Appendix B: Natural Heritage

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Natural Heritage Report

BIRCH AVENUE IMPROVEMENTS FROM BARTON STREET TO BURLINGTON STREET HAMILTON, ONTARIO

prepared for:

IBI GROUP

prepared by:

LGL LIMITED
environmental research associates

JANUARY 2020

BIRCH AVENUE IMPROVEMENTS FROM BARTON STREET TO BURLINGTON STREET HAMILTON, ONTARIO

NATURAL HERITAGE REPORT

prepared by:

Lisa Catcher
Hons. B.A.
Botanist/ISA Certified Arborist

Heather Polan
M.Sc., R.P. Bio.
Wildlife Biologist

Anna Jose
M.Env.Sc.
GIS Specialist

reviewed by:

Grant N. Kauffman, M.E.S.
Vice President, Ontario Region

LGL Limited
environmental research associates
22 Fisher Street, P.O. Box 280
King City, Ontario CANADA L7B 1A6
Tel: (905) 833-1244 Fax: (905) 833-1255
Email: kingcity@lgl.com
URL: www.lgl.com

JANUARY 2020

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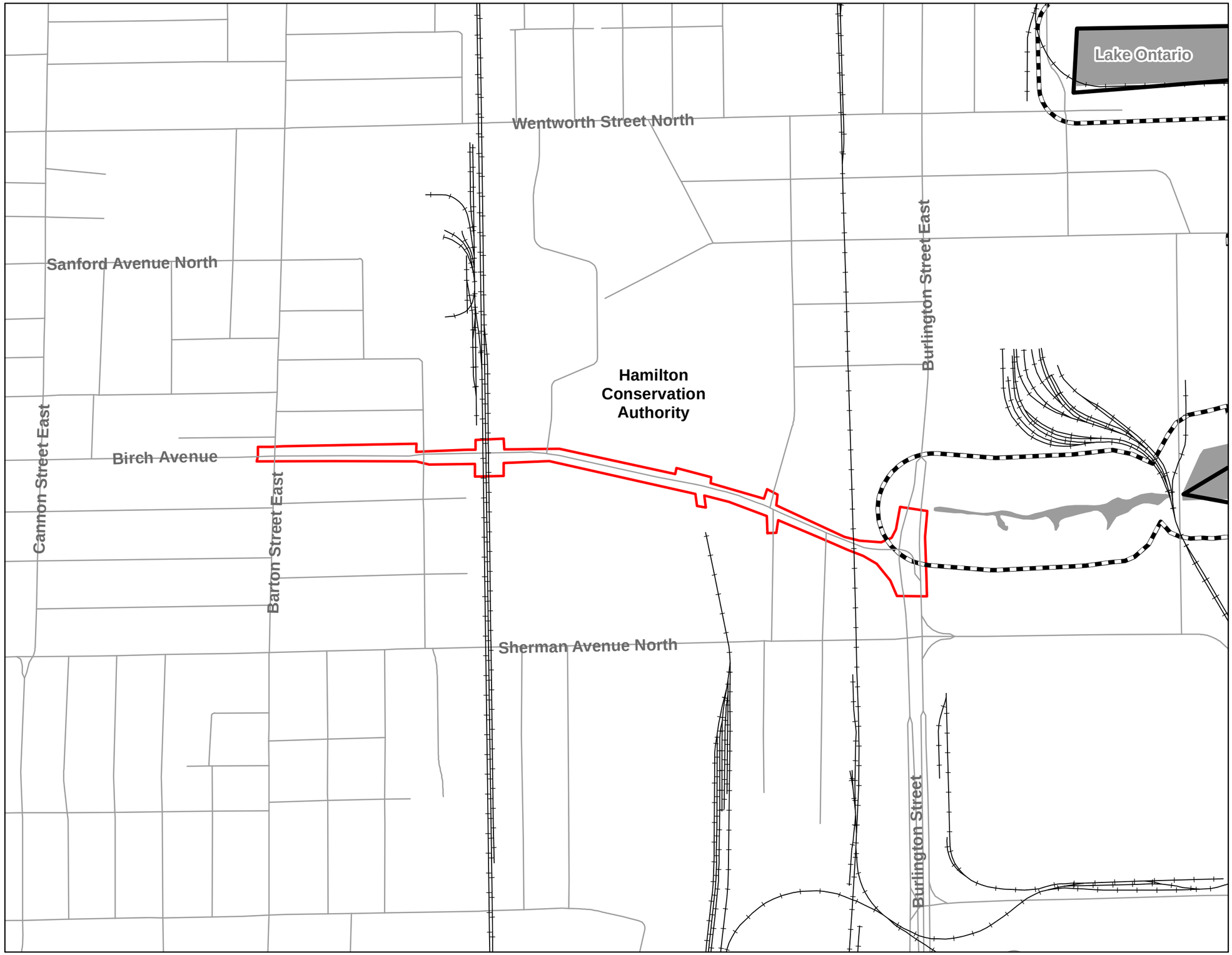
1.0 INTRODUCTION

The City of Hamilton has initiated a Schedule “B” Municipal Class Environmental Assessment to investigate improvements to Birch Avenue from Barton Street to Burlington Street. Birch Avenue is a one-way, minor arterial serving local, through and goods movement traffic. Two bridges on the corridor are nearing the end of their design life and need to be replaced. The height of the bridges above the road is substandard and there are drainage issues that cause flooding. In the near term, the road will be converted to two-way traffic and will become the primary access route to the Hamilton Transit Bus Maintenance and Storage Facility. The City is looking at opportunities to resolve clearance, address drainage issues and implement active transportation infrastructure and traffic operational improvements for the benefit of users.

LGL Limited was retained by IBI Group, on behalf of the City to Hamilton, to conduct a natural heritage investigation along Birch Avenue from Barton Street to Burlington Street as shown in **Figure 1**. The study area included the new Birch Avenue right-of-way and immediately adjacent lands within the municipal road corridor. This Natural Heritage Report presents the results of the natural heritage investigation carried out in 2019.



