to the ice thrust that radiated from the western end of the basin of Lake Ontario. These drumlins are not as close as other areas; therefore, more intervening low ground is present, which holds fluvial materials. The till in the drumlins are loamy, calcareous and quite stony, becoming sandier traveling to the northeast (Chapman and Putnam, 1984, pp.137-138).

Agriculture within the Guelph Drumlin Field was traditional and generalized, with a growing specialization in the production of beef cattle, hogs, and poultry. "Natural pasture" land was poorly drained land that was improved through drainage and seeding. The Guelph countryside was accidentally laid out by early surveyors by the grain of the land. This allowed easier arrangement and carry out systems of contour elevation. Although there is a great amount of gravel near Guelph, these have provided useful building aggregates, and farmsteads and homes are well built on stone foundations. Abandoned farms are less frequent compared to nearby areas (Chapman & Putnam, 1984, p.138-139).

A few native soil types are found within the study corridor: Caledon loam, Pontypool sandy loam and Bottom lands. Bottom Lands is located along Shaw's Creek and the tributary of Shaw's Creek, while the land located southwest of Shaw's Creek is in Caledon loam, and the land northeast is in Pontypool sandy loam. A description of their characteristics may be found in **Table 6** (Ontario Agricultural College, 1953). The great variety in soil types further highlights the mixed landscape that the study corridor encompasses and supports the mixed nature of past subsistence practices and changing industries of early settlers in these areas. Soils more conducive to agriculture, such as good drainage and stonefree, has the potential for past settlement, support greater population density and subsequently elevated archaeological potential.

Table 6: Study Corridor Soil Types

Soil Series and Type	Great Soil Group	Profile Description of Cultivated Soil	Drainage	Topography and Stoniness
Caledon loam	Grey-Brown Podzolic	4" dark greyish brown sandy loam underlain by well defined A2 and B horizons. Parent material usually sandy with	Good	Irregular steeply sloping. Few stones.

Soil Series and Type	Great Soil Group	Profile Description of Cultivated Soil	Drainage	Topography and Stoniness
		occasional pockets of gravel. Profile well developed.		
Pontypool sandy loam	Grey-Brown Podzolic	4" very dark grey-brown loam; profile well developed; concentration of stones in B horizon; parent material consists of well sorted sand and gravel; brown in colour; shaley.	Good	Smooth, very gently sloping. Few stones
Bottom lands	Alluvial	Low-lying land along stream courses; subject to flooding. Profile immature and horizons poorly defined.	Variable	Variable

Hydrological features such as primary water sources (i.e. lakes, rivers, creeks, streams) and secondary water sources (i.e. intermittent streams and creeks, springs, marshes, swamps) would have helped supply plant and food resources to the surrounding area and are indicators of archaeological potential (per *Section 1.3.1* of the *2011 S&G*). Shaw's Creek and a tributary of Shaw's Creek are located within the study corridor. Therefore, this feature further elevates archaeological potential within portions of the study corridor that fall within 300 metres of these hydrological features.

1.4.9 Current Land Conditions

The study corridor is situated within the residential area of the Village of Alton, in the Town of Caledon. The study corridor is located along Queen Street East and encompasses the Queen Street East, it's Right-of-Way (ROW), the Orangeville Brampton Rail Development Corporation (OBRDC) Railway, Shaw's Creek, a tributary of Shaw's Creek, manicured yardage, woodlots, and areas of overgrown vegetation. The topography within the study corridor increases from southwest to northeast, with the elevation of 392 to 400 metres above sea level.

1.4.10 Date of Review

A desktop review of field conditions using 20th century aerial photography as well as past and current satellite imagery obtained through the Google Earth application was undertaken on August 1st and 20th, 2017.

1.5 Confirmation of Archaeological Potential

Based on the information gathered from the background research documented in the preceding sections, elevated archaeological potential has been established within the study corridor boundary. Features contributing to archaeological potential are summarized in **Appendix B**.

2.0 ANALYSIS AND CONCLUSIONS

In combination with data gathered from the background research (*see Sections 1.3 and 1.4*) and an inspection of aerial photography and satellite imagery, an evaluation of the established archaeological potential was performed.

2.1 Historical Imagery

To facilitate the evaluation of the established archaeological potential, a detailed review of an aerial photograph taken in 1954 (*see Map 5*), and satellite imagery taken from 2005 to 2016 (*see Maps 6-7*) was undertaken.

