

# Speedvale Avenue Bridge – Trails Linkage Project

City of Guelph, Ontario

Scoped Environmental Impact Study (Revision 4)

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The City of Guelph

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## **1.0 Introduction**

Aboud & Associates Incorporated (AA) was retained by the City of Guelph to complete a Scoped Environmental Impact Study (EIS) to study the feasibility of establishing a safe off-road linkage for trail users that does not negatively impact the existing Natural Heritage System. The study examines several trail alignments, as it relates to natural heritage features, of a proposed off-road trail linkage, connecting the existing Trans Canada Trail (TCT), and the Riverside Park Trail System and includes a proposed section of trail under the Speedvale Avenue East bridge crossing at the Speed River. At the time of submission of this EIS, the City had initiated an Environmental Assessment for proposed improvements to Speedvale Avenue from Manhattan Court to Woolwich Street, including replacement of the existing bridge over the Speed River. Preliminary proposed bridge designs developed as part of the Environmental Assessment project have been considered as part of this EIS with respect to trail impacts connecting to a proposed underpass; however the design and construction of the bridge structure, including the underpass, and its potential natural heritage impacts are not included in this study and are to be evaluated as part of the Environmental Assessment and detailed design of the bridge/road improvement project.

### **1.1 Project Background**

A multi-use trail is proposed along the west side of the Speed River connecting the existing TCT to a proposed Speedvale Avenue bridge underpass (SAUT) and continuing north to the existing Riverside Park trail system, with access to the Evergreen Seniors Centre, in the City of Guelph. To create this linkage approximately 300 metres of new trail south of Speedvale Avenue and approximately 400m of new trail north of Speedvale Avenue are to be constructed on the west side of the Speed River (Figure 1, 2A, 2B illustrate proposed trail options).

The Speedvale Bridge underpass was proposed by council during a resolution dated February 23, 2015 (Appendix 14), to examine the feasibility of an off road trail connection and underpass linkage from the existing TCT, connecting to the Riverside Park trail system. This underpass route was recommended to provide a shorter and safer route to cross Speedvale Avenue, expand the TCT north to Riverside Park, provide a safer off-road connection to the existing on-road links along Woolwich Street and Speedvale Avenue, improve vehicular traffic flow along Speedvale Avenue and create a linkage for residents of the Evergreen Senior's Center, and Riverside Park trail system users, to the downtown.

### **1.2 Project Rationale**

The proposed underpass and multi-use trail route are essential to the City's off-road recreational trail and active transportation network. The proposed route provides trail users with a continuous, convenient, accessible and direct north-south connection along the west side of Speed River, in comparison to the current on-road route, that integrates pedestrians and cyclists in the road network with vehicular traffic on a busy arterial road and requires crossing the river once.

A trail linkage to the Trans Canada Trail currently exists on the south side of Speedvale Avenue, however, it is partially constructed of limestone screenings, portions of the trail are located on privately owned property, the longitudinal slope gradient exceeds City accessibility guidelines, and connections to Riverside Park consist of two on-road, crossings at Woolwich Street, and adjacent to the fire station at Riverview Drive, both of which contribute to traffic congestion along Speedvale Avenue. The existing trail linkage brings trail users mid-block into the road right of way system where users have to integrate into the road network along an indirect route, or create their own unsafe direct connection, by crossing outside of the signalized indirect crossings.

The proposed underpass also provides an opportunity for trail users who prefer to not interact with the road network. The proposed connection provides the City with an option to re-route the TCT so that it has a more continuous and unencumbered route, increasing successful use of the trail and providing economic and social benefits.

The proposed trail route would provide a city-wide, off-road, safe and accessible network, for many active transportation users, including hikers, walkers, runners, cyclists, wheelchairs and strollers for all ages and diverse abilities. Detailed positive benefits are described below.

### **1.2.1 Accessibility**

A section of the existing trail route just south of Speedvale contains longitudinal slopes up to 18% and does not meet the current City approved accessibility standards. Guelph's Facility Accessibility Design Manual (FADM) requires trails to be sloped at 4% or less longitudinally. The proposed trail route would improve user accessibility options by meeting the FADM and has been designed to be accessible with a longitudinal slope at 4% or less and rest areas at a regular interval.

### **1.2.2 Pedestrian and cyclists safety**

The existing pedestrian route travels on a side walk along Speedvale and includes a pedestrian activated traffic signal. Currently, all trail users are expected to cross the busy Speedvale Avenue at one of the two traffic lights Woolwich Street or at the fire station (Riverview Drive). Alternately, trail users are crossing directly, mid-block for convenience. Cyclists are at a disadvantage at both crossings, as Speedvale Avenue does not include, and cyclists must merge with traffic in either direction, crossing two-lanes of traffic within a short distance in order to connect with off-road trails, or continue to the TCT along Woolwich Street. Not all pedestrians and cyclists are willing to walk to the traffic light; many currently take risks by crossing the street several metres away from a traffic light for convenience, to continue on the off-road system. The current north/south bike lane alternative to the Trans Canada Trail is Woolwich Street. This bike lane ends on Woolwich Street at Speedvale Avenue and cyclists merge into the vehicular lane. The proposed off-road underpass and trail linkage north of Speedvale Avenue offers a safer alternative to Woolwich Street. This connection allows cyclists to connect with the Trans Canada Trail along Marilyn Drive, a two-lane dead-end residential street, entering Woodlawn Cemetery at a direct, signalized intersection.

### **1.2.3 Connectivity**

In order to encourage citizens to use trail networks for every day needs, they must be contiguous. The proposed SAUT proposes an important off-roadlink for citizens to continue on the TCT north of Speedvale Avenue (where it currently exists as an on-road route). The SAUT will allow trail users to continue on to the TCT through Riverside Park to Marilyn Drive, through the cemetery, and on to the new Woodlawn multi-use path. With the pending reconstruction of the Speedvale Bridge, it is an opportune time to study an underpass that connects the city-wide off-road trail network, north and south of Speedvale Avenue.

### **1.2.4 Speed River Retaining wall maintenance access**

During EIS project initiation, it was determined that no historical construction or maintenance practice data was available for an existing retaining wall on the west bank of the Speed River, north of Speedvale Avenue East. Due to the proposed trail alignments directly adjacent to this existing wall, a condition assessment was conducted, by Amec Foster Wheeler, concurrently with the EIS. The report has been included as Appendix 18. The condition assessment report provides several recommendations including maintenance and repair of the retaining wall. The proposed trail would provide appropriate access to the wall for required maintenance as identified through the river wall condition assessment.

### **1.2.5 Improved traffic flow and increased opportunity for alternative modes of transportation**

The proposed SAUT provides a continuous off-road connection as an alternative to trail users who do not want to integrate into the road network.. Council directed staff to improve vehicle traffic flow along Speedvale, including alternative routes for cyclists; the proposed trail will provide an alternative route. The use of alternative modes of transportation as a community has significant environmental, community and health benefits, including the reduction of greenhouse gases, and improvements to the health and well-being of citizens.

### **1.2.6 Guelph Trail Master Plan**

While the Guelph Trail Master Plan (GTMP) (2005) does not include the proposed off-road trail linkage between the TCT and Riverside Park, the GTMP does encourage improvements, expansions, and the addition of missing links within the trail network that overcome existing physical barriers to movement. Recommendations are geared to promote, encourage and increase the level of trail use in the City of Guelph. The proposed route bridges a missing link in the trail network. There is community support for the proposed trail from various community coalitions, clubs and groups within the City of Guelph.

### **1.2.7 Natural Heritage System**

While the trail is important for user safety, the EIS examines how the trail will work in conjunction with the natural heritage system. The proposed multi-use trail and underpass are within the Grand River Conservation Authority Regulation Limit, the One Zone Flood Plain and include a number of features within the Natural Heritage System as defined under the schedules of the City of Guelph Official Plan, including Valleylands, Significant Wildlife Habitat, and



Significant Woodlands, and are adjacent to Locally Significant Wetlands, and Cool Water Fish Habitat. These significant features must be reviewed to ensure that the establishment of a trail does not negatively impact the sensitivity of the landscape.

### **1.2.8 Conclusion & Purpose**

The purpose of the study is to examine the feasibility of the trail within the context of the City of Guelph's Official Plan, the City of Guelph's Trail Master Plan, an analysis of proposed trail alignment alternatives and potential impacts, and an examination of the proposed trails natural heritage constraints and impacts.

Several additional technical studies have been prepared concurrently with the EIS to inform the proposed trail alignment options and impact analysis and are provided as appendices to this report:

- Geomorphic Characterization & Design Support Draft Speed River, Speedvale Avenue East Underpass and Multi-Use Trail Linkage (Aqualogic, March 13, 2017) *Appendix 16*
- Geotechnical investigation and slope stability assessment proposed Speedvale bridge underpass and multi-use trail linkage (Amec Foster Wheeler, May 2017) *Appendix 17*
- Speedvale Trail retaining wall structural condition assessment report (Amec Foster Wheeler, October 2016) *Appendix 18*
- Speedvale Trail Hydrological assessment (Amec Foster Wheeler, May 2017) *Appendix 19*

## **1.3 Existing Land Use and Study Area**

The proposed SAUT is located on the west side of the Speed River within two woodland features and the floodplain. Surrounding land uses within the vicinity include a mix of residential, industrial and commercial buildings. The Guelph Junction Rail (GJR) line runs parallel to the river, west of the proposed trail.

The study area includes all lands occurring between the Speed River to the east, and existing trails and development to the west; as well as 30m to either end of each of the proposed trail alignment alternatives to the north and south where access is permitted ( Figure 1).

Lands adjacent to the study area, where access was permitted, were assessed in order to document the features and functions of natural heritage system.

## **1.4 Existing Regulations**

### **1.4.1 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.*

#### **1.4.2 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.

#### **1.4.3 Fisheries Act, 1985**

The study area contains fish bearing waters in the form of, rivers and wetlands. These areas 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).

- Section 2 (1) of the act defines fish habitat as:
- *“spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes; For the purposes of this Act, serious harm to fish is the death of fish or any permanent alteration to, or destruction of, fish habitat.”*

This applies to work conducted in or near waterbodies that support recreational, commercial and Aboriginal fisheries. Within the context of the Speedvale Bridge Multi-use Trail Linkage, 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 that cannot be mitigated for then a Fisheries Act Authorization would be required.

#### **1.4.4 Grand River Conservation Authority**

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

The proposed trail development is entirely within the floodplain and the allowances adjacent to these features. The Speed River and a locally significant wetland are also located adjacent to the proposed trail.

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.”*

### **1.4.5 City of Guelph Official Plan (OP)**

Development within flood plain areas is regulated by the Grand River Conservation Authority. The City of Guelph 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. A zoning amendment may be required to permit boardwalks within the One Zone Floodplain.

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.”*

#### **1.4.5.1 Natural Heritage System**

One of the city’s most valuable assets is its natural heritage system. The city takes an environment first approach and is committed to protecting, maintaining, enhancing and restoring the diversity, function, linkages, and connectivity between and among natural heritage features and areas and surface and ground water features within the city over the long term. 2.4.14.1 The city will define the natural heritage system to be maintained, restored and, where possible, improved and will recognize the linkages between natural heritage features and areas, surface water, and groundwater features. Development will be prohibited within defined features in accordance with the provisions of the Provincial Policy Statement and the Growth Plan. The OP indicates that development is generally prohibited within the Natural Heritage System, including minimum or established buffers, with exceptions listed under section 6A.1.2- General permitted uses, exceptions include passive recreational activities.

Passive Recreational Activities may require the construction of a trail, benches or boardwalks in accordance with the Guelph Trail Master Plan and/or be integral to the scientific, educational or passive recreational use of a property. An EIS may be required for the construction of trails and walkways where there may be the potential for negative impacts to the natural heritage system.

Additionally, any trails within significant wetlands or woodlands must meet the limitations and requirements of section 6A1.2.7 and 6A1.2.8 below

##### **6A1.2.7**

*Where 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*
- iii) Disturbed areas of the minimum or established buffers shall be re-vegetated or restored with site-appropriate indigenous plants wherever opportunities exist*

#### 6A1.2.8

*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.*

#### **1.4.5.2 Significant Wetlands**

Under OP section 6A.2.4 it indicates that development and site alteration are not permitted within Significant Wetlands, or their established buffers except for uses permitted by the General Permitted Uses of Section 6A.

In spite of the General Permitted Uses of Section 6A.1.2, trails within Significant Wetlands are also subject to additional limitations and the requirements of 6A.1.2.7 and 6A.1.2.8, identified in section 1.3.5.1 above.

It also indicates that the formalization of existing ad hoc trails through formal trails and walkways may be permitted within Significant Wetlands and their established buffers where:

- i) they are considered essential to the City's trail system or integral to the scientific, educational or passive recreational use of the property;*
- ii) the environmental impacts of the proposed trails have been assessed and mitigated through design that minimize impacts to the natural heritage features and areas, and ecological functions; and*
- iii) where appropriate, they consist primarily of boardwalks and viewing platforms and are accompanied with educational signs.*

#### **1.4.5.4 Surface Water Features and Fish Habitat**

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 Uses of Section 6.

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.

### **1.4.5.3 Significant Woodlands**

Under OP section 6A.2.6 it indicates that development and site alteration are not permitted within Significant Woodlands and their established buffers except for uses permitted by the General Permitted Uses of Section 6A. Significant Woodlands also require a minimum buffer of 10 m from the drip line of the trees at the woodland edge, except where existing development precludes it.

In spite of the General Permitted Uses of Section 6A.1.2, trails within Significant Woodlands are also subject to additional limitations and the requirements of 6A.1.2.7 and 6A.1.2.8, identified in section 1.3.5.1 above.

It also indicates that the formalization of existing ad hoc trails through formal trails and walkways may be permitted within Significant Woodlands and their established buffers where:

- i) they are considered essential to the City's trail system or integral to the scientific, educational or passive recreational use of the property;*
- ii) the environmental impacts of the proposed trails have been assessed and mitigated through design that minimize impacts to the natural heritage features and areas, and ecological functions; and*
- iii) where appropriate, they consist primarily of boardwalks and viewing platforms and are accompanied with educational signs.*

### **1.4.5.4 Significant Valleylands**

Under OP section 6A.2.7, development and site alteration are not permitted within Significant Valleylands and established buffers except for uses permitted by the General Permitted Uses of Section 6A.1.2

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.

### **1.4.5.5 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 and acknowledged.

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

### **1.4.5.6 Urban Forest**

The City's Urban Forest includes smaller wooded areas less than one 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.

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.

## **1.5 Terms of Reference**

Based on the above regulations and policies (Section 1.3) and communication with regulatory authorities, an EIS is required to determine the feasibility of establishing a multi-use off-road trail in the study area, 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) and the GRCA on October 7, 2015. Comments regarding the proposed ToR were received from the City of Guelph on November 19, 2015 and from the GRCA on November 10, 2015. A meeting with the River Systems Advisory committee for review and approval of the Terms of Reference was held on November 18, 2015.

Based on comments received from the GRCA, the City of Guelph and RSAC, additional surveys (i.e. Amphibians, Watercourse Characterization and Background Fisheries Review, and DFO Watercourse Assessments) were added to the EIS study requirements. Correspondence with the MNRF was conducted to identify potential SAR within the study area.

The revised Terms of Reference were provided to the GRCA, RSAC and City of Guelph for final approval on February 24, 2016 (Appendix 1).



## **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: 2015)
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 2015)
8. City of Guelph Official Plan, 2014
9. Locally Significant Species List – City of Guelph (2012)

### **2.2 Trees & Vegetation**

#### **2.2.1 Ecological Land Classification**

Ecological Land Classification (ELC) field investigations were completed on May 25, 2016, July 5, 2016 & July 12, 2016. Detailed survey dates and weather information are provided in Appendix 3. Surveys were completed by qualified ecologists, Ryan Hamelin, OMNRF Certified in Ecological Land Classification and Cheryl-Anne Ross, 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 two 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 (COSARO, SARA) provincial ranks (NHIC 2015), global ranks, 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 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, 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**

A total of 592 Trees with a diameter at Breast Height (DBH) of 10cm or greater were inventoried in the study area by Chery-Anne Ross, ISA Certified Arborist and Ryan Hamelin. DBH, species, overall condition and estimated crown reserve were collected for each tree. The locations of individual trees were surveyed by Van Harten Surveying Inc. on March 17, 2016.

## **2.3 Locally Significant Wetlands**

Ryan Hamelin, Certified Ontario Wetland Evaluator, of Aboud & Associates completed the delineation and staking of the Locally Significant Wetland boundary on June 16, 2016. GRCA Ecologist, Robert Messier, field reviewed and confirmed the boundaries of the wetlands on June 16, 2016, with City of Guelph Staff, April Nix, in attendance. Boundaries were determined using vegetation communities and soil probes to depths of up to 60 cm for water and hydric soil detection. The wetland boundary was established where vegetation was comprised of 50% wetland and 50% upland species, and where soils displayed hydric conditions (e.g. presence of mottles and/or gleys), per the *Ontario Wetland Evaluation System* (2013). The identified wetland boundary, was surveyed using a hand held GPS Trimble unit and is show in Figure 2A and 2B. The Locally Significant Wetland meets the requirements for significance under the City of Guelph Official Plan.

Within the wetland portion of the study area and adjacent fresh woodland or forest communities, evidence of seeps or springs was looked for. Potential evidence of seeps or springs include moist areas of bubbling water (often most apparent during winter wildlife surveys), rust colored water, areas of rust coloured stained soil and signs of sighting of flowing water from steep slopes or fissures.

## 2.4 Wildlife

### 2.4.1 Amphibians (Anurans)

Evening point count surveys to detect breeding calls of anurans (frog and toad) were conducted by Cheryl-Anne Ross, Wildlife Ecologist and Ryan Hamelin, Terrestrial and Wetland Ecologist, in accordance with the *Marsh Monitoring Program Participants Handbook for Surveying Amphibians* (Bird Studies Canada 2009). Three surveys were completed, in accordance with the recommended windows for the spring and early summer, in order to maximize the chances of detecting all potential species. Surveys coincided with optimum weather conditions for anuran breeding activity and detection of calls, i.e. suitable temperature relative to each survey window, humid or damp but not raining, and low wind. Call Level Codes were applied to each species detected per area of suitable habitat, and numbers of individuals were counted or estimated, where applicable. The surveys took place on April 19, May 18 and June 22, 2016. The point count locations are illustrated on Figure 3. Detailed survey dates and weather information are provided in Appendix 3.

### 2.4.2 Breeding Birds

Breeding bird surveys were conducted by Cheryl-Anne Ross, Wildlife Ecologist, through 10 minute point counts positioned at least 250m apart within the study area. The highest observed level of breeding evidence was used to assign breeding status (i.e. confirmed, possible, probable or observed) to each species, as per the *Ontario Breeding Bird Atlas: Guide for Participants* (Bird Studies Canada 2001). All other species observed during the survey were identified through an area search, including incidental bird species.