LEGEND

- Railroad
- Roads
- Study Area
- Regulation Limit (Hamilton Conservation Authority)
- Conservation Authority Boundary
- Waterbody

Data Source: Ontario Ministry of Natural Resources and Forestry (LIO) & Hamilton Conservation Authority. Contains information licenced under the Open Government Licence - Ontario

0 30 60 120 180 Meters

N

Key Map of Study Area

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Project:	TA8927	**Figure:**	1
Date:	November, 2019	**Prepared By:**	AJ
Scale:	1:6,000	**Verified By:**	GNK

2.0 SITE DESCRIPTION

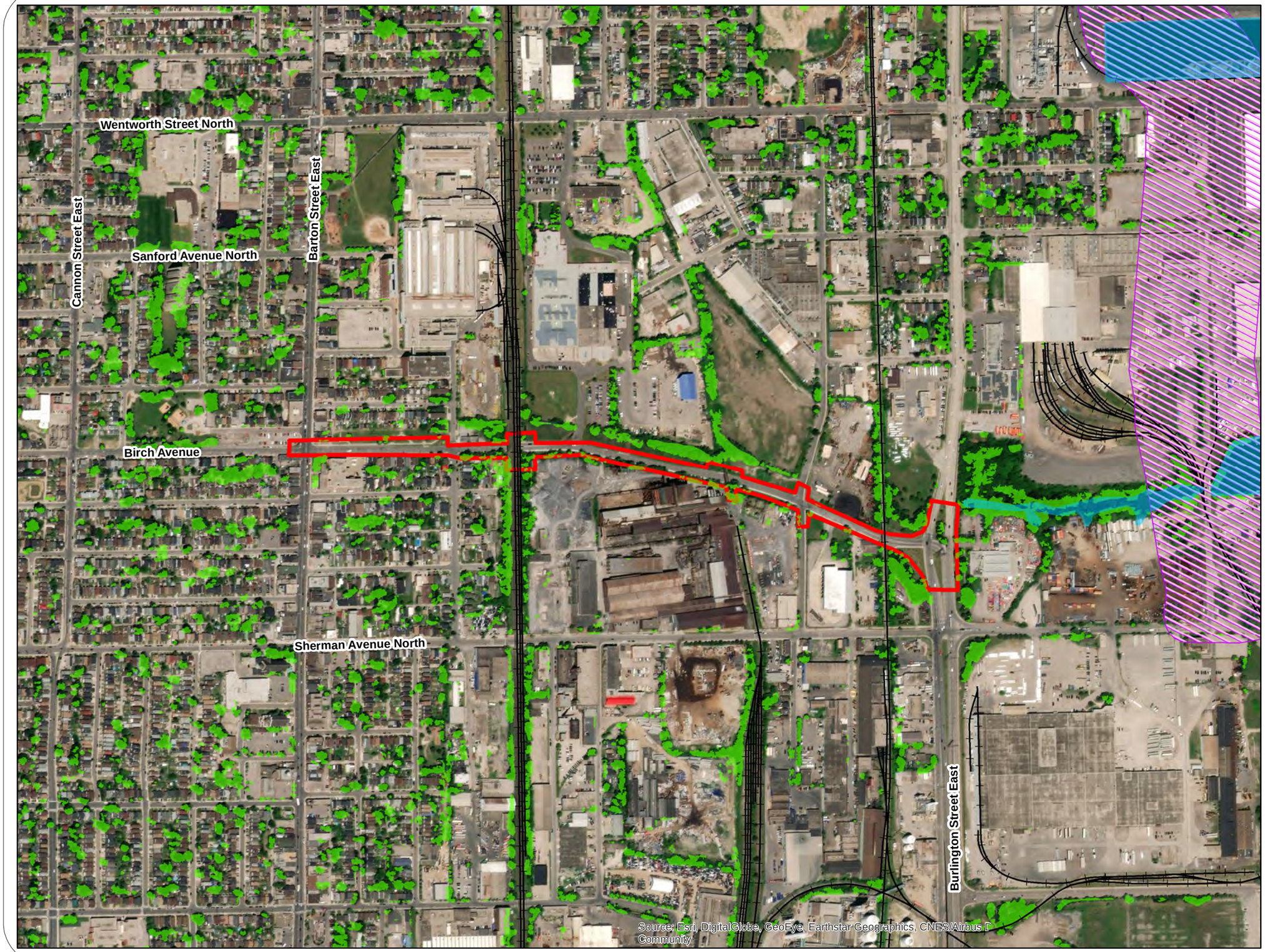
Birch Avenue is designated primarily as “Industrial Land,” with a “Neighbourhood” designation in the vicinity of Barton Street and a “Shipping and Navigation” designation north of Burlington Street according to the Urban Hamilton Official Plan, Schedule E-1, Urban Land Use Designation. Natural heritage features are primarily associated with the “Parks and Urban Space” designation, including Birch Park and Birch Avenue Dog Park, in Schedule B, Natural Heritage System, of the Urban Hamilton Official Plan. No other natural heritage official plan designation exists within the road corridor, and there are no Core Areas or Linkage Areas located within 120 m of the road corridor. Part of the Birch Avenue/Burlington Street intersection lies within a Regulated Area defined under Ontario Regulation 161/06 of the Hamilton Conservation Authority. Natural heritage features are presented in **Figure 2**.

2.1 PHYSIOGRAPHY, BEDROCK AND QUATERNARY GEOLOGY

The site is located within the Iroquois sand plain physiographic region (Chapman and Putnam 1984). The Iroquois sand plain was flooded by glacial Lake Iroquois and is comprised mostly of permeable sand deposits. Bedrock consists of the Queenston Formation, which is Middle Ordovician in age, and comprised of shale, limestone, dolostone and siltstone (Ontario Geological Survey 1991). Quaternary geology consists of lacustrine and outwash sand of the Pleistocene period from Barton Street to north of the CNR tracks and recent stream deposits including gravel, sand, silt and clay from north of the CNR tracks to Burlington Street (Karrow 1987). The study area is mostly level, with a slight trend towards Lake Ontario to the north.

2.2 FISHERIES

There are no watercourses or waterbodies located within the study area; therefore, no fish habitat is present.