In 1954, the study corridor was located along the open road allowance of Queen Street East (*see Map 5*). Residential structures, the OBRDC Railway, Shaw's Creek and its flood plain, and long stretches of wooded and overgrown areas flank Queen Street East. By 2005, the study corridor also traversed a tributary of Shaw's Creek (*see Map 6*). After this time, the study corridor remained unchanged (*see Map 7*).

2.2 Identified Deep and Extensive Disturbances

The study corridor was evaluated for extensive disturbances that have removed archaeological potential. Disturbances may include but are not limited to: grading below topsoil, quarrying, building footprints, or sewage and infrastructure development. *Section 1.3.2* of the 2011 S&G considers infrastructure development among those "features indicating that archaeological potential has been removed."

Disturbances include the paved roadway and gravel shoulder of Queen Street East, the Queen Street East right-of-way (ROW), ditches, the OBRDC Railway and its graded ROW, extant structures, and paved and gravel driveways (*see Maps 8-10*). The construction of these features would have resulted in severe damage to the integrity of any archaeological resources which may have been present within their footprints. However, the areas of deep and extensive disturbances should only be considered as *likely* not requiring Stage 2 survey. A visual inspection is still required to provide on-site confirmation and documentation of the actual condition and exact extent of the disturbance.

2.3 Physiographic Features of No or Low Archaeological Potential

The study corridor was evaluated for physical features of no or low archaeological potential. These usually include but are not limited to: permanently wet areas, exposed bedrock, and steep slopes (greater than 20°) except in locations likely to contain pictographs or petroglyphs, as per *Section 2.1, Standard 2.a.* of the 2011 S&G.

Physical features of low to no archaeological potential include steep sloping terrain, low-lying wet area associated with Shaw's Creek and the tributary of Shaw's Creek, and the Shaw's Creek and the tributary of the Shaw's Creek (*see Maps 8-10*). However, the areas of low to no archaeological potential should only be considered as *likely* not requiring Stage 2 survey. A visual inspection is still required to provide on-site confirmation and documentation of the actual condition and exact extent of these features.

2.4 Identified Areas of Archaeological Potential

Portions of the study corridor that neither exhibit extensively disturbed conditions nor contain physical features of low to no archaeological potential are considered to retain the established archaeological potential. These areas include, but are not limited to, areas of overgrown vegetation, woodlots and manicured yardage (*Maps 8-10*). Given the established potential to recover archaeological resources within these identified areas, a Stage 2 AA will be required. Due to the presence of overgrown vegetation and trees, ploughing in advance of survey is not a viable option; therefore, these identified areas that retain archaeological potential must be subjected to a Stage 2 test pit survey at five-metre transects in accordance with *Section 2.1.2* of the 2011 S&G.

3.0 RECOMMENDATIONS

Considering the findings detailed in preceding sections, the following recommendations are presented:

1. Parts of the study corridor that were identified as having archaeological potential removed (i.e., areas of identified deep and extensive disturbance) need to be confirmed through an on-site property inspection during a Stage 2 AA.
2. Parts of the study corridor that were identified as having no or low archaeological potential (i.e., areas of steeply sloping terrain and low-lying wet areas and watercourses) need to be confirmed through an on-site property inspection during a Stage 2 AA.
3. Parts of the study corridor that were identified as retaining archaeological potential must be subjected to a Stage 2 AA. These areas must be subjected to test pit survey at five metre intervals in accordance with *Section 2.1.2* of the *2011 S&G*.

No construction activities shall take place within the study corridor prior to the *MTCS* (Archaeology Programs Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

4.0 ADVICE ON COMPLIANCE WITH LEGISLATION

1. This report is submitted to the *MTCS* 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 that are 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 *MTCS*, 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.
2. 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 Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.
3. 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 consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.
4. The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the *Ministry of Consumer Services*.

