

Guelph Pedestrian Bridges

Ward to Downtown

City of Guelph, Ontario

Scoped Environmental Impact Study

Prepared for:
The City of Guelph

Project Number:
AA16-047A

Alternative formats are available as per the Accessibility for Ontario with Disabilities Act by contacting Tiffany Hanna (Brule) at 519-822-1260 at extension 3371.

Date:
February 14, 2017

ABOUD & ASSOCIATES INC.
Consulting Arborists • Ecologists • Landscape Designers

591 Woolwich Street . Guelph . Ontario . N1H 3Y5 . T:519.822.6839 . F:519.822.4052 . info@abouding.com . www.abouding.com

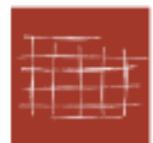


Table of Contents

1.0	INTRODUCTION	1
1.1	PROJECT BACKGROUND & RATIONALE	1
1.2	EXISTING LAND USE AND STUDY AREA.....	1
1.3	EXISTING REGULATIONS.....	2
1.3.1	<i>Provincial Policy Statement</i>	2
1.3.2	<i>Endangered Species Act, 2007</i>	3
1.3.3	<i>Fisheries Act, 1985</i>	4
1.3.4	<i>Grand River Conservation Authority</i>	4
1.3.5	<i>City of Guelph Official Plan</i>	6
1.3.6	<i>City of Guelph By-laws</i>	10
1.4	TERMS OF REFERENCE.....	10
2.0	METHODS	11
2.1	BACKGROUND REVIEW	11
2.2	TREES & VEGETATION	11
2.2.1	<i>Ecological Land Classification</i>	11
2.2.2	<i>Botanical Inventory</i>	12
2.2.3	<i>Tree Inventory</i>	12
2.3	WILDLIFE.....	13
2.3.1	<i>Incidental Wildlife Observations</i>	13
2.3.2	<i>Fish</i>	13
2.4	SIGNIFICANT WILDLIFE HABITAT.....	13
2.5	SAR HABITAT ASSESSMENT	13
2.6	AQUATIC HABITAT ASSESSMENT	14
3.0	EXISTING CONDITIONS	15
3.1	BACKGROUND REVIEW	15
3.1.1	<i>Natural Heritage Information Centre - Species at Risk</i>	15
3.1.2	<i>Ministry of Natural Resources and Forestry</i>	16
3.1.3	<i>Ontario Breeding Bird Atlas</i>	16
3.1.4	<i>Ontario Reptile and Amphibian Atlas</i>	16
3.1.5	<i>Atlas of the Mammals of Ontario</i>	16
3.2	TREES & VEGETATION.....	17
3.2.2	<i>Botanical Inventory</i>	17
3.2.3	<i>Tree Inventory</i>	18
3.2.3	<i>Woodland Assessment</i>	19
3.3	WILDLIFE.....	19
3.3.1	<i>Incidental Wildlife Observations</i>	19
3.4	SIGNIFICANT WILDLIFE HABITAT.....	20
3.5	SAR HABITAT ASSESSMENT	20
3.6	AQUATIC HABITAT ASSESSMENT	21

3.6.1	<i>Aquatic Assessment</i>	21
3.6.2	<i>GRCA Records</i>	22
3.6.3	<i>DFO Self-Assessment for Projects near Water</i>	22
3.6.4	<i>Assessment of recommended buffers to designated features</i>	23
4.0	IMPACT ANALYSIS, MITIGATION, AND RESTORATION	25
4.1	ANALYSIS AND COMPARISON OF BRIDGE LOCATIONS.....	25
4.2	GENERALIZED IMPACT ASSESSMENT AND MITIGATION.....	30
4.3	HYDROLOGICAL FUNCTION AND CHANGES TO WATERCOURSE.....	37
4.4	RESTORATION, COMPENSATION AND INVASIVE SPECIES MANAGEMENT STRATEGY.....	37
5.0	LEGISLATION AND POLICY COMPLIANCE	39
5.1	PROVINCIAL POLICY STATEMENT	39
5.2	ENDANGERED SPECIES ACT	39
5.3	FISHERIES ACT, 1985	39
5.4	GRAND RIVER CONSERVATION AUTHORITY	39
5.5	CITY OF GUELPH OFFICIAL PLAN.....	40
6.0	SUMMARY AND CONCLUSIONS	42
6.1	BIOLOGICAL STUDIES AND SITE CONSTRAINTS	42
6.2	IMPACT ASSESSMENT.....	42
6.3	LEGISLATION AND POLICY COMPLIANCE	43
7.0	AVOIDANCE, MITIGATION AND COMPENSATION RECOMMENDATIONS	44
8.0	REFERENCES	47

List of Tables

Table 1. NHIC Species at Risk Records.....	15
Table 2. Ecological Land Classification Communities.....	17
Table 3. Trees within 30m from proposed bridge locations.....	18
Table 4. Incidental Species Observations	19
Table 5 Confirmed Significant Wildlife Habitat.....	20
Table 6. Recommended Buffers to Designated Features	24
Table 7. Comparison and rating of Impacts to Natural Heritage by Alternative	27
Table 8. Development Impacts and Mitigation Guidelines	30

List of Figures

Figure 1	Study Area and Natural Heritage Features
Figure 2	Tree Survey

List of Appendices

Appendix 1	Terms of Reference and comments
Appendix 2	MNRF Request for Information
Appendix 3	Site Investigation Details
Appendix 4	Ecological Land Classification Data Sheets
Appendix 5	Vascular Plant List
Appendix 6	Background Wildlife List
Appendix 7	Significant Wildlife Habitat Assessment
Appendix 8	Species at Risk Habitat Assessment
Appendix 9	Aquatic Assessment
Appendix 10	Fish Records
Appendix 11	Glossary of Terms and Impact Ratings
Appendix 12	Tree Survey Data
Appendix 13	Tree Group Data
Appendix 14	Tree Inventory and Assessment Definitions

1.0 Introduction

The City of Guelph has proposed the construction of two pedestrian bridges to link St. Patrick's Ward with Downtown Guelph. A Schedule 'B' Municipal Class Environmental Assessment (Class EA) has been initiated by the City to determine the feasibility and optimal location of two proposed pedestrian bridges. Aboud & Associates Inc. (AA) has been retained as part of a project team with Ecosystem Recovery Inc. and GM BluePlan to complete the Class EA. This EIS has been completed as part of the Class EA file to characterize and document natural heritage features within the study area, assess impacts, and to propose reasonable measures to mitigate potential impacts to natural heritage features.

1.1 Project Background & Rationale

Two pedestrian bridges are proposed to be constructed crossing the Speed River between Macdonell Street and Neeve Street. The pedestrian bridges are intended to connect The Metalworks development at 5 Arthur Street and the St. Patrick's Ward neighborhood to Downtown. There are five proposed locations for the pedestrian bridges between the Existing Guelph Junction Rail and Neeve Street (*Figure 1*).

The proposed pedestrian bridges are considered essential transportation infrastructure, as defined in the City's Official Plan (Pers. Comm., Adèle Labbé 2016), indicating that there is a demonstrated need for the infrastructure and no other reasonable alternatives exist (Guelph OP 2014).

The proposed bridges are located at the intersection between *Significant Natural Area*, *Corporate Business Park*, and *Special Policy Area / Floodplain* (OP Schedule 1). The location is also within the *Regulatory Floodplain* for the *One Zone* and *Special Policy Area*. Features within the Natural Heritage System, as defined under the schedules of the City of Guelph Official Plan, including: Significant Wildlife Habitat, Significant Valleylands, Ecological Linkages, Urban Forest, and Surface Water & Fish Habitat, and their associated minimum established buffers.

The proposed pedestrian bridges are within the Grand River Conservation Authority jurisdiction and Regulation Limit from a watercourse (Reg. 150/06).

1.2 Existing Land Use and Study Area

The study area includes all lands occurring within the naturalized or park lands between Macdonell Street and Neeve Street, east of Wellington Street. Due to property access restriction and the presence of little to no natural feature on the east side of Speed River (The Metalworks development), the field studies were confined to the watercourse and lands west of the Speed River (*Figure 1*).

1.3 Existing Regulations

1.3.1 Provincial Policy Statement

The *Provincial Policy Statement* ([PPS] OMMHA 2014) provides policy direction on matters of provincial interest related to land use planning and development.

In regards to **community development** the PPS states that:

Healthy, active communities should be promoted by:

a) planning public streets, spaces and facilities to be safe, meet the needs of pedestrians, foster social interaction and facilitate active transportation and community connectivity;

b) planning and providing for a full range and equitable distribution of publicly-accessible built and natural settings for recreation, including facilities, parklands, public spaces, open space areas, trails and linkages, and, where practical, water-based resources;

c) providing opportunities for public access to shorelines; and

d) recognizing provincial parks, conservation reserves, and other protected areas, and minimizing negative impacts on these areas.

In regards to **Natural Heritage Protection** the PPS states that:

“Natural features and areas shall be protected for the long term.”

And that:

“The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.”

Under the PPS, development and site alteration are not permitted in:

- a) significant wetlands;*
- b) significant woodlands;*
- c) significant valleylands;*
- d) significant wildlife habitat;*
- e) significant areas of natural and scientific interest; and*
- f) coastal wetlands,*

unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

The PPS (2014) also states that:

- *“Development and site alteration is not permitted in fish habitat, habitat of endangered species and threatened species except in accordance with provincial and federal requirements.*
- *Development and site alteration is not permitted on adjacent lands to the natural heritage features and areas identified above, unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.*
- *Development and site alteration is restricted in or near sensitive surface water features and sensitive ground water features in order to protect the hydrologic functions of the feature. Mitigation and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions.”*

Under Section 1.6.8.5, these significant resources shall be given consideration in the planning of significant transportation *infrastructure*.

The proposed pedestrian bridges are considered infrastructure and therefore is not prohibited on lands containing significant resources. However, natural features must be documented and considered when selecting a preferred option.

1.3.2 Endangered Species Act, 2007

The provincial Endangered Species Act, 2007 (ESA) provides protection to species designated as Threatened or Endangered on the Species at Risk in Ontario list (MNRF 2015a). The habitat of Species at Risk is also generally protected under the ESA. Protected habitat is habitat identified as essential for life processes including breeding, rearing, feeding, hibernation, and migration.

The ESA (Subsection 9(1)) states that:

“No person shall,

- (a) kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;*
- (b) possess, transport, collect, buy, sell, lease, trade or offer to buy, sell, lease or trade,*
 - (i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species,*
 - (ii) any part of a living or dead member of a species referred to in subclause (i),*
 - (iii) anything derived from a living or dead member of a species referred to in subclause (i); or*
- (c) sell, lease, trade or offer to sell, lease or trade anything that the person represents to be a thing described in subclause (b) (i), (ii) or (iii).”*

Clause 10(1)(a) of the ESA also states that:

“No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario list as an endangered or threatened species.”

An authorization or permit between the proponent and the Minister of Natural Resources and Forestry is required to authorize activities that would otherwise be prohibited by subsection 9(1) and 10(1) of the ESA.

1.3.3 Fisheries Act, 1985

The study area contains fish-bearing waters in the form of the Speed River. This area and the fish within are protected under the Federal Fisheries Act, 1985. The Fisheries Act provides protection for the sustainability and ongoing productivity of Canada’s recreational, commercial and Aboriginal fisheries.

Section 35 (1) of the Fisheries Act States that:

“No person shall carry on any work, undertake activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or fish that support such a fishery”

The Fisheries Act requires that projects and activities avoid causing serious harm to fish and fish habitat unless authorized to do so by the Department of Fisheries and Oceans Canada (DFO). This applies to work conducted in or near waterbodies that support recreational, commercial and Aboriginal fisheries. Within the context of the pedestrian bridges, any proposed actions that could impact fish or fish habitat would need to be assessed for compliance with the Fisheries Act. If it is determined that proposed actions will cause serious harm to fish, which cannot be mitigated for, then a Fisheries Act Authorization would be required.

1.3.4 Grand River Conservation Authority

The study area is located within the jurisdiction and Regulation Limits of the Grand River Conservation Authority (GRCA).

The proposed bridge is entirely within the Flooding Hazard Limit and the regulatory allowances.

Section 8.1.18 of the GRCA’s Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Ontario Regulation 150/06, 2015) identifies recreational uses such as trails and river access points may be permitted *“in accordance with the policies in Sections 7.1.2-7.1.3 - General Policies, and where it can be demonstrated that:*

- a) There is no feasible alternative site outside the Riverine Flooding Hazard,*
- b) There is no loss of flood storage,*
- c) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site, facility and/or landscape design and appropriate remedial measures will adequately restore and enhance features and functions, and*

d) The risk of property damage is minimized through site and facility design and flood emergency plans.”