As per the OBBA recommendations, two surveys were performed during the peak breeding season for the bulk of species in Southern Ontario (May 29 to July 9), and were spaced at least 10 days apart in order to determine presumed established breeding territories through territorial singing males. The two surveys took place on the mornings of June 3 and June 17, 2016. The Point Count Locations are illustrated on Figure 3, breeding bird survey results and breeding evidence codes are provided in Appendix 7. Detailed survey dates and weather information are provided in Appendix 3.

### 2.4.6 Winter Wildlife

Two winter wildlife surveys were undertaken, one early winter, conducted on November 26 2015, and one late winter, conducted over 2 days on February 18, 2015 and March 1, 2015 by Cheryl-Anne Ross, Wildlife Ecologist and Ryan Hamelin, Terrestrial and Wetland Ecologist. Detailed survey dates and weather information are provided in Appendix 3. Wildlife sightings and evidence such as tracks, scat, vocalizations and markings were used to determine species presence. Notes and habitat information were taken for each observation. Snow depth in the study area was approximately 0.25m during the surveys conducted in February and March, 2016. There was light snow of less than 1 cm in the proceeding 24 hours on February 18, 2016. Approximately 15 cm of fresh snow cover fell in the 24 hours prior to the survey on March 1, 2016. No snow cover was present during the November survey.

As part of the winter wildlife survey, particular effort was applied to locating and identifying raptors, mammal tracks, stick nests and trees that may be suitable for Bat maternity. The path traveled during the winter wildlife survey is shown on Figure 3.

#### **2.4.8 Incidental Wildlife Observations**

Incidental observations of insects, mammals and reptiles were recorded during all field visits, in addition to incidental observations of birds and amphibians made outside of the formal field surveys for these groups of fauna. Detailed survey dates and weather information are provided in Appendix 3.

### **2.5 Significant Wildlife Habitat**

With guidance from the *Significant Wildlife Habitat Technical Guide* (2000) and the *SWH EcoRegion Criterion Schedule 6E* (2015), 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 8.

### **2.6 SAR Habitat Assessment**

A thorough review of all 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 MNRF 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 of candidate habitat for SAR is provided in Appendix 9.

### **2.7 Aquatic Habitat Assessment**

On July 6<sup>th</sup>, 2016 an aquatic habitat assessment was completed following the Ontario Stream Assessment Protocol (OSAP), Version 9.0 (MNRF 2013). The assessment was completed by Ryan Hamelin, OMNRF Certified in Ontario Stream Assessment Protocol, and Cheryl-Anne Ross. Detailed survey dates and weather information are provided in Appendix 3.

The aquatic habitat assessment was completed to determine the quality of habitat to fish, barriers to fish movement, substrate type and general stream characteristics. OSAP Modules S1.M2 (Screening Level Site Documentation), S1.M3 (Assessment Procedures for Site Features Documentation) and S4.M8 (Rapid Assessment Methodology for Instream Substrate Sampling) were completed to characterize stream sections within the study area. Stream entrenchment, bankfull height and bankfull width were also determined using the OSAP protocol.

Surveys were conducted for two sampling stations, which captured the diversity of stream characteristics found within the overall study area. Each sampling station consisted of a

complete geomorphic unit, with at least one riffle-pool sequence. Sampling stations were at least 40 m long and begin and end at a crossover point; crossover points are locations where the thalweg (main concentration of flow) is in the center of the channel during bankfull discharge.

The main component of the aquatic habitat assessment consisted of the OSAP Rapid Assessment Methodology for Instream Substrate Sampling Module (S4.M8). For this module, approximately ten transects of 6 sampling points (30 cm radius) were completed at each of the two sampling stations. At each sampling point depth, hydraulic head, instream cover, and substrate type were recorded. For each transect the banks on each side of the watercourse were assessed for bank stability.

At both sampling stations, entrenchment (i.e. measure of confinement within the floodplain) was calculated as the distance of floodplain available at two times the bankfull maximum depth. As per OSAP, un-entrenched streams are defined as having access to a greater than 40m of floodplain.

The following information was collected as part of the aquatic assessment:

- Mean Stream Width;
- Maximum Depth at Crossover;
- Maximum Particle Size;
- Substrate Type;
- Presence and Type of Instream Cover;
- Channel Structure;
- Flow Pattern;
- Bank Stability;
- Riparian Vegetation Type;
- Water Temperature;
- Presence of Specific Site Features;
- General Site Notes.

In addition to the field aquatic habitat assessment, data provided by the GRCA such as fish collection records, water temperature data and thermal fish community classification information was used to characterize watercourse within the study area.

## **2.8 DFO Watercourse Assessment**

The federal Fisheries Act, 1985 provides protection to 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”*

This section of the Fisheries Act applies to the fish and habitat present in the Speed River at the location of the of the proposed trial installation. In order to ensure compliance with the Fisheries Act, a DFO Self-Assessment was completed to determine if proposed actions would cause harm to a commercial, recreational or Aboriginal fishery or habitat that supports such fisheries, which cannot be fully mitigated.

### 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 three provincial Species at Risk (SAR) under the ESA recorded within approximately 1km of the study area. These species and their habitat requirements are summarized in *Table 1*.

Table 1. NHIC Species at Risk Records

| Scientific Name              | Common Name              | (COSEWIC) Status <sup>1</sup> | (SARO) Status <sup>2</sup> | Last Observed (NHIC) | S-Rank <sup>3</sup> | Habitat Requirements   |
|------------------------------|--------------------------|-------------------------------|----------------------------|----------------------|---------------------|--|
| <i>Bombus affinis</i>        | Rusty-patched Bumble Bee | END                           | END                        | 1998                 | S1                  | Uses a variety of open or semi-open habitat, including meadows, agricultural land and savannah habitat for foraging. Nests are often found underground, in old rodent burrows (COSEWIC 2010c).   |
| <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>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). |

<sup>1</sup> COSEWIC – Committee on the status of endangered wildlife in Canada

<sup>2</sup> SARO – Species at Risk Act Ontario

<sup>3</sup> S-Rank – Denotes the conservation status of a species at the provincial level

S1: Critically Imperiled

S3: Vulnerable

##### 3.1.2 Ministry of Natural Resources and Forestry

A request for information was sent to the MNR to inquire whether any further Species at Risk may occur in the study area. The response presented in Appendix 7 identified Snapping Turtle as having records of occurrence within the study area.

##### 3.1.2 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 104 species; nine are considered Species at Risk under the ESA. Potential breeding habitat was identified in the study area for one of these species (Eastern Wood-pewee (*Contopus virens*)), a review of species at risk identified and

their habitat requirements are discussed in Appendix 9. 47 species are considered Locally Significant in the City of Guelph (City of Guelph, 2012). The findings of this review are presented in Appendix 5.

### **3.1.3 Ontario Reptile and Amphibian Atlas**

Review of the Ontario Reptile and Amphibian Atlas identified ten species that are known to occur within the 10km x 10km square containing the study area. This list includes one Species at Risk under the ESA; Common Snapping Turtle (*Chelydra serpentina*) is listed as Special Concern provincially and federally. Confirmed nesting or overwintering habitat was not identified on the subject parcel for this species. Nine species are considered Locally Significant in the City of Guelph. The findings of this review are presented in *Appendix 5*.

### **3.1.4 Atlas of the Mammals of Ontario**

Review of the Atlas of the Mammals of Ontario (1994) identified thirty-two species that are known to occur within approximately 10km of the study area. This list includes two Species at Risk under the ESA; Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis are listed as Endangered provincially and federally. Potential maternity habitat was not identified in the study area for these species. A review of Species at Risk identified in the background review and their habitat requirements are discussed in Appendix 9.

Two of the species known to occur in the square are considered Locally Significant in the City of Guelph (City of Guelph, 2012). The findings of this review are presented in Appendix 5.

## **3.2 Trees & Vegetation**

### **3.2.1 Ecological Land Classification**

A two season ELC evaluation was completed in 2016 by Aboud & Associates. 6 ELC polygons, consisting of 4 unique ELC communities, were identified and mapped in the study area. 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). ELC communities are shown on Figure 1.



Table 2. Ecological Land Classification

| ELC Code <sup>1</sup>         | Vegetation Type  | Summary Description  |
|-------------------------------|--|--|
| <i>Deciduous Forest (FOD)</i> |  |  |
| FODM4-5                       | Dry – Fresh Manitoba Maple Deciduous Forest Type         | <p>These culturally influenced communities occur in the dry to fresh upland areas adjacent to the existing trail and the river. The canopy is dominated by Manitoba Maple (<i>Acer negundo</i>) and Crack Willow (<i>Salix fragilis</i>), with occurrences of Norway Maple (<i>Acer platanoides</i>), White Elm (<i>Ulmus americana</i>), Sugar Maple (<i>Acer saccharum</i>) and Black Walnut (<i>Juglans nigra</i>). The understory consisted of young canopy species, with a high occurrence of White Ash (<i>Fraxinus americana</i>), Common Buckthorn (<i>Rhamnus cathartica</i>), Tartarian Honeysuckle (<i>Lonicera tatarica</i>) and Poison Ivy (<i>Toxicodendron rydbergii</i>). Other less abundant understory species included Alternate-leaved Dogwood (<i>Cornus alternifolia</i>), Virginia Creeper (<i>Parthenocissus quinquefolia</i>), Riverbank Grape (<i>Vitis riparia</i>). Herbaceous ground cover is dominated by exotic weedy species, with rare to occasional occurrences of native species, including Ostrich Fern (<i>Matteuccia struthiopteris</i>), White Avens (<i>Geum canadense</i>), Zigzag Goldenrod (<i>Solidago flexicaulis</i>), and Spotted Jewelweed (<i>Impatiens capensis</i>).</p> <p>Soils varied from dry to moist, creating a complex of Dry – Fresh Manitoba Maple Deciduous Forest Type (FODM4-5) and Fresh – Moist Manitoba Maple Lowland Deciduous Forest (FODM7-7).</p>                                     |
| FODM7-4                       | Fresh - Moist Black Walnut Lowland Deciduous Forest Type | <p>This culturally influenced community had evidence of disturbance, including ad hoc trails, dumping of yard waste, garbage, and a high percent of exotic species. The canopy is dominated by Black Walnut and Manitoba Maple, with Norway Maple and White Elm as the most common associate species. White Ash, Basswood (<i>Tilia americana</i>) and Sugar Maple are present, in low abundance.</p> <p>Woody understory plants include immature canopy species, and abundant Virginia Creeper, Riverbank Grape, Black Raspberry (<i>Rubus occidentalis</i>) and Red Raspberry (<i>Rubus idaeus ssp. strigosus</i>). Invasive shrubby species including Common Buckthorn and Tartarian Honeysuckle are also present.</p> <p>The herbaceous ground cover is dominated by Garlic Mustard (<i>Alliaria petiolate</i>), with a high occurrence of Dames Rocket (<i>Hesperis matronalis</i>), White Avens (<i>Geum canadense</i>) and Broad-leaved Enchanter's-Nightshade (<i>Circaea canadensis</i>).</p>   |
| <i>Deciduous Swamp (SWD)</i>  |  |  |
| SWDM4-1                       | Willow Mineral Deciduous Swamp Type                      | <p>This riverine wetland community is relatively undisturbed within the study area. The canopy is dominated by Crack Willow, Black Walnut and Manitoba Maple, with occurrences of White Elm, Basswood, Eastern White Cedar (<i>Thuja occidentalis</i>), Butternut Green Ash (<i>Fraxinus pennsylvanica</i>) and Norway Maple.</p> <p>Woody understory species include a mix of native and non-native shrubs and vines, including Red-osier Dogwood (<i>Cornus stolonifera</i>), Alternate-leaved Dogwood, Swamp Red Currant (<i>Ribes triste</i>), Heart-leaved Willow (<i>Salix eriocephala</i>), Basket Willow (<i>Salix purpurea</i>), Glossy Buckthorn (<i>Frangula alnus</i>), and Common Buckthorn.</p> <p>The groundcover varied throughout the community and included a variety of mostly native grasses, sedges and forbs, with some exotic species.</p> <p>Soils within the community varied from saturated to fresh. The community is complexed with Fresh-Moist Black Walnut Lowland Deciduous Forest (FODM7-4), which is present throughout the dryer areas. An inclusion of Mixed Willow Organic Deciduous Swamp (SWTO2-6) is present within the polygon, which has a more open canopy with shrub willow species and Red-osier Dogwood as the dominant woody vegetation. The SWTO2-6 contains a number of sedge species and is dominated by Tall Mannagrass (<i>Glyceria grandis</i>) and Reed Canary Grass (<i>Phalaris arundinacea</i>).</p> |

Table 2. Ecological Land Classification

| ELC Code <sup>1</sup>   | Vegetation Type | Summary Description   |
|-------------------------|-----------------|---|
| <i>Constructed (CV)</i> |                 |   |
| CGL_2                   | Parkland        | <p>Polygon B is a cultural community of mowed landscaped grass with approximately 7 planted trees. This community has no identified naturalized vegetation.</p> <p>Polygon F is a 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.</p> |

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 110 species of vascular plants, from 46 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 those identified, 70 species (64%) are native and 40 species (36%) 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).

Butternut trees, were identified throughout the study area, and are listed as S3? by the NHIC and are classified as Endangered under SARO and COSEWIC. Butternut trees are the only identified species listed 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 only species with moderate to high tolerance for environmental ranges, which may be less impacted by minor site alteration or environmental perturbations.

### 3.2.3 Tree Inventory

The tree inventory collected information for 592 trees in the study area. The specific data for each individual tree are provided in *Appendix 13*, including overall condition score, recommended actions based on condition and development and a complete analysis of each trail alignment option impact. The locations and identification numbers, of trees impacted by each proposed trail option are shown on *Figures 2A and 2B*. Over 50% of the trees inventoried in the study area were comprised of Manitoba Maple (31%) or Black Walnut (21%), with Norway Maple (10%). Associate species include Crack Willow (5%), Sugar Maple (5%), American Elm (3%), White Ash (3%), Red Pine (2%), Basswood (2%) and White Spruce (2%), with the remaining 15% comprised of 23 species with between 1 and 9 individual trees.

A summary of each trail 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.

**Table 3. Summary of Tree Impact**

| Recommendation       | Individual Trees       |                        |                        |                        |                        |                        |
|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|                      | Option 1<br>North Side | Option 2<br>North Side | Option 1<br>South Side | Option 2<br>South Side | Option 3<br>South Side | Option 4<br>South Side |
| Remove (Development) | 77                     | 57                     | 48                     | 36                     | 55                     | 40                     |
| Remove (Health)      | 6                      | 9                      | 30                     | 31                     | 37                     | 40                     |
| Total Preserved      | 509                    | 526                    | 514                    | 516                    | 500                    | 512                    |
| Total Removed        | 83                     | 66                     | 78                     | 67                     | 92                     | 80                     |

### 3.2.4 Butternut

During the Tree Inventory a total of 9 trees of Butternut or trees with butternut-like characteristics were identified within the study area. All trees were located south of the Speedvale Avenue Bridge, on the west side of the Speed River, and within the floodplain or on the lower east-facing slope of the floodplain. All proposed trail alignment options will impact Butternut 324, with trail option 3 also impacting Butternut 226. The locations of the nine Butternut or butternut-like trees and the four trail alignment options are shown on *Figure 4*.

Leaf tissue samples of eight trees were collected on August 6<sup>th</sup> and August 8<sup>th</sup>, 2016. A sample from one tree (Tree 354) was not submitted because it was not possible to collect a sample due to the height of the leaves in the crown. Samples were sent to the Ontario Forest Research Institute in Sault Ste. Marie for testing on August 8<sup>th</sup>. Hybridity was not detected in seven of the samples; these are considered to be *Juglans cinerea*. Hybridity was detected in one sample, Tree 285 (Appendix 15). The 8<sup>th</sup> sample, Tree 285, had evidence of hybridity.

Each of the nine trees was tagged with its unique tree number and white tree marking paint was used to mark the tree number and a ring around each stem at 2 m above ground level. A Butternut Health Assessment was completed for each tree by Steven Aboud, Butternut Health Assessor and submitted to the MNRF Guelph District Office. A summary of the Butternut health assessment and hybridity testing is provided in Table 4.

**Table 4. Summary of Butternut Health Assessment and Sample Testing**

| Tree No. | DBH (cm) | Hybridity Detected<br>(Test Results from Ontario Forest<br>Research Institute) | Butternut Analysis Category Type<br>(Calculated using BHA Tree Analysis<br>Spreadsheet) |
|----------|----------|--|---|
| 179      | 12       | NO   | 1   |
| 220      | 29       | NO   | 1   |
| 226      | 13       | NO   | 1   |
| 239      | 18       | NO   | 1   |
| 244      | 30       | NO   | 1   |
| 285      | 12       | YES  | 2   |
| 324      | 7        | NO   | 2   |
| 354      | 50       | Not tested   | 1   |
| 365      | 8        | NO   | 1   |

Of the trees assessed, seven trees were identified as Category 1 trees, and are considered non-retainable. Two of the trees assessed are considered category 2 trees and retainable, one of these trees tested positive for hybridity, and is not protected under the ESA. The ESA states that up to 10 category 2 trees may be removed without a permit, but you must:

- register the activity with the MNRF
- Plant Butternut seedlings following certain ratios and planting requirements (At least 5 seedlings for trees 3 to 15cm DBH)
- Tend and monitor the seedlings
- Maintain records that relate to planting, tending and monitoring

Under Ontario Regulation 242/08 of the ESA, Tree 324 a Category 2 Butternut tree, may require further reporting (e.g. Notice of Butternut Impact Form) prior to construction if the proposed trail alignment entails killing, harming or taking the Butternut tree. Changes to the proposed activity location may reduce or eliminate the impact to Tree 324.

### **3.3 Wetlands**

#### **3.3.1 Boundary Survey**

Following boundary confirmation by the GRCA on June 16 2016, the unevaluated wetland, further detailed below, was surveyed by Aboud & Associates Inc. using a hand held Trimble GPS unit (Figure 1). A figure depicting the mapped wetland boundary and associated shape file of the surveyed wetland boundary was issued to the GRCA on July 8 2016, for their records. Currently, trail option 3 is the only proposed alignment that falls directly within the delineated wetland boundary.

#### **3.3.2 Wetland Characteristics**

The GRCA's online mapping (Grand River Information Network, 2013) shows an unevaluated wetland within the study area, downstream (south) of Speedvale Avenue. The unevaluated wetland is not considered Provincially Significant, but is classified as Locally Significant within the City of Guelph Official Plan and Natural Heritage Policy. The wetland is comprised of Willow Mineral Deciduous Swamp Type (SWDM4-1) and Mixed Willow Organic Deciduous Swamp (SWTO2-6), with intermixed areas of Fresh-Moist Black Walnut Lowland Deciduous Forest (FODM7-4).