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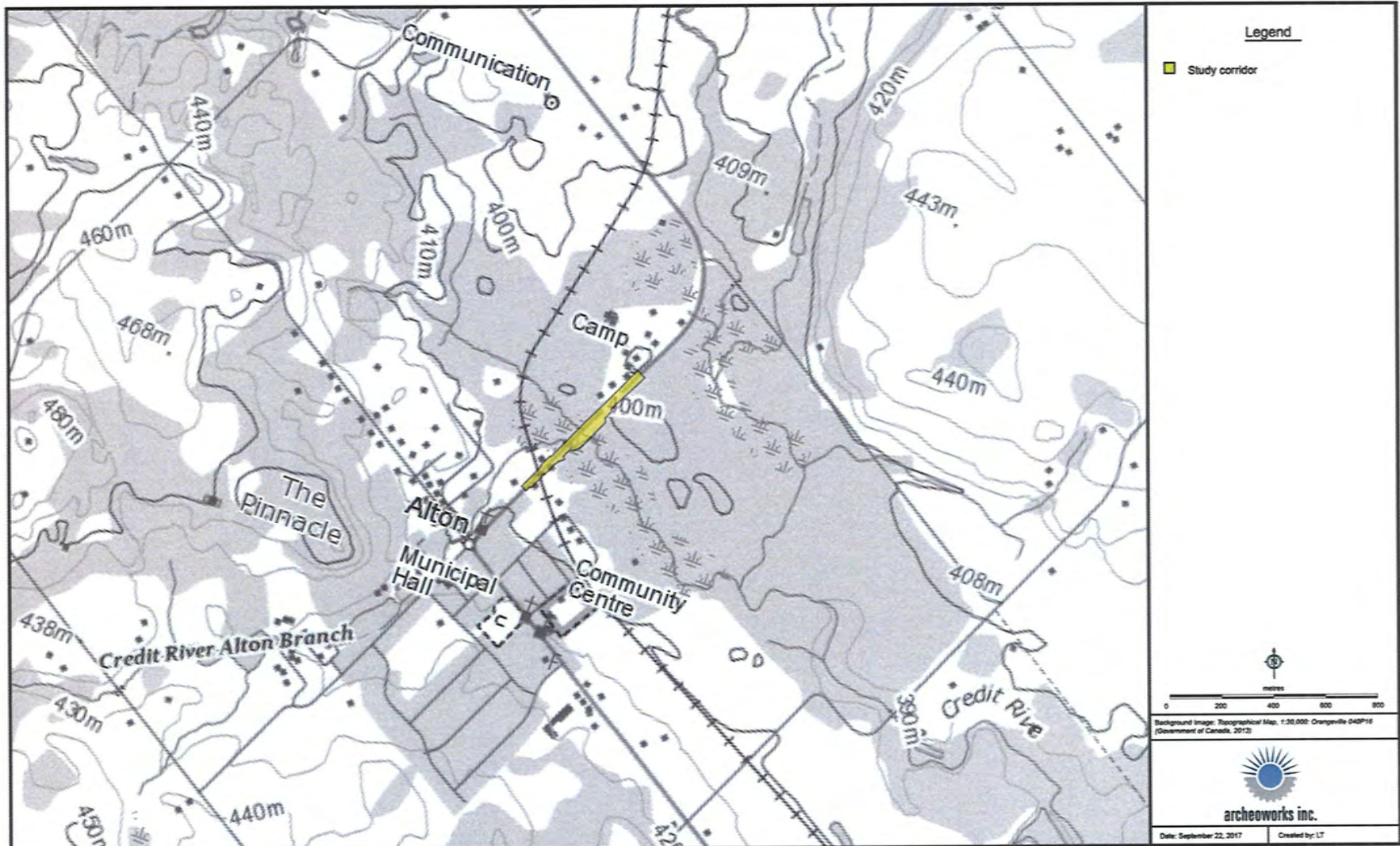
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