Section 8.1.15:

“Public Infrastructure including but not limited to roads, sanitary sewers, utilities, water and sewage treatment plants, water supply wells, well houses, and pipelines may be permitted in accordance with the policies in Sections 7.1.2- 7.1.3 – General Policies, provided that there is no feasible alternative site outside the Riverine Flooding Hazard as determined through an Environmental Assessment or other comprehensive plan supported by the GRCA, and where it can be demonstrated that:

- a) adverse hydraulic or fluvial impacts are limited and any risk of flood damage to upstream or downstream properties is not increased or is minimized through site design and the affected landowner(s) is informed of the increased risk,*
- b) there is no loss of flood storage wherever possible, and*
- c) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions”*

Section 9.1. states:

“Any alteration to the channel of a river, creek, stream or watercourse requires permission from the GRCA. This includes activities such as, but not limited to, culvert placement or replacement, bridge construction, bed level crossings, piping of watercourses, installation or maintenance of pipeline crossings, cable crossings, construction or maintenance of by-pass, connected or online ponds, straightening and diversions as well as any work on the bed or the banks of the watercourse such as bank protection projects.”

And 9.1.2. states:

“Crossings including but not limited to bridges, culverts, pipelines, channel enclosures of less than 20 metres (66 feet) and causeways may be permitted to be constructed, replaced or upgraded in accordance with the policies in Sections 7.1.2 - 7.1.3 – General Policies and Sections 8.1.16 - 8.1.17 and/or Section 8.2.21 where appropriate, and provided that all feasible alternative sites and alignments have been considered through an Environmental Assessment supported by the GRCA Policies for the Administration of Ontario Regulation 150/06 Revisions, October, 2015 Page 48 or through site-specific studies, whichever is applicable based on the scale and scope of the project, 27 and where it can be demonstrated that:

- a) crossings avoid any bends in the watercourse to the extent practical,*

- b) crossings are located to take advantage of existing impacted or open areas on the channel bank or valley slope, wherever possible,*
- c) crossing structures avoid the Riverine Erosion Hazard in order to accommodate natural watercourse movement, wherever possible,*
- d) the risk of flood damage to upstream or downstream properties is reduced through site and infrastructure design, wherever possible,*
- e) there is no inhibition of fish passage,*
- f) where unavoidable, intrusions on significant natural features or hydrologic or ecological functions are minimized and it can be demonstrated that best management practices including site and infrastructure design and appropriate remedial measures will adequately restore and enhance features and functions.*
- g) physical realignments or alterations to the river, creek, stream or watercourse channel associated with a new crossing are avoided or are in accordance with the policies in Section 9.1.16, and*
- h) maintenance requirements are minimized”.*

1.3.5 City of Guelph Official Plan

The Guelph Official Plan (OP) identifies the goals, objectives and policies intended to guide land use and activities while having regard for the social, economic and natural environment of the Guelph community.

The proposed Bridges are considered essential transportation infrastructure under the City of Guelph Official Plan (Pers. Comm., Adèle Labbé 2016).

The OP indicates that no development is permitted within the One Zone Floodplain, but may be used for outdoor recreation (excluding buildings and structures) and open space and conservation areas.

The City of Guelph OP states that they will encourage and develop a system of publicly accessible parkland, open space and trails, including shoreline areas that:

- a) clearly demarcates where public access is and is not permitted;*
- b) is based on a co-ordinated approach to trail planning and development; and*
- c) is based on good land stewardship practices for public and private lands.*

1.3.5.1 Natural Heritage System

OP section 6A.1.2 (7) states:

“Where essential transportation infrastructure, essential linear infrastructure, stormwater management facilities and structures, and/or trails are permitted within minimum or established buffers under policies 6A.2 and 6A.3, the following shall apply:

- i) works are to be located as far away from the feature boundary within the minimum or established buffer as possible;*
- ii) the area of construction disturbance shall be kept to a minimum; and*
- ii) disturbed areas of the minimum or established buffers shall be re-vegetated or restored with site appropriate indigenous plants wherever opportunities exist.”*

OP section 6A1.2.(8) states:

“Where essential transportation infrastructure, essential linear infrastructure, stormwater management facilities and structures, and/or trails are permitted within natural heritage features and areas under policies 6A.2 and 6A.3, the following shall apply:

- i) The area of construction disturbance shall be kept to a minimum; and*
- ii) Disturbed areas shall be re-vegetated or restored with site-appropriate indigenous plants wherever opportunities exist.”*

Any permitted infrastructure, including the proposed pedestrian bridges, must consider the Natural Heritage System and minimize impact where feasible. Areas disturbed should be revegetated and enhanced.

1.3.5.2 Surface Water Features and Fish Habitat

OP section 6A.2.5 (5) states:

“In addition to the General Permitted Uses of Section 6A.1.2, the following additional uses may be permitted within Surface Water Features, Fish Habitat and established buffer, subject to the requirements under 6A.1.2.7 and 6A.1.2.8:

- iii) essential linear infrastructure and their normal maintenance;*
- iv) essential transportation infrastructure and their normal maintenance;*
- v) flood and erosion control facilities or other similar works and their normal maintenance; and*
- vi) stormwater management facilities and structures and their normal maintenance.”*

OP section 6A.2.5 (6) states:

“These additional uses may only be permitted where it has been demonstrated through an EIS, EA or subwatershed plan, to the satisfaction of the City, in consultation with the MNR and/or the GRCA, and/or the Department of Fisheries and Oceans (DFO), that:

- i) *there will be no negative impacts on the water resources, fish habitat or related ecological and hydrologic functions;*
- ii) *there will be no net loss of fish habitat, and no harmful alteration, disruption, or destruction of fish habitat;*
- iii) *where authorization for the harmful alteration, disruption, or destruction of fish habitat has been obtained from DFO under the Fisheries Act using the guiding principle of no net loss of productive capacity, and the impact of development on fish habitat will be avoided or fully mitigated; and if not, the loss of fish habitat will be adequately compensated for through a compensation plan approved by the GRCA and/or the DFO; and*
- iv) *all applicable protocols or policies of the provincial and federal government have been met.”*

Under OP section 6A.2.5 it indicates that development and site alteration are not permitted within Surface Water features and Fish Habitat or their established buffer, except for uses permitted by the General Permitted.

Any construction within or across surface water features or fish habitat must occur during the appropriate MNR fisheries timing window to avoid or minimize impacts on fish, wildlife and water quality; and implement best management practices during construction.

The OP also indicates that opportunities to restore permanent and intermittent stream and fish habitat are encouraged and will be supported.

1.3.5.3 Significant Valleylands

Significant Valleylands are identified along the edges of the watercourse within the study area, as shown in Schedule 10D: Natural Heritage System.

Under OP section 6A.2.7, development and site alteration are not permitted within Significant Valleylands and their established buffers except for uses permitted by the General Permitted Uses of Section 6A.

The following additional uses may be permitted within Significant Valleylands and established buffers, subject to the requirements of 6A.1.2.7 and 6A.1.2.8, where it has been demonstrated through an EIS or EA, to the satisfaction of the City, and where applicable the GRCA, that there will be no negative impacts on the natural characteristics of the valley features or its ecological or hydrologic functions, nor will there be increased susceptibility to natural hazards:

- i) essential linear infrastructure and their normal maintenance;
- ii) essential transportation infrastructure and their normal maintenance;
- iii) flood and erosion control facilities or other similar works;
- iv) renewable energy systems; and
- v) stormwater management facilities and structures and their normal maintenance in accordance with the surface water features and fish habitat policies of this Plan.

Where Significant Valleylands are disturbed, the City promotes restoration and/or naturalization in order to improve water quality and quantity, ensure bank and slope stabilization, and to enhance wildlife habitat.

1.3.5.4 Significant Wildlife Habitat

The watercourse within the study course is identified as Significant Wildlife Habitat in Schedule 10E: Natural Heritage System.

The watercourse is considered Significant Wildlife Habitat for Waterfowl Overwintering.

Under OP section 6A.2.9, Development and site alteration shall not be permitted within Significant Wildlife Habitat (including Ecological Linkages) or the established buffers, where applicable, except for uses permitted by the General Permitted Uses of Section 6.A.1.2.

4. Development and site alteration may be permitted on adjacent lands to Significant Wildlife Habitat (including Ecological Linkages) where it has been demonstrated through an EIS or EA to the satisfaction of the City, and GRCA where applicable, that there will be no negative impacts to Significant Wildlife Habitat or its ecological functions.

6. The extent of the habitat and buffers for Significant Wildlife Habitat will be established through an EIS or EA, to the satisfaction of the City, in consultation with the GRCA where appropriate, with consideration for the MNR's technical guidance, and the local and regional context.

7. Additional areas of Significant Wildlife Habitat (i.e., in addition to those areas shown on Schedule 10 and Schedule 10E, including Ecological Linkages) May be identified through an EIS or EA based on consideration for the MNR's technical guidance. These additional areas will be subject to the applicable policies.

Essential Transportation infrastructure is not identified as an additional permitted use within significant wildlife habitat or their established buffers.

1.3.5.5 Ecological Linkages

While no Ecological Linkages are mapped within the study area on schedule 10, the river corridor is a natural linkage for natural heritage features in this area, including Significant Wildlife Habitat, as such; the following policy will also be applied.

Connectivity between Significant Natural Areas and/or protected Habitat for Significant Species shall be maintained, and where appropriate, enhanced, with Ecological Linkages.

1.3.5.6 Urban Forest

The City's Urban Forest includes smaller wooded areas less than 1 ha, that are not included in the City's Natural Heritage System. The City of Guelph recognizes that in some cases urban

woodlands are degraded (e.g., dominated by invasive species) and that new development may provide opportunities for enhancement and restoration as part of the proposed site alteration.

Policies of the urban forest include the encouragement to retain healthy non-invasive trees to the fullest extent possible, compensating for trees that must be removed, and the removal of invasive, non-native trees and shrubs.

1.3.5.7 Special Policy Applicable to St. Patrick's Ward Portion of the Planning Area

OP section 11.1.7.11.4(b) states:

“The plan should also create connections to the surrounding trails and open space system including anticipating a future pedestrian bridge adjacent to the Guelph Junction Railway bridge and another bridge across the river, generally aligned with a crossing of Wellington Street and connected to Arthur Street.”

The proposed bridges are consistent with the policy and goals of the Special Policy Area for the St. Patrick's Ward.

1.3.6 City of Guelph By-laws

Any tree removal (trees >10cm DBH) will be subject to the City of Guelph Tree By-law. Where the City is undertaking infrastructure work, healthy non-invasive trees within the urban forest will be retained to the fullest extent possible. Where regulated trees are damaged or destroyed a Tree Preservation and Vegetation Compensation Plan is needed.

1.4 Terms of Reference

Based on the above regulations and policies (Section 1.3) and communication with regulatory authorities, an EIS is required for the construction of the proposed pedestrian bridges, as there may be the potential for negative impacts to the natural heritage system.

A proposed Terms of Reference (ToR) for the EIS was developed and submitted to the City of Guelph, the City of Guelph River Systems Advisory Committee (RSAC) on June 12, 2016. The ToR was subsequently provided to the GRCA on July 21, 2016. Comments regarding the proposed ToR were received from the City of Guelph on July 20, 2016, and from the GRCA on September 14th, 2015. The River Systems Advisory committee reviewed and provided comments on the ToR on August 4, 2016.

Based on comments received from the GRCA, the City of Guelph and RSAC, the study area was increased to include all lands between MacDonnell Street and Neeve Street. Correspondence with the MNR was conducted to identify potential SAR within the study area.