### **3.4 Woodlands**

Two small woodlands occur within the study area, the first is located on the south side of the Speedvale Avenue Bridge, while the second woodland occurs to the north of Speedvale Avenue. These woodlands are separated from each of by a distance of approximately 30 metres, indicating that they are functionally separate units, each described in detail below.

*Woodland 1-north of Speedvale*

Woodland 1 occurs in a narrow steep band, adjacent to the speed river, it is dominated by Manitoba Maple and Crack Willow with occurrences of Norway Maple and Sugar Maple. The understory is comprised of Common Buckthorn and Poison Ivy. Woodland 1 is less than 0.5ha (0.35ha) in total area, and does not meet the criteria for significant woodland under the City of Guelph Official Plan. All alignment options for the proposed trail north of Speedvale are within or adjacent to this woodland.

#### *Woodland 2-south of Speedvale*

Woodland 2 is located adjacent to the Speed River, and bounded by the River to the east, the TCT and GJR to the west. Dominant tree cover varies throughout the woodland, but generally includes Manitoba Maple, Black Walnut, Crack Willow and White Ash. Woodland 2 is greater than 1ha in total area, and is part of the larger, linear woodland, identified by the City of Guelph along both sides of the Speed River, with connections to smaller woodlands, for a total area of approximately 76ha. This woodland meets the criteria for Locally Significant Woodland under the City of Guelph Official Plan. This woodland provides shading and water infiltration, reduces soil erosion, deposition of sediment into the Speed River and stabilizes the channel banks. It is also considered a natural ecological linkage for wildlife species traversing the Speed River within an urban area. All alignment options for the proposed trail south of Speedvale Avenue are located within the Significant Woodland or the associated 10 metre buffer. Trail development provides opportunity to manage the loss of Ash and control Manitoba Maple in order to protect the woodland function.

### **3.5 Wildlife**

#### **3.5.1 Amphibians (Anurans)**

Results of the Anuran Point Count Surveys are provided and discussed below. The Point Count Locations are illustrated on Figure 3.

##### *Amphibian Habitat A*

No Anuran species were detected calling from within Amphibian Habitat 1. This site targeted the ephemeral pond, adjacent to a back eddy from the Speed River. Amphibian Habitat 1 does not meet the criteria for Significant Wildlife Habitat-Amphibian Breeding (woodland), as there were no anuran species detected during any survey.

##### *Amphibian Habitat B*

No Anuran species were detected calling from within Amphibian Habitat 2. This site targeted the shrub swamp thicket community, adjacent to the Speed River at the south end of the study area. Amphibian Habitat 2 does not meet the criteria for Significant Wildlife Habitat-Amphibian Breeding (woodland), as there were no anuran species detected during any survey.

#### **3.5.2 Breeding Birds**

The results of the breeding bird survey (BBS) are presented in Appendix 7. Locations of significant observations are provided in Figure 3, and are approximate; they are designed to give a general indication of the area in which the species may be nesting. During BBS visits, a total of 24 species were detected, of which two were assigned 'confirmed' breeding evidence,

ten were assigned 'Probable', ten were assigned 'possible' and two showed no sign of breeding evidence observed. All recorded species were detected within the study area.

Due to the contiguity with natural lands to the north and south along the river corridor, it is important to note that, despite high levels of breeding evidence, a given species may not have been breeding specifically in the area in which it was observed. This is particularly true where species were only detected during one of the two breeding bird surveys. These species may have been foraging in these areas or, may have been wandering during post-breeding dispersal, supporting the linkage function of the corridor. Therefore, the following 12 species are those that can be presumed to have been breeding in, or within 30m of, the study area, and exhibited confirmed or probable breeding evidence: Mallard (*Anas platyrhynchos*), Killdeer (*Charadrius vociferus*), Downy Woodpecker (*Picoides pubescens*), Gray Catbird (*Dumetella carolinensis*), European Starling (*Sturnus vulgaris*), Red-eyed Vireo (*Vireo olivaceus*), Yellow Warbler (*Setophaga petechial*), Northern Cardinal (*Cardinalis cardinalis*), Song Sparrow (*Melospiza melodia*), Red-winged Blackbird (*Agelaius phoeniceus*), Common Grackle (*Quiscalus quiscula*), Baltimore Oriole (*Icterus galbula*), and House Sparrow (*Passer domesticus*).

Breeding Bird Area Searches were also conducted prior to and between point count locations, a total of 23 species were detected outside of formal point counts, including four species; American Crow (*Corvus brachyrhynchos*), Blue Jay (*Cyanocitta cristata*), Northern Rough-winged Swallow (*Stelgidopteryx serripennis*), White-breasted nuthatch (*Sitta carolinensis*); which were not detected during formal point count surveys, of these species, Blue Jay and Northern Rough-winged Swallow exhibited signs of confirmed or probable breeding evidence and are presumed breeding in or adjacent to the study area.

Most of the species presumed to be breeding in the study area, are considered common and abundant species (S-Rank 4-5). The majority of the observations were located within the unevaluated wetland community east of the proposed trail alignments, however species including Northern Cardinal, Baltimore Oriole and Gray Catbird were also observed within the area that may potentially be impacted by trail options B, C and D.

#### **3.5.2.1 Breeding Bird Species at Risk**

None of the species observed are considered species at risk under the ESA.

#### **3.5.2.2 Breeding Bird Regional and Local Significance**

All species detected in the study area are ranked as either S5 (Very Common) or S4 (Common) or in Ontario. The rank qualifier 'B' denotes the status of a migratory species during the breeding season.

Seven species observed in the study area, are considered Conservation Priorities by the GRCA (GRCA, undated), two of which showed probable breeding evidence and are described in Table 4.

The City of Guelph has identified a number of species considered Locally Significant (City of Guelph, 2012). Four Locally Significant species were observed in the study area, one of which showed probable breeding evidence, locations of species observed which are presumed to be breeding within or adjacent to the study area and their conservation status are described in Table 5.

Of the locally significant species identified with probable or confirmed evidence, two, Gray Catbird and Baltimore Oriole, are considered edge species, and all three are tolerant to human activity. Northern rough-winged Swallow, in particular, are noted for their tolerance of human activity in the vicinity of nest sites (Dejong, 1996).

Table 5. Regionally or Locally Significant Breeding Bird Species

| COMMON NAME                   | SCIENTIFIC NAME                   | LOCATION OF OBSERVATION   | CITY OF GUELPH | GRCA CONSERVATION PRIORITY | HIGHEST BREEDING EVIDENCE |
|-------------------------------|-----------------------------------|---|----------------|----------------------------|---------------------------|
| Gray Catbird                  | <i>Dumetella carolinensis</i>     | Observed within the eastern portion of the study area, along edges and shrub area.              |                | CP                         | Probable                  |
| Baltimore Oriole              | <i>Icterus galbula</i>            | Observed within the eastern portion of the study area, along edges and shrub area.              | ✓              |                            | Probable                  |
| Northern Rough-winged Swallow | <i>Stelgidopteryx serripennis</i> | Observed nesting below the Speedvale Avenue Bridge on the north side, foraging the Speed River. |                | CP                         | Confirmed                 |

### 3.5.2.3 Breeding Bird Regional Priority Species

The Ontario Landbird Conservation Plan (OLCP): Lower Great Lakes/St. Lawrence Plain, North American Bird Conservation Region 13 (Ontario Partners in Flight, 2008) has identified a number of species that are considered conservation priorities for the region. One priority species was observed in the study area, Baltimore Oriole. The OLCP does not provide legislative protection of species or their habitat, but rather identifies species that should be conservation priorities on a regional level that were not designated Species at Risk at the time of writing.

### 3.5.3 Winter Wildlife

A total of 23 species were identified during the winter wildlife survey, including 17 bird species and 6 mammal species. Figure 3 illustrates the winter wildlife survey route. All species identified during the survey are described in Table 6.

| Table 6. Winter Wildlife Survey Results |                                |  |         |        |     |                  |                       |
|---|--------------------------------|--|---------|--------|-----|------------------|-----------------------|
| COMMON NAME                             | SCIENTIFIC NAME                | DATE(S) OBSERVED                                 | S RANK  | G RANK | PIF | GRCA (DATE UNK.) | CITY OF GUELPH (2012) |
| <b>BIRDS</b>                            |                                |  |         |        |     |                  |                       |
| Canada Goose                            | <i>Branta canadensis</i>       | 26/11/2015, 18/02/2016<br>22/02/2016, 02/03/2016 | S5      | G5     |     | CP               |                       |
| Mallard                                 | <i>Anas platyrhynchos</i>      | 26/11/2015, 18/02/2016<br>22/02/2016, 02/03/2016 | S5      | G5     |     |                  |                       |
| Common Merganser                        | <i>Mergus merganser</i>        | 18/02/2016                                       | S5B,S5N | G5     |     |                  | ✓                     |
| Sharp-shinned Hawk                      | <i>Accipiter striatus</i>      | 18/02/2016                                       | S5      | G5     |     | CP               | ✓                     |
| Ring-billed Gull                        | <i>Larus delawarensis</i>      | 18/02/2016, 02/03/2016                           | S5B,S4N | G5     |     |                  | ✓                     |
| Mourning Dove                           | <i>Zenaidra macroura</i>       | 26/11/2015, 18/02/2016                           | S5      | G5     |     |                  |                       |
| Belted Kingfisher                       | <i>Megasceryle alcyon</i>      | 18/02/2016                                       | S4B     | G5     | ✓   |                  | ✓                     |
| Downy Woodpecker                        | <i>Picoides pubescens</i>      | 18/02/2016, 02/03/2016                           | S5      | G5     |     |                  |                       |
| Blue Jay                                | <i>Cyanocitta cristata</i>     | 18/02/2016                                       | S5      | G5     |     |                  |                       |
| American Crow                           | <i>Corvus brachyrhynchos</i>   | 18/02/2016, 02/03/2016                           | S5B     | G5     |     |                  |                       |
| Black-capped Chickadee                  | <i>Poecile atricapillus</i>    | 26/11/2015, 18/02/2016<br>02/03/2016             | S5      | G5     |     | CP               |                       |
| White-breasted Nuthatch                 | <i>Sitta carolinensis</i>      | 18/02/2016, 22/02/2016                           | S5      | G5     |     |                  |                       |
| Brown Creeper                           | <i>Certhia americana</i>       | 18/02/2016                                       | S5B     | G5     |     | CP               | ✓                     |
| European Starling                       | <i>Sturnus vulgaris</i>        | 18/02/2016                                       | SNA     | G5     |     |                  |                       |
| Northern Cardinal                       | <i>Cardinalis cardinalis</i>   | 18/02/2016, 02/03/2016                           | S5      | G5     |     |                  |                       |
| American Goldfinch                      | <i>Carduelis tristis</i>       | 02/03/2016                                       | S5B     | G5     |     | CP               |                       |
| House Sparrow                           | <i>Passer domesticus</i>       | 18/02/2016                                       | SNA     | G5     |     |                  |                       |
| <b>MAMMALS</b>                          |                                |  |         |        |     |                  |                       |
| Eastern Cottontail                      | <i>Sylvilagus floridanus</i>   | 18/02/2016, 02/03/2016                           | S5      | G5     |     |                  |                       |
| Eastern Gray Squirrel                   | <i>Sciurus carolinensis</i>    | 26/11/2015, 18/02/2016<br>02/03/2016             | S5      | G5     |     |                  |                       |
| Red Squirrel                            | <i>Tamiasciurus hudsonicus</i> | 26/11/2015, 18/02/2016                           | S5      | G5     |     |                  |                       |
| Beaver                                  | <i>Castor canadensis</i>       | 18/02/2016                                       | S5      | G5     |     |                  |                       |
| Northern Raccoon                        | <i>Procyon lotor</i>           | 18/02/2016                                       | S5      | G5     |     |                  |                       |
| American Mink                           | <i>Mustela vison</i>           | 18/02/2016                                       | S4      | G5     |     |                  |                       |

### 3.5.3.1 SAR, Regional and Local Significance

All species identified during the winter wildlife survey are considered provincially Secure (S5) or Apparently Secure (S4).

Five species observed in the study area, are considered Conservation Priorities by the GRCA.

The City of Guelph has identified a number of species considered locally significant (City of Guelph, 2012). Five locally significant species were observed within or adjacent to the study area. All of the locally significant species observed are birds observed outside the nesting season, as a result, impacts are not expected to these species.

### 3.5.4 Incidental Wildlife Observations

All Incidental wildlife observations made outside of the above formal field surveys are presented in Table 7. All observations were of single individuals unless otherwise stated. Species with conservation designation are identified on Figure 3.



**Table 7. Incidental Species Observations**

| COMMON NAME                 | SCIENTIFIC NAME            | TAXA      | DATE -OBSERVATION  | SIGNIFICANCE  |
|-----------------------------|----------------------------|-----------|--|---|
| Common Snapping Turtle      | <i>Chelydra serpentina</i> | Reptile   | May 28, 2016 – Adult observed on land, moving across existing path (ad hoc trail, directly adjacent to river), moving in a southerly direction   | <ul style="list-style-type: none"> <li>Species of Special Concern, provincially and federally</li> <li>S-Rank S3</li> </ul> |
| American Toad               | <i>Anaxyrus americanus</i> | Amphibian | May 28, 2016 – Observed along existing trail (ad hoc trail, southern most limit of study area).  | <ul style="list-style-type: none"> <li>none</li> </ul>  |
| Turkey Vulture              | <i>Cathartes aura</i>      | Bird      | June 17 & July 12, 2016 – Turkey vultures observed in north side woodland, including feathers and abundant scat, likely roosting site.   | <ul style="list-style-type: none"> <li>none</li> </ul>  |
| Mallard                     | <i>Anas platyrhynchos</i>  | Bird      | Observed within the speed River during most surveys (aquatic assessments, botanical surveys)   | <ul style="list-style-type: none"> <li>none</li> </ul>  |
| Unidentified fish species   | <i>c.f. Cyprinidae sp.</i> | Fish      | June 16 & July 7, 2016 – A number of groups of small unidentified fish were observed within the watercourse throughout the study area. Potentials spawning and foraging habitat was also present | <ul style="list-style-type: none"> <li>Protected from 'Serious Harm' under the federal Fisheries Act. 1985.</li> </ul>      |
| Eastern Garter Snake        | <i>Thamnophis sirtalis</i> | Reptile   | August 8, 2016 – Observed crossing ad hoc trail  | <ul style="list-style-type: none"> <li>none</li> </ul>  |
| Unidentified Turtle Species | <i>unknown</i>             | Reptile   | August 8, 2016 – Observed in ponded back eddy of Speed River on South Side   | <ul style="list-style-type: none"> <li>none</li> </ul>  |

### 3.5.5 Species Listed under the Endangered Species Act

Observations, habitat requirements, breeding evidence and a habitat assessment of two Species at Risk, Common Snapping Turtle and Butternut, observed in the study area, are discussed below. No other federally or provincially listed species were identified within the study area through background research, provided data, or field observations.

#### 3.5.5.1 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. Snapping Turtle is generally found in shallow waters with soft mud bottoms and leaf litter (COSEWIC 2008). Nesting occurs on gravely or sandy areas along streams, roadsides or embankments. One observation of Snapping Turtle occurred incidentally within the study area, exiting the Speed River and traversing south through the woodland, this individual was observed in late May, likely traveling to a nesting area. No evidence of candidate habitat for overwintering, nesting or breeding was observed within the study area, it is likely that Snapping Turtle overwinter within further reaches of the Speed River, which may provide suitable substrates for overwintering. Since the habitat of Snapping Turtles fall within Significant Wildlife Habitat and is protected by the PPS, it must be demonstrated that the implementation of the SAUT will have no negative impacts on the habitat or its ecological functions.

#### 3.5.5.2 Butternut

Butternut tree is listed as Endangered provincially (ESA 2007) and federally (Species at Risk Public Registry 2014). Butternuts primarily occur in rich, moist well drained soils, often along streams (MNR 2015a). Suitable habitat for Butternut is present along the Speed River

valleylands throughout the study area. Regulated habitat for Butternut is defined as a 25m radius around the stem of an individual Butternut tree (Figure 4). Butternut was identified in the study area during field surveys. Figure 4 depicts the locations of the proposed trail alignments and identified Butternut trees and indicates two Butternut trees have the potential to be affected by the proposed trail options. Based on the severity of impact to Butternut trees, planting of Butternut seedlings will be required in accordance with Ontario Regulation 242/08 of the ESA.

### 3.6 Significant Wildlife Habitat

With guidance from the *Significant Wildlife Habitat Technical Guide* (2000) and the SWH EcoRegion Criterion Schedule 6E (2015), two types of Significant Wildlife Habitat (SWH) were identified within the study area (Appendix 17). Significant Wildlife Habitat and its location and assessment are presented in Table 8. No surveys were completed to confirm Turtle Wintering, and are assumed significant based on incidental sightings and information provided by the City of Guelph and MNRF.

**Table 8. Confirmed Significant Wildlife Habitat**

| SIGNIFICANT WILDLIFE HABITAT TYPE        | RATIONALE AND LOCATION   |
|--|--|
| Waterfowl Stopover and Staging (Aquatic) | <ul style="list-style-type: none"> <li>The Speed River is a large shallow, open water feature.</li> <li>Identified as a waterfowl overwintering area by the MNRF.</li> </ul>   |
| Turtle Wintering Area                    | <ul style="list-style-type: none"> <li>The Speed River may provide overwintering habitat for Common Snapping Turtle, and occurs adjacent to the study area, 1 Snapping Turtle was observed during spring surveys.</li> </ul> |

### 3.7 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 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 9. Potential habitat for Western Chorus Frog (*Pseudacris triseriata* pop. 2), Monarch Butterfly (*Danaus plexippus*), Rusty-patched Bumble Bee (*Bombus affinis*), Eastern Wood-pewee (*Contopus virens*), Snapping Turtle (*Chelydra serpentina*), Eastern Ribbonsnake (*Thamnophis sauritus*) and Milksnake (*Lampropeltis triangulum*), were identified as potentially occurring within the study area.

Common Snapping Turtle and Butternut were observed in the study area, and are described in section 3.5 no further Species at Risk were identified as occurring through ELC, Breeding Bird Surveys, Amphibian Surveys or incidentally in the study area. Due to the presence of these species and the protection they are afforded within the PPS and Ontario Regulation 240/08, the EIS must demonstrate that the implementation of the SAUT will have no negative impacts on the habitat of each species or the ecological functions they provide.

### **3.8 Aquatic Habitat Assessment**

#### **3.8.1 Aquatic Assessment**

The aquatic assessment was completed for two sampling stations in the Speed River, within the study area. Locations of sampling stations are shown on Figure 1. Details of aquatic assessment are presented in Appendix 10. The area of watercourse not directly evaluated through the aquatic assessment was visually inspected and determined to be comparable to the characteristics of Station 2 (SPR02). It was therefore determined that additional sampling stations were not required to characterize the entire watercourse.