LEGEND

- Railroad
- Study Area
- Waterbody
- Tree Canopy
- Waterfowl Wintering Area

Data Source: Ontario Ministry of Natural Resources and Forestry (LIO) & IBI Group. Contains information licenced under the Open Government Licence - Ontario

0 30 60 120 180
Meters

Natural Heritage Existing Conditions

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Project:	TA8927	**Figure:**	2
Date:	November, 2019	**Prepared By:**	AJ
Scale:	1:6,000	**Verified By:**	GNK

2.3 VEGETATION

2.3.1 Purpose

The geographical extent, composition, structure and function of vegetation communities were identified through air photo interpretation and field investigations. Air photos were interpreted to determine the limits and characteristics of vegetation communities. A field investigation of the vegetation communities within the existing right-of-way of Birch Avenue between Barton Street and Burlington Street and beyond to the extent possible, was undertaken on October 9, 2019.

Vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee *et al*. 1998). The communities were sampled using a plotless method for the purpose of determining general composition and structure of the vegetation. Plant species status was reviewed for Ontario (Oldham 2009) and Hamilton-Brant (Riley 1989). Vascular plant nomenclature follows Newmaster *et al*. (1998) with a few exceptions that have been updated to Newmaster *et al.* (2007).

The study area is highly urbanized and as such, the ELC communities identified within the study area are those that are disturbance tolerant. A total of two ELC cultural vegetation communities were identified within the study area during LGL's botanical surveys including Dry-Moist Old Field Meadow (CUM1-1), and Mineral Cultural Thicket (CUT1). In general, cultural vegetation communities typically persist in areas that are regularly disturbed, and as a result, generally contain a high proportion of invasive and non-native plant species that are disturbance tolerant. The vegetation communities identified in the study area are described in **Table 1** and presented in **Figure 2**. All of the vegetation communities within the study area are considered widespread and common in Ontario and are secure globally.

In addition, there are several areas that are not identified as ELC vegetation communities including manicured areas (M) which include mowed lawns, gardens and planted trees.

TABLE 1.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Community Characteristics
TERRESTRIAL – CULTURAL			
CUM1	Cultural Meadow		
CUM1-1	Dry-Moist Old Field Meadow	**Emergent Trees/Shrubs:** includes Siberian elm (*Ulmus pumila*). **Ground cover:** includes awnless brome (*Bromus inermis* ssp. *inermis*), Kentucky bluegrass (*Poa pratensis* ssp. *pratensis*), white sweet-clover (*Melilotus alba*), New England aster (*Aster novae-angliae*), and Canada goldenrod (*Solidago canadensis*).	• Cultural communities (CU). • Tree cover and shrub cover < 25 % (M). • Mineral soil (1). • Grasses and forbs are dominant (-1).
CUT	Cultural Thicket		
CUT1	Mineral Cultural Thicket	**Canopy:** includes Siberian elm, Manitoba maple (*Acer negudo*), tree-of-heaven (*Ailanthus altissima*), Norway maple (*Acer platanoides*), and Austrian pine (*Pinus nigra*). **Understory:** includes Siberian elm, staghorn sumac (*Rhus typhina*), Tartarian honeysuckle (*Lonciera tatarica*), and riverbank grape (*Vitis riparia*). **Ground cover:** includes Kentucky bluegrass, common motherwort (*Leonurus cardiaca* ssp. *cardiaca*), riverbank grape, and common burdock (*Arctium minus* ssp. *minus*).	• Cultural community (CU). • Tree cover <25 %; shrub cover >25% (T). • Mineral soil (1).
*OTHER	Manicured		
M	Manicured	Areas where large expanses of grass/shrubs/trees are maintained and/or planted. **Trees/shrubs:** includes white mulberry (*Morus alba*), maiden-hair tree (*Ginkgo biloba*), and small leaf linden (*Tilia cordata*).	• Manicured grasses and planted shrubs and/or trees

*community not defined by ELC

2.3.2 Flora

A total of 67 plant species have been recorded within the study area. Of the 67 plants identified to species, 25 (37%) plant species identified are native to Ontario and 42 (63%) plant species are considered introduced and non-native to Ontario. A list of vascular plants is presented in **Appendix A**. Definitions of the acronyms and species ranks used in **Appendix A** are described in **Appendix B**.

2.3.3 Species at Risk

One plant species regulated as Threatened under the *Endangered Species Act*, 2007 was noted within the study area. Four Kentucky coffee trees (*Gymnocladus diocus*) were noted as planted amenity trees (LGL tree # 39, 60, 79 and 79). Consultation with MECP Management Biologists have advised that streetscape Kentucky coffee-trees likely are cultivars and as such, they are not protected under the *Endangered Species Act*. In addition, no plant species considered rare in Hamilton were identified within the study area (Riley 1989).

2.3.4 Designated Natural Areas

Designated natural areas include areas identified for protection by the Ontario Ministry of Natural Resources and Forestry (MNRF), Hamilton Conservation Authority, and the City of Hamilton. A review of the MNRF Natural Heritage Information Centre database and the City of Hamilton Official Plan (2013) indicates that there are no Areas of Natural and Scientific Interest (ANSIs), Provincially Significant Wetlands (PSW) or Environmentally Sensitive Areas (ESAs) located within 120 m of the study area.

2.3.5 Tree Resources

An LGL ISA Certified Arborist conducted an inventory of tree resources on November 22, 2019. The tree survey was undertaken along Birch Avenue from Barton Street to Burlington Street and included trees within the existing Birch Avenue right-of-way and private trees with canopies that overhang the right-of-way. The survey included an analysis of all trees 10 cm diameter at breast height (DBH) and greater with the exception of planted street trees, all planted trees were surveyed regardless of size.

The following information was collected for each tree:

- Species identification, including screening for species regulated by the Ontario *Endangered Species Act*, 2007 (ESA);

- Measurements: diameter at breast height (DBH) and estimation of canopy dripline;
- Location: trees were assigned a numerical identifier and their locations recorded using a TopCon GRS1 GPS. No trees were tagged as part of this survey; and;
- Health Assessment: trees were assessed as poor, fair or good based on qualities such as trunk integrity, crown structure, vigour, and dieback. Physical irregularities and defects were also noted for each tree.