2.0 Methods

2.1 Background Review

A background information review was conducted of both biological and physical features within the vicinity of the study area. The following resources were consulted as part of this review:

1. Fisheries and Oceans Canada (DFO), Online mapping (accessed: 2016)
2. Ministry of Natural Resources and Forestry (MNRF), Guelph District (*Appendix 2*)
3. Natural Heritage Information Centre (NHIC) database (accessed: 2016)
4. Ontario Reptile and Amphibian Atlas Interactive map (Ontario Nature 2016)
5. Ontario Mammal Atlas (1994)
6. Atlas of the Breeding Birds of Ontario, 2001-2005
7. Grand River Conservation Authority Regulation Mapping (accessed 2016)
8. Region of Wellington Significant species list (2008)
9. City of Guelph Official Plan, 2014
10. Locally Significant Species List – City of Guelph (2012)
11. W.C Woods Property, 5 Arthur St., Guelph, ON, Scoped Environmental Impact Study (Stantec 2013)
12. 5 Arthur Street South, Urban Design Master Plan, Guelph, Ontario (Kirkor 2015)

2.2 Trees & Vegetation

2.2.1 Ecological Land Classification

Ecological Land Classification (ELC) field investigations were completed on August 17, 2016. Detailed survey dates and weather information are provided in *Appendix 3*. Surveys were completed by qualified ecologist, Ryan Hamelin, OMNRF Certified in Ecological Land Classification. Vegetation communities within the study area were characterized and delineated through field investigation, following the Ecological Land Classification (ELC) system for Southern Ontario 1st approximation; community codes generally follow the 2nd approximation (Lee, et al., 1998, 2008). Boundaries of ELC communities were mapped using aerial images and field observations (*Figure 1*). Digitized ELC data sheets are provided in *Appendix 4*.

Identified ELC communities were cross-referenced with the NHIC Ontario Plant Community List (NHIC 2015) to determine the presence of rare plant communities (S3-S1). The Subnational, or Provincial, Ranks (S-Rank) are assigned by the Ontario Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC) in order to help assign protection priorities.

2.2.2 Botanical Inventory

Concurrent with ELC evaluations, the subject lands were systematically searched in order to provide a comprehensive one season botanical inventory. Detailed survey dates and weather information are provided in *Appendix 3*.

Identified vascular plant species were compared to provincial and federal SAR lists (COSSARO, SARA) provincial ranks (NHIC 2015), global ranks, Significant Plants of Wellington County (Dougan & Associates 2009), and City of Guelph – Locally Significant Species List (Guelph 2012) in order to assess federal, provincial, regional and local conservation status of each species. English colloquial names and scientific binomials of plant species generally follow the Database of Vascular Plants of Canada (VASCAN) (VASCAN 2015).

Identification of environmentally sensitive plant species was completed based on the assignment of a coefficient of conservatism value (CC) for each native species (Oldham, et al., 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to specific natural habitat parameters. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters. These species may be more sensitive to environmental changes (Mortarello et. al., 2010).

A list of all identified plant species is provided in *Appendix 5*. The list provides botanical name, common name, provincial rarity rank (S-Rank), global rarity rank (G-Rank), provincial SAR status, federal SAR status, Local Rarity/Significance within Wellington County (Dougan & Associates 2009), City of Guelph – Locally Significant Species List (Guelph 2012) coefficient of conservatism (CC) and coefficient of wetness (CW). Plant species that could only be identified to genus were not assigned the above information.

2.2.3 Tree Inventory

Within 30 meters from the 5 potential bridge locations, a total of 95 Trees with a diameter at breast height (DBH) of 10cm or greater were inventoried and surveyed by Steven Aboud, ISA Certified Arborist, and Ryan Hamelin on October 12, 2016. DBH, species, biological health, structural condition, overall condition and estimated crown reserve were collected for each tree. Based on recommendations for Guelph City Planners (Adèle Labbè), an additional 7 tree groups were also identified and characterized for the areas within the broader study area but outside the 30m tree inventory areas around each potential bridge location; DBH range and species presence data was collected for each tree group.

2.2.3 Woodland Assessment

The wooded area adjacent to the watercourse within the study area was assessed to determine if it met the criteria for and Significant Woodland or Cultural Woodland under the Guelph Official Plan. Orthophoto interpretation was used to calculate the area of the woodland.

The criteria for designation as a Significant Woodland are:

1. Woodlands (not identified as cultural woodlands or plantations) of 1 ha or greater in size, and a 10 m minimum buffer.
2. Woodlands, 0.5 ha in size or greater consisting of Dry-Fresh Sugar Maple Deciduous Forest and a 10 m minimum buffer, or
3. Woodland types ranked as S1 (Critically Imperiled), S2 (Imperiled) or S3 (Vulnerable) by the MNR Natural Heritage Information Centre, and a 10 m minimum buffer.

The criteria for designation as a Cultural Woodland are:

1. equal to or greater than 1 ha in size, and
2. not dominated by non-indigenous, invasive species.

2.3 Wildlife

2.3.1 Incidental Wildlife Observations

Incidental observations of insects, mammals and reptiles were recorded during all field visits. Detailed survey dates and weather information are provided in *Appendix 3*.

2.3.2 Fish

Background fish records for the Speed River were provided by GRCA and reviewed. DFO Species at Risk and Species at Risk Habitat screening was completed.

2.4 Significant Wildlife Habitat

With guidance from the *Significant Wildlife Habitat Technical Guide (2000)* and the *SWH EcoRegion Criterion Schedule 6E (2015b)*, the study area and adjacent lands were considered for the presence of Significant Wildlife Habitat (e.g. specialized habitats for wildlife, habitat for species of conservation concern). Detailed survey dates and weather information are provided in *Appendix 3*. An assessment of the study area for all SWH is provided in *Appendix 7*.

2.5 SAR Habitat Assessment

A thorough review of background documents was conducted to compile a master list of all Species at Risk, and species with conservation designation that may occur in the study area. A review of the site, along with habitat requirements for each species was conducted; the site was then evaluated for potential habitat using Ecological Land Classification, guidance from MNR documents, and on-site knowledge acquired through field surveys. Detailed survey dates and weather information are provided in *Appendix 3*. An assessment of the study area for candidate habitat for SAR is provided in *Appendix 8*.

2.6 Aquatic Habitat Assessment

On August 17th, 2016 and October 12, 2016, an Aquatic Habitat Assessment was completed by Ryan Hamelin, OMNRF Certified in Ontario Stream Assessment Protocol, for all sections of watercourses in the study area. Detailed survey dates and weather information are provided in *Appendix 3*. The Aquatic Habitat Assessment was completed in order to determine the quality of habitat for fish, barriers to fish movement, and general aquatic habitat characteristics. Stream reaches within the study area were characterized with respect to the following criteria:

- Mean channel width;
- mean channel depth;
- mean water depth;
- percent stream shading;
- buffer width;
- substrate;
- flow pattern;
- channel morphology;
- instream cover;
- bank characteristics; and
- presence of specific site features.

In addition to the field Aquatic Habitat Assessment, data provided by the GRCA such as fish collection records, and thermal fish community classification information was used to characterize the watercourse. Information from the Fluvial Geomorphology Assessment, completed by Ecosystem Recovery Inc. (2016), was also used to characterize the watercourse with respect to the above criteria.

3.0 Existing Conditions

Information that characterizes the existing conditions of the study area came from several sources, including but not limited to, background review of existing documents, public information sources, and field reconnaissance.

3.1 Background Review

3.1.1 Natural Heritage Information Centre - Species at Risk

Preliminary investigation through the Natural Heritage Information Centre (NHIC) identified two provincial Species at Risk (SAR) under the ESA and three additional species ranked as rare (SH-S3) recorded within approximately 1km of the study area (17NJ6121). These species and their habitat requirements are summarized in *Table 1*.

Table 1. NHIC Species at Risk Records

Scientific Name	Common Name	(COSEWIC) Status ¹	(SARO) Status ²	Last Observed (NHIC)	S-Rank ³	Habitat Requirements
<i>Graptemys geographica</i>	Northern Map Turtle	SC	SC	1924	S3	Highly aquatic species, found in deep, large waterbodies, including lakes and large rivers, with abundant basking sites. Emerge onto land only during nesting, which occurs in soft sand or soil. Waterbodies with slow currents, soft mud bottoms, and abundant aquatic vegetation are preferred (COSEWIC, 2002b).
<i>Thamnophis sauritus</i>	Eastern Ribbonsnake	SC	SC	1990	S3	A semi-aquatic species that inhabits dense, low- vegetation, edges of ponds, streams, marshes, fens, and bogs, with open sunlit areas for basking (COSEWIC 2002c).
<i>Lampropeltis triangulum</i>	Eastern Milksnake	SC	NAR	1978	S3	A habitat generalist, with a preference for open areas including rock outcrops and meadows. Often occupy structures such as barns, sheds, and rural buildings. (COSEWIC 2014)
<i>Carex careyana</i>	Carey's Sedge	NAR	NAR	1905	S2	Found in mature dry to moist rich hardwood forests (NatureServe 2015).
<i>Polystoechotes punctatus</i>	Giant Lacewing	NAR	NAR	1948	SH	Inhabits open areas along damp roadsides, swamps flooded areas and another fresh water habitat (Saskatchewan Conservation 2016).

¹ COSEWIC – Committee on the status of endangered wildlife in Canada

² SARO – Species at Risk Act Ontario

³ S-Rank – Denotes the conservation status of a species at the provincial level

SH: Possibly Extirpated , S1: Critically Imperiled, S2: Imperiled, S3: Vulnerable

3.1.2 Ministry of Natural Resources and Forestry

A request for information was sent to the MNR on June 21, 2016, to inquire whether any further Species at Risk may occur in the study area. A response was provided on July 7, 2016, and is provided in *Appendix 2*. No SAR occurrence records were provided.

3.1.3 Ontario Breeding Bird Atlas

A list of birds determined to be breeding (Possible, Probable or Confirmed) in the 10km x 10km square containing the study area during the 2001-2005 Ontario Breeding Bird Atlas (Cadman et al. 2007) was compiled. This list includes 114 species; ten are considered Species at Risk under the ESA. No habitat for Species at Risk birds was present in the study area. A review of species at risk identified through background resources and their habitat requirements are discussed in *Appendix 8*. 46 species are considered Locally Significant in the City of Guelph (City of Guelph, 2012), and 57 are considered Significant Species in Wellington County (Dougan & Associates 2009). The findings of this review are presented in *Appendix 6*.

3.1.4 Ontario Reptile and Amphibian Atlas

Review of the Ontario Reptile and Amphibian Atlas identified 28 species that are known to occur within the 10km x 10km square containing the study area. This list includes four Species at Risk under the ESA; Common Snapping Turtle (*Chelydra serpentina*), Eastern Ribbonsnake (*Thamnophis sauritus*), and Northern Map Turtle (*Graptemys geographica*), are listed as Special Concern provincially and federally; Blanding's Turtle (*Emydoidea blandingii*), is listed as Threatened. Milksnake (*Thamnophis sauritus*) is listed as Special Concern federally and Western Chorus Frog / St. Lawrence - Canadian Shield Population (*Pseudacris triseriata pop. 2*) is listed as Threatened federally. Confirmed nesting or overwintering habitat was not identified on the subject parcel for any of these species, although overwintering habitat may be present within other areas of the Speed River for Common Snapping Turtle. Twelve species are considered Locally Significant in the City of Guelph, and seventeen are considered Significant Species in Wellington County (Dougan & Associates, 2009). The findings of this review are presented in *Appendix 6*.

3.1.5 Atlas of the Mammals of Ontario

Review of the Atlas of the Mammals of Ontario (1994) identified twenty-nine species that are known to occur within approximately 10km of the study area. This list includes one Species at Risk under the ESA; Little Brown Myotis (*Myotis lucifugus*) are listed as Endangered provincially and federally. Potential maternity habitat was not identified in the study area for this species. A review of all Species at Risk identified in the background review and their habitat requirements are discussed in *Appendix 8*. Two of the species identified as occurring in the square are considered Locally Significant in the City of Guelph (City of Guelph, 2012) and two are considered Significant Species in Wellington County (Dougan & Associates, 2009). The findings of this review are presented in *Appendix 6*.

3.2 Trees & Vegetation

3.2.1 Ecological Land Classification

A one season ELC evaluation was completed on August 17, 2016, by Aboud & Associates. Two ELC polygons, consisting of three unique ELC communities, were identified and mapped in the study area (*Figure 1*). The community polygons identified during the ELC surveys are summarized in *Table 2*. Digitized field forms are provided in *Appendix 4*. Comparison with the NHIC Rare Plant Communities confirmed that none of the ELC communities identified within the study area are listed as provincially rare plant communities (S1 – S3).