##### **3.8.1.1 Aquatic Assessment Station 1 (SPR01):**

Sampling Station 1 (SPR01) is a highly modified section of watercourse with concrete channel walls on both banks. The watercourse has been altered and engineered and no-longer displays stream properties such as meanders, pool riffle sequence or access to a flood plain. Due to the altered nature of the watercourse, it was not possible to accurately measure the bankfull depth or entrenchment. Bankfull width presented is the approximate mean channel width between the channel walls.

During the aquatic survey, the watercourse flow pattern was characterized as 80% slow moving pools and glides and 20% slow or fast riffles. Approximately 69% of the watercourse had a depth of between 101 – 600 mm, with only one sampling point deeper than 600mm. The maximum stream depth at the downstream crossover was 230mm.

Approximately 34% of the watercourse included cover, which is defined as an unembedded material with a median axis greater than 100 mm and of sufficient density to block >75% of light. The most common form of cover was round rocks, with minor occurrences of flat rocks and woody debris. The substrate was comprised of mostly of fines and gravel, with cobble distributed throughout the station. A single occurrence of bedrock or concrete slab was observed.

During the aquatic assessment a single goldfish was observed, as well as greater than 10 individual common carp, a number of small unidentified fish were also observed throughout the sampling station.

##### **3.8.1.1.1 Fish Habitat**

The watercourse within the Sampling Station 1 (SPR01) is of poor habitat quality for fish. The water is generally shallow, with only moderate variations in depth and flow. Although cover was present in 34% of the sampling points, the cover was generally small and would not provide suitable habitat for larger fish. Nearly the entire sampling station is open and unshaded, which would increase thermal impacts to fish within the area. The low head bridge at the upstream crossover 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 water course to provide refuge to fish.

### **3.8.1.2 Aquatic Assessment Station 2 (SPR02):**

Sampling Station 2 (SPR02) is a moderately impacted section of watercourse with naturalized riparian vegetation on both banks. The watercourse shows some evidence of historic alterations, such as large concrete blocks within the watercourse, but is otherwise an intact system with natural stream process, such as meanders, pool riffle sequence and access to a flood plain. The watercourse within the sampling station was determined to be un-entrenched, with access to greater than 40m of flood plain at two times bankfull height.

Stream width at the location of the downstream crossover was 26.2 m with the bankfull width calculated as 28.2 m. The maximum channel depth at the location of the downstream crossover was 410mm, while the bankfull depth is 710mm, indicating at the time of sampling the water level was 300mm below bankfull conditions.

At the time of the aquatic survey, the watercourse flow pattern was characterized as over 80% slow moving pools and glides and less than 20% of the watercourse characterized by slow or fast riffles. Approximately 91% of the watercourse had a depth of between 101 – 600 mm, with only one sampling point deeper than 600mm.

Approximately 37% of the watercourse contained cover, with the most common form of cover being round rocks, followed by woody debris with minor occurrences of flat rocks. The substrate was comprised of mostly fines and gravel, with cobble distributed throughout the station. Occurrence of bedrock was also present in approximately 20% of the station.

During the aquatic assessment a number of small unidentified fish were observed within the station.

Through visual inspections, it was determined that the upstream section of watercourse, between Sampling Station 1 and 2, that was not assessed, is of similar characteristics to Sampling Station 2.

#### **3.8.1.2.1 Fish Habitat**

The watercourse within the study area is considered fish habitat, within Sampling Station 2 (SPR02) and the comparable upstream section, the quality of habitat for fish is moderate. The watercourse was generally shallow and relatively warm (21°C at time of sampling), limiting habitat suitability to only smaller, warm water tolerant fish. The presence of small unidentified fish and associated spawning and foraging habitat was also noted.

The watercourse contains a wider variety of habitat feature including pool riffle sequence, access to riverine wetland areas, woody debris, log jams, undercut banks and rock cover. The most common form of cover was round rock, which were varied in size and could provide suitable cover to a diversity of fish species. The watercourse was partially shaded by the riparian vegetation on east and west banks, providing some protection to fish from thermal impacts. Full and partial barriers, both upstream and downstream of the sampling station would

limit fish movement from other locations within the Speed River system.

### 3.8.2 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 15<sup>th</sup> – June 30<sup>th</sup> (Pers. Comm. Ashley Rye, GRCA Resource Planner).

GRCA records for fish sampling show 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 11.

### 3.8.3 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 multi-use trail linkage located adjacent to the Speed River.

Detailed construction plans for the proposed multi-use trail linkage have not yet been developed; therefore, a final analysis of impacts could not be completed. However, preliminary assessment of the proposed trails 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, a 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 SAUT would not require formal DFO Request for Review if the following conditions were met (DFO 2015).

- No temporary or permanent increase in existing footprint<sup>1</sup> below the High Water Mark<sup>2</sup>
- 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

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

<sup>2</sup> 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. In flowing waters (rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level (DFO 2015).

Based on the proposed trail option 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 trail will be at or below the high water mark (elevation 322.71 observed on May 12, 2017); as a result, condition 1, a temporary or permanent increase in existing footprint below the High Water Mark, will occur. Therefore, the installation of any of the proposed trail options would likely trigger a DFO Request for Review, or DFO Authorization. ADFO Request for Review must be completed as part of the detailed design phase. Proper mitigation measures to ensure no impacts to fish should be adhered to in order to ensure that the Fisheries Act is not contravened, this includes, but is not limited to:

- timing in water work to respect fisheries timing windows,
- minimizing time spent completing in water work,
- conducting all work during low flow,
- avoiding work during wet weather to reduce sediment and erosion,
- minimize loss and impacts to aquatic habitat including riparian vegetation,
- undertake all in water works in isolation of open or flowing water,
- develop a response plan for contaminants and spills,
- use building materials that do not release substances that may be harmful to fish,
- develop and implement an Erosion and Sediment Control Plan and ensure they are maintained until ground cover has been established
- Ensure that all in-water activities do not interfere with fish passage, constrict the channel width, or reduce flows, or result in fish death
- Retain a qualified environmental professional to ensure appropriate protocols are applied, and applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them,
- operate all machinery on land above the high water mark, or from a floating barge that minimizes disturbance to the banks and bed of the waterbody.

### **3.9 Significant Valleylands**

Significant Valleylands are identified in the study area, characterized by steep slopes, and rock/rubble in the ground layer. Valleylands in the southern portion of the trail are less steep, and include wetlands at the bottom of the valley slope. Valleylands are considered erosion hazard lands, and special design considerations must be taken into account when planning within erosion hazard lands in order to avoid creating new hazards or aggravating existing hazards.

The Speed River has been channelized in various locations since the 1950's, with the majority of floodplain areas used extensively for landfilling. As a result, it is difficult to discern where valleyland slopes are naturally occurring, or the result of extensive infilling and/or the creation of the rail line. The Dam and weirs located adjacent to Riverside Park were constructed between 1955 and 1966, and the channel bottom is concrete between the dam and the first weir downstream (City of Guelph 1993).

When assessing the Valleylands in this area, per the Natural Heritage Reference manual criteria recommendations for significance, the following features are recommended for investigation: surface water functions (flood attenuation, storage and release), Groundwater functions (areas of infiltration, springs and seepage slopes), landform prominence (large, well defined valleylands are often significant features in the landscape and important characteristics of an area), Distinct Geomorphic landforms (action of water leading to distinct landforms in the landscape), Degree of Naturalness (relatively undisturbed, proportion of natural vegetation cover), Community and species diversity, Unique species and communities, habitat value (natural areas with healthy aquatic systems are more valuable) and linkage function (minimum 100m width, with continuous vegetation).

Valleylands within the study area on the south side meet only a few of the criteria, this includes surface water attenuation due to wetlands, some degree of naturalness including naturalized vegetation cover, some habitat value for urban bird species, and performs some linkage function, However they do not meet the standards for significance of a minimum 100m width.

On the north side the valleylands provide significantly less functional value, as they are highly disturbed with a low proportion of native vegetation and cover, and includes a retaining wall and significant infilling. No wetlands are present, as a result flood attenuation and infiltration are reduced, and linkage functions are reduced, due to the presence of a large retaining wall, ending at Speedvale Avenue. No groundwater functions were observed, and while the valley slopes are prominent, they are not natural.

### **3.10 Hydrological Function of the Wetland**

Detailed hydrological study of the wetland in the study area was not completed as part of the EIS. However a general assessment of hydrological function and potential impacts to the wetland was completed using field observations and background resources.

The wetland feature within the study area is a riverine wetland, along the banks of the Speed River, at the bottom of a steeply sloped woodland community. The wetland provides benefits to the aquatic system, directly as a habitat feature, but also by buffering flows and providing floodplain during periods of high flow. No seeps or springs were identified within the wetland, or reported in background material.

### **3.11 Ad-Hoc Trails**

Within the woodland and wetlands on the south side of Speedvale Avenue are a number of well-worn ad-hoc trails that see regular pedestrian use. This includes a trail that runs directly adjacent to the Speed River within the flood plain, accessed via two trails beginning approximately at the beginning of trail option 3 that traverse directly down the valley slope crossing through the wetland to reach the river edge, and a loop trail through the wetland. Areas that cross the wetland include items such as pieces of lumber and rocks placed by pedestrians to walk through the wetland areas. The ad-hoc trail along the river also crosses a number of inlets from the river that feed into the wetland, and evidence of garbage and man-made

temporary structures were observed throughout the area adjacent to the trails. During surveys the area was observed being used as an off-leash dog area by a number of trail users. The formalization of any of these ad-hoc trails would likely increase the impacts to the wetland, and pose a hazard to users by occurring directly within the flood plain of the speed river, resulting in trails being under water for portions of the year.



## 4.0 Impact Analysis, Mitigation and Restoration

### 4.1 Analysis and Comparison of Trail Design Impacts

Four Trail Alignments are proposed for the south side of Speedvale Avenue, and two trail alignments are proposed for the north side (see Figures 1, 2A, 2B, 2C). Options include both asphalt trail surface with cut/fill and retaining walls as well as elevated boardwalks as potential construction materials. Granular (limestone) trails and natural surfaced trails were not considered as appropriate based on proposed longitudinal slopes approaching 4%. As slopes approach 4% or greater, hard (asphalt) surfaces are constructed as a general City practice that helps to reduce erosion. From a built form perspective, all proposed trail alignments are intended to be in compliance with Integrated Accessibility Standards Regulation, Ontario Regulation 191/11, the Accessibility for Ontarians with Disabilities Act, 2005 (AODA) for 'Recreational Trails' and the City of Guelph 2015 Facility Accessibility Design Manual. However, prior to proceeding with detailed design, the City must consult with the public and people with disabilities as well as any additional consultation requirements with the City of Guelph Accessibility Advisory Committee accordance with subsection 29 (1) or (2) of the Act. O. Reg. 413/12, s. 6. on the following:

1. slope of the trails;
2. need for, and location of, ramps on the trail; and
3. need for, location and design of:
  - i. rest areas;
  - ii. passing areas;
  - iii. viewing areas;
  - iv. amenities on the trail; and
  - v. any other pertinent feature O. Reg. 413/12, s. 6.

Subject to future detailed engineering design, which needs to take into consideration the recommendations included in each of the supplemental studies:

- Geomorphic Characterization & Design Support Draft Speed River, Speedvale Avenue East Underpass and Multi-Use Trail Linkage Report (Aqualogic, March 13, 2017) *Appendix 16*
- Geotechnical investigation and slope stability assessment proposed Speedvale bridge underpass and multi-use trail linkage (Amec Foster Wheeler, May 2017) *Appendix 17*
- Speedvale Trail retaining wall structural condition assessment report (Amec Foster Wheeler, October 2016) *Appendix 18*
- Speedvale Trail Hydrological assessment (Amec Foster Wheeler, May 2017) *Appendix 19*

each option is described below in detail, including potential impacts to each sensitive feature and their functions, and proposed mitigation recommendations to reduce or negate impacts. Monitoring and residual effects are also proposed for some options and impacts. A more detailed description of all potential impacts that apply to all alignment options and mitigation guidelines are provided in Table 10.

#### **4.1.1 South Side Options**

##### **4.1.1.1 Option 1**

###### Proposed Trail

This trail alignment connects to the existing Trans Canada Trail, north of the rail line crossing access point at Mac Avenue. This alignment option is of moderate length (in comparison to the three other options). The proposed trail cross section is comprised of a 3-meter wide asphalt trail, with 0.6-metre clear areas 'mow strips' on each side of the trail area, with 2:1 side slopes or retaining walls to match to existing grade, is to be constructed to City of Guelph standards. A continuous railing is proposed on the east edge of the trail where required as a guard per the Ontario Building Code for retaining walls, as well as side slopes without retaining walls to improve accessibility and provide a barrier to discourage access to the existing ad-hoc trail network and wetland features. Trail option 1 follows a small plateau parallel to the existing Trans Canada Trail prior to proceeding down the valley slope in a series of alternating 2.5% and 4% longitudinal slopes, generally following the middle and bottom of slope with retaining walls, to avoid excessive grading, impacts to the wetland, and further tree impacts, before connecting with the Speedvale bridge underpass on the south side of Speedvale Avenue (Figure 2A). The alternating longitudinal trail slopes, follow existing grades where possible, and provide brief rest points for trail users traversing the grade change between the existing Trans Canada Trail and Speedvale bridge underpass.

###### Significant Wetlands

The Significant Wetland is located to the east of option 1. This option avoids the wetland and is located a minimum of 2 meters from the Locally Significant Wetland at the closest point, it is on average, at least 5 meters or more from the wetland edge. Option 1 occurs within the 15 metre buffer to the wetland for the majority of its length. Impacts to the wetland could include sedimentation, loss of vegetative cover that increases erosion, introduction of invasive species, and off trail use. Mitigation for potential impacts includes the maintenance or restoration of vegetative buffers, development & implementation of an erosion and sediment control plan and the creation of physical buffers and barriers, to reduce off trail usage and closure of existing ad hoc trails. Option 1 will reduce impacts to the Significant Wetland, by creating a formal trail that avoids traversing the wetland; current ad hoc trails traverse the wetland in a number of locations, and have a significant impact on the wetland through introduction of non-native plants and trampling.

###### Significant Woodlands

Portions of the Significant Woodland will be impacted, through the removal of trees and vegetation to complete grading and slope stabilization and retaining walls for the asphalt trail. A total of 0.11ha or 0.14% of the City of Guelph mapped significant woodland area will be removed with option 1. All tree removals occur along the northern edge of the significant woodland, within an area dominated by Manitoba Maple and Black Walnut. The majority of the herbaceous vegetation to be removed consists of non-native and weedy species. The area of removal is along the edge of the woodland, no impacts to the woodland are expected from light infiltration. Potential impacts from the removal of woodland could include sedimentation, loss of herbaceous ground cover, and reduced infiltration. Slight short-term reductions in canopy cover may also be expected. Option 1 will reduce impacts to the Significant Woodland, by creating a formal trail that avoids traversing the center of the woodland; current ad hoc trails traverse the woodland in a number of locations, and have a significant impact on the woodland through introductions of non-native plants, and dumping of plant material and non-natural debris. Compensation and restoration of the woodland would provide an overall benefit to the greater significant woodland, by removing invasive species, planting of native trees and shrubs, and removing exotic and invasive species, such as Norway Maple and Manitoba Maple.

### Trees

48 trees will be directly impacted by the proposed trail alignment. Impacted trees consisted of 16 Manitoba Maple, 19 Black Walnut, 4 White Ash, 2 Norway Maple, 1 sugar maple and 1 each of Butternut (category 2), White Spruce, Black Cherry, Crack Willow, Eastern White Cedar and Basswood. 30 additional trees, in poor condition, though not impacted by trail construction, may need to be removed due to proximity to the proposed trail alignment, and may present safety risks to trail users. The removal of Manitoba maple and Norway maple are considered a benefit to the tree community, allowing for the planting and compensation of native, non-invasive species of trees within the woodland. The impact to Butternut is discussed in detail below. Compensation for trees removed will occur at a rate of 3:1 in accordance with city policies, adequately mitigating any impacts to trees within the woodland. During detailed design, a complete Tree Preservation and Compensation plan be applied, to provide protection to trees outside of the grading limits of the trail, as well as to determine on a case by case basis, if any trees within the impact area can be retained.

### Species at Risk

One regulated Butternut tree, 324 the most significant Butternut, may be affected by this trail alignment; numerous areas within the woodland are suitable for compensation. The Butternut tree is located in close proximity to the bottom of the bridge, and is an immature tree of 7cm DBH; as such the tree may not be impacted by the trail as a result of the small Tree Protection zone required by a tree of this size. There is also the potential with a tree of this size to transplant the tree to a new location. If impacts cannot be avoided to this tree, a detailed compensation plan, and long-term monitoring plan is required by the ESA as part of future detailed design, in consultation with the MNRF.

Snapping Turtle habitat is afforded protected within Significant Wildlife Habitat under the Provincial Policy Statement. They are typically found in shallow waters with soft mud bottoms and leaf litter (COSEWIC 2008). Given that the ecological communities that have the potential to be affected by this trail option do not contain ideal Snapping Turtle habitat, they will not be granted protection under the PPS.

#### Aquatic Habitat

No impacts to aquatic habitat are expected from the proposed trail alignments. The trail will only have a minor encroachment into the aquatic habitat, below the high water mark (100-year flood elevation), at the location of the connection to the Speedvale Bridge. The flow and characteristics of the watercourse will not be altered by the trail. Hydrological studies completed by Amec Foster Wheeler (2017), have indicated that this trail design option will not impact regional flood elevations, and all trail options are above the 50 year observed flood event.

A minor increase in the footprint below the high water mark is expected at the connection of the trail with the Speedvale Bridge. The specific dimension of the increased footprint below the high water mark will be determined during detailed design. An increase in footprint below the high water mark will trigger a DFO Request for Review. The DFO review will assess the project to ensure that proposed action do not cause 'serious harm' to fish or fish habitat. The impacts from the increased footprint below the high water mark will be negligible, as the location of the increased footprint is in a disturbed area, close to an existing bridge and bridge abutment. The riparian vegetation within the area is dominated by non-native species and no area of wetlands that could be used as direct or indirect fish habitat will be impacted.

Closure and restoration of existing ad hoc trails along the watercourse will improve the aquatic habitat by allowing more riparian vegetation to establish, providing shade and cover for fish and aquatic species.