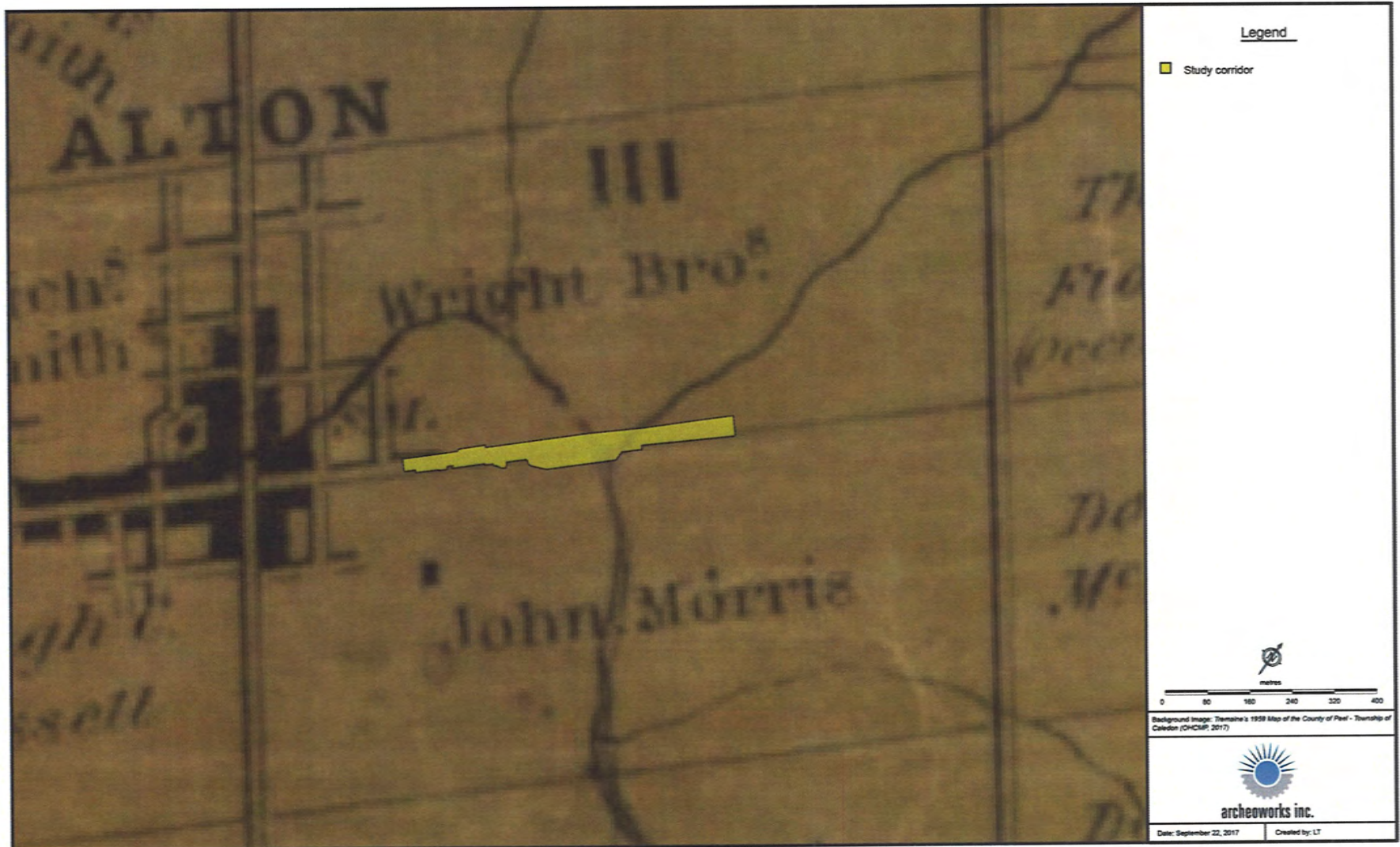
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APPENDICES