Table 2. Ecological Land Classification Communities

ELC Code ¹	Vegetation Type	Summary Description
Deciduous Forest (FOD)		
FODM4-5	Dry – Fresh Manitoba Maple Deciduous Forest Type	This is a culturally influenced community, which occurs in the riverine area between the existing trail and river. The canopy is dominated by Manitoba Maple (<i>Acer negundo</i>), with occurrences of Norway Maple (<i>Acer platanoides</i>), White Elm (<i>Ulmus americana</i>), and Colorado Blue Spruce (<i>Picea pungens glaucus</i>). The Subcanopy consisted of young canopy species, with a high occurrence of Common Buckthorn (<i>Rhamnus cathartica</i>). Understory species included Willow species, Virginia Creeper (<i>Parthenocissus quinquefolia</i>), Riverbank Grape (<i>Vitis riparia</i>). Herbaceous ground cover is dominated by exotic weedy species, such as Garlic Mustard (<i>Alliaria petiolate</i>) and Greater Celandine (<i>Chelidonium majus</i>). There is a complex of Mixed Mineral Meadow Marsh Type along open areas within the floodplain and adjacent to the river.
Constructed (CV)		
CGL_2	Parkland	This is cultural landscaped park community consisting of mowed grass, planted trees, gardens, and trails. Planted tree species are mostly non-native ornamental trees, with some native species and cultivars of native species. This community has no identified naturalized vegetation.
Shallow Aquatic (SA)		
SA	Shallow Aquatic	This community consists of the Speed River watercourse and is characterized as a Shallow Water community with an average depth of less than 2 meters. The watercourse contains little to no aquatic plant species. A more detailed description of the community is provided in the Aquatic Habitat Section.

ELC Codes generally follows the ELC Second Approximation (Lee 2008)

3.2.2 Botanical Inventory

A detailed botanical field inventory of the study area was completed and 69 species of vascular plants, from 34 families, were identified. All identified plant species are listed in *Appendix 5*. A further 5 species were identified only to the level of genus and have not been designated as native or non-native or included in the overall species count.

Of 69 species identified, 33 species (48%) are native and 36 species (52%) are exotic or cultivars.

3.2.2.1 Species at Risk, Regional and Local Significance

All but one of the native vascular plants observed in the study area are ranked as secure in Ontario (S5) or apparently secure (S4) and globally, very common (G5) or common (G4) (NHIC 2015).

Honeylocust (*Gleditsia triacanthos*) is ranked as Imperiled (S2) in Ontario. However, the specimens within the study area are planted horticultural varieties (.var inermis) and are not considered rare or protected within Ontario.

No identified species are listed under SARO or COSEWIC and no species are listed as a Significant Species in Wellington County (Dogan & Associates et. al. 2009) or as a Locally Significant Species in the City of Guelph (2012).

None of the species observed in the study area had a co-efficient of conservatism of 9 or 10. This indicates the presence of species with moderate to high tolerance for environmental ranges, which may be less impacted by minor site alteration or environmental disturbance.

3.2.3 Tree Inventory

The tree inventory collected information for 95 trees in the study area. The individual tree data is provided in *Appendix 12* with the tree inventory and assessment definition provided in *Appendix 14*. Seven tree groups were also identified; tree groups are located outside the immediate 30 meter survey area. The data for the tree groups is provided in *Appendix 13*. The locations and identification numbers, of trees within the 30 meter survey zone around each potential bridge location and identified tree groups are shown on *Figure 2*.

38% of the trees inventoried in the study area were Manitoba Maple, with Blue Spruce (13%) and Siberian Elm (11%) as the next most abundant species.

There are three trees (467, 517 and 600) which are larger (>30 DBH), native trees with Overall Condition Rating of 'Good' condition or better. These trees should be prioritized for preservation when selecting a preferred bridge alignment.

A summary of each proposed bridge alignment option and the number of trees recommended to be preserved or removed based on the health and condition of trees or the development impact is in *Table 3*. A detailed tree protection plan will be provided under separate cover.

Table 3. Trees within 30m from proposed bridge locations

	Location A	Location B	Location C	Location D	Location E
Trees with DBH >10cm, within 30m from Bridge	7	20	11	15	24

3.2.3 Woodland Assessment

The woodland was determined to be approximately 0.29 ha in area. This is less than the required size for classification as a Significant Woodland or Cultural Woodland, therefore the treed area within the study area does not meet the criteria for Significant Woodland or Cultural Woodland. The wooded area is considered part of the urban forest and healthy non-invasive trees should be retained where possible.

3.3 Wildlife

3.3.1 Incidental Wildlife Observations

All Incidental wildlife observations made outside formal field surveys are presented in *Table 4*. All observations were of single individuals unless otherwise stated. Species with conservation designation are identified on *Figure 1*.

Table 4. Incidental Species Observations

COMMON NAME	SCIENTIFIC NAME	TAXA	DATE - OBSERVATION	SIGNIFICANCE
Common Snapping Turtle	<i>Chelydra serpentina</i>	Reptile	August 17, 2016 – Adult observed on a rock within the watercourse.	<ul style="list-style-type: none"> Species of Special Concern, provincially and federally S-Rank S3
Painted Turtle	<i>Chrysemys picta</i>	Reptile	August 17, 2016 – Adult observed on a rock within the watercourse.	<ul style="list-style-type: none"> None
Downy Woodpecker	<i>Picoides pubescens</i>	Bird	August 17, 2016 – Observed in a tree along the edge of the woodlot community.	<ul style="list-style-type: none"> None
Common Starling	<i>Sturnus vulgaris</i>	Bird	August 17, 2016 – Observed in a tree along the edge of the woodlot community.	<ul style="list-style-type: none"> None
Mallard	<i>Anas platyrhynchos</i>	Bird	October 12, 2016. Observed within the Speed River during Tree Survey	<ul style="list-style-type: none"> None
Unidentified fish species	<i>c.f. Cyprinidae sp.</i>	Fish	Aug 17, 2016 – A number of groups of small unidentified fish were observed within the watercourse throughout the study area.	<ul style="list-style-type: none"> Protected from 'Serious Harm' under the federal Fisheries Act. 1985.
Common Carp	<i>Cyprinus carpio</i>	Fish	October 12, 2016. Observed within the Speed River during Tree Survey	<ul style="list-style-type: none"> None - Invasive

3.3.1.1 Species Listed under the Endangered Species Act

One Species at Risk, Common Snapping Turtle, was observed in the study area, habitat requirements are discussed below. No other federally or provincially listed species were

identified within the study area through background research, provided data, or field observations.

3.3.1.1.1 Common Snapping Turtle

Common Snapping Turtle is listed as Special Concern provincially (ESA 2007) and federally (Species at Risk Public Registry 2014), general habitat protection is not afforded to Special Concern species. However, species listed as Special Concern and their habitat is protected under the PPS (2014), through the protection of Significant Wildlife Habitat. Common Snapping Turtle is generally found in shallow waters with soft mud bottoms and leaf litter (COSEWIC 2008). Nesting occurs on gravelly or sandy areas along streams, roadsides or embankments. One observation of Common Snapping Turtle occurred incidentally within the Speed River in the study area during the summer months. No evidence of candidate habitat for overwintering was observed within the study area, it is likely that Common Snapping Turtle overwinters within further reaches of the Speed River, which may provide suitable substrates for overwintering. No nesting habitat was identified in the study area. Retaining walls and steep embankments are a barrier to reaching any potential man-made nesting areas outside of the Speed River within the study area (e.g. railway embankments, gravel trails).

3.4 Significant Wildlife Habitat

With guidance from the *Significant Wildlife Habitat Technical Guide* (2000) and the SWH EcoRegion Criterion Schedule 6E (2015b), no Significant Wildlife Habitat (SWH) was identified within the study area (*Appendix 7*) per the SWHTG or the Ecoregion criterion. Significant Wildlife Habitat is present within the study area, per the City of Guelph Official Plan and the MNRF. Its location and assessment are presented in *Table 5*.

Table 5 Confirmed Significant Wildlife Habitat

SIGNIFICANT WILDLIFE HABITAT TYPE	RATIONALE AND LOCATION
Waterfowl Overwintering	<ul style="list-style-type: none"> The Speed River is a large shallow, open water feature, with areas that remain open during most winters The Speed River within the Study area is identified as a waterfowl overwintering area by the MNRF and City of Guelph.

3.5 SAR Habitat Assessment

An assessment of all Species at Risk, and species with conservation designation, that have the potential to occur in the study area based on lists provided by the MNRF (2015c), Breeding Bird Atlas, Ontario Reptile and Amphibian Atlas, Mammal Atlas and the NHIC was completed. Species assessed include all species with Provincial SARO status, Federal SARA status, or an S-Rank of S1-S3. A description of habitat requirements, field studies conducted, and results are provided in *Appendix 8*.

Common Snapping Turtle was observed in the study area, and are described in section 3.3.1.1.1. No further Species at Risk were identified as occurring during ELC, or incidentally in the study area.

3.6 Aquatic Habitat Assessment

3.6.1 Aquatic Assessment

The aquatic assessment was completed for the stream reach between Macdonell Street and Neeve Street. Digitized field forms for the assessment are provided in *Appendix 9*. Additional information from the Fluvial Geomorphic Assessment was used to characterize the watercourse.

The segment of Speed River between Macdonell Street and Neeve Street is highly modified with concrete and stone channel walls along portions of both banks. The watercourse has been altered and engineered and no longer displays natural stream properties such as meanders, pool-riffle sequence or access to a floodplain. Due to the altered nature of the watercourse, it was not possible to accurately measure the bankfull depth or entrenchment.

During the aquatic survey, the watercourse flow pattern was characterized as 70% slow moving flat pools and glides and 30% riffles. Water depth was deepest toward Macdonell Street, with a maximum depth of 0.7m (Ecosystem Recovery 2016) and gradually becoming shallower towards Neeve Street. During the Aquatic Habitat Assessment on August 17, 2016, the average depth of water was approximately 30cm.

Approximately 5% of the watercourse contained woody debris as instream cover (i.e. unembedded material with a median axis greater than 100 mm and of sufficient density to block >75% of light.) Large cobble and sections of concrete also provide instream cover. The substrate was comprised of mostly of fines and gravel, with cobble more abundant in the upper stream reach. The substrate was generally firm, with no identified areas of deep organic material or soft muck.

During the aquatic assessment, a number of small unidentified fish were observed throughout the study area.

3.6.1.1 Fish Habitat

The watercourse within the study area is of poor to moderate habitat quality for fish. Although cover was present, the cover was generally small and would not provide suitable habitat for larger fish. Approximately 85% of the stream section is open and unshaded, which would increase thermal impacts to fish within the area. A water control structure at Macdonell Street creates a full or partial barrier, limiting potential fish movement into cooler upstream headwaters. There are no riverine wetlands and little riparian or aquatic vegetation along this section of the water course. Water temperature monitoring completed by Ecosystem Recovery Inc. (2016), recorded the water temperature as 22.75°C on September 27, 2016. This is a

relatively warm temperature and indicates limited habitat suitability for cold or cool water fish species.

3.6.2 GRCA Records

Records provided by the GRCA indicate that the Speed River is classified as a cool water system, fisheries timing windows specify that no in-water works are permitted from March 15th – June 30th (Pers. Comm. Ashley Rye, GRCA Resource Planner).

GRCA records for fish sampling indicate the presence of 20 identified species in the Speed River between Guelph Lake and the confluence with the Speed River and Eramosa River. Potential full and partial barriers to fish movement, such as dams and weirs, are present within the stream reach for which the fish records were provided. Therefore, all species listed may not be present within the study area. GRCA fish species records are provided in *Appendix 10*.

3.6.3 DFO Self-Assessment for Projects near Water

The Federal *Fisheries Act* requires that projects near watercourses or fish habitat avoid causing serious harm to fish unless authorized to do so. This applies to the proposed pedestrian bridges to cross the Speed River.

Detailed construction plans for the proposed bridges have not yet been developed; therefore, a final analysis of impacts could not be completed. Preliminary assessment of the bridges impact to fisheries habitat has been completed based on the proposed location and anticipated construction methods and impacts. Following detailed design, including grading and erosion and sediment control plans, a final Fisheries and Oceans Canada (DFO) assessment should be completed to ensure the Fisheries Act (1985) is not contravened.

To determine if the proposed development activity requires DFO Request for Review, Self-Assessment and Pathways of Effect analysis were completed based on the information available. Through the analysis, it was determined that construction of the proposed bridges would not require formal DFO Request for Review if the following conditions were met (DFO 2015).

- No temporary or permanent increase in existing footprint¹ below the High Water Mark²
- No new temporary or permanent fill placed below the High Water Mark
- Channel realignment is not required
- No narrowing of the channel
- Any obstruction to fish passage will respect timing windows
- Provides for fish passage
- Work can be done in isolation of flowing water

¹ Footprint: Total area of the bed of a waterbody that is covered by a structure of fill (DFO 2015).

² High Water Mark: The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to leave a mark on the land (DFO 2015).