#### Valleylands

Impacts to valleylands include 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. A moderate (in comparison to the three other alignment options) amount of Grading, fill and retaining walls are required to stabilize the trail, and ensure safety and accessibility for users. By beginning further back along the Trans Canada trail, longitudinal slopes required for this trail alignment are less steep, with fewer sharp turns, reducing requirements for fill and grading, and reducing the overall impact to valleylands. Further mitigation to reduce impacts include the installation of vegetation and shrubs to stabilize soils, and the installation of ESC fencing to control the potential for erosion of banks during construction to be included as part of detailed design. Educational signage may also be applied, to inform trail users of the instability and sensitivity of slopes, to avoid off trail use. The installation of a formal trail will also reduce use of ad hoc trails, which are currently impacting the valleylands. No impacts to drainage, habitat, surface water functions, groundwater functions, community and species diversity, linkage functions or habitat value are expected from the construction of the proposed trail.

### Wildlife

Wildlife impacts that have the potential to occur as a result of this trail alignment are minor, and easily avoidable through mitigation. 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 1<sup>st</sup> -August 31<sup>st</sup>) 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.

### Ecological Linkages

No impacts are expected to occur to the Speed River Ecological Linkage, the trail alignment runs adjacent/parallel to the river, crossing under the bridge, and will not provide a barrier to north-south movement along the river, or access to the terrestrial and wetland communities adjacent to the river. The existing bridge, abutments and retaining walls are existing barriers to any terrestrial linkage capacity from north to south of the bridge, as a result, the speed river provides a linkage between the north and south sides only in an aquatic capacity. No natural features are located west of the speed river, as a result, it is unlikely that species movement from the river moving west occur, as no suitable habitat is identified (e.g. rail line, residential, roads). The trail under the bridge and along the top of the retaining wall may increase the terrestrial capacity of the speed river to provide a terrestrial linkage between the north and south sides, allowing for terrestrial species to cross under the bridge using the trail.

#### **4.1.1.2 Option 2**

##### Proposed Trail

This trail alignment option connects to the existing Trans Canada at the junction of the Trans Canada Trail, and the existing trail segment on private property. The proposed trail cross section is comprised of a 3-meter wide asphalt trail, with 0.6-metre clear areas ‘mow strips’ on each side of the trail area, with 2:1 side slopes or retaining walls to match to existing grade, is to be constructed to City of Guelph standards. A continuous railing is proposed on the east edge of the trail where required as a guard per the Ontario Building Code for retaining walls, as well as side slopes without retaining walls to improve accessibility and provide a barrier to discourage access to the existing ad-hoc trail network and wetland features. Trail option 2 requires significant grading and retaining walls, is comprised of one continuous 5% longitudinal trail slope and requires a tight turn at the bottom of a 5% slope in order to meet the linkage below the Speedvale Bridge underpass (Figure 2A). The shortest in length of the four options, this alignment follows the valley slopes without regard for existing topography, requires significant quantities of fill, and is not optimal from a trail user perspective. The use of a 5% longitudinal trail surface slope must also be approved as part of the required Accessibility for Ontarians with Disabilities Act public consultation process, as the slope is 1% steeper than the 4% maximum identified in the City of Guelph Facility Accessibility Design Manual.

##### Significant Wetlands

Trail Option 2 is located a minimum of 2 meters from the locally Significant Wetland at the closest junction, and is generally 5 meters or more from the wetland edge. This option occurs within the 15m buffer to the wetland for the majority of its length. Impacts to the wetland could include sedimentation, loss of vegetative cover that increases erosion, introduction of invasive species, and off trail use. Mitigation proposed for these impacts includes the maintenance or restoration of vegetative buffers, development & implementation of an Erosion and Sediment Control plan and the creation of physical buffers and barriers, to reduce off trail usage as part of detailed design. Option 2 will reduce impacts to the Significant Wetland, by creating a formal trail that avoids traversing the wetland; current ad hoc trails traverse the wetland in a number of locations, and have a significant impact on the wetland through introduction of non-native plants and trampling.

### Significant Woodlands

Portions of the Significant Woodland will be impacted, through the removal of trees and vegetation to complete grading and slope stabilization for the trail. A total of 0.08ha or 0.11% of the City of Guelph mapped significant woodland area will be removed with option 2. Trees to be removed within this area are dominated by Manitoba Maple with Black Walnut; the majority of the herbaceous vegetation consists of non-native and weedy species. Since the area of removal is along the edge of the woodland, no impacts to the woodland are expected from light infiltration. Potential minor impacts from the removal of woodland could include sedimentation, loss of herbaceous ground cover, and reduced infiltration. Slight short-term reductions in canopy cover may also be expected. Option 2 will reduce impacts to the Significant Woodland, by creating a formal trail that avoids traversing the center of the woodland; current ad hoc trails traverse the woodland in a number of locations, and have a significant impact on the woodland through introductions of non-native plants, and dumping of non-native plant material by users. Compensation and restoration of the woodland would provide an overall benefit to the greater significant woodland, by removing invasive species, and planting native trees and shrubs, and removing exotic and invasive species, such as Norway maple and Manitoba maple.

### Trees

36 trees will be directly impacted by the proposed trail alignment. Impacted trees consisted of 15 Manitoba Maple, 8 Black Walnut, 2 White Ash, 2 Norway Maple, 2 sugar maple and 1 each of butternut, White Spruce, Black Cherry, Crack Willow, Eastern White Cedar and American Elm. 31 additional trees, in poor condition, though not impacted by trail construction, may need to be removed due to proximity to the proposed trail alignment, and may present safety risks to trail users. The removal of Manitoba maple and Norway maple are considered a benefit to the tree community, allowing for the planting and compensation of native, non-invasive species of trees within the woodland. The impact to Butternut is discussed in detail below. Compensation for trees removed will occur at a rate of 3:1, adequately mitigating any impacts to trees within the woodland. During detailed design, it is recommended that a complete Tree Preservation and Compensation plan be applied, to provide protection to trees outside of the grading limits of the trail, as well as to determine on a case by case basis, if any trees within the impact area can also be retained.

### Species at Risk

One regulated Butternut tree (324) may be affected by this trail alignment; numerous areas within the woodland are suitable for compensation. The Butternut tree is located in close proximity to the bottom of the bridge, and is an immature tree of 7cm DBH; as such the tree may not be impacted by the trail as a result of the small Tree Protection zone required by a tree of this size. There is also the potential with a tree of this size to transplant the tree to a new location. If impacts cannot be avoided to this tree, a detailed compensation plan, and long-term monitoring plan is required by the ESA as part of future detailed design, in consultation with the MNRF.

### Aquatic Habitat

No impacts to aquatic habitat are expected from the proposed trail alignments. The trail will only have a minor encroachment into the aquatic habitat, below the high water mark, at the location of the connection to the Speedvale Bridge. The flow and characteristics of the watercourse will not be altered by the trail. Hydrological studies completed by Amec Foster Wheeler (2017), have indicated that this trail design option will not impact regional flood elevations, and all trail options are above the 50 year observed flood event.

The minor increase in the footprint below the high water mark is expected at the connection of the trail with the Speedvale Bridge. The specific dimension of the increased footprint below the high water mark will be determined during detailed design. An increase in footprint below the high water mark will trigger a DFO Request for Review. The DFO review will assess the project to ensure that proposed action do not cause 'serious harm' to fish or fish habitat. The impacts from the increased footprint below the high water mark will be negligible, as the location of the increased footprint is in a disturbed area, close to an existing bridge and bridge abutment. The riparian vegetation within the area is dominated by non-native species and no area of wetlands that could be used as direct or indirect fish habitat will be impacted.

Closure and restoration of existing ad hoc trails along the watercourse will improve the aquatic habitat by allowing more riparian vegetation to establish, providing shade and cover for fish and aquatic species.

### Valleylands

Impacts to valleylands include increased potential for 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. Significant grading, fill and retaining walls are required to stabilize the trail, and ensure the safety and accessibility for users. This option requires steeper slopes, with sharp turns in order to meet accessibility standards, and reach the bridge underpass, requiring the most grading, filling and retaining walls of the four alignment options and increasing the overall impact to valleylands. Mitigation to reduce impacts includes the installation of vegetation to stabilize soils, and the development and implementation of an Erosion and Sediment Control plan during detailed design to control the potential for erosion of banks during construction. This alignment option has the highest chance of impacting the valleylands. No impacts to drainage, habitat, surface water functions, groundwater functions,

community and species diversity, linkage functions or habitat value are expected from the construction of the proposed trail.

### Wildlife

Wildlife impacts that have the potential to occur as a result of this trail alignment are minor, and easily avoidable through mitigation. Potential wildlife impacts generally consist of the potential to harm or harass migratory birds during the migratory bird nesting season and wandering wildlife within the construction area. Recommended mitigation for this impact include the avoidance of any clearing or grading during the general nesting season (April 1st-August 31<sup>st</sup>) where possible, and the clear delineation of the work space through the installation of silt and sediment fencing to avoid potential entry by wandering wildlife.

### Ecological Linkages

No impacts are expected to occur to the Speed River Ecological Linkage, the trail alignment runs adjacent to the river, crossing under the bridge, and will not provide a barrier to north-south movement along the river, or access to the terrestrial and wetland communities adjacent to the river. The bridge and retaining wall are existing barriers to any terrestrial linkage capacity from north to south of the bridge, as a result, the speed river provides a linkage between the north and south sides only in an aquatic capacity. No natural features are located west of the speed river, as a result, it is unlikely that species movement from the river moving west occur, as no suitable habitat is identified (e.g. rail line, residential, roads). The trail under the bridge and along the top of the retaining wall may increase the terrestrial capacity of the speed river to provide a terrestrial linkage between the north and south sides, allowing for terrestrial species to cross under the bridge using the trail.

#### **4.1.1.3 Option 3**

##### Proposed Trail

This trail alignment is the longest, connecting to the existing Trans Canada Trail south of the access point at Mac Avenue (Figure 2A). The proposed trail cross section is comprised of a 3-meter wide asphalt trail, with 0.6-metre clear areas ‘mow strips’ on each side of the trail area, with 2:1 side slopes or retaining walls to match to existing grade, is to be constructed to City of Guelph standards. A continuous railing is proposed on the west and east edges of the trail where required as a guard per the Ontario Building Code for retaining walls. Trail Option 3 immediately proceeds down the valley slope at a 4% longitudinal slope, then generally follows bottom of valley slope, before connecting with the Speedvale bridge underpass on the south side of Speedvale Avenue (Figure 2A). The incorporation of retaining walls along slopes, and railings will also provide a barrier to users, to reduce access to ad-hoc trails.

##### Significant Wetlands

Approximately 130 metres of trail option 3 is within the Locally Significant Wetland, and within the 15m buffer to the wetland for the remainder of its length. Impacts to the wetland include removal of wetland plants for required grading, potential changes to hydrology and infiltration as a result of fill within the wetland, potential sedimentation, loss of vegetative cover that increases erosion, introduction of invasive species, trampling and pets in the wetland, and off trail use.



Mitigation for these potential impacts includes the maintenance or restoration of vegetative buffers, Development & implementation of an Erosion and Sediment Control plan and the Creation of physical buffers and barriers, to reduce off trail usage. While option 3 will cause impacts to the Significant Wetland, by creating a formal trail that traverses the wetland in one specific area, along the edge of the wetland; it will reduce impacts caused by the current ad hoc trails that bisect the wetland in multiple locations, and occur in the more sensitive areas of the wetland, with unstable soils, and more sensitive plants.

### Significant Woodlands

Portions of the Significant Woodland will be impacted, through the removal of trees and vegetation to complete grading and slope stabilization for the trail. A total of 0.16ha or 0.20% of the City of Guelph mapped significant woodland area will be removed with option 3. Trees to be removed within this area are dominated by Manitoba Maple with Black Walnut; the herbaceous vegetation in this area includes areas of wetland plants within the willow shrub thicket swamp community, and impacts are expected to wetland communities. Since the area of removal is within the woodland, impacts to the woodland are expected from light infiltration, sedimentation, loss of herbaceous ground cover, and reduced infiltration. Slight short-term reductions in canopy cover may also be expected. Option 3 will reduce impacts to the Significant Woodland, by creating a formal trail; current ad hoc trails traverse the woodland in a number of locations, and have a significant impact on the woodland through introductions of non-native plants, and dumping of plant material. Compensation and restoration of the woodland would provide an overall benefit to the greater significant woodland, by removing invasive species, and planting native trees and shrubs, and removing exotic and invasive species, such as Norway Maple and Manitoba Maple.

### Trees

55 trees will be directly impacted by the proposed trail alignment. Impacted trees consisted of 27 Manitoba Maple, 12 Black Walnut, 3 Crack Willow, 2 each of European Alder, Butternut, Eastern White Cedar, White Spruce and American Elm and 1 each of White Ash, Norway Maple and Trembling Aspen. 37 additional trees, in poor condition, though not impacted by trail construction, may need to be removed due to proximity to the proposed trail alignment, and may present safety risks to trail users. The removal of Manitoba Maple, European Alder and Norway Maple are considered a benefit to the tree community, allowing for the planting and compensation of native, non-invasive species of trees within the woodland. The impact to Butternut is discussed in detail below. Compensation for trees removed will occur at a rate of 3:1 in compliance with city policies, adequately mitigating any impacts to trees within the woodland. During detailed design, it is recommended that a complete Tree Preservation and Compensation plan be enforced, to provide protection to trees outside of the grading limits of the trail, as well as to determine on a case by case basis, if any trees within the impact area can also be retained.

### Species at Risk

One category 2 regulated Butternut tree and one unregulated category 1 Butternut tree may be affected by this trail alignment; numerous areas within the woodland are suitable for compensation for the regulated tree. The regulated Butternut tree is located in close proximity to the bottom of the bridge, and is an immature tree of 7cm DBH; as such the tree may not be impacted by the trail as a result of the small Tree Protection zone required by a tree of this size. There is also the potential with a tree of this size to transplant the tree to a new location. If impacts cannot be avoided to this tree, a detailed compensation plan, and long-term monitoring plan is required by the ESA as part of future detailed design, in consultation with the MNR. The unregulated butternut tree has no requirements under the ESA.

#### Aquatic Habitat

No impacts to aquatic habitat are expected from the proposed trail alignments. The trail will only have a minor encroachment into the aquatic habitat, below the high water mark, at the location of the connection to the Speedvale Bridge. The flow and characteristics of the watercourse will not be altered by the trail. The hydrological study completed by Amec foster Wheeler have identified that this option may cause minor flood elevation differences, as a result, it is the least preferred option from a hydrological standpoint. All trail options have been determined to be above the 50 year observed flood event.

The minor increase in the footprint below the high water mark is expected at the connection of the trail with the Speedvale Bridge. The specific dimension of the increased footprint below the high water mark will be determined during detailed design. An increase in footprint below the high water mark will trigger a DFO Request for Review. The DFO review will assess the project to ensure that proposed action do not cause 'serious harm' to fish or fish habitat. The impacts from the increased footprint below the high water mark will be negligible, as the location of the increased footprint is in a disturbed area, close to an existing bridge and bridge abutment. The riparian vegetation within the area is dominated by non-native species and no area of wetlands that could be used as direct or indirect fish habitat will be impacted.

Closure and restoration of existing ad hoc trails along the watercourse will improve the aquatic habitat by allowing more riparian vegetation to establish, providing shade and cover for fish and aquatic species.

#### Valleylands

Impacts to valleylands include increased erosion on ravine slopes adjacent to the Speed River, impacts to unstable landforms and potential loss of stabilizing roots from trees to be removed. Grading, fill and retaining walls are required to stabilize the trail, and ensure the safety and accessibility for users. By beginning further south along the Trans Canada Trail, slopes required for this trail alignment are less steep, with few sharp turns, allowing for a gradual incline and reducing requirements for fill and grading, and reducing the overall impact to valleylands, though it does require a greater area of grading at the base of the valley slope. Further mitigation to reduce impacts include the installation of vegetation to stabilize soils, and the implementation of an Erosion and Sediment Control Plan to control the potential for erosion of banks during

construction. No impacts to habitat, groundwater functions, community and species diversity, linkage functions or habitat value are expected from the construction of the proposed trail. Some impacts to surface water attenuation and drainage may be expected through the installation of the trail within the wetland feature.

### Wildlife

Wildlife impacts that have the potential to occur as a result of this trail alignment are minor, and easily avoidable through mitigation. Potential wildlife impacts generally consist of the potential to harm or harass migratory birds during the migratory bird nesting season and wandering wildlife within the construction area. Recommended mitigation for this impact include the avoidance of any clearing or grading during the nesting season (April 1<sup>st</sup> – August 31<sup>st</sup>) where possible, and the clear delineation of the work space through the installation of silt and sediment fencing to avoid potential entry by wandering wildlife.

### Ecological Linkages

No impacts are expected to occur to the Speed River Ecological Linkage, the trail alignment runs adjacent to the river, crossing under the bridge, and will not provide a barrier to north-south movement along the river, or access to the terrestrial and wetland communities adjacent to the river. The bridge and retaining wall are existing barriers to any terrestrial linkage capacity from north to south of the bridge, as a result, the speed river provides a linkage between the north and south sides only in an aquatic capacity. No natural features are located west of the speed river, as a result, it is unlikely that species movement from the river moving west occur, as no suitable habitat is identified (e.g. rail line, residential, roads). The trail under the bridge and along the top of the retaining wall may increase the terrestrial capacity of the speed river to provide a terrestrial linkage between the north and south sides, allowing for terrestrial species to cross under the bridge using the trail.

#### **4.1.1.4 Option 4**

##### Proposed Trail

Similar to Option 1 (Figure 2A), this moderate length alignment option connects to the existing Trans Canada Trail north of the access point at Mac Avenue (Figure 2B). The upper portion of the trail alignment has a proposed trail cross section is comprised of a 3-meter wide asphalt trail, with 0.6-metre clear areas 'mow strips' on each side of the trail area, with 2:1 side slopes or retaining walls to match to existing grade, is to be constructed to City of Guelph standards. A continuous railing is proposed on the east edge of the trail where required as a guard per the Ontario Building Code for retaining wall. The lower portion of the trail is proposed to be a 3-meter wide elevated boardwalk with railings/guards in compliance with the Ontario Building Code on east and west edges of the boardwalk. The upper portion of the trail follows a small plateau with minor grading and short retaining walls, prior to proceeding down the valley slope as a boardwalk at a 3.5% longitudinal slope, leveling out to a 1.5% longitudinal slope boardwalk before connecting with the Speedvale bridge underpass on the south side of Speedvale Avenue (Figure 2B). Option 4 has the fewest impacts as the option requires the lowest quantity of fill and the shortest length and height retaining walls required to traverse the grade change from the existing Trans Canada Trail to the Speedvale Bridge Underpass. The use of a boardwalk also

allows the trail alignment to be positioned closer to the west bank of the Speed River, providing the longest clear sightline under the Speedvale Bridge underpass. In addition, the curved layout at the bottom of the boardwalk slope acts as a calming element for cyclists to reduce the speed.