A total of 112 trees consisting of 24 species were inventoried during the field investigation. A detailed summary of all trees surveyed are presented in **Tree Inventory - Appendix C** and the locations of each tree (by identifier number) are presented in **Figure 5** (see later section). Overall, trees within the study limits range in size from 4 to 55 cm DBH and are generally considered to be in good to fair condition.

2.4 WILDLIFE

Field investigations within the study area were conducted on several dates in the spring of 2019 to document wildlife and wildlife habitat and to characterize the nature, extent and significance of animal usage. Direct observations, calls, tracks, and scat were used to record wildlife present. A summary of survey date(s), tasks and weather is presented in **Table 2**. Breeding bird surveys were conducted late in the breeding bird season due to the date that the contract was awarded. While the protocols recommended in the Ontario Breeding Bird Atlas Guide for Participants (Bird Studies Canada 2001) could not be fully achieved (e.g. no survey in June, less than 15 days between surveys), the results of the survey are considered reasonable, given the highly urbanized study area.

TABLE 2.
SUMMARY OF DATE OF INVENTORY, TASK, WEATHER AND PERSONNEL

Date of Inventory	Task	Weather	Personnel Involved
July 5, 2019	Breeding Bird survey and incidental wildlife survey	Clear, 26 degrees Celsius (C), calm	Heather Polan (LGL)
July 12, 2019	Breeding bird survey and incidental wildlife survey	Clear, 24C, calm	Heather Polan (LGL)

2.4.1 Wildlife Habitat

Limited wildlife and wildlife habitat were found within the study area. Natural heritage features consisted primarily of manicured grass, cultural meadow and cultural thicket. The highest quality wildlife habitat found within the study area is provided by the cultural thicket and cultural meadow communities. No anuran breeding habitat was identified as no aquatic features exist within the study area. Existing human disturbance (e.g. litter, trails, etc.) was evident across the lands examined.

In terms of wildlife, the study area supports an assemblage of common species that are typical of a highly disturbed landscape. The breeding bird community was primarily composed of urban, tolerant, habitat generalist bird species. Significant wildlife habitat (amphibian breeding, reptile hibernacula, etc.) was not identified within the study area. No significant wildlife movement or passage corridors were identified within the lands examined. The wildlife assemblage identified is generally represented by species tolerant of anthropogenic features and disturbances.

2.4.2 Fauna

Based on field observations, 24 species of wildlife could be verified in the study area and most of these recordings came from identification (through calls and sightings) of bird species with more modest numbers of mammal species identified. A summary of wildlife species documented in the study area during field investigations is presented in **Table 3**.

TABLE 3.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA BY LGL (2019)

Wildlife	Scientific Name	Common Name	SARA	ESA	Legal Status	Other
Birds	*Carduelis tristis*	American Goldfinch			MBCA	
	Turdus migratorius	American Robin			MBCA	
	Riparia riparia	Bank Swallow		THR	MBCA	
	Hirundo rustica	Barn Swallow		THR	MBCA	
	Cyanocitta cristata	Blue Jay			FECA (P)	
	Chaetura pelagica	Chimney Swift	THR	THR	MBCA	
	Quiscalus quiscula	Common Grackle			-	
	Sturnus vulgaris	European Starling			-	
	Dumetella carolinensis	Gray Catbird			MBCA	
	Carpodacus mexicanus	House Finch			MBCA	
	Passer domesticus	House Sparrow			-	
	Passerina cyanea	Indigo Bunting			MBCA	
	Zenaida macroura	Mourning Dove			MBCA	
	Cardinalis cardinalis	Northern Cardinal			MBCA	
	Mimus polyglottos	Northern Mockingbird			MBCA	
	Agelaius phoeniceus	Red-winged Blackbird			-	
	Larus delawarensis	Ring-billed Gull			MBCA	
	Columba livia	Rock Dove (Pigeon)			-	
	Melospiza melodia	Song Sparrow			MBCA	
	Dendroica petechia	Yellow Warbler			MBCA	
Mammals	*Sylvilagus floridanus*	Eastern Cottontail			FWCA(G)	
	Sciurus carolinensis	Eastern Gray Squirrel			FWCA(G)	
	Marmota monax	Groundhog			-	
	Procyon lotor	Northern Raccoon			FWCA(F)	

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

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

Other:
Significant Wildlife Habitat Technical Guide:
SWH – Area Sensitive Species
INT - Interior Species
For definitions of species ranks, refer to **Appendix C**.

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

2.4.2.1 Birds

Breeding bird surveys were conducted on two mornings during the 2019 breeding bird season to document breeding bird evidence (BBE) and to characterize the nature, extent and significance of breeding bird usage of the habitats found within the study area (see **Table 3**). Breeding bird survey methodology and breeding bird behaviours used as evidence of breeding success were categorized according to the Breeding Bird Atlas five-year surveys organized by Bird Studies Canada (Cadman et al., 2007). Given the size of the study area, five breeding bird survey stations were established. Wandering transects were also used to record incidental bird species. The location of the breeding bird point count stations are shown in **Figure 2**.

The study area contained a moderate number of breeding bird species representing several habitat types. Breeding evidence was obtained for 20 species of birds. Breeding evidence was confirmed in one species, probable in six species, possible in seven species, and observed in an additional six species. Confirmed breeding by bird species was documented based on observation of fledged young of American Robin (*Turdus migratorius*). Probable breeding status was determined based on BBE evidence such as a territory being established, or agitated behaviour being exhibited. A total of six species were categorized as probable breeders, several examples include: Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospica melodia*), Gray catbird (*Dumetella carolinensis*) and House Sparrow (*Passer domesticus*).

Species which were most commonly encountered across the study area were generally species associated with open-country, aquatic, forest/forest edge or highly disturbed habitat types. Three species at risk birds were identified during surveys; however, all three were considered observed. The SAR birds included Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundo rustica*) and Chimney Swift (*Chaetura pelagica);* each of these species were documented as fly-overs and no habitat within the study area was documented. The rail bridges may provide nesting opportunities for Barn Swallow, but during field surveys no nests were observed under any of the three bridges. Two species, Northern Mockingbird (*Mimus polyglottos*) and Chimney Swift, are also considered uncommon within the City of Hamilton, as indicated in **Appendix D.** No nests of migratory bird species were identified during field investigations. However, BBE collected during surveys suggests migratory species are expected to nest within the study area. A summary of the breeding birds documented in the study area during field investigations is presented in **Appendix E**.