Based on the proposed bridge locations, and anticipated construction activities, it is expected that the above conditions will not be met. It is anticipated that grading and/or the footprint of the bridge will be at or below the high water mark. Therefore, the installation of any of the proposed bridge options would likely trigger a DFO Request for Review, or DFO Authorization. It is recommended that a DFO Request for Review be completed as part of the detailed design phase if the proposed design does not meet all of the above conditions. Projects that do not need review are still required to avoid causing serious harm to fish and fish habitat. Proper mitigation measures to ensure no impacts to fish should be adhered to, in order to ensure that the Fisheries Act is not contravened.

3.6.4 Assessment of recommended buffers to designated features

Each designated feature has been assessed individually. See Table 6 for a summary of all recommended buffers.

3.6.4.1 Significant Wildlife Habitat

No minimum buffers have been established through the City of Guelph Official Plan. Within the study area a sized buffer is not recommended to the Significant Wildlife Habitat (Waterfowl Overwintering), the riparian area to each side of the river within the Valleyland is the recommended buffer (Figure X). Where possible, areas to be naturalized within the riparian corridor for fish will also benefit the Waterfowl Overwintering Habitat.

3.6.4.2 Surface Water Features and Fish Habitat

Recommended minimum buffers have been established through the City of Guelph Official Plan as 30 metres. Within the study area a 30 metre buffer is precluded, due to the adjacent developments, and the location of Wellington road in proximity to the Speed River. As a result, the established buffers vary from approximately 15 metres to 30 metres on the west side, and have been established as 15 metres on the east side by the metal works development (Stantec 2013). Most areas within 15 metres adjacent the Speed River will generally not be altered for the construction of the pedestrian bridges, and existing retaining walls preclude the ability to naturalize portions of the edge habitat along the Speed River. Any areas without retaining walls along the speed river in the study area are recommended to be naturalized, to provide overhanging vegetation and shading to increase the quality of Fish Habitat in this section of the Speed River.

3.6.4.3 Significant Valleylands

No minimum buffers have been established through the City of Guelph Official Plan. Within the study area a buffer is not recommended to the Significant Valleyland. The Pedestrian bridges will occur outside the valleylands through the use of a clear-span design. The Speed River corridor will not be altered for the construction of the pedestrian bridges, and existing retaining walls preclude the ability to naturalize the Valleylands along the Speed River.

Table 6. Recommended Buffers to Designated Features

Natural Heritage Feature	Designation	Recommended minimum Buffer (OP)	Recommended Buffer (EIS)
Significant Wildlife Habitat (Waterfowl Overwintering)	Identified as a waterfowl overwintering area by the MNR and in the City of Guelph OP.	No minimum buffer	No encroachment into SWH, the riparian habitat within the Valleyland limit is the buffer.
Surface Water Features and Fish Habitat (Cold/cool water fish habitat)	Identified in the City of Guelph OP	30 metres	No encroachment into the SWH, the established buffer to the west of the River is established as a range of 15-30M at the limit of Wellington Road, while a 15M buffer has been established on the east side through the Metal Works project.
Significant Valleylands	Identified in the City of Guelph OP	No minimum buffer	No minimum buffer is recommended, clear-span design will reduce or eliminate any impacts to the Significant Valleyland.

4.0 Impact Analysis, Mitigation, and Restoration

4.1 Analysis and Comparison of Bridge Locations

The five potential locations for the eventual construction of two pedestrian bridges crossing the Speed River and link St. Patrick Ward to Downtown have been assessed for impacts to the Natural Heritage System. The five proposed location for the bridges are between the existing GJR Bridge and Neeve Street. Construction at the proposed location for Bridge Alternative 1 is anticipated to have the least impact on the natural heritage features, as it will require less tree removal and will be elevated further above the regional flood elevation. Construction at location two and four downstream from Bridge A, is anticipated to have equivalent and comparable impacts to the watercourse and natural features. A moderately higher impact is expected at Alternative 3, due to the construction of a bridge abutment within an undisturbed portion of the valleyland, with no existing retaining wall. Bridge Alternative 5 is considered the least desirable from a natural heritage perspective, as it occurs in an area that is heavily treed, and will have likely impacts to large diameter native trees. An analysis of required tree removal will be completed as part of the Tree Preservation and Compensation Plans (to be provided under separate cover).

Impacts to each natural heritage feature and their functions, and proposed mitigation recommendations to reduce or negate impacts are provided below. An analysis of each bridge location alternative is provided in *Table 7*. Monitoring and mitigation of residual effects are also proposed. A detailed description of all potential impacts and mitigation guidelines are provided in *Table 8*.

Trees

A total of ninety-five trees and 7 tree groups were identified in the study area. The number of trees within each 30m zone around each proposed bridge location is presented in *Table 3*. Trees within 30m of the proposed bridge locations have the potential to be injured or destroyed, as part of construction activity. During detailed design, a Tree Preservation and Compensation will be completed to provide recommendations on preservation or removal and to prescribe protection measures for retained trees. The removal of Manitoba Maple and Norway Maple from within the area of impact, and compensation with native, non-invasive trees is considered a net benefit to the tree community. Compensation for tree removal should occur at a rate of 3:1 in accordance with City policies or as determined through consultation with City Planning staff.

Aquatic Habitat & Fish Passage:

The Speed River in the study area is classified as cool water fish habitat. Impacts to aquatic habitat could include sedimentation from construction, construction below the high water mark, impacts to fish habitat and water quality changes due to pedestrian bridge maintenance. The flow and characteristics of the watercourse will not be altered by the pedestrian bridges, as the bridges will not occur within the water through the use of a clear span bridge design.

The removal of invasive species and restoration of riparian habitat where possible along the Speed River will serve to improve fish habitat by providing cover within this reach of the Speed River, and is an overall benefit. The addition of a bridge above the natural deposition area located adjacent to Neeve Street may have greater impacts due to winter maintenance of trails, and changes to the vegetation composition from foot traffic and introduction of non-native materials.

Vegetation:

The majority of the herbaceous vegetation to be removed consists of non-native and weedy species. Removal of invasive species and restoration of riparian areas will provide an overall benefit to vegetation in the area of the pedestrian bridges.

Significant Wildlife Habitat:

The Speed River is identified as a Waterfowl Overwintering area, species that have been observed in the River, and adjacent riparian area include Mallard and Canada Goose. Both species are considered tolerant to humans, and development disturbance in the short term. Clear span bridges are unlikely to impact this habitat, and through the use of a clear span design, and placement above existing retaining walls or valleyland slopes, the pedestrian bridges will occur entirely outside the habitat. The restoration of riparian areas within the valleylands may also provide additional refuge areas for waterfowl.

Species at Risk:

No species at risk listed as threatened or endangered or their regulated habitat were identified in the study area. The addition of pedestrian bridges may convey a benefit to Barn Swallow, by providing suitable nesting habitat below the pedestrian bridges.

Wildlife & Wildlife Habitat:

Potential wildlife impacts generally include the potential to harm or harass migratory birds during the migratory bird nesting season and wandering wildlife within the construction area. Recommended mitigation for these impacts include the avoidance of any clearing or grading during the general nesting season (April 1st -August 31st) where possible, and the clear delineation of the work space through the installation of silt and sediment and tree protection fencing to avoid potential entry by wandering wildlife. Benefits to wildlife include the addition of the bridges, which may provide nesting habitat for birds that nest on man-made structures (e.g. Barn Swallow, Northern Rough-winged Swallow).

Significant Valleylands:

Valleylands occur to either side of the Speed River, where retaining walls are not present. Impacts to valleylands include the potential for increased erosion on ravine slopes adjacent to the Speed River during construction, impacts to unstable landforms and potential loss of stabilizing roots from trees to be removed. Through the installation of pedestrian bridges above existing structures (retaining walls) impacts to valleylands can be negated. The restoration of

riparian areas may also provide a benefit to valleylands, through the installation of vegetation to provide greater slope stabilization.

Table 7. Comparison and rating of Impacts to Natural Heritage by Alternative

Factor/ Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6 Do Nothing
Trees	7 trees were identified within 30 m of alternative 1, including Manitoba Maple, Balsam Poplar, Austrian Pine and Blue Spruce.	20 trees were identified within 30m of alternative 2, 85% of the trees were Manitoba Maple with 15% White Elm.	11 trees were identified within 30m of alternative 3. Over 50% were Manitoba Maple, with Norway Maple, Blue Spruce and Apple species the remainder.	15 trees were identified within 30m of alternative 4, including Manitoba Maple, Blue Spruce and Colorado Spruce, with one individual each of Green Ash and of Staghorn Sumac.	24 trees were identified within 30m of alternative 5, over 50% of the trees identified were Manitoba Maple and Siberian Elm, with White Elm, Green Ash and Bur Oak. Three trees recommended for preservation (467, 517 and 600) are within this alignment.	0 Trees will be affected. Existing non-native and invasive tree species will continue to spread and thrive.
Aquatic Habitat and Fish Passage	No impact to floodlines, channel processes or fish movement potential.	No impact to floodlines, channel processes or fish movement potential.	Potential for changes in flood elevations due to altered flow regime may impact aquatic species. No impact to fish movement potential.	Potential for changes in flood elevations due to bridge and abutments within the floodplain. No impact to fish movement potential.	Potential for changes in flood elevations due to bridge and abutments within the floodplain. No impact to fish movement potential. Bridge located above natural deposition area.	Existing impacts to fish habitat, including reduced thermal cover and barriers to movement will remain.

Table 7. Comparison and rating of Impacts to Natural Heritage by Alternative

Factor/ Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6 Do Nothing
Vegetation	No naturalized vegetation is anticipated to require removal.	Requires naturalized vegetation removal on the west side of the Speed River. Allows for restoration and removal of non-native and invasive species.	Requires naturalized vegetation removal on the west side of the Speed River. Allows for restoration and removal of non-native and invasive species.	Requires naturalized vegetation removal on the west side of the Speed River. Allows for restoration and removal of non-native and invasive species.	Requires naturalized vegetation removal on the west side of the Speed River. Allows for restoration and removal of non-native and invasive species.	Vegetation will not be removed. No restoration or invasive species management will occur.
Significant Wildlife Habitat	No impacts to the River corridor, or adjacent riparian area are anticipated, no impacts to SWH are expected.	No impacts to the River corridor, or adjacent riparian area are anticipated, no impacts to SWH are expected.	No impacts to the River corridor are anticipated, changes to riparian slopes, and abutments within valleyland are not permitted in SWH.	No impacts to the River corridor, or adjacent riparian area are anticipated, no impacts to SWH are expected.	No impacts to the River corridor are anticipated, changes to riparian slopes may have minor impacts to SWH resting areas outside of the water.	No impacts to SWH
Species at Risk	No impacts to SAR are anticipated. May provide nesting habitat for SAR birds.	No impacts to SAR are anticipated. May provide nesting habitat for SAR birds.	No impacts to SAR are anticipated. May provide nesting habitat for SAR birds.	No impacts to SAR are anticipated. May provide nesting habitat for SAR birds.	No impacts to SAR are anticipated. May provide nesting habitat for SAR birds.	No impacts to SAR
Wildlife & Wildlife Habitat	No impacts to Wildlife & Wildlife habitat are anticipated. Restoration & invasive species management plan will provide improvements to degraded habitat.	No impacts to Wildlife & Wildlife habitat are anticipated. Restoration & invasive species management plan will provide improvements to degraded habitat.	No impacts to Wildlife & Wildlife habitat are anticipated. Restoration & invasive species management plan will provide improvements to degraded habitat.	No impacts to Wildlife & Wildlife habitat are anticipated. Restoration & invasive species management plan will provide improvements to degraded habitat.	No impacts to Wildlife & Wildlife habitat are anticipated. Restoration & invasive species management plan will provide improvements to degraded habitat.	No impacts to Wildlife & Wildlife habitat. No improvements to degraded habitat.

Factor/ Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6 Do Nothing
Significant Valleylands	West abutment would be located behind an existing retaining wall reducing impact.	West abutment would be located behind an existing retaining wall reducing impact.	West abutment would be located on the existing naturalized slope.	West abutment would be located behind an existing retaining wall reducing impact.	West abutment would be located on the existing naturalized slope.	No impacts to Valleylands.
Ranking						

4.2 Generalized Impact Assessment and Mitigation

All of the proposed bridge locations will result in impacts to the existing natural features. An assessment of the generalized impacts (potential and actual) and mitigation measures are provided in *Table 8*. A glossary of terms and impact ratings is found in *Appendix 11*.