Existing slopes and drainage patterns on the larger valley slopes are maintained. The use of Boardwalks will also reduce or eliminate access to ad-hoc trails by providing a barrier, and railings. During detailed design, consideration should be given to founding the elevated boardwalk on helical piers. This construction method has considerably less impact on the existing natural features, does not require excavation and can be constructed using significantly smaller construction equipment. If selected for advancing to detailed design, an amendment to the current zoning bylaw to add 'boardwalks' to the list of allowable structures within natural features may be required.

### Significant Wetlands

This alignment option is located a minimum of 2 meters from the locally Significant Wetland at the closest junction, and is generally 5 meters or more from the wetland edge. This option occurs within the 15m buffer to the wetland for the majority of its length. Impacts to the wetland could include introduction of invasive species, and off trail use. Mitigation proposed for these impacts includes the maintenance or restoration of vegetative buffers, development & implementation of an Erosion and Sediment Control plan and the creation of physical buffers and barriers, to reduce off trail usage as part of detailed design. Option 4 will reduce impacts to the Significant Wetland, by creating a formal trail that avoids traversing the wetland and significantly reduces the potential for creation of new ad hoc trails as an elevated boardwalk with railings; current ad hoc trails traverse the wetland in a number of locations, and have a significant impact on the wetland through introduction of non-native plants and trampling.

### Significant Woodlands

Portions of the Significant Woodland will be impacted, through the removal of trees and vegetation to complete grading at the top of the trail, and vegetation and tree removal to allow construction of the boardwalk. A total of 0.10ha or 0.13% of the City of Guelph mapped significant woodland area will be removed with option 4. Since the area of removal is along the edge of the woodland, no impacts to the woodland are expected from light infiltration. Potential minor impacts from the removal of woodland could include sedimentation, loss of herbaceous ground cover, and reduced infiltration. Option 4 will reduce impacts to the Significant Woodland, by creating a formal trail that avoids traversing the center of the woodland; current ad hoc trails traverse the woodland in a number of locations, and have a significant impact on the woodland through introductions of non-native plants, and dumping of non-native plant material by users. The use of boardwalks for the majority of the trail alignment will also significantly reduce impacts to the woodland, as grading will not be required for installation of the trail. Compensation and restoration of the woodland would provide an overall benefit to the greater significant woodland, by removing invasive species, and planting native trees and shrubs, and removing exotic and invasive species, such as Norway Maple and Manitoba maple.

### Trees

A40 trees will be directly impacted by the proposed trail alignment. Impacted trees consisted of 13 Manitoba Maple, 21 Black Walnut, 3 White Ash, and 1 each of Norway Maple, Sugar Maple, Eastern White Cedar, and Basswood. 40 additional trees, in poor condition, though not impacted by trail construction, may need to be removed due to proximity to the proposed trail alignment, and may present safety risks to trail users. The removal of Manitoba Maple is considered a benefit to the tree community, allowing for the planting and compensation of native, non-invasive species of trees within the woodland. Compensation for trees removed will occur at a rate of 3:1 in compliance with city policies, adequately mitigating any impacts to trees within the woodland. During detailed design, it is recommended that a complete Tree Preservation and Compensation plan be enforced, to provide protection to trees outside of the grading limits of the trail, as well as to determine on a case by case basis, if any trees within the impact area can also be retained.

#### Species at Risk

No species at Risk will be directly impacted by trail alignment option 4. 1 Butternut specimen is identified within 25 meters of the trail alignment, however the crown reserve of this tree is outside the trail alignment, and further investigation is required at the detailed design stage.

#### Aquatic Habitat

No impacts to aquatic habitat are expected from the proposed trail alignments. The trail will only have a minor encroachment into the aquatic habitat, below the high water mark, at the location of the connection to the Speedvale Bridge. The flow and characteristics of the watercourse will not be altered by the trail. Hydrological studies completed by Amec Foster Wheeler (2017), have indicated that this trail design option will not impact regional flood elevations, and all trail options are above the 50 year observed flood event.

The minor increase in the footprint below the high water mark is expected at the connection of the trail with the Speedvale Bridge. The specific dimension of the increased footprint below the high water mark will be determined during detailed design. An increase in footprint below the high water mark will trigger a DFO Request for Review. The DFO review will assess the project to ensure that proposed action do not cause 'serious harm' to fish or fish habitat. The impacts from the increased footprint below the high water mark will be negligible, as the location of the increased footprint is in a disturbed area, close to an existing bridge and bridge abutment. The riparian vegetation within the area is dominated by non-native species and no area of wetlands that could be used as direct or indirect fish habitat will be impacted.

Closure and restoration of existing ad hoc trails along the watercourse will improve the aquatic habitat by allowing more riparian vegetation to establish, providing shade and cover for fish and aquatic species.

#### Valleylands

Impacts to valleylands include increased potential for erosion on ravine slopes adjacent to the Speed River during construction. This option requires the least grading and no retaining walls are required. Existing slopes and drainage patterns on the larger valley slopes are maintained. Mitigation to reduce impacts includes the installation of vegetation to stabilize soils, and the development and implementation of an Erosion and Sediment Control plan during detailed design to control the potential for erosion of banks during construction. This alignment option has the least chance of impacting the valleylands. No impacts to drainage, habitat, surface water functions, groundwater functions, community and species diversity, linkage functions or habitat value are expected from the construction of the proposed trail.

#### Wildlife

Wildlife impacts that have the potential to occur as a result of this trail alignment are minor, and easily avoidable through mitigation. Potential wildlife impacts generally consist of the potential to harm or harass migratory birds during the migratory bird nesting season and wandering wildlife within the construction area. Recommended mitigation for this impact include the avoidance of any clearing or grading during the nesting season (April 1st – August 31st) where possible, and the clear delineation of the work space through the installation of silt and sediment fencing to avoid potential entry by wandering wildlife.

#### Ecological Linkages

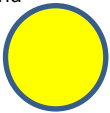

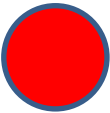

No impacts are expected to occur to the Speed River Ecological Linkage, the trail alignment runs adjacent to the river, crossing under the bridge, and will not provide a barrier to north-south movement along the river, or access to the terrestrial and wetland communities adjacent to the river. The bridge and retaining wall are existing barriers to any terrestrial linkage capacity from north to south of the bridge, as a result, the speed river provides a linkage between the north and south sides only in an aquatic capacity. No natural features are located west of the speed river, as a result, it is unlikely that species movement from the river moving west occur, as no suitable habitat is identified (e.g. rail line, residential, roads). The trail under the bridge and along the top of the retaining wall may increase the terrestrial capacity of the speed river to provide a terrestrial linkage between the north and south sides, allowing for terrestrial species to cross under the bridge using the trail.

#### **4.1.1.5 Conclusion:**

Options 1, 2 and 4 are preferred from a Natural Heritage perspective; these options avoid the Locally Significant Wetland; occur in areas considered highly disturbed, with a high proportion of non-native species; remove fewer trees, occur along the edge of the woodland, and retain the woodland designation as Significant; these options also affect the least number of Butternut Trees. A Hydraulic assessment completed by Amec Foster Wheeler (May 2017) has also indicated that options 1, 2 and 4 are preferred, as they will have no impact on the regional flood elevations or regional storm events; option 3 has been determined to cause minor flood elevation differences. All options were determined to be above the observed 50 year flood event. Options 1 and 4 are preferred from a design perspective. Both options are compliant with current City of Guelph accessibility guidelines, reduce impacts to valleylands, wetlands, woodlands, requiring less grading, shorter retaining walls, and reduced longitudinal slopes. Of

these two options, Option 4 (combination asphalt trail and boardwalk) has the lowest short and long term impacts based on the potential to use smaller construction equipment through the use of helical piers and no fill/retaining walls required in the boardwalk (lower) portion of the trail and only minor of fill/retaining walls required at the asphalt (upper) portion of the alignment. In addition, option 4 is the best alignment from a trail user perspective. Each Option and Natural Heritage impacts are detailed and described in Table 9. Proposed impact direction in Table 9 is prior to mitigation application.

| Criteria                             | Option 1   | Option 2   | Option 3  | Option 4   |
|--------------------------------------|--|--|---|--|
| <b>Locally Significant Wetlands</b>  | Outside limit of the Locally significant Wetland. Within adjacent lands.<br>NS   | Outside limit of the Locally significant Wetland. Within adjacent lands.<br>NS   | <b>Within the locally significant wetland.</b> Trail impact long term.<br>NL  | Outside limit of the Locally significant Wetland. Within adjacent lands.<br>NS   |
| <b>Locally Significant Woodlands</b> | <b>0.11ha</b> of woodland will be removed from a total woodland size of 76 Ha.<br>NS   | <b>0.08ha</b> of woodland will be removed from a total woodland size of 76 Ha.<br>NS   | <b>0.16ha</b> of woodland will be removed from a total woodland size of 76 Ha.<br>NS  | <b>0.10ha</b> of woodland will be removed from a total woodland size of 76 Ha.<br>NS   |
| <b>Individual Trees</b>              | <b>78</b> Trees will be impacted.<br>NS  | <b>67</b> Trees will be impacted.<br>NS  | <b>92</b> Trees will be impacted.<br>NS   | <b>80</b> Trees will be impacted.<br>NS  |
| <b>Aquatic Habitat</b>               | Potential increase in footprint below the High Water Mark. <b>Within the One Zone Flood Plain.</b> No impacts to regional flow elevations.<br>NS | Potential increase in footprint below the High Water Mark. <b>Within the One Zone Flood Plain.</b> No impacts to regional flow elevations.<br>NS   | Potential increase in footprint below the High Water Mark. <b>Within the One Zone Flood Plain.</b> Minor impacts to regional flow elevations.<br>NS | Potential increase in footprint below the High Water Mark. <b>Within the One Zone Flood Plain.</b> No impacts to regional flow elevations.<br>NS   |
| <b>Species at Risk</b>               | <b>One</b> Butternut Tree will be impacted.<br>NS  | <b>One</b> Butternut Tree will be impacted.<br>NS  | <b>Two</b> Butternut Trees will be impacted.<br>NS  | <b>No</b> butternut Trees will be impacted, Butternut is identified within 25m of the trail alignment.<br>NS                                       |
| <b>Significant Wildlife Habitat</b>  | Not likely to impact either Waterfowl Stopover Area, or Turtle Overwintering Habitat, trail option occurs outside of the watercourse.<br>N       | Not likely to impact either the Waterfowl Stopover Area, or the Turtle Overwintering Habitat, trail option occurs outside of the watercourse.<br>N | Not likely to impact either the Waterfowl Stopover Area, or the Turtle Overwintering Habitat, trail option occurs outside of the watercourse.<br>N  | Not likely to impact either the Waterfowl Stopover Area, or the Turtle Overwintering Habitat, trail option occurs outside of the watercourse.<br>N |
| <b>Wildlife</b>                      | Potential to impact nesting migratory birds.<br>NS   | Potential to impact nesting migratory birds.<br>NS   | Potential to impact nesting migratory birds.<br>NS  | Potential to impact nesting migratory birds.<br>NS   |

| Criteria                   | Option 1   | Option 2   | Option 3  | Option 4   |
|----------------------------|--|--|---|--|
| <b>Native Vegetation</b>   | Contained to the highly impacted Dry – Fresh Manitoba Maple Deciduous Forest Type and Fresh – Moist Black Walnut Lowland Deciduous Forest Type.<br><br>NS  | Contained to the highly impacted Dry – Fresh Manitoba Maple Deciduous Forest Type and Fresh – Moist Black Walnut Lowland Deciduous Forest Type.<br><br>NS  | Generally contained to the highly impacted Dry – Fresh Manitoba Maple Deciduous Forest Type and Fresh – Moist Black Walnut Lowland Deciduous Forest Type, but will also impact the edge of the Willow Mineral Deciduous Swamp Type.<br><br>NL | Contained to the highly impacted Dry – Fresh Manitoba Maple Deciduous Forest Type and Fresh – Moist Black Walnut Lowland Deciduous Forest Type.<br><br>NS  |
| <b>Valleylands</b>         | Significant Valleylands will be disturbed through, grading, addition of retaining walls.<br><br>NS   | Significant Valleylands will be disturbed through, grading, addition of retaining walls.<br><br>NS   | Significant Valleylands will be disturbed through, grading, addition of retaining walls.<br><br>NS  | Significant Valleylands are unlikely to be disturbed, no grading or retaining walls proposed with use of boardwalk.<br><br>N   |
| <b>Ecological Linkages</b> | No impact expected, trail design does not bisect north south linkage, and may provide increased capacity for north-south movements by terrestrial species using trails (such as small mammals).<br><br>N | No impact expected, trail design does not bisect north south linkage, and may provide increased capacity for north-south movements by terrestrial species using trails (such as small mammals).<br><br>N | No impact expected, trail design does not bisect north south linkage, and may provide increased capacity for north-south movements by terrestrial species using trails (such as small mammals).<br><br>N                                      | No impact expected, trail design does not bisect north south linkage, and may provide increased capacity for north-south movements by terrestrial species using trails (such as small mammals).<br><br>N |
| <b>Final ranking</b>       | Second<br>  | Third<br>   | fourth<br>  | Preferred<br>   |
| Legend                     | P: Positive  | N: Neutral   | NS: Negative (Short-term, minor or potential)   | NL: Negative (Long-term, extensive or definitive)  |

### 4.1.2 North Side Options

#### 4.1.2.1 Option 1

##### Proposed Trail

Trail option 1, a 3-metre wide proposed asphalt trail, with 0.6-metre clear area (mow strip) at the west edge of the trail, to be constructed to City of Guelph standards, requires significant retaining walls and grading at the bottom of steep slopes and encroaches on adjacent property; it will also require a guard along the edge of the existing flood wall in accordance with the Ontario Building Code. Portions of private land will also require purchase or an easement obtained to accommodate the 3 metre wide trail and associated retaining walls. A 0.4-meter height seat wall is proposed in front of the proposed retaining wall to provide an informal opportunity for rest, as well as stepping the retaining wall back by 0.5-metres from the trail edge to reduce the perceived height of the wall, and provide clearance at the edge of the trail in the



absence of a 0.6-metre clear area (mow strip). The majority of the proposed trail option matches the top of the existing, with cross slopes at 2%. The south portion of the trail slopes at 3.7% behind the floodwall to match the proposed Speedvale bridge underpass and the north portion of the trail slopes at 4% to match the existing driveway and sidewalk in Riverside Park south of the Enabling Garden. The remaining north portion of the trail continues at existing grade within Riverside Park adjacent the existing pavilion and open turf area, terminating at the main park access road.

### Urban Forest

Trees on top of the retaining wall and trees which have fallen on, or are growing over the wall have been identified as having the potential to affect the structural integrity of the retaining wall during structural assessment investigations completed by AMEC. As a result, these trees and debris are recommended for immediate removal to maintain the integrity of the retaining wall, regardless of the construction of the proposed trails. 0.09ha or 12% of the total urban forest (0.72ha) will be removed for option 1; however the woodland does not meet the minimum size criteria for significance in the City of Guelph OP, as such, it is considered part of the Urban Forest. Policies of the Urban forest indicate that many are degraded and that new development may provide opportunities for enhancement and restoration as part of the proposed site alteration, including removal of invasive species, and retention of healthy native trees where possible.

The herbaceous vegetation was dominated by noxious and weedy species, including Poison Ivy. Trees to be removed within this woodland consist of 42% Manitoba Maple, a naturalized species, which is considered an Aggressive invasive plant species (Urban Forest Associates, 2002). A further 11% consisted of Norway Maple, a non-native species. Since the area of removal is along the edge of the woodland, no impacts to the woodland are expected from light infiltration. Potential impacts from the removal of woodland could include sedimentation, and loss of herbaceous ground cover, easily mitigated through the implementation of an ESC plan, and ensuring ground cover has recovered prior to ESC removal. Slight short-term reductions in canopy cover may also be expected. Retaining walls will be designed to maintain drainage. Compensation and restoration of the Urban Forest would provide an overall benefit, by removing invasive species, and planting native trees and shrubs, and removing exotic and invasive species, such as Norway Maple and Manitoba Maple, in line with the Urban forest policies of the City of Guelph. The addition of a trail will also allow for future recommended investigation of the retaining wall, and ensure no trees are growing in areas that may affect the structural integrity.

### Trees

77 trees will be directly impacted by the proposed trail alignment. Impacted trees consisted of 33 Manitoba Maple, 9 Norway Maple, 5 Sugar Maple, 4 Freeman's Maple, 5 White Ash, 2 each of Horse Chestnut, Crack Willow and Basswood, 3 each of Hackberry, and American Elm, 5 Red pine, and 1 each of Beech species, Black Walnut, White Pine, and Willow Species. 6 additional trees, in poor condition, though not impacted by trail construction, may need to be removed due to proximity to the proposed trail alignment, and may present safety risks to trail users. The removal of Manitoba Maple and Norway Maple are considered a benefit to the tree

community, allowing for the planting and compensation of native, non-invasive species of trees within the woodland, a number of the trees to be removed are horticultural specimens. Compensation for trees removed will occur at a rate of at least 3:1, adequately mitigating any impacts to trees within the woodland. During detailed design, it is recommended that a Tree Preservation and Compensation plan be completed to provide protection to trees outside of the grading limits of the trail, as well as to determine on a case by case basis, if any trees within the impact area can also be retained.

#### Aquatic Habitat

No impacts to aquatic habitat are expected from the proposed trail alignments. The trail will only have a minor encroachment below the high water mark, at the location of the connection below the Speedvale Bridge. Hydrological studies completed by Amec Foster Wheeler (2017), have indicated that this trail design option will not impact regional flood elevations, and all trail options are above the 50 year observed flood event. The flow and characteristics of the watercourse will not be altered by the trail. Overhanging vegetation over the retaining wall must be removed to maintain the structural integrity of the retaining wall regardless of the construction of any trail options; as a result, this is not considered an impact of trail development.

The minor increase in the footprint below the high water mark is expected at the connection of the trail with the Speedvale Bridge. The specific dimension of the increased footprint below the high water mark will be determined during detailed design. An increase in footprint below the high water mark will trigger a DFO Request for Review. The DFO review will assess the project to ensure that proposed action do not cause 'serious harm' to fish or fish habitat. The impacts from the increased footprint below the high water mark will be negligible, as the location of the increased footprint is in a disturbed area, close to an existing bridge and bridge abutment. The riparian vegetation within the area is dominated by non-native species and no area of wetlands that could be used as direct or indirect fish habitat will be impacted.

#### Valleylands

Impacts to valleylands include increased erosion on ravine slopes adjacent to the Speed River, impacts to unstable landforms and potential loss of stabilizing roots from trees to be removed. Grading and retaining walls are required to stabilize the trail and existing slopes, and ensure the safety and accessibility for users. Further mitigation to reduce impacts include the installation of vegetation to stabilize soils, and the installation of ESC fencing to control the potential for erosion of banks during construction. Geotechnical Investigations and Slope stability assessment completed by Amec Foster Wheeler (May 2017, provided under separate cover), determined that any construction involving alteration of the existing slope is likely to have a detrimental impact on slope stability,

#### Species at Risk

No species at risk were identified within the woodland.