2.4.2.2 Mammals

Four mammal species were identified during field investigations in the study area, including: Eastern cottontail (*Sylvilagus floridanus*), Eastern gray squirrel (*Sciurus carolinensis*), Northern raccoon (*Procyon lotor*), and groundhog (*Marmota monax*). Each of these species was identified in association with treed habitats found in the study area. The mammal species documented represent an assemblage that readily utilizes human influenced landscapes.

2.4.3 Species at Risk/Species of Concern

Fourteen recorded species of birds are protected under the *Migratory Birds Convention Act* (MBCA) and one bird species is protected under the *Fish and Wildlife Conservation Act* (FWCA). Five bird species are not afforded any legislative protection. Three recorded mammal species are afforded protection under the FWCA. As noted above, two species, Northern Mockingbird and Chimney Swift, are considered uncommon within the City of Hamilton.

Of the 24 wildlife species recorded within the study area by LGL (2019), three are regulated under the Ontario *Endangered Species Act, 2007* (ESA). One of the recorded bird species is also regulated under the federal *Species at Risk Act* (SARA). A query for rare species was conducted on the Natural Heritage Information Centre (NHIC) Biodiversity Explorer database (MNR 2019) and there were no recent records of rare species in association with the study area. An information request was sent to the MECP on October 25, 2019 requesting information on species at risk previously identified within proximity to the study area. No response has been provided to date.

There are limited mature trees within the study area but some do have the potential to provide habitat for endangered bat species (all regulated species under the ESA), including eastern small-footed myotis (*Myotis leibii*), little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), and tri-coloured bat (*Perimyotis subflavus*).

The species described above, their respective legal status, biological requirements and the likelihood of presence within the study area are discussed below.

2.4.3.1 Bats

As noted above, limited mature trees are present within the study area but may provide suitable roosting habitat for a variety of bat species. There are currently four bat species

regulated as ‘Endangered’ under the Ontario ESA, including: eastern small-footed myotis; little brown myotis; northern myotis; and, tri-colored bat. The ESA affords protection for both individuals of these species (subsection 9(1)) and their habitat (subsection 10(1)). Given that species-specific habitat regulations have not yet been developed for SAR bats, habitat is protected according to the general definition provided in the ESA. Specifically, according to section 2(1), the Act protects “an area, on which the species depends, directly or indirectly, to carry on its life processes, including processes such as reproduction, rearing, hibernation, migration or feeding”.

Mature trees which could contain suitable roosting habitat for SAR bats were identified in association with treed portions of the study area. Lake Ontario, which is situated just north of the proposed works, offers suitable foraging habitat for bat species. Little brown myotis and northern myotis will use cavities in the trees or exfoliating bark, while tri-coloured bat roosts in clumps of leaves in the foliage. Little brown myotis will frequently use buildings and the other three endangered bat species will use buildings, but far less frequently. Eastern small-footed myotis is a saxicolous (rock-loving) species and will frequently roost in rock piles, talus or crack and crevices in rock outcrops. A more detailed evaluation of bat habitat and the occupancy of their habitat would be required to appropriately demonstrate presence or absence of these species.

2.4.3.2 Birds

2.4.3.2.1 Chimney Swift

Chimney Swift is regulated as ‘Threatened’ under the ESA and SARA. The Chimney Swift nests in urban and rural areas, largely in chimneys but also in hollowed trees or caves, and forages mainly over open areas (over forests, ponds, and residential areas). Chimney Swifts were identified during LGL’s 2019 field investigations; however, no suitable nesting habitat was identified within the study area.

2.4.3.2.2 Barn Swallow

Barn Swallow is regulated as ‘Threatened’ under the ESA. Barn Swallow is not a regulated species under the SARA. The Barn Swallow generally builds mud nests on bridges, walls, ledges and barns (Cadman et al. 2007). The Barn Swallow typically forages in open areas such as agricultural lands, meadows or over water. Habitat considered marginally suitable (cultural meadow) to support foraging Barn Swallow was identified within the study area. Breeding bird surveys conducted in 2019 documented multiple flyovers of Barn Swallow; however, no nests were observed. Bridge structures

within the study area have the potential to provide nesting habitat and should be screened prior to demolition.

2.4.3.2.3 Bank Swallow

Bank Swallow is regulated as ‘Threatened’ under the ESA but is not regulated under the SARA. The Bank Swallow generally nests along rivers, streams, lake shorelines or reservoirs. Nests are excavated along vertical surfaces such as eroded stream banks, sand/gravel piles and road cuts. Bank Swallows were identified during LGL’s 2019 breeding bird surveys; however, no suitable nesting habitat was identified within the study area for this species.

3.0 PROJECT DESCRIPTION

Birch Avenue is currently a three-lane, southbound, minor arterial road. There are three bridges located within the study limits including: Bridge 330 (north bridge); Bridge 331 (centre bridge); and, Bridge 332 (south bridge). All three bridges have substandard clearances and are prone to flooding from storm events.

The proposed project involves a conversion of Birch Avenue to two-way traffic with one lane in each direction, turn lanes at some intersections and a northbound turn lane at the Birch Avenue/Burlington Street intersection. The north (Bridge 330) and south (Bridge 332) bridges will be replaced, and the new bridges will be raised and the road lowered to meet clearance requirements. The centre bridge (Bridge 331) will be demolished and not replaced since this railway line is now abandoned. A new expanded drainage system will be constructed on the east side of Birch Avenue and two new pumping stations will be constructed to remove stormwater from the bridge underpasses. A dedicated and separated 3 m wide multi-use path (MUP) will be provided along the west side of Birch Avenue. The preliminary concept design for improvements to Birch Avenue is shown in **Figure 3**.