Table 8. Development Impacts and Mitigation Guidelines

Phase	Activity	Potential Impacts	Duration of Impact	Reversibility	Geographic level of influence	Frequency	Ecological Site Context	Likelihood of Occurring	Cumulative Effects?	Potential Impact Rating	Mitigation Recommendations / Comments	Final Impact Rating	Monitoring & Follow-up Recommendations
Site Preparation	Vegetation Removal – Clearing & Grubbing	<ul style="list-style-type: none"> Loss of vegetation and wildlife habitat 	ST	R	SA	O	PD	H	Y	Minor	<ul style="list-style-type: none"> Establish and maintain buffers around significant features Incorporate design to avoid or minimize loss of vegetation and edge habitat Minimize vegetation removal on slopes Designate construction staging and vehicle access areas outside of established designated natural areas and isolate with ESC measures 	None	<ul style="list-style-type: none"> Monitor for successful establishment of native plant communities. Adapt Integrative Pest Management Plan as needed to control exotic species.

Table 8. Development Impacts and Mitigation Guidelines

Phase	Activity	Potential Impacts	Duration of Impact	Reversibility	Geographic level of influence	Frequency	Ecological Site Context	Likelihood of Occurring	Cumulative Effects?	Potential Impact Rating	Mitigation Recommendations / Comments	Final Impact Rating	Monitoring & Follow-up Recommendations
Site Preparation (cont.)	Vegetation Removal – Clearing & Grubbing	<ul style="list-style-type: none"> Loss of woodland habitat Loss of Tree cover 	ST	R	SA	O	PD	M	Y	Minor	<ul style="list-style-type: none"> Revegetate areas with native species after site preparation Implement Restoration plan Compensate for Trees removed at a 3:1 ratio 	None	<ul style="list-style-type: none"> Monitor for successful establishment of native plant communities. Adapt Integrative Pest Management Plan as needed to control exotic species.
		<ul style="list-style-type: none"> Disturbance of fish and wildlife species 	ST	R	SA	O	PD	M	Y	Minor	<ul style="list-style-type: none"> Time activities to avoid wildlife disturbance during critical life stages. Follow MNRF timing window of no in-water works from March 15th – June 30th. 	Minor - None	

Table 8. Development Impacts and Mitigation Guidelines

Phase	Activity	Potential Impacts	Duration of Impact	Reversibility	Geographic level of influence	Frequency	Ecological Site Context	Likelihood of Occurring	Cumulative Effects?	Potential Impact Rating	Mitigation Recommendations / Comments	Final Impact Rating	Monitoring & Follow-up Recommendations
Site Preparation (cont.)	Vegetation Removal – Clearing & Grubbing	<ul style="list-style-type: none"> Impacts to Nesting Birds Protected under the Migratory Bird Convention Act 	ST	R	AA	O	PD	H	Y	Minor	<ul style="list-style-type: none"> Any tree and vegetation removals must be in compliance with the Migratory Birds Convention Act. Removals must take place outside of the general nesting period (April 1 - August 31) for the Lower Great Lakes /St. Lawrence Plain Bird Conservation Region of Ontario. If removal of vegetation is to occur during the general nesting period, a nest search carried out by a skilled and experienced Biologist should be completed and documented. 	Minor - None	
	Grading	<ul style="list-style-type: none"> Reduced vegetation diversity Increased erosion, sedimentation, and turbidity Increase nutrient inputs and contaminants to waterbodies and wetlands 	ST	R	SA	O	PD	L	N	Minor	<ul style="list-style-type: none"> Revegetate areas with native species after site preparation 	None	
				R	AA	O	PD	M	Y	Moderate	<ul style="list-style-type: none"> Maintain or restore vegetative buffers Develop & implement ESC plan Control water contamination through good housekeeping practices 	None	<ul style="list-style-type: none"> Monitor ESC fencing Monitor for successful establishment of native plant communities.

Table 8. Development Impacts and Mitigation Guidelines

Phase	Activity	Potential Impacts	Duration of Impact	Reversibility	Geographic level of influence	Frequency	Ecological Site Context	Likelihood of Occurring	Cumulative Effects?	Potential Impact Rating	Mitigation Recommendations / Comments	Final Impact Rating	Monitoring & Follow-up Recommendations																							
Site Preparation (cont.)	Grading	<ul style="list-style-type: none"> Increased soil compaction 	ST	R	SA	O	PD	H	Y	Moderate	<ul style="list-style-type: none"> Control access and movement of equipment and people Minimize the use of heavy equipment in sensitive areas Construction equipment limited to the construction allowance area and not encroach within the adjacent woodland or wetland 	Minor																								
														<ul style="list-style-type: none"> Changes to drainage Changes to surface runoff 	ST	R	SA	O	PD	H	Y	Moderate	<ul style="list-style-type: none"> Minimize changes to land contours and natural drainage Maintain streams and timing, quantity of flows 	Minor-None												
																										<ul style="list-style-type: none"> Changes in soil moisture, vegetation 	ST	R	SA	O	PD	L	N	Minor	None	
Construction	Bridge Construction	<ul style="list-style-type: none"> Wildlife Entering Construction Areas Increased erosion, sedimentation, and turbidity 	ST	R	SA	O	PD	L	N	Minor	<ul style="list-style-type: none"> Implementation of ESC fence to minimize wildlife wandering 	Minor-None																								
														<ul style="list-style-type: none"> Maintain vegetated buffers Develop sediment and erosion control plan Maintain or provide vegetative buffers Implement infiltration techniques 	ST	R	SA	S	PD	H	Y	Minor	None	<ul style="list-style-type: none"> Monitor for successful establishment of native plant communities. 												

Table 8. Development Impacts and Mitigation Guidelines

Phase	Activity	Potential Impacts	Duration of Impact	Reversibility	Geographic level of influence	Frequency	Ecological Site Context	Likelihood of Occurring	Cumulative Effects?	Potential Impact Rating	Mitigation Recommendations / Comments	Final Impact Rating	Monitoring & Follow-up Recommendations
Construction	Bridge Construction	<ul style="list-style-type: none"> Water contamination by oils, gasoline, grease, and other materials 	ST	R	SA	S	PD	H	Y	Moderate	<ul style="list-style-type: none"> Control water contamination through good housekeeping practices 	Minor-None	
		<ul style="list-style-type: none"> Loss of vegetation and removal of dead trees for user safety 	ST	R	SA	O	PD	M	N	Minor	<ul style="list-style-type: none"> Revegetate areas with native species Compensate for Dead Tree Loss 	None	<ul style="list-style-type: none"> Monitor for successful establishment of native plant communities.
		<ul style="list-style-type: none"> Disturbance to Wildlife from sounds and activity associated with construction. 	ST	R	SA	O	PD	M	N	Minor	<ul style="list-style-type: none"> Time activities to avoid sensitive wildlife periods 	Minor-None	
Post-Construction	Recreation Activities (e.g. walking, cycling, fishing)	<ul style="list-style-type: none"> Increased erosion, sedimentation and turbidity to waterbodies 	LT	P	SA	C	PD	M	Y	Moderate	<ul style="list-style-type: none"> Choose designs and materials that will minimize impacts Minimize erosion by using Asphalt, gravel, stones or wood on paths 	Minor-None	

Table 8. Development Impacts and Mitigation Guidelines

Phase	Activity	Potential Impacts	Duration of Impact	Reversibility	Geographic level of influence	Frequency	Ecological Site Context	Likelihood of Occurring	Cumulative Effects?	Potential Impact Rating	Mitigation Recommendations / Comments	Final Impact Rating	Monitoring & Follow-up Recommendations
	Recreation Activities (e.g. walking, cycling, fishing)	<ul style="list-style-type: none"> Trampling of vegetation 	LT	P	AA	S	PD	M	Y	Minor	<ul style="list-style-type: none"> Restrict access to natural areas Restrict access to designated access points Encourage users to remain on the walkway and keep dogs leashed, through installation of signs Install site-specific educational signage to inform users of the significance/sensitivity of the natural features 	Minor-None	
		<ul style="list-style-type: none"> Disturbance to wildlife during critical life stages 	LT	P	AA	S	PD	M	Y	Moderate	<ul style="list-style-type: none"> Provide clearly marked walkway away from sensitive features and wildlife habitat 	None	
		<ul style="list-style-type: none"> Attraction of some wildlife species and scavengers due to human activities, including garbage causing increased human-wildlife interactions 	LT	P	AA	S	PD	M	Y	Minor	<ul style="list-style-type: none"> Provide appropriate garbage receptacles along the pedestrian walkway and ensure regular maintenance by City parks staff. 	Minor-none	

Table 8. Development Impacts and Mitigation Guidelines

Phase	Activity	Potential Impacts	Duration of Impact	Reversibility	Geographic level of influence	Frequency	Ecological Site Context	Likelihood of Occurring	Cumulative Effects?	Potential Impact Rating	Mitigation Recommendations / Comments	Final Impact Rating	Monitoring & Follow-up Recommendations
Post-Construction (Cont.)	Operation/ Maintenance	<ul style="list-style-type: none"> Water quality impacts from de-icing procedures Pollution from regular maintenance and use. 	LT	A	LA	S	PD	M	Y	Moderate	<ul style="list-style-type: none"> Limit salt or de-icing solution on bridge and use alternative 'eco' solutions (e.g. Beet juice). Limit any cleaning solutions or paint used on the bridge and take appropriate precautions to avoid products entering the watercourse. 	Minor	

4.3 Hydrological Function and Changes to Watercourse

Detailed Fluvial Geomorphic Assessment of the study area was completed by Ecosystem Recovery Inc. (2016) and is provided under separate cover.

4.4 Restoration, Compensation and Invasive Species Management Strategy

The construction of a bridge at any of the proposed locations will result in impacts to the natural features within the study area. In order to mitigate impacts, a comprehensive restoration, compensation and invasive species management plan should be developed as part of detailed design and implemented in conjunction with bridge construction. This will help to ensure the re-establishment of native plant communities following construction and limit the likelihood of invasive species becoming dominant within the newly disturbed areas.

A detailed, balanced landscape restoration plan that considers site-specific conditions, constructability and cost should be developed and implemented. The goals of restoration should be to increase native vegetation communities, reduce invasive exotic vegetation and enhance wildlife habitat. Potential methods that could be used to achieve the goals of restoration include, but are not limited to:

- Site Preparation
 - Control existing invasive exotic vegetation using an Integrated Pest Management approach.
 - Migratory birds are to be protected per the Migratory Breeding Bird Convention Act. No construction, tree removal or site preparation work is to occur during the generalized nesting period of April 1 to August 31.
 - Amend soils to meet specific vegetation community needs.
- Seeding and Planting
 - Identify existing native species suitable for salvage;
 - Seeding and planting native species to establish a mosaic of targeted vegetation communities.
- Wildlife Habitat Enhancement
 - Create habitat features and structures for target wildlife species (e.g. woody debris, nesting tubes, nesting boxes etc.).
- Short-Term Management
 - Monitoring the establishment of seeded and planted native species and adapting establishment maintenance requirements
 - Continued control of invasive exotic vegetation using an Integrated Pest Management approach and adapting methods/frequency to meet control targets.
 - Implementing a Sediment and Erosion Control Plan

In addition to restoration actions, The City of Guelph typically requires compensation for removed native trees with a DBH of 10cm or greater. This is regulated by the Private Tree Protection By-law (2010) – 19058 ('the By-law'). Removal of trees under the By-law requires permission from the City and may be subject to conditions, including compensation in the form

of replacement trees. For this specific project, trees to be removed are not covered under the *By-law* as they are not on private property, but are instead on City of Guelph land. Requirements for compensation of removed trees should be at a 3:1 ratio, per management direction on recent City projects completed by Aboud & Associates in 2016, or as determined through consultation with City staff.

Implementing a comprehensive restoration plan within the area impacted by the bridges will improve the ecological value of the natural feature relative to the current degraded and impacted state.

The entire west bank of the river within the section of the study area is heavily infested with European and Glossy Buckthorn (Figure 1). These are non-native, invasive species that can impact the natural environment and out-compete native species. Non-native Buckthorn species should be controlled within the immediate areas of the construction to allow for successful restoration. The invasive species management required for the construction of the pedestrian bridges may provide an opportunity for a larger invasive species management initiative along the entire bank from MacDonell to Neeve Street, as illustrated on figure 1. Specific opportunities for restoration and invasive species management should be investigated with City of Guelph Park and Environmental staff at detailed design.

5.0 Legislation and Policy Compliance

5.1 Provincial Policy Statement

The proposed pedestrian bridges are considered essential transportation infrastructure and are therefore exempt from the constraints applied to development. The natural resources within the zone of impact from the proposed pedestrian bridges must still be given consideration, and impacts minimized where possible. To fulfill the requirement under the PPS, natural features were inventoried and assessed for potential and actual impacts from the proposed bridge construction. Each location was assessed to ensure that the final location(s) had consideration for creating the least impact to the natural heritage resources on site.