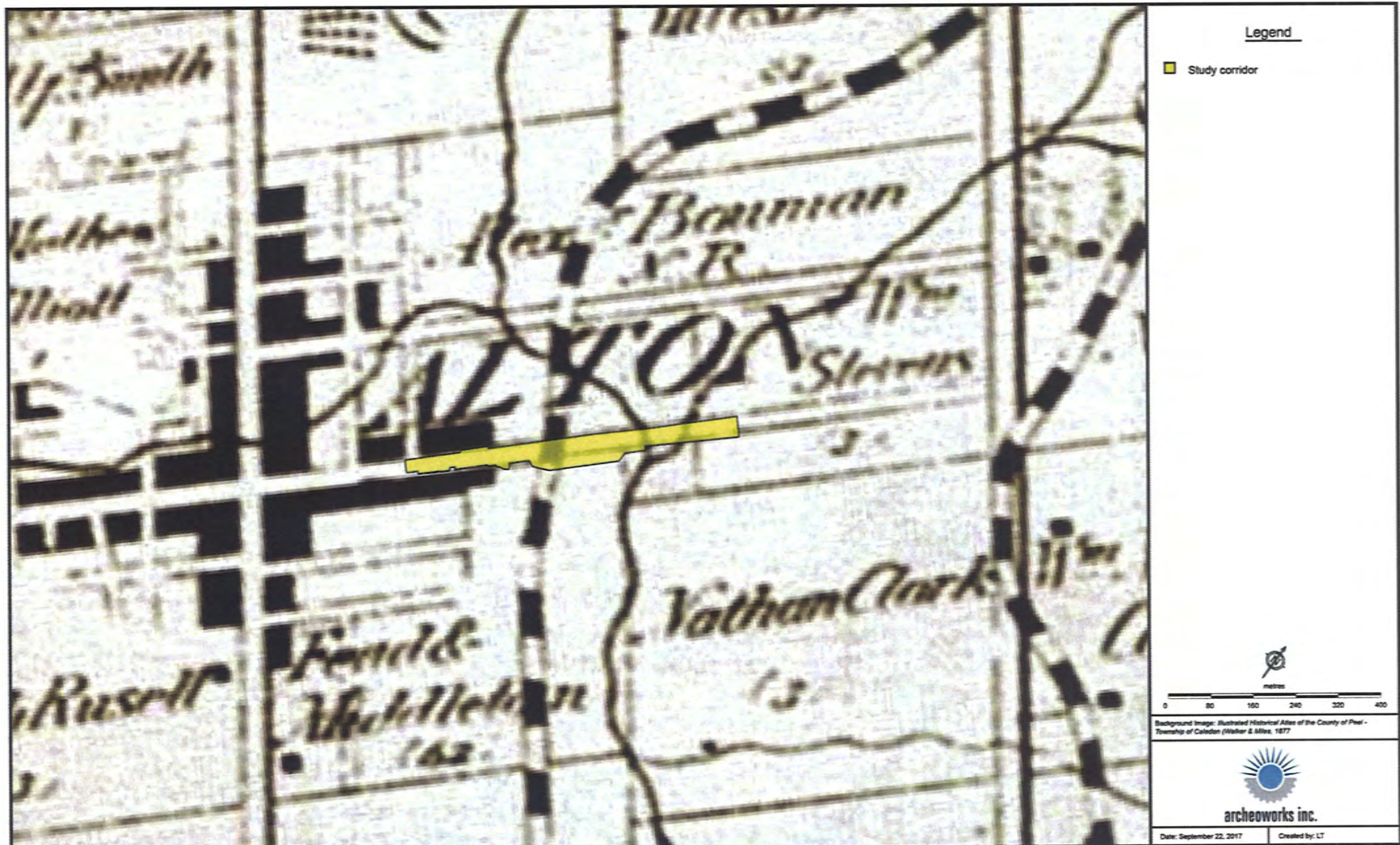
APPENDIX A: MAPS



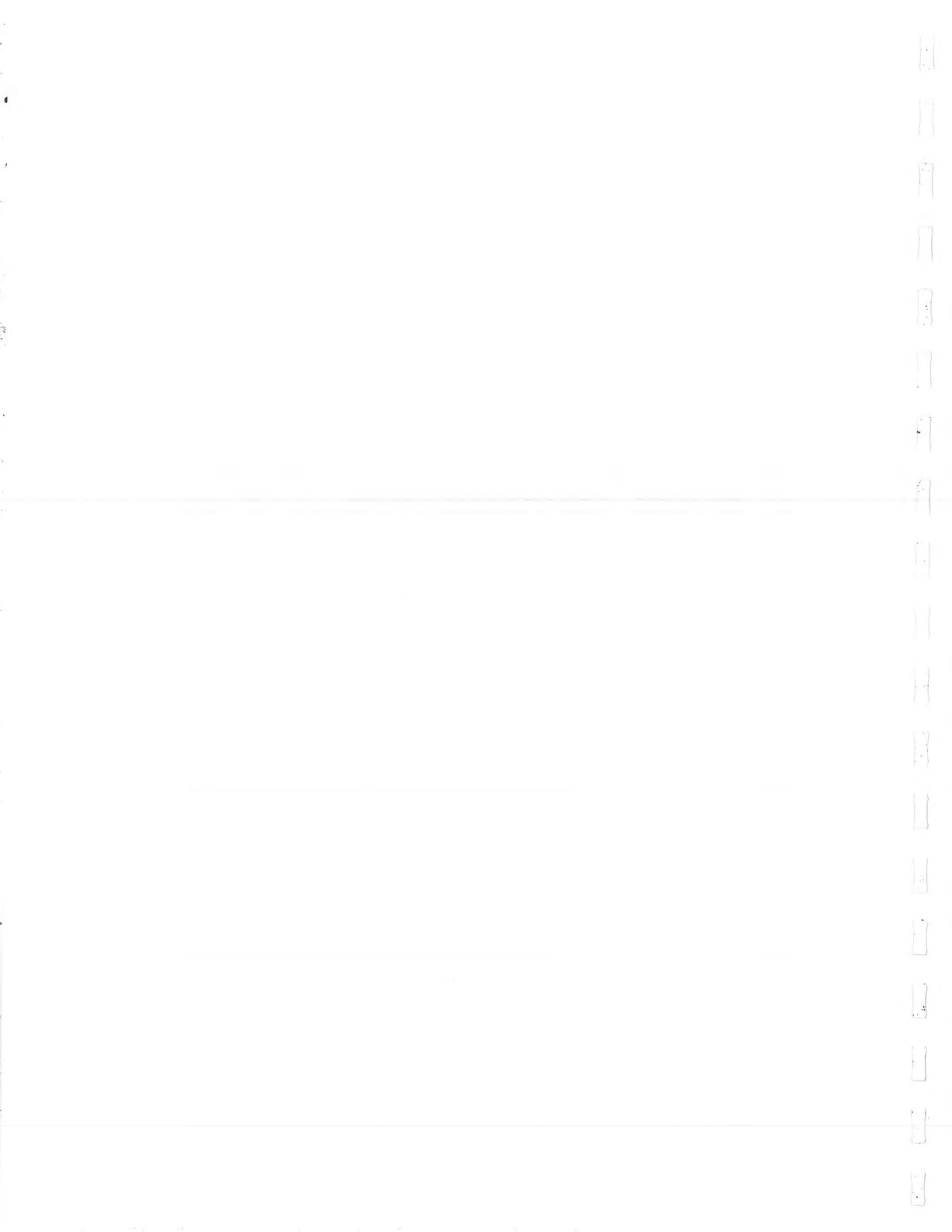
Map 1: Topographical map 1:50,000, NTS Orangeville 040P16 (Government of Canada, 2013) identifying the Stage 1 AA study corridor.