BRIDGE #332 (REPLACEMENT)
BRIDGE #331 (REMOVAL)
BRIDGE #330
WESTINGHOUSE STREET OPERATION CENTRE
HAMILTON TRANSIT MAINTENANCE FACILITY
BRANT STREET
BURLINGTON STREET
GERRARD STREET
PRELIMINARY FOR DISCUSSION PURPOSES ONLY

4.0 IMPACT ASSESSMENT AND MITIGATION

4.1 FISHERIES

There is no fish or fish habitat located in the study area. However, appropriate erosion and sedimentation control measures will be installed and maintained during construction in accordance with OPSS 805, Construction Specification for Temporary Erosion and Sediment Control Measures. Silt fence will be installed around the work area and catch basins will be protected from sedimentation.

4.2 VEGETATION

Improvements to Birch Avenue from Barton Street to Burlington Street has the potential to result in impacts to vegetation and vegetation communities. Effects on vegetation related to the proposed road improvements could include:

- Displacement of and/or disturbance to vegetation and vegetation communities; and,
- Displacement of and/or disturbance to Rare, Threatened or Endangered Vegetation and Vegetation Communities.

4.2.1 Displacement of and/or Disturbance to Vegetation and Vegetation Communities

Clearing of vegetation will be required to accommodate the proposed road and drainage improvements to Birch Avenue. Approximately 0.35 ha of cultural vegetation communities will be impacted as a result of the proposed road improvements including cultural meadow and cultural thicket communities. Cultural vegetation communities are disturbed and generally contain a high proportion of invasive and non-native plant species, consequently, the impacts to the cultural communities is considered to be minor. In addition, a total of 0.25 ha of manicured lands will be impacted. Overall, disturbance to vegetation communities as a result of the proposed improvements are considered to be minor since the majority of vegetation located adjacent to the Birch Avenue right-of-way have been previously disturbed by the existing roadway and surrounding land-uses.

Plant species displaced and/or disturbed due to the road widening will re-colonize available lands adjacent to the new right-of-way. Disturbance activities often serve to promote the establishment and/or spread of certain plant species such as those disturbance tolerant species identified within the existing rights-of-way.

4.2.2 Displacement of and/or Disturbance to Rare, Threatened or Endangered Vegetation and Vegetation Communities

As noted previously, four planted Kentucky coffee trees were identified within the study area. Kentucky coffee tree is regulated as Threatened under the ESA, however, since these trees were planted, no authorization under the ESA is required. No regionally rare plant species were identified within the study area.