5.2 Endangered Species Act

One species, Common Snapping Turtle, listed under the ESA was observed within the study area. Common Snapping Turtle is listed as Special Concern and are not afforded general habitat protection. Overwintering habitat for Common Snapping Turtle was not observed within the study area. Authorization under the ESA is not required for the construction of the pedestrian bridge.

5.3 Fisheries Act, 1985

In order to ensure compliance with the *Fisheries Act*, a DFO Self-Assessment or DFO Request for Review of the detailed design should be completed by a qualified biologist to ensure compliance under the *Fisheries Act*, 1985. If it is determined that proposed actions may cause serious harm to fish that cannot be mitigated for, then a Fisheries Act Authorization would be required.

5.4 Grand River Conservation Authority

The proposed bridges are entirely within the Floodplain and the regulatory allowances.

The proposed pedestrian bridges meet GRCA Policy, as they are considered Public Infrastructure and crossings. Public Infrastructure is permitted in Riverine Flooding Hazard lands provided there is no feasible alternative outside of the Hazard. The proposed bridges must limit adverse hydraulic or fluvial impacts, ensure no loss of flood storage wherever possible, and where unavoidable, minimize intrusions on significant natural features or hydraulic or ecological functions.

The proposed crossings are located in areas of existing disturbance and degradation of natural features. Hydrological impacts to the watercourse and changes to flood capacity should be minimized through detailed design. Appropriate mitigation measures should be applied through design and construction planning and disturbed areas restored or enhanced.

Any alteration to the channel alignment will require permission from the GRCA. Through the selection of the alternatives with the least impact to the natural heritage system, and through the proposed mitigation, restoration and compensation, the objectives of the GRCA policy can be met.

5.5 City of Guelph Official Plan

Construction of the proposed pedestrian bridges is consistent with the objectives for the St. Patrick's Ward Special Policy Area, which recommends that pedestrian linkages be established within the proposed location for the bridges, identifying a demonstrated need.

5.5.1 Natural Heritage System

The proposed crossings are considered essential transportation infrastructure and are permitted under the Guelph OP. The bridges are proposed to be located in areas of existing disturbance and degradation of natural features. Areas of disturbance will be kept to a minimum and tree protection fence installed to delineate the zone of impact and to protect natural heritage features to be preserved. Appropriate mitigation measures should be applied through design and construction planning and disturbed areas restored or enhanced.

5.5.1.1 Surface Water Features and Fish Habitat

Any construction within or across surface water features or fish habitat must occur during the appropriate MNRF fisheries timing window to avoid or minimize impacts on fish, wildlife, and water quality; and implement best management practices during construction.

All in-water works and construction activity that could impact fish habitat will be completed during the appropriated in water works timing window of no in-water works permitted from March 15th – June 30th (Pers. Comm. Ashley Rye, GRCA Resource Planner).

A restoration and compensation plan that includes the installation of riparian plants to provide cover over the watercourse would improve fisheries habitat within this reach, as would the removal of partial or full barriers where possible.

Impacts to the watercourse and fish habitat will be mitigated for through detailed design. The project will be reviewed at detailed design to ensure compliance with the Fisheries Act, 1985.

5.5.1.3 Significant Valleylands

Through the implementation of a restoration and compensation plan, including the removal of invasive species and the placement of bridge locations where existing structures occur, impacts to significant valleylands will be mitigated, and the habitat improved.

5.5.1.4 Significant Wildlife Habitat

The watercourse is considered Significant Wildlife Habitat for Waterfowl Overwintering.

Essential transportation infrastructure is not identified as an additional permitted use within Significant Wildlife Habitat or their established buffers. Through the use of clear-span bridge design, and no abutments within the habitat or its buffers (which includes the significant valleyland) all alternatives are located outside of the Significant Wildlife Habitat, and are unlikely to cause impacts to the SWH. By choosing alternatives that do not impact any of the exiting valleyland slopes, and are placed at existing infrastructure, the habitat will be further protected meeting the policies of the OP.

5.5.1.2 Ecological Linkages

The implementation of a restoration and compensation plan along the riparian corridor in the study area, and removal of invasive species will enhance the wildlife habitat within the Speed River corridor, meeting the policies of the OP.

5.5.1.3 Urban Forest

Areas disturbed by vegetation and tree removal will be restored and compensated for through planting of appropriate native species, resulting in enhancement of the Urban Forest compared to the current condition. As a result, the proposed bridges will not negatively impact the City's Urban Forest or its ecological function but would provide ecological benefit to the woodland community.

5.5.2. City of Guelph By-laws

Any tree removal (trees >10cm DBH) will be subject to the City of Guelph Tree By-law. Where the City is undertaking infrastructure work, healthy non-invasive trees within the urban forest will be retained to the fullest extent possible. Where regulated trees are damaged or destroyed a Tree Preservation and Vegetation Compensation Plan is needed.

A tree inventory and Tree Preservation Plan will be provided under separate cover at detailed design.

6.0 Summary and Conclusions

It is our opinion that through implementing the mitigation measures identified in *Table 8* and in *Section 4*, the proposed pedestrian bridges will result in no significant long-term negative impacts to natural heritage features identified within and adjacent to the proposed bridge locations. The natural features within the study area will be protected and enhanced through mitigation and restoration recommendations. This will result in long term positive effects on the natural heritage features within the study area. Below is a summary of the affected natural heritage features, constraints and impacts. Recommendations for associated mitigation and/or protection measures are identified in *Section 4*.

6.1 Biological Studies and Site Constraints

1. Surveys were conducted for Ecological Land Classification and Vegetation Communities (ELC and Vascular Plant List), Significant Wildlife Habitat, Species at Risk Habitat Assessment, Aquatic Habitat Assessment, and a Tree Inventory.
2. One Species listed as Special Concern was detected in the study area, Common Snapping Turtle.
3. Significant Wildlife Habitat (Waterfowl Overwintering) occurs within the study area, as identified by the Ministry of Natural Resources and Forestry and the City of Guelph Official Plan, Natural Heritage Policies.
4. Significant Wildlife Habitat (Turtle Overwintering) likely occurs within the Speed River, but was not identified within the study area.
5. The study area includes cool water fish habitat.
6. The study area includes One Zone Floodplain, Floodway, and Special Policy Area Floodplain.

6.2 Impact Assessment

1. Potential impacts from the construction of the bridges were assessed to determine their extent, and mitigation guidelines have been provided (*Table 6*).
2. Impacts primarily involve the removal of trees, naturalized weedy herbaceous vegetation communities, site grading, impacts to Valleylands, Significant Wildlife Habitat and Fish Habitat, and wildlife disturbance.
3. Trees close to the bridge locations and in impacted areas along the watercourse edge may require an assessment of stability for the retained trees and may include some selective tree removal and pruning.

4. There are opportunities in the study area for edge enhancement, restoration, invasive species management and compensation planting to mitigate and offset potential impacts.

6.3 Legislation and Policy Compliance

1. Under the City of Guelph OP, the construction of two pedestrian bridges, considered essential transportation infrastructure, is permitted within the Onezone Floodplain, Floodway, Fish Habitat, Significant Valleylands, Ecological Linkages and Urban Forest under OP Section 6A.1.2(7)(8). It is not permitted within Significant Wildlife Habitat. It is our opinion that through the implementation of mitigation and restoration measures described, there will be no negative effects to the Onezone Floodplain, Floodway, Fish Habitat, Significant Valleylands, Ecological Linkages and Urban Forest from the proposed bridges. Through the use of a clear span design, and placement in the location of existing structures, the bridges will occur outside of the significant wildlife habitat, and thus meet the policies of the OP. Recommended mitigation, restoration and compensation measures will provide an overall positive effect to the natural heritage features.
2. The proposed construction of two pedestrian bridges is permitted in accordance with GRCA's *Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation* (Ontario Regulation 150/06, 2013). The proposed pedestrian bridges meet GRCA Policy, as they are considered public infrastructure and crossings, rather than development. Public infrastructure is permitted in Riverine Flooding Hazard lands provided there is no feasible alternative outside of the Hazard. The proposed bridges must limit adverse hydraulic or fluvial impacts, ensure no loss of flood storage wherever possible, and where unavoidable, minimize intrusions on significant natural features or hydraulic or ecological functions. Appropriate design and mitigation measure can ensure the above conditions are met. Therefore the proposed infrastructure complies with GRCA's wetland policies.

Any alteration to the channel alignment will require permission from the GRCA.

7.0 Avoidance, Mitigation and Compensation Recommendations

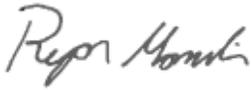
The following recommendations are provided to ensure protection and maintenance of natural heritage features and function within and adjacent the proposed pedestrian bridges. Through the implementation of the proposed mitigation, restoration, and compensation, no negative impacts are expected to the natural heritage system.

1. Prepare and implement an Erosion and Sediment Control Plan (ESC) as part of detailed design.
2. Install and monitor a, silt and sediment control barrier
 - a) Silt fence to be inspected weekly during construction and following a storm event of 25mm of rainfall within 24 hours.
3. ESC measures to be kept in place until trail construction is completed and disturbed soils have been vegetated.
4. The area of construction disturbance shall be kept to a minimum;
5. Control access and movement of equipment and people
6. Minimize the use of heavy equipment in sensitive areas
7. Works are to be located as far away from the feature boundary as possible
8. Equipment is to be limited to the construction allowance area and is not to encroach within the adjacent urban forest or watercourse
9. Accumulated sediment and debris to be removed before silt fence is removed.
10. All disturbed areas will be re-vegetated or restored with site appropriate indigenous plants.
11. Prioritize trees 467, 517 and 600 for preservation when selecting a preferred bridge alignment and developing construction plan.
12. Implement a comprehensive Restoration, Compensation and Invasive Species Management plan within the areas of impact associated with the construction of the bridge.
13. Ensure all abutments are located at existing infrastructure (i.e. retaining walls) to reduce impacts to the valleyland slopes.

14. Implement a clear-span bridge design to ensure compliance with the City of Guelph Official Plan.
15. During detailed design, discuss with Guelph City staff and consider opportunities for larger restoration and invasive species management options along the entire west bank of the watercourse between Neeve St. and MacDonnell St.
16. Time activities to avoid wildlife disturbance during critical life stages;
 - a) No in-water works are permitted from March 15th to June 30th, as per GRCA fisheries timing window for cool water systems.
 - b) Avoid removal of trees and vegetation during the generalized breeding bird nesting period from April 1 to August 31. If removal of vegetation is to occur during the general nesting period, a nest search should be carried out by a skilled and experienced Biologist.
17. Compensate for Trees removed at a 3:1 ratio
18. Choose designs and materials that will minimize impacts
19. Ensure the trail design to the bridges is located away from sensitive features
20. Include educational signage (site-specific) and informative signage (i.e., no off-leash dogs);
21. Limit salt or de-icing solution on bridge and use alternative 'eco' solutions (e.g. Beet juice).
22. Limit any cleaning solutions or paint used on the bridge and take appropriate precautions to avoid products entering the watercourse.

Prepared by:

ABOUD & ASSOCIATES INC.



Ryan Hamelin, M.Sc.
Terrestrial and Wetland Ecologist



Cheryl-Anne Ross, B. Sc.
Ecology Lead & Wildlife Ecologist
ISA Certified Arborist ON-2017A

Reviewed by:



Shannon Ferguson, B.Env.,
Ecologist

8.0 References

- Bird Studies Canada. 2001. Ontario Breeding Bird Atlas: Guide for Participants. Bird Studies Canada in cooperation with Environmental Canada (Canadian Wildlife Service), Federation of Ontario Field Naturalists, Ontario Field Ornithologists, Ontario Ministry of Natural Resources.
- Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier. 2007. The Atlas of the Breeding Birds Ontario 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706pp.
- COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp. Available at: (www.sararegistry.gc.ca/status/status_e.cfm).
- COSEWIC. 2014. COSEWIC assessment and status report on the Eastern Milksnake *Lampropeltis triangulum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 61 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).
- Dobbyn, John. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists, viii + 120pp.
- Dougan & Associates, with Sneil & Cecile Environmental Research. 2009. List of Significant Wildlife in Wellington County; In City of Guelph Natural Heritage Strategy - Phase 2: Terrestrial Inventory & Natural Heritage System (VOL. 2 – APPENDICES). Final Report March 2009.
- Fisheries Act, 1985. R.S.C., 1985, c. F-14
- GRCA. 2013. Grand River Conservation Authority. *Grand River Information Network*. Available at: <http://www.grandriver.ca/index/document.cfm?sec=63&sub1=0&sub2=0>
- Kirkor 2015. 5 Arthur Street South, Urban Design Master Plan, Guelph, Ontario Project No. 13-120. January 2015
- Lee H.T. 2008. Southern Ontario Ecological Land Classification – Vegetation Type List Ontario Ministry of Natural Resources.
- Lee, H.T., W.D. Bakowsky, J.L. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurry. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Science Section. Science Development and Transfer Branch. SCSS Field Guide FG-02
- MNRF. 2000. Ontario Ministry of Natural Resources. *Significant Wildlife Habitat Technical Guide*. October 2000.