#### Wildlife

Wildlife impacts that have the potential to occur as a result of this trail alignment are minor, and easily avoidable through mitigation. Potential wildlife impacts generally consist of the potential to harm or harass migratory birds during the migratory bird nesting season and wandering wildlife within the construction area. Recommended mitigation for this impact include the avoidance of any clearing or grading during the nesting season (April 1<sup>st</sup> -August 31<sup>st</sup>) where possible, and the clear delineation of the work space through the installation of silt and sediment fencing to avoid potential entry by wandering wildlife.

### Ecological Linkages

No impacts are expected to occur to the Speed River Ecological Linkage, the trail alignment runs adjacent to the river, in the direction of the linkage, crossing under the bridge, and will not provide a barrier to north-south movement along the river. The bridge and retaining wall are existing barriers to any terrestrial linkage capacity from north to south of the bridge, as a result, the speed river provides a linkage between the north and south sides only in an aquatic capacity. No natural features are located west of the speed river, as a result, it is unlikely that species movement from the river moving west occur, as no suitable habitat is identified (e.g. rail line, residential, roads). The trail under the bridge and along the top of the retaining wall may increase the terrestrial capacity of the speed river to provide a terrestrial linkage between the north and south sides, allowing for terrestrial species to cross under the bridge using the trail.

#### **4.1.2.2 Option 2**

##### Proposed Trail

Trail option 2 proposes a combination of a 3-metre wide asphalt trail with a 0.6-metre clear area (mow strip) on the west edge of the trail and a guard along the edge of the existing flood wall in accordance with the Ontario Building Code for the first 90-metres of trail, then a 3-metre wide elevated boardwalk, with guards in accordance with the Ontario Building Code, above the existing flood wall for 280-metres. The remaining north portion of the trail continues at existing grade within Riverside Park adjacent the an existing pavilion and open turf area, terminating at the main park access road in the same as trail option 1. Trail option 2 will avoid grading and retaining walls at the bottom of the steep slopes identified in option 1. The option also avoids building directly on the adjacent private property, however a portion of the proposed elevated boardwalk encroaches approximately 0.4-metres into the air space above the adjacent private property and may require the purchase of land, obtaining an easement, or further refinement of the elevated boardwalk in this location as part of detailed design to avoid legal/real estate implications.

##### Urban Forest

Trees on top of to the existing retaining wall and trees which have fallen on, or are growing over the wall have been identified as having the potential to affect the structural integrity of the retaining wall during structural assessment investigations completed by AMEC. As a result, these trees and debris are recommended for immediate removal to maintain the integrity of the retaining wall. 6.9% of the total 0.76ha Urban Forest will be removed; however, the woodland does not meet the minimum size criteria for the City of Guelph Significant Woodland criteria, as a result, it is considered part of the Urban Forest. Policies of the Urban forest indicate that many

within the city are degraded and that new development may provide opportunities for enhancement and restoration as part of the proposed site alteration, including removal of invasive species, and retention of healthy native trees where possible.

Trees to be removed within this area consist of 62% Manitoba Maple, which is considered an aggressive invasive plant species (Urban Forest Associates, 2002). The herbaceous vegetation was dominated by noxious and weedy species, including Poison Ivy. Since the area of removal is along the edge of the woodland, no impacts to the woodland are expected from light infiltration. Potential impacts from the removal of woodland could include sedimentation, and loss of herbaceous ground cover, easily mitigated through the implementation of an ESC plan, and ensuring ground cover has recovered prior to ESC removal. A boardwalk will have no impact on site drainage. Slight short-term reductions in canopy cover may also be expected. Compensation and restoration of the urban forest would provide an overall benefit to the , by removing invasive species, and planting native trees and shrubs, and removing exotic and invasive species, such as Norway Maple and Manitoba Maple, in line with the Urban forest policies of the City of Guelph. The addition of a trail will also allow for future recommended investigation of the retaining wall, and ensure no trees are growing in areas that may affect the structural integrity.

### Trees

57 trees will be directly impacted by the proposed trail alignment. Impacted trees consisted of 33 Manitoba Maple, 4 Norway Maple, 4 Red Pine, 3 each of White Ash and American Elm, 2 each of Crack Willow, Horse Chestnut and Basswood, and 1 each of Freeman's Maple, Common Apple, white pine and Willow Species. 9 additional trees, in poor condition, though not impacted by trail construction, may need to be removed due to proximity to the proposed trail alignment, and may present safety risks to trail users. The removal of Manitoba Maple is considered a benefit to the tree community, allowing for the planting and compensation of native, non-invasive species of trees within the woodland, a number of the trees to be removed are horticultural specimens. Compensation for trees removed will occur at a rate of at least 3:1, adequately mitigating any impacts to trees within the woodland. During detailed design, it is recommended that a complete Tree Preservation and Compensation plan be applied to provide protection to trees outside of the grading limits of the trail, as well as to determine on a case by case basis, if any trees within the impact area can also be retained.

### Aquatic Habitat

No impacts to aquatic habitat are expected from the proposed trail alignments. The trail will only have a minor encroachment into the aquatic habitat, below the high water mark, at the location of the connection to the Speedvale Bridge. Hydrological studies completed by Amec Foster Wheeler (2017), have indicated that this trail design option will not impact regional flood elevations, and all trail options are above the 50 year observed flood event. Overhanging vegetation over the retaining wall must be removed to maintain the structural integrity of the retaining wall, regardless of trail construction; as a result, this is not considered an impact of trail development.

The minor increase in the footprint below the high water mark is expected at the connection of the trail with the Speedvale Bridge. The specific dimension of the increased footprint below the high water mark will be determined during detailed design. An increase in footprint below the high water mark will trigger a DFO Request for Review. The DFO review will assess the project to ensure that proposed action do not cause 'serious harm' to fish or fish habitat. The impacts from the increased footprint below the high water mark will be negligible, as the location of the increased footprint is in a disturbed area, close to an existing bridge and bridge abutment. The riparian vegetation within the area is dominated by non-native species and no area of wetlands that could be used as direct or indirect fish habitat will be impacted.

#### Valleylands

Impacts to valleylands are unlikely to occur with option 2; the installation of a boardwalk negates the requirement for grading into the Valley slope.

#### Species at Risk

No species at risk were identified within the woodland.

#### Wildlife

Wildlife impacts that have the potential to occur as a result of this trail alignment are minor, and easily avoidable through mitigation. Potential wildlife impacts generally consist of the potential to harm or harass migratory birds during the migratory bird nesting season and wandering wildlife within the construction area. Recommended mitigation for this impact include the avoidance of any clearing or grading during the nesting season (April 1-august 31<sup>st</sup>) where possible, and the clear delineation of the work space through the installation of silt and sediment fencing to avoid potential entry by wandering wildlife.

#### Ecological Linkages

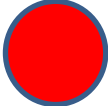

No impacts are expected to occur to the Speed River Ecological Linkage, the trail alignment runs adjacent to the river, crossing under the bridge, and will not provide a barrier to north-south movement within the river. The bridge and retaining wall are existing barriers to any terrestrial linkage capacity from north to south of the bridge, as a result, the speed river provides a linkage between the north and south sides only in an aquatic capacity. The trail under the bridge and along the top of the retaining wall may increase the terrestrial capacity of the speed river to provide a terrestrial linkage between the north and south sides, allowing for terrestrial species to cross under the bridge using the trail.

#### **4.1.2.3 Conclusion**

Both Option 1 and Option 2 are unlikely to impact Natural Heritage features, both options occur outside of any significant wetlands or woodlands. Option 1 will impact a greater number of trees, and requires extensive grading and encroaches onto adjacent private properties, potentially having an impact on Valleylands, and slope stability. Geotechnical Investigations and Slope stability assessment completed by Amec Foster Wheeler (May 2017, provided under separate cover), determined that any construction involving alteration of the existing slope is likely to

have a detrimental impact on slope stability, the report also recommended that Option 2 is the more prudent approach as it will not cause major disturbance to the existing slope. The Hydraulic assessment completed by Amec Foster Wheeler (May 2017), has indicated that all trail options will not impact regional flood elevations, and all trail options are above the 50 year observed flood event, no option is preferred based on hydraulic studies, as both options are outside the regional flood elevation. Option 2 will not affect the slope, and does not require extensive grading for trail creation. Option 2 is the preferred Trail Option from a Natural heritage and design perspective. Each Option and Natural Heritage impacts are detailed and described in Table 10. Proposed impact direction in Table 10 is prior to mitigation application.

| Criteria                     | Option 1   | Option 2   |
|------------------------------|--|--|
| Locally Significant Wetlands | No wetlands occur within 30m.<br>N   | No wetlands occur within 30m.<br>N   |
| Woodlands                    | 0.09ha of invasive and non-native woodland will be removed from a total woodland size of 0.72ha.<br>N-P  | 0.05ha of invasive and non-native woodland will be removed from a total woodland size of 0.72ha.<br>N-P  |
| Individual Trees             | 83 Trees will be impacted (removed).<br>NS   | 66 Trees will be impacted (removed).<br>NS   |
| Aquatic Habitat              | Potential construction activities below the High Water Mark. <b>Within the One Zone Flood Plain. No impacts to regional flow elevations.</b><br>NS   | Potential construction activities below the High Water Mark. <b>Within the One Zone Flood Plain. No impacts to regional flow elevations.</b><br>NS   |
| Species at Risk              | No Species at Risk were identified within the west side trail option 1.<br>N   | No Species at Risk were identified within the west side trail option 2.<br>N   |
| Significant Wildlife Habitat | Not likely to impact either the Waterfowl Stopover Area, or the Turtle Overwintering Habitat, trail option occurs outside of the watercourse.<br>N   | Not likely to impact either the Waterfowl Stopover Area, or the Turtle Overwintering Habitat, trail option occurs outside of the watercourse.<br>N   |
| Wildlife                     | Potential to impact nesting migratory birds.<br>NS   | Potential to impact nesting migratory birds.<br>NS   |
| Native Vegetation            | Trail option is contained to the highly impacted Dry – Fresh Manitoba Maple Deciduous Forest Type and Parkland community.<br>NS  | Trail option is contained to the highly impacted Dry – Fresh Manitoba Maple Deciduous Forest Type and Parkland community.<br>NS  |
| Valleylands                  | Significant Valleylands will be disturbed. Significant grading required may affect slope stability.<br>NS  | Significant Valleylands will be disturbed. No grading or retaining walls are proposed with this option, and is unlikely to affect slope stability.<br>N  |
| <i>Ecological Linkages</i>   | No impact expected, trail design does not bisect north south linkage, and may provide increased capacity for north-south movements by terrestrial species using trails (such as small mammals).<br>N | No impact expected, trail design does not bisect north south linkage, and may provide increased capacity for north-south movements by terrestrial species using trails (such as small mammals).<br>N |

| Criteria             | Option 1  | Option 2   |
|----------------------|---|--|
| <i>Final ranking</i> | Second<br> | preferred<br> |
| <b>Legend</b>        | <b>P:</b> Positive  | <b>N:</b> Neutral  |
|                      | <b>NS:</b> Negative (Short-term, minor or potential)  | <b>NL:</b> Negative (Long-term, extensive or definitive)   |

## 4.2 Impacts to Hydrological Function of the wetland

The proposed trail alignments are largely outside the limits of the wetland feature, but may still impact the wetland and hydrology through direct and on-going impacts if not mitigated for. Vegetation removal through the creation of the trail could lead to higher rates of erosion and increased sedimentation into the wetland and watercourse. As well, removal of trees may open the canopy, allowing more light to reach the understory community. This could lead to changes in the plant community composition, and increased temperature. Ongoing impacts associated with the trail could occur if it encourages more people to walk through the wetland, or is used by people to dispose of trash or yard waste within the wetland.

The overall wetland size will not be reduced as part of the south trail alignments 1, 2 and 4, and flood storage capacity will be maintained. The riverine nature of the wetland indicates that the primary source of water is from the Speed River, this hydrological input will not be affected by any of the proposed trail alignments. The sandy loam soil of the upland communities, above the wetland allows for moderate to rapid infiltration of water, with minimal pooling. This surface soil profile will be largely maintained following construction of the trail system and associated grading. Culverts under the trail will provide hydrological connection and free flow of water, specific locations of culverts will be determined as part of detailed design. It is expected that infiltration rates and surface water flow into the wetland would not be substantially altered from current condition.

Mitigation measures, proposed restoration and closure of existing ad hoc trails will minimize and offset the minor impact to the wetland and wetland function associated with the creation of the formal trail. Planting of vegetation in disturbed areas will provide shade, minimizing or eliminating the negative thermal impacts of vegetation removal required for the construction of the trail. Deliberate closure and restoration of the numerous ad hoc trails in the area will reduce tramping through the wetland, and increase connectivity throughout the wetland. These mitigation measures and selection of the most appropriate trail alignment will minimize or fully off-set expected minor impacts to the wetland feature.

### 4.3 Generalized Impact Assessment and Mitigation

All of the proposed trail designs will result in impacts to the existing natural features. An assessment of the generalized impacts of all Trail Options (potential and actual) and mitigation measures are provided in *Table 11*. A Glossary of terms and impact ratings is found in Appendix 12.

Table 11. 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"> <li>Loss of vegetation and wildlife habitat</li> </ul>              | ST                 | R             | SA                            | O         | PD                      | H                       | Y                   | Minor                   | <ul style="list-style-type: none"> <li>Establish and maintain buffers around significant features</li> <li>Incorporate design to avoid or minimize loss of vegetation and edge habitat</li> <li>Minimize vegetation removal on slopes</li> <li>Designate construction staging and vehicle access areas outside of established designated natural areas and isolate with ESC measures</li> </ul> | None                | <ul style="list-style-type: none"> <li>Monitor for successful establishment of native plant communities.</li> <li>Adapt Integrative Pest Management Plan as needed to control exotic species.</li> </ul> |
|                  |  | <ul style="list-style-type: none"> <li>Loss of woodland habitat</li> <li>Loss of Tree cover</li> </ul> | ST                 | R             | SA                            | O         | PD                      | M                       | Y                   | Minor                   | <ul style="list-style-type: none"> <li>Revegetate areas with native species after site preparation</li> <li>Implement Restoration plan</li> <li>Compensate for Trees removed at a 3:1 ratio</li> </ul>  | None                | <ul style="list-style-type: none"> <li>Monitor for successful establishment of native plant communities.</li> <li>Adapt Integrative Pest Management Plan as needed to control exotic species.</li> </ul> |



Table 11. 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 | • Disturbance of wildlife species  | ST                 | R             | SA                            | O         | PD                      | M                       | Y                   | Minor                   | • Time activities to avoid wildlife disturbance during critical life stages  | None                |  |
|                          |  | • Impacts to Nesting Birds Protected under the Migratory Bird Convention Act | ST                 | R             | AA                            | O         | PD                      | H                       | Y                   | Moderate                | • 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. Due to the existing dense vegetation on site Environment and Climate Change Canada advises against removal of vegetation during the general nesting period, even with a nest search carried out by a skilled and experienced observer. | None                |  |
|                          |  | • Increased erosion, sedimentation into wetlands                             | ST                 | R             | AA                            | O         | PD                      | M                       | Y                   | Moderate                | • Maintain or restore vegetative buffers<br>• Develop & implement ESC plan<br>• Create physical buffers  | Minor-None          | • Monitor ESC fencing<br>• Monitor for successful establishment of native plant communities. |
|                          |  | • Reduced vegetation diversity   | ST                 | R             | SA                            | O         | PD                      | L                       | N                   | Minor                   | • Revegetate areas with native species after site preparation  | None                |  |

Table 11. 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   |
|---------|----------|---|--------------------|---------------|-------------------------------|-----------|-------------------------|-------------------------|---------------------|-------------------------|---|---------------------|--|
|         |          |   |                    |               |                               |           |                         |                         |                     |                         |   |                     |  |
| Grading |          | <ul style="list-style-type: none"> <li>Increased erosion, sedimentation and turbidity</li> <li>Increase nutrient inputs and contaminants to waterbodies and wetlands</li> </ul> | ST                 | R             | AA                            | O         | PD                      | M                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Maintain or restore vegetative buffers</li> <li>Develop &amp; implement ESC plan</li> <li>Control water contamination through good housekeeping practices</li> </ul>   | None                | <ul style="list-style-type: none"> <li>Monitor ESC fencing</li> <li>Monitor for successful establishment of native plant communities.</li> </ul> |
|         |          | <ul style="list-style-type: none"> <li>Increased soil compaction</li> </ul>   | ST                 | R             | SA                            | O         | PD                      | H                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Control access and movement of equipment and people</li> <li>Minimize the use of heavy equipment in sensitive areas</li> <li>Construction equipment limited to the trail construction allowance area and not encroach within the adjacent woodland or wetland</li> </ul> | Minor               |  |
|         |          | <ul style="list-style-type: none"> <li>Changes to drainage</li> <li>Changes to surface runoff</li> </ul>  | ST                 | R             | SA                            | O         | PD                      | H                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Minimize changes to land contours and natural drainage</li> <li>Maintain streams and timing, quantity of flows</li> </ul>  | Minor-None          |  |
|         |          | <ul style="list-style-type: none"> <li>Changes in soil moisture, vegetation</li> </ul>  | ST                 | R             | SA                            | O         | PD                      | L                       | N                   | Minor                   | <ul style="list-style-type: none"> <li>Minimize the area and duration of soil exposure</li> </ul>   | None                |  |
|         |          | <ul style="list-style-type: none"> <li>Disturbance to wildlife</li> </ul>   | ST                 | R             | SA                            | O         | PD                      | L                       | N                   | Minor                   | <ul style="list-style-type: none"> <li>Conduct work outside timing windows of sensitive species or periods</li> </ul>   | Minor-None          |  |
|         |          | <ul style="list-style-type: none"> <li>Wildlife Entering Construction Areas</li> </ul>  | ST                 | R             | SA                            | O         | PD                      | L                       | N                   | Minor                   | <ul style="list-style-type: none"> <li>Implementation of ESC fence to minimize wildlife wandering</li> </ul>  | Minor-None          |  |