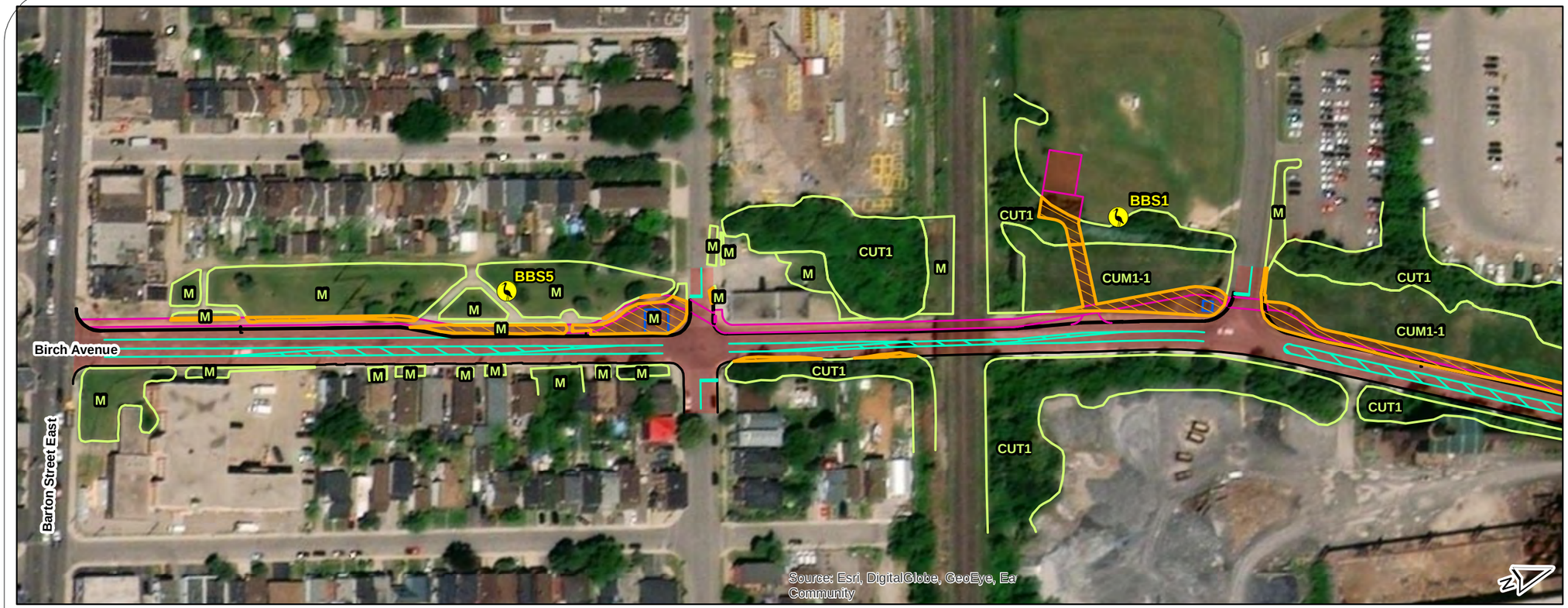
4.2.2.1 Tree Resources

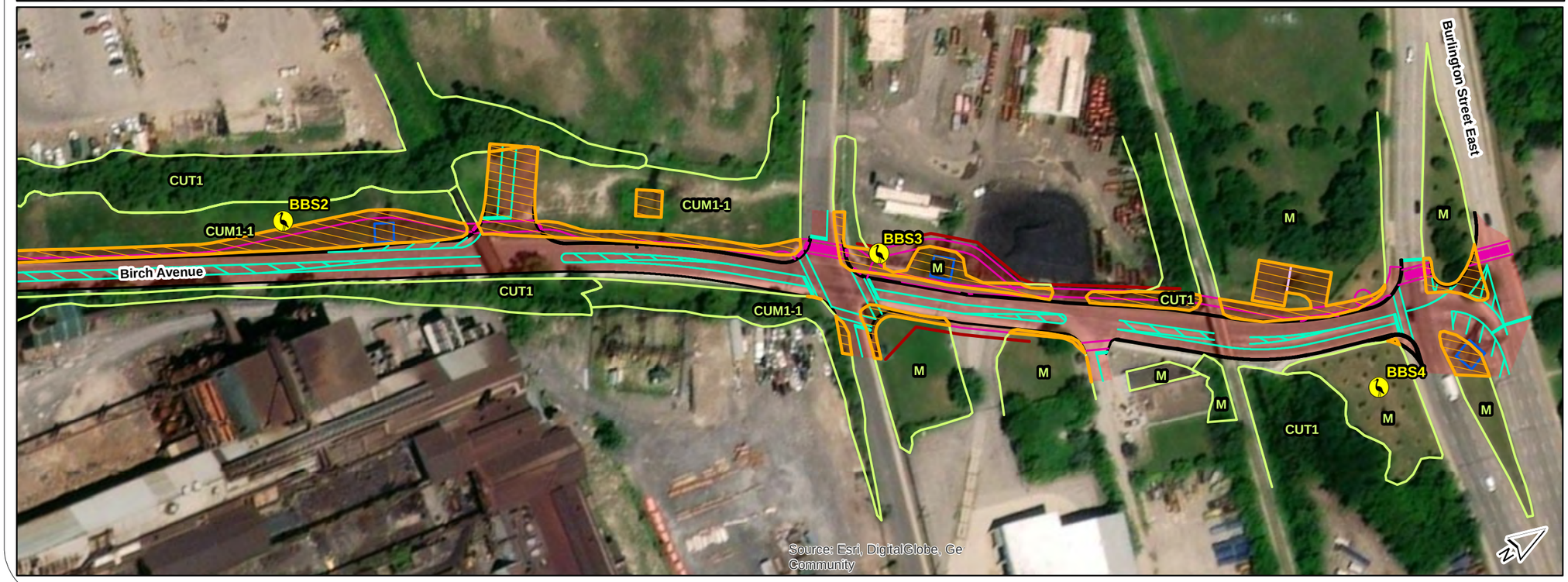
A preliminary impact assessment was undertaken to determine impacts to trees resources as a result of the proposed improvements to Birch Avenue from Barton Street to Burlington Street. This assessment was conducted using the assumed grading limits for the preliminary design provided to LGL in November 2019. Trees recommended for removal include trees within the grading limits or trees that would not be able to withstand construction related impacts. Trees identified as impacted likely will required root and/or canopy pruning. In addition, trees identified as retained are considered to be minimally affected and will be protected through mitigation measures.

As noted above, this assessment is preliminary and a detailed tree preservation plan should be prepared during the detail design phase. The recommendations for tree preservation, removal and mitigation measures included in this report should be updated at each phase of the detail design. The tree preservation plan should be prepared in accordance with the City of Hamilton guidelines and standard arboriculture practices.

4.2.2.2 Tree Removals

As noted in **Section 4.2.2.1**, trees identified for removal includes trees within the proposed grading limits and those trees outside of the grading limits where the amount of critical root zone that will be removed will likely cause significant and irreversible decline of the health of tree. As such, a total of 23 trees have been recommended for removal as a result of the proposed improvements to Birch Avenue. Trees identified for removal are listed in **Appendix C** and presented in **Figure 5.**





LEGEND

- Breeding Bird Survey
- Impacted ELC Area
- Disturbance Limit
- Proposed Pumping Station
- Proposed Curb
- Proposed Hydro
- Proposed Lane
- Proposed Right of Way
- Proposed Walkway
- Vegetation Community Boundary
- CUM1-1 Dry - Moist Old Field Meadow Type
- CUT1 Mineral Cultural Thicket Ecosite
- M Manicured