- MNRF. 2010. Ontario Ministry of Natural Resources. *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005*. Second Edition. Toronto: Queen's Printer for Ontario.
- MNRF. 2015a. Ontario Ministry of Natural Resources. Ontario Species at Risk website. Available at: <http://www.mnr.gov.on.ca/en/Business/Species/index.html>
- MNRF. 2015b. Significant Wildlife Habitat Ecoregion 6E Criteria Guide. Ministry of Natural Resources and Forestry. Regional Operations Division, Peterborough Ontario, January, 2015.
- MNRF. 2015c. Wellington County Upper Tier Species at Risk. Ministry of Natural Resources and Forestry. Provided by Guelph District MNRF, February, 2015.
- Mortarello, S., Mike Barry, M., Gann G., Zahina, J., Channon, S., Hilsenbeck, C., Scofield, D., Wilder, G., and Wilhelm, G. 2012. Coefficients of Conservatism Values and the Floristic Quality Index for the Vascular Plants of South Florida. *Southeastern Naturalist*. Volume 11(Monograph 3):1–62.
- NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>. (Accessed: October 11, 2016)
- NHIC. 2015. Natural Heritage Information Centre. *NHIC online database and mapping*. Ontario Ministry of Natural Resources. Available at: <https://www.ontario.ca/environment-and-energy/natural-heritage-information-centre>
- Official Plan 2014. City of Guelph Official Plan 2001. September 2014 Consolidation. City of Guelph.
- OMMHA. 2014. Ontario Ministry of Municipal Affairs and Housing. *Ontario Provincial Policy Statement*. April 30, 2014.
- Ontario Nature. 2016. *Ontario Reptile and Amphibian Atlas*. Available at: http://www.ontarionature.org/protect/species/herpetofaunal_atlas.php
- SARA 2014. Federal Species at Risk Registry. Government of Canada. Available at http://www.registrelep-sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=110
- Saskatchewan Conservation. 2015. Saskatchewan Conservation Data Center. Have you seen the Giant Lacewing? Available at: http://www.biodiversity.sk.ca/Docs/2016_Giant_Lacewings_advert_VB.pdf (Accessed: October 11, 2016)
- Stantec 2013.W.C Woods Property, 5 Arthur St., Guelph, ON, Scoped Environmental Impact Study. File 160960804. September 2013.

VASCAN. 2015. Database of Vascular Plants of Canada (VASCAN). Université de Montréal Biodiversity Centre. Version 36. Published September 24, 2015.

Agency Correspondence

Labbè, Adèle. Environmental Planner. City of Guelph. Email and phone correspondence.

Rye, Ashley. Resource Planner – North. Grand River Conservation Authority. Email and phone correspondence.

Wagler, Jason. Resource Planner – North. Grand River Conservation Authority. Email correspondence.

Thompson, Melinda. Management Biologist. Ministry of Natural Resources and Forestry, Guelph District. Email Correspondence.

- Urban Forestry
- Ecological Restoration
- Landscape Architecture
- Environmental Studies
- Expert Opinion

ABOUD & ASSOCIATES INC.
Consulting Arborists • Ecologists • Landscape Designers

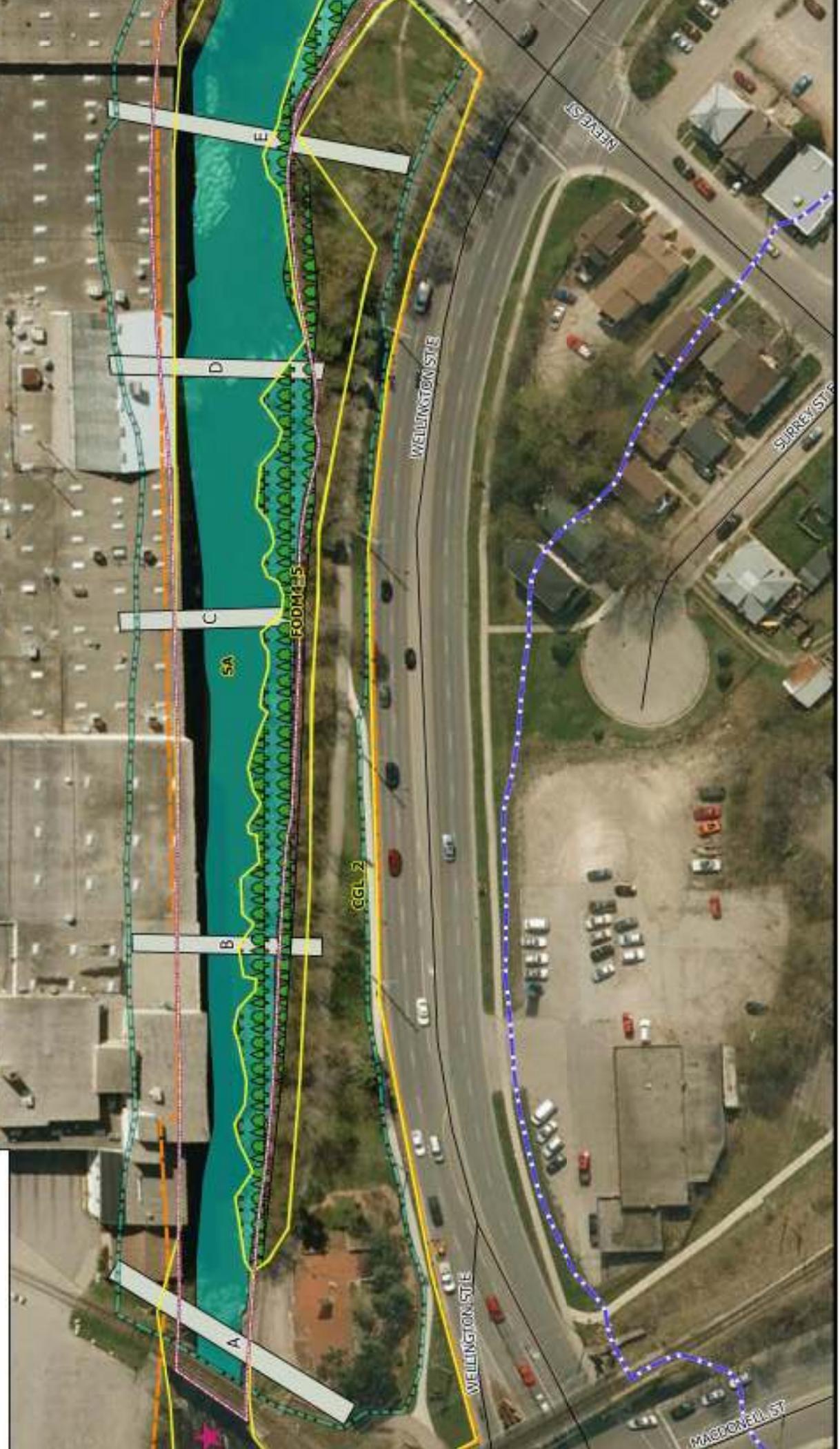


591 Woolwich Street . Guelph . Ontario . N1H 3Y5 . T:519.822.6839 . F:519.822.4052 . info@aboudtng.com . www.aboudtng.com

Maple Deciduous Forest Type

SERVATIONS

e



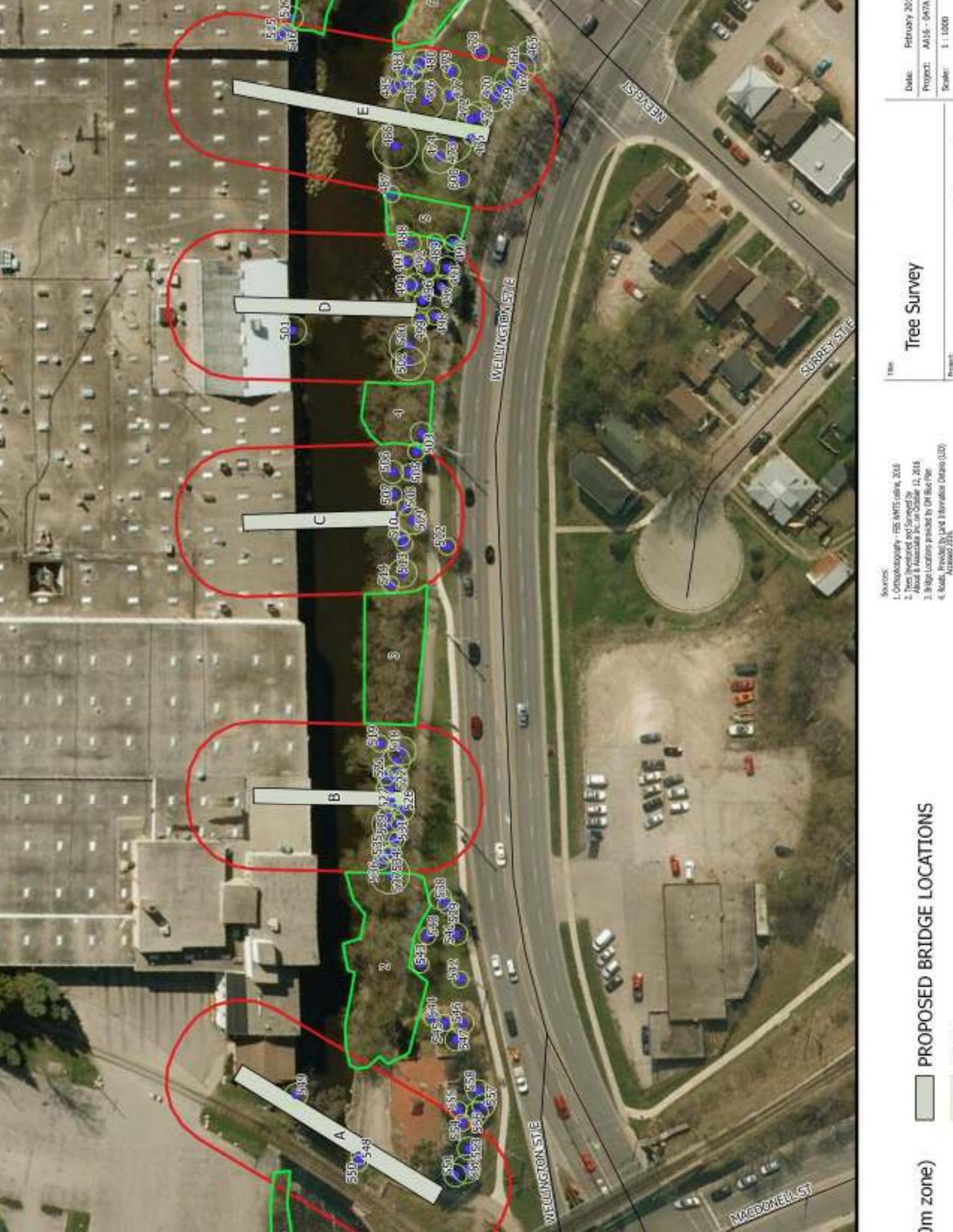
- Sources:
- 1. Orthophotography - FTS WMTS online, 2000
 - 2. Ecological Land Classification Report by AECOM & Associates, Inc. on August 11, 2014
 - 3. Site Plan and Bridge Locations provided by CM Blue Plan, 2005
 - 4. Soils, Provided by Geospatial Information Ontario (GIO) Accessed 2014

Title: Study Area & Natural Heritage Features
Date: February 2015
Project: A416 - P47A
Scale: 1 : 1500

PROPOSED RESTORATION AREAS



STONEYCRAKE WOODS, HARTNET & AQUATIC HABITAT



- Sources:
1. Orthophotography - FSE IMTS online, 2010
 2. Trees inventoried and Sampled by Alan H. Macdonell Inc. on October 12, 2014
 3. Bridge Locations provided by DM Blue Plan
 4. Roads: Provided by Land Information Ontario (LIO) Accessed 2014.

Title: Tree Survey

Date: February 2015
 Project: A416 - 047A
 Scale: 1 : 10000

PROPOSED BRIDGE LOCATIONS

PROPOSED BRIDGE LOCATIONS (50m zone)