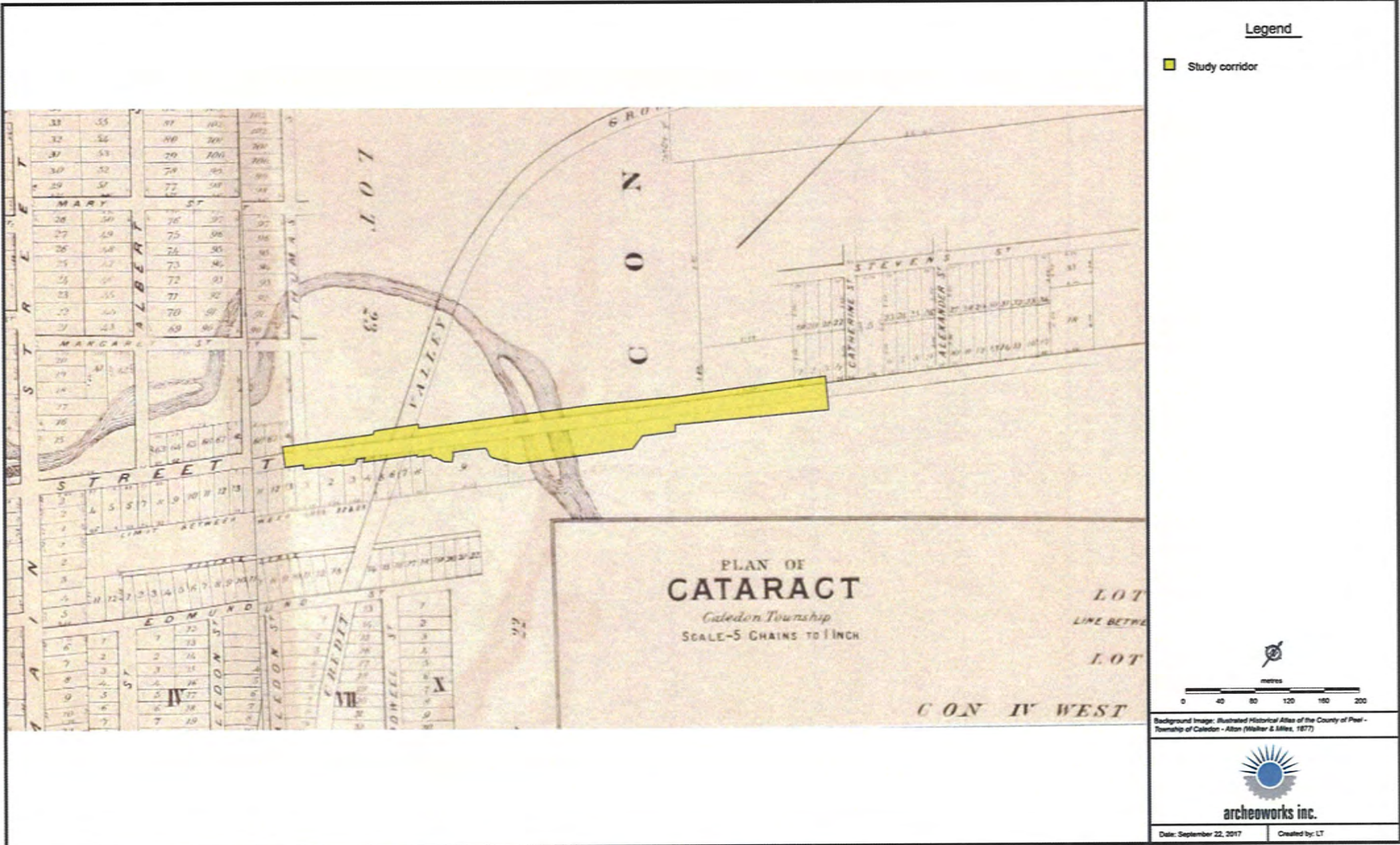


Map 2: Stage 1 AA study corridor within the 1859 Tremain's Map of the County of Peel – Township of Caledon (OHCMF, 2017).



Map 3: Stage 1 AA study corridor within the 1877 Illustrated Historical Atlas of the County of Peel – Township of Caledon (Walker & Miles, 1877).





Map 4: Stage 1 AA study corridor within the 1877 Illustrated Historical Atlas of the County of Peel – Township of Caledon – Village of Alton (Walker & Miles, 1877).

STAGE 1 AA FOR QUEEN STREET EAST RECONSTRUCTION, AND BRIDGE AND CULVERT IMPROVEMENTS
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL, ONTARIO



Map 5: Stage 1 AA study corridor within a 1954 aerial photograph (Hunting Survey Corporation Ltd., 1954).

STAGE 1 AA FOR QUEEN STREET EAST RECONSTRUCTION, AND BRIDGE AND CULVERT IMPROVEMENTS
TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL, ONTARIO



Map 6: Stage 1 AA study corridor within a 2005 satellite image (Google Earth, 2017a).



Map 7: Stage 1 AA study corridor within a 2016 satellite image (Google Earth, 2017b).

APPENDIX B: SUMMARY OF BACKGROUND RESEARCH

Feature of Archaeological Potential		Yes	No	Unknown	Comment
1	Known archaeological sites within 300 m?		X		If Yes, potential confirmed
Physical Features		Yes	No	Unknown	Comment
2	Is there water on or adjacent to the property?	X			If Yes, potential confirmed
2a	Presence of primary water source within 300 metres of the study corridor (lakes, rivers, streams, creeks)	X			If Yes, potential confirmed
2b	Presence of secondary water source within 300 metres of the study corridor (intermittent creeks and streams, springs, marshes, swamps)	X			If Yes, potential confirmed
2c	Features indicating past presence of water source within 300 metres (former shorelines, relic water channels, beach ridges)		X		If Yes, potential confirmed
2d	Accessible or inaccessible shoreline (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh)		X		If Yes, potential confirmed
3	Elevated topography (knolls, drumlins, eskers, plateaus, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
4	Pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
5	Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
Cultural Features		Yes	No	Unknown	Comment
6	Is there a known burial site or cemetery that is registered with the Cemeteries Regulation Unit on or directly adjacent to the property?		X		If Yes, potential confirmed
7	Associated with food or scarce resource harvest areas (traditional fishing locations, food extraction areas, raw material outcrops, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
8	Indications of early Euro-Canadian settlement (monuments, cemeteries, structures, etc.) within 300 metres	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
9	Associated with historic transportation route (historic road, trail, portage, rail corridor, etc.) within 100 metres of the property	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
Property-specific Information		Yes	No	Unknown	Comment
10	Contains property designated under the Ontario Heritage Act		X		If Yes, potential confirmed
11	Local knowledge (aboriginal communities, heritage organizations, municipal heritage committees, etc.)		X		If Yes, potential confirmed
12	Recent ground disturbance, not including agricultural cultivation (post-1960, extensive and deep land alterations)	X- parts of the study corridor			If Yes, low archaeological potential is determined