**Table 11. 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      | Trail Construction                                     | <ul style="list-style-type: none"> <li>Increased erosion, sedimentation and turbidity</li> </ul>  | ST                 | R             | SA                            | S         | PD                      | H                       | Y                   | Minor                   | <ul style="list-style-type: none"> <li>Maintain vegetated buffers</li> <li>Develop sediment and erosion control plan</li> <li>Maintain or provide vegetative buffers</li> <li>Implement infiltration techniques</li> </ul>       | None                | <ul style="list-style-type: none"> <li>Monitor for successful establishment of native plant communities.</li> </ul> |
|                   |  | <ul style="list-style-type: none"> <li>Water contamination by oils, gasoline, grease and other materials</li> </ul>                                       | ST                 | R             | SA                            | S         | PD                      | H                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Control water contamination through good housekeeping practices</li> </ul>  | Minor-None          |   |
|                   |  | <ul style="list-style-type: none"> <li>Increased impervious surfaces causing: Increased runoff, reduced infiltration and groundwater discharge</li> </ul> | LT                 | P             | AA                            | C         | PD                      | H                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Implement infiltration techniques</li> <li>Maintain sufficient buffer between trail and significant features</li> <li>Construct trail with permeable substrates where possible</li> </ul> | Minor-None          |   |
|                   |  | <ul style="list-style-type: none"> <li>Loss of vegetation and removal of dead trees for trail user safety</li> </ul>                                      | ST                 | R             | SA                            | O         | PD                      | M                       | N                   | Minor                   | <ul style="list-style-type: none"> <li>Revegetate areas with native species</li> <li>Compensate for Dead Tree Loss</li> </ul>  | None                | <ul style="list-style-type: none"> <li>Monitor for successful establishment of native plant communities.</li> </ul> |
|                   |  | <ul style="list-style-type: none"> <li>Disturbance to Wildlife from sounds and activity associated with construction.</li> </ul>                          | ST                 | R             | SA                            | O         | PD                      | M                       | N                   | Minor                   | <ul style="list-style-type: none"> <li>Time activities to avoid sensitive wildlife periods</li> </ul>  | Minor-None          |   |
| Post-Construction | Recreation Activities (e.g. walking, cycling, fishing) | <ul style="list-style-type: none"> <li>Increased erosion, sedimentation and turbidity to waterbodies</li> </ul>   | LT                 | P             | SA                            | C         | PD                      | M                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Choose designs and materials that will minimize impacts</li> <li>Minimize erosion by using Asphalt, gravel, stones or wood on paths</li> </ul>  | Minor-None          |   |

Table 11. 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.) | Recreation Activities (e.g. walking, cycling, fishing) | <ul style="list-style-type: none"> <li>Increased access to sensitive sites, and destruction of sensitive features from trampling</li> </ul>      | LT                 | P             | AA                            | M         | PD                      | M                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Develop trails for walking and cycling that avoid sensitive habitat</li> <li>Provide opportunities for people to report on natural areas</li> <li>Install site specific educational signage to inform users of the significance/sensitivity of the natural features</li> <li>Close, and provide barriers to existing trails within the woodlands and adjacent to wetlands to discourage use.</li> </ul> | Minor-None          |  |
|                           |  | <ul style="list-style-type: none"> <li>Trail development impacts including vegetation trampling, damage to root mat, soil disturbance</li> </ul> | LT                 | P             | AA                            | M         | PD                      | M                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Enforce proper trail use</li> <li>Maintain or provide vegetative buffers</li> <li>Install fencing or other deterrents to reduce off trail impacts</li> <li>Install site specific educational signage to inform users of the significance/sensitivity of the natural features</li> </ul>   | Minor-None          | Monitor for off-trail use, and provide recommendations for the installation of further deterrents and/or signage |
|                           |  | <ul style="list-style-type: none"> <li>Introduction of invasive &amp; non-native plant species</li> </ul>  | LT                 | P             | AA                            | M         | PD                      | M                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Enforce no dumping rules and proper trail use</li> <li>Promote public education/awareness</li> </ul>  | Minor               |  |

Table 11. 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) | • Trampling of vegetation and chasing of wildlife by off-leash dogs   | LT                 | P             | AA                            | M         | PD                      | M                       | Y                   | Minor                   | <ul style="list-style-type: none"> <li>Restrict access to natural areas to suitable trails</li> <li>Restrict access to designated trail access points</li> <li>Install fencing or other deterrents to reduce off trail impacts</li> <li>Encourage users to remain on the trail and keep dogs leashed, through installation of signs</li> <li>Install site specific educational signage to inform users of the significance/sensitivity of the natural features</li> </ul> | Minor-None          |  |
|       |  | • Disturbance to wildlife during critical life stages   | LT                 | P             | AA                            | M         | PD                      | M                       | Y                   | Moderate                | <ul style="list-style-type: none"> <li>Provide clearly marked trails away from sensitive features and wildlife habitat</li> </ul>   | None                |  |
|       |  | • Attraction of some wildlife species and scavengers due to human activities, including garbage causing increased human wildlife interactions | LT                 | P             | AA                            | M         | PD                      | M                       | Y                   | Minor                   | <ul style="list-style-type: none"> <li>Provide appropriate garbage receptacles at the pedestrian trailhead and ensure regular maintenance by City parks staff.</li> <li>Install fencing or other deterrents to reduce off trail impacts</li> </ul>  | Minor-none          |  |

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## 4.5 Restoration, Compensation and Invasive Species Management Strategy

The construction of any of the proposed trail designs 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 trail 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.).
  - Install riparian vegetation and fish refuge areas to create cover and enhance fish habitat.
  - Installation of terraces and benches within the Speed River channelized corridor to provide shading and thermal refuge.
- 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 DBH of 10cm or greater. This is regulated by the Private Tree Protection By-law (2010) – 19058. The Private Tree Protection By-law (2010) – 19058 regulates this ('the By-law'). Removal of trees under the By-law requires permission from the City, and

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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, and may exceed this calculation where warranted, per management direction on recent city projects completed by Aboud & Associates in 2016 and 2017.

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

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## 5.0 Legislation and Policy Compliance

### 5.1 City of Guelph Official Plan

The City of Guelph 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's environment first approach is committed to protecting, maintaining, enhancing and restoring the diversity, function, linkages, and connectivity between and among natural heritage features and areas and surface and ground water features within the City over the long term. The development of the trail will provide an opportunity to enhance and restore the diversity and function of the natural heritage system within the study area, through a comprehensive restoration and invasive species management plan. Thus ensuring the project is respecting the city's environment first approach, while allowing the recreational use of the natural heritage system for its citizens.

Development of a trail or walkway is considered outdoor recreation, as such; it may be permitted within the One Zone Floodplain. The development of a trail in this area encourages public accessibility that will clearly demarcate where public access is permitted and is based on a coordinated approach to trail planning and development. The development will also provide land stewardship opportunities, through a restoration and mitigation plan for the woodland. As such, this trail is in line with the policies identified in the City of Guelph OP related to the One Zone Flood policy area, and the general guidelines of the OP regarding the development of a system of publicly accessible parkland, open space and trails, including shoreline areas.

While the OP does not define a structure, the City of Guelph Zoning policy identifies structures as anything which is fixed or resting on/or in the ground, it also specifies a list of exceptions. This list includes fences, retaining walls, signs, play equipment, poles and pillars. An application for a zoning amendment may be required for the installation of boardwalks.

The OP indicates that development is generally prohibited within the Natural Heritage System, including minimum or established buffers, with exceptions listed under section 6A.1.2- General permitted uses, exceptions include passive recreational activities. Passive Recreational Activities may require the construction of a trail, benches or boardwalks in accordance with the Guelph Trail Master Plan and/or be integral to the scientific, educational or passive recreational use of a property.

The development of a trail or walkway is listed as an exception for development within the Natural Heritage system under the OP, to allow passive recreation activities. The addition of this trail segment is recommended in order to allow the passive recreational use of the property by the public, and provide a safe, off-road linkage to Riverside Park. Proposed trails are located as far from significant feature boundaries as possible, while providing a link below the Speed River for pedestrians and cyclists. The environmental impacts to the significant woodland, currently



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resulting from the use of informal trails throughout the woodland and within sensitive features will be reduced, and educational signage will be placed to enhance understanding and educational opportunities within a significant natural area. Mitigation for trails include keeping the construction disturbance area to a minimum through the use of Erosion and sediment control fencing, and re-establishing vegetation in disturbed areas with site-appropriate indigenous vegetation. As such, this trail complies with the policies identified in the City of Guelph OP related to the Natural Heritage System, general permitted uses.

### **5.1.1 Significant Wetlands and Significant Woodlands**

Under OP section 6A.2.4 and 6A.2.6 it indicates that development and site alteration are not permitted within Significant Wetlands or significant Woodlands, or their established buffers except for uses permitted by the General Permitted Uses of Section 6A.

Existing Ad Hoc trails within the Significant Wetland and Significant Woodland are currently located directly in sensitive habitat, formalization of existing trails in this area would be detrimental to the natural environment, and as such are not recommended as options. In consideration of the criteria for the formalization of ad hoc trails, trail alignment options include the use of boardwalks where appropriate, and viewing platforms and benches adjacent to the river. Educational signage is also recommended as a mitigation measure, to encourage proper stewardship and usage adjacent to a significant natural feature. The environmental impacts of each option have been assessed, evaluated and mitigation proposed through this EIS, and as such, meets the policy requirements for Significant Wetlands and Significant Woodlands.

### **5.1.2 Surface Water Features and Fish Habitat**

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 Uses of Section 6.

Passive Recreational Activities are permitted in Surface Water Features and Fish Habitat under Section 6 of the OP and may include the construction of a trail, benches or boardwalks in accordance with the Guelph Trail Master Plan and/or be integral to the scientific, educational or passive recreational use of a property.

All potential in-water works will respect MNRF timing windows, DFO mitigation requirements and implement best management practices.

### **5.1.3 Significant Valleylands**

Under OP section 6A.2.7, development and site alteration are not permitted within Significant Valleylands and established buffers except for uses permitted by the General Permitted Uses of Section 6A.1.2. 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.

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The Creation of Trails and Walkways are permitted within significant Valleylands. Areas disturbed within the significant Valleylands will be restored and naturalized through a comprehensive restoration and invasive species management plan as part of detailed design. This will improve water quality and quantity, promote bank stabilization and enhance wildlife habitat within the significant valleylands. As such, the development meets the policy requirements for Significant Valleylands.

#### **5.1.4 Ecological Linkages**

While no Ecological Linkages are mapped within the study area on schedule 10 of the Official, 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 and acknowledged.

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

The river corridor will be maintained, and all trail options occur along the edge of the natural feature, no changes are anticipated to occur to the river through the creation of trails, maintaining connectivity between the north, and south side of Speedvale Avenue. Rehabilitation and restoration of the woodland, including along river edges, will enhance wildlife habitat, by providing shading through vegetation overhang, and reduced evapo-transpiration, providing an enhancement to water quality in the Speed River. As such, the development meets the policy requirements for Ecological Linkages.

#### **5.1.5 Urban Forest**

The City's Urban Forest includes smaller wooded areas less than one 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.

Through a comprehensive restoration, compensation and management plan for the significant woodland prepared as part of detailed design, using the strategies identified in section 4.4 of this EIS, the urban forest will be enhanced, invasive and non-native species will be removed, and replaced to the fullest extent possible. All efforts have been made to retain as many healthy, non-invasive trees as possible through the evaluation of trail alignment options. As such, the development meets the policy requirements for the Urban Forest.

All 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

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Compensation Plan will be implemented, and trees will be compensated at a minimum 3:1 ratio, and may exceed this ratio where warranted within the restoration and compensation plan.

### **5.1.6 Policy Conclusion**

All trail alignment options proposed as part of this study, will result in minor removals of Significant Woodland of less than 0.25% of the woodland, consisting of over 50% non-native invasive tree Species. Removals will not result in changes to the overall canopy, as the trail will be below the retained tree canopy. Through the implementation of restoration, tree compensation and invasive species management plan as part of detailed design, in accordance with the restoration strategy described in section 4.4 of this study, the woodland will be restored to a varied and native vegetated system, providing greater benefit to the City's Natural Heritage System through water quality improvements, slope stabilization and removal of exotic and invasive species.

In addition, the creation of a formalized trail in this area will reduce the use of ad hoc trails which occur throughout the natural heritage feature, and are negatively impacting the Natural Heritage System.

Therefore, the proposed trail would not negatively impact the Natural Heritage System or its ecological function, but provide benefits to the community, a safer trail linkage, and provide ecological benefit to the woodland community.

## **5.2 Provincial Policy Statement**

The *Provincial Policy Statement* ([PPS] OMMHA, 2005) provides policy direction on matters of provincial interest related to land use planning and development. Section 2.1.4 of the PPS states that "*Development and site alteration shall not be permitted in: Significant Wetlands, Significant Woodlands, Significant Valleylands, south and east of the Canadian Shield;... unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological function.*"

Based on the City of Guelph policy in Section 5.1 of this EIS, the proposed trail does not contravene the policies of the PPS because the proposed trail, with the provided mitigation, restoration and management, would result in no negative impact to the Significant Woodland, wetland, or valleylands. Therefore, the proposed trail would not negatively impact the wider *Significant Woodland, Wetland or Valleylands* or their ecological function.

## **5.3 GRCA Wetland Policies**

The proposed trail development is entirely within the Floodplain and the allowances adjacent to these features. The Speed River and a Locally Significant Wetland are also located adjacent to the proposed trail options.

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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."*

The proposed preferred trail alignments, together with the mitigation measures proposed in Section 4.0 of this EIS, will result in no negative hydrological or ecological impacts upon the locally Significant Wetland, there is no loss of flood storage, and mitigation measures will enhance features and functions. *Figure 1* demonstrates that three of the four trail alignment options are proposed to occur outside of the locally significant wetland, and none of the options include extensive in-water works.

Flood storage will not be impacted by trail alignment options (south of Speedvale Avenue) 1, 2 or 4, as these options are outside of the wetland, which is the main source of water storage. The wetland will not be reduced or filled in as part of these proposed options. Culverts under the trail alignments will allow for free flow of water beyond the trail, allowing for water storage beyond the trail if water levels were to rise to a height greater than the trail.

The grading and retaining wall along the edge of the wetland for trail option 3 (south of Speedvale Avenue) will reduce the overall storage capacity of the wetland through infilling. Trail option 3 is therefore not consistent with the GRCA wetland Policy.

In order to provide a safe, off-road linkage to Riverside Park across Speedvale Avenue, the provision of an underpass of Speedvale Avenue is required, no other feasible alternative is possible to provide safe, off-road passage across Speedvale Avenue. Therefore the proposed development complies with GRCA's wetland policies.

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## 6.0 Summary and Conclusions

It is our opinion that by implementing the mitigation measures identified in Table 10 and section 4, that the proposed trail alignment option 4 south of Speedvale Avenue and option 2 north of Speedvale Avenue will result in no long-term negative impacts to natural heritage features identified within and adjacent to the proposed trails. The Locally Significant Wetland, Significant Woodlands, Significant Valleylands and Significant Wildlife Habitat identified in the study area will be protected and enhanced, and will result in long term positive effects. Below is a summary of the affected Natural Heritage features and constraints, impacts. Recommendations for associated mitigation and/or protection measures are identified in section 7.

### 6.1 Biological Studies and Site Constraints

1. Surveys were conducted for Ecological Land Classification and Vegetation Communities (ELC and Vascular Plant List), Amphibians, Breeding Birds, Winter Wildlife, Significant Wildlife Habitat, Aquatic Habitat and a Tree Inventory.
2. One Species at Risk was detected within the study area, Butternut.
3. One Species listed as Special Concern was detected in the study Area, Common Snapping Turtle.
4. Significant Wildlife Habitat occurs adjacent to the proposed trail alignments (Waterfowl Overwintering), as identified by the Ministry of Natural Resources and Forestry.
5. Three regionally or locally significant bird species were observed in the study area (Gray Catbird, Baltimore Oriole and Northern Rough-winged Swallow).
6. A Locally Significant Wetland occurs within the study area.
7. The Study Area includes Significant Woodlands.
8. The study area includes Valleylands.
9. The study area is within the one zone floodplain.

### 6.2 Impact Assessment

1. Potential impacts from the creation of a trail were assessed to determine their extent (Section 4), and mitigation guidelines have been provided (*Table 10*).
2. Impacts primarily involve the removal of trees, naturalized weedy herbaceous vegetation communities, site grading and wildlife disturbance.

3. Four trail options were analyzed on the south side of the Speedvale Avenue, and two were analyzed on the north side to determine the option with the least impact to the Natural Heritage System.
4. There is also potential for site preparation works (grading) to have impacts upon trees, wildlife and the locally significant wetland, and watercourse, through tree removals, root damage, wandering wildlife and sediment run-off respectively.
5. Management of trees along the trail edges may require an assessment of stability of retained trees and may include some selective tree removal and pruning.
6. 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 formal trails is permitted within Significant Woodlands and Locally Significant Wetlands. The trail development is part of a proposed off-road trail linkage, linking the TransCanada Trail, to Riverside Park system. It is our opinion that through the selection of trail alignment option 1 or 4 on the south side of Speedvale Avenue, and option 2 on the north side, and the implementation of mitigation and restoration measures described, there will be no negative effects to the Significant Woodland, Valleylands, Significant Wildlife Habitat or Locally Significant bird species from the proposed trail development. Provided mitigation, restoration and compensation will provide an overall positive effect to the woodland and wetland communities.
2. The proposed development can occur 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) because it has been demonstrated that there will be no negative impacts upon the nearby Locally Significant Wetland, The proposed trail, together with the mitigation measures proposed in Section 4.0 of this EIS, will result in no negative hydrological or ecological impacts upon the Locally Significant Wetland, there is no loss of flood storage, and mitigation measures will enhance features and functions. *Figure 1* demonstrates that two of the three trail alignment options are proposed to occur outside of the Locally Significant Wetland, and none of the options include in water works. No other feasible alternative is possible to provide safe, off-road passage across Speedvale Avenue. Therefore the proposed development complies with GRCA's wetland policies.

## 7.0 Mitigation Recommendations

The following recommendations are provided to ensure protection and maintenance of natural heritage features and function within and adjacent the proposed trail alignments, through 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
  1. 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. Control access and movement of equipment and people
5. Control water contamination through good housekeeping practices
6. Minimize the use of heavy equipment in sensitive areas
7. Designate construction staging and vehicle access areas outside of established designated natural areas and isolate with ESC measures
8. Construction equipment limited to the trail construction allowance area and not encroach within the adjacent woodland or wetland
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 wherever opportunities exist.
11. Implement a comprehensive restoration, Compensation and Invasive Species Management plan after site preparation.
12. Time activities to avoid wildlife disturbance during critical life stages
13. Compensate for Trees removed at a 3:1 ratio

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14. Provide clearly marked trails away from sensitive features and wildlife habitat
  15. Provide appropriate garbage receptacles at the pedestrian trailhead and ensure regular maintenance by City Park staff.
  16. Install fencing or other deterrents to reduce off trail impacts
  17. Choose designs and materials that will minimize impacts
  18. Construct trail with permeable substrates where possible
  19. Close, and provide barriers to all existing informal trails within the woodlands and adjacent to wetlands to discourage use.
  20. Conduct work outside aquatic timing windows
  21. Complete all tree and vegetation removals 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.
  22. Promote public education/awareness through Installation of site specific educational signage to inform users of the significance/sensitivity of the natural features.



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