APPENDIX C: INVENTORY OF DOCUMENTARY AND MATERIAL RECORD

Project Information:				
Project Number:		008-AL246B-17		
Licensee:		Kim Slocki (P029)		
MTCS PIF:		P029-0912-2017		
Document/ Material		Location		Comments
1.	Research/ Analysis/ Reporting Material	Digital files stored in: /2017/ 008-AL246B-17- Queen Street Bridge + Culvert Replacement - Alton village /Stage 1	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4	Stored on Archeoworks network servers

Under Section 6 of Regulation 881 of the *Ontario Heritage Act*, *Archeoworks Inc.* will, “keep in safekeeping all objects of archaeological significance that are found under the authority of the licence and all field records that are made in the course of the work authorized by the licence, except where the objects and records are donated to Her Majesty the Queen in right of Ontario or are directed to be deposited in a public institution under subsection 66 (1) of the Act.”

APPENDIX G

BUILT HERITAGE

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
 - is a recognized heritage property
 - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
 - the main project area
 - temporary storage
 - staging and working areas
 - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – [separate checklist](#)
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

Project or Property Name

Queen Street East Road Reconstruction, and Bridge and Culvert Replacement over Shaw's Creek

Project or Property Location (upper and lower or single tier municipality)

Town of Caledon, Regional Municipality of Peel

Proponent Name

R.V. Anderson Associates Ltd. 2001 Sheppard Avenue East, Suite 300 Toronto, ON M2J 4Z8

Proponent Contact Information

David O'Sullivan E: dosullivan@rvanderson.com T: 416.497.8600

Screening Questions

1. Is there a pre-approved screening checklist, methodology or process in place?

Yes No

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Yes No

If Yes, do not complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

3. Is the property (or project area):

Yes No

- a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?
- b. a National Historic Site (or part of)?
- c. designated under the *Heritage Railway Stations Protection Act*?
- d. designated under the *Heritage Lighthouse Protection Act*?
- e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?
- f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. has or is adjacent to a known burial site and/or cemetery?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. is in a Canadian Heritage River watershed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. contains buildings or structures that are 40 or more years old?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Part C: Other Considerations

	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. has a special association with a community, person or historical event?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. contains or is part of a cultural heritage landscape?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
 - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's [Ontario Heritage Toolkit](#) or [Standards and Guidelines for Conservation of Provincial Heritage Properties](#).

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's [Standards & Guidelines for Conservation of Provincial Heritage Properties](#) [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

- i. designated under the *Ontario Heritage Act*
 - individual designation (Part IV)
 - part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note:** To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
 - [Ontario Heritage Trust](#)
 - local land registry office (for a title search)
-

ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- [Ontario Heritage Trust](#) - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
 - municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
 - local land registry office (for a title search)
-

iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
 - municipal heritage planning staff
 - municipal heritage committee
-

iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act*. **Note:** To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
 - [Ontario Heritage Trust](#)
-

v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the [National Historic Sites website](#).

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the [Directory of Designated Heritage Railway Stations](#).

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the [Heritage Lighthouses of Canada website](#).

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the [Federal Heritage Buildings Review Office](#).

See a [directory of all federal heritage designations](#).

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – [World Heritage Site website](#).

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- [municipal heritage committees](#) or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's [Heritage directory](#) – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a [list of plaques](#) commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a [list of plaques](#) commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a [database of registered cemeteries](#)
- Ontario Genealogical Society (OGS) – to [locate records of Ontario cemeteries](#), both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to [locate early cemeteries](#)

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the [Canadian Heritage River System](#).

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide [Heritage Property Evaluation](#).

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- [municipal heritage committees](#) or local heritage organizations
- Ontario Historical Society's "[Heritage Directory](#)" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through [Ontario Trails](#).