0 12.5 25 50 75 Meters

Impact Assessment Vegetation Communities

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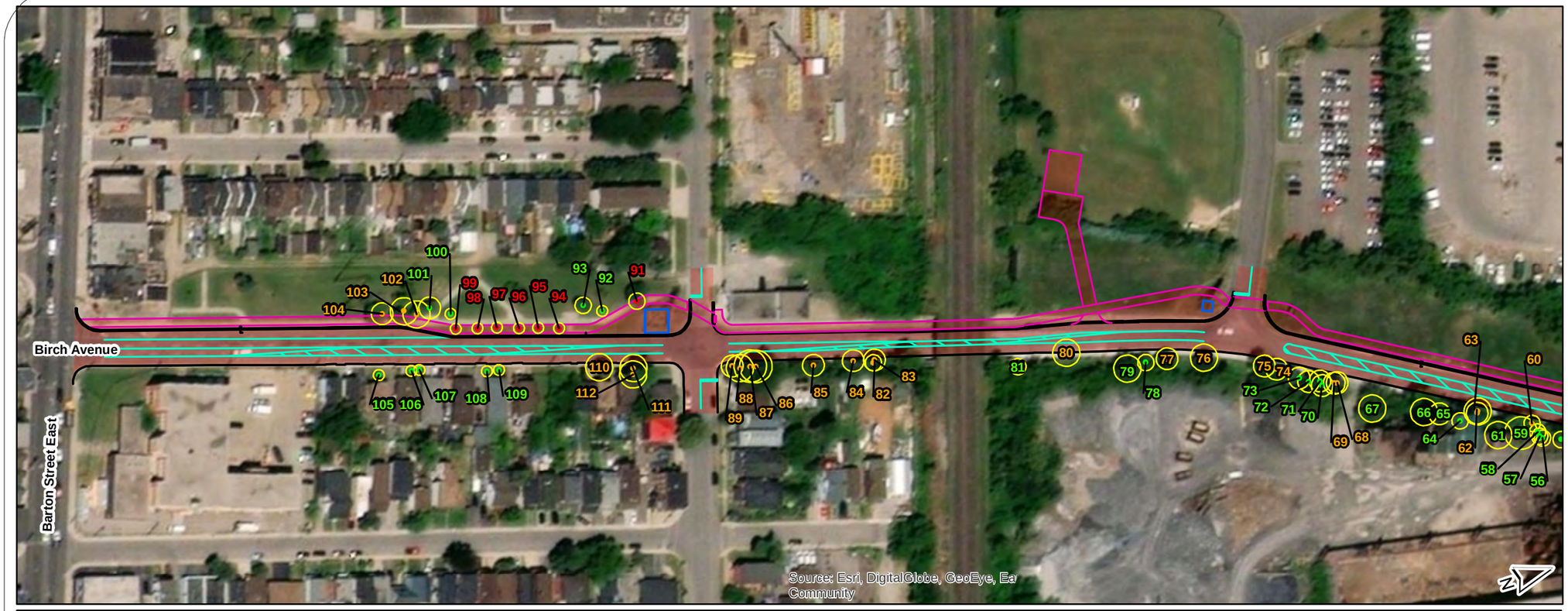
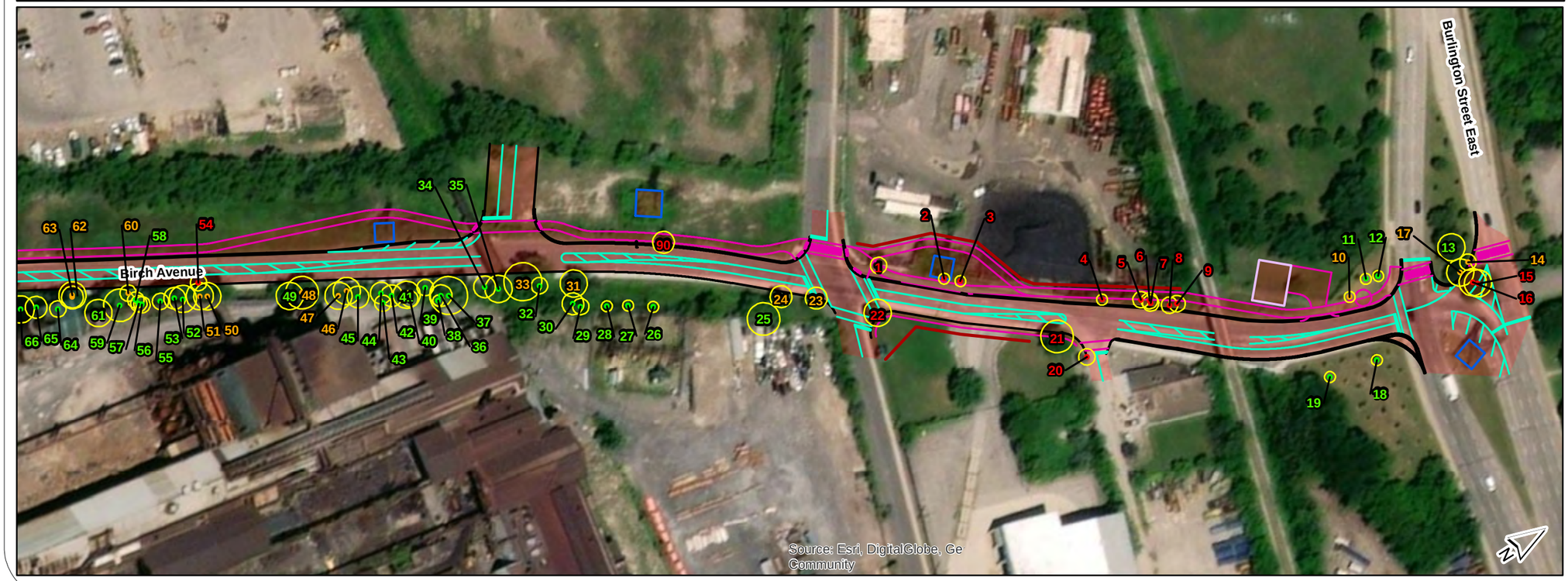
Project	TA8927	**Figure**	4
Date	November, 2019	**Prepared By**	AJ
Scale	1:1,700	**Verified By**	GNK





LEGEND

- Tree to be Impacted
- Tree to be Removed
- Tree to be Retained
- Tree Protection Zone
- Disturbance Limit
- Proposed Pumping Station
- Proposed Curb
- Proposed Hydro
- Proposed Lane
- Proposed Property Line
- Proposed Walkway

0 12.5 25 50 75 Meters

Impact Assessment Tree Resources

LGL LIMITED
environmental research associates

Project	TA8927	**Figure**	5
Date	November, 2019	**Prepared By**	AJ
Scale	1:1,700	**Verified By**	GNK

4.2.3 Impacted Trees

Impacted trees are those that are identified for retention, but minor encroachment into the minimum tree protection zone (TPZ) will occur, these trees will likely require root and/or canopy pruning. A total of 39 trees have been identified as impacted as a result, of the proposed improvements to Birch Avenue. Trees identified as impacted are listed in **Appendix C** and are presented in **Figure 5.**

4.2.3.1 Tree Retention

Trees identified for retention will not be adversely affected by the proposed improvements to Birch Avenue from Barton Street to Burlington Street. A total of 50 trees have been identified for retention and listed in **Appendix C** and presented in **Figure 5**.

4.2.3.2 Mitigation Recommendations

The following general recommendations conform to good forestry practices and are designed to help ensure impacts to trees surrounding the work zone, and those identified to be retained are minimized. General recommendations include:

- Tree protection fencing must be installed as per the approved tree preservation plan. The contract administrator must review and approve the fencing prior to the commencement of any grading work and the fencing will be maintained until all construction is complete;
- Heavy machinery should not to be operated within the TPZ (including overhead swinging of machine arms);
- Construction materials, equipment, soil, construction waste or debris are not to be stored within the TPZ or dripline of the trees identified for protection;
- There should be no movement or parking of vehicles, placement of equipment or pedestrian traffic within the TPZ;
- No grade changes shall occur within the TPZ unless approved by the Tree Protection Plan;
- Trees shall not have any rigging cables or hardware of any sort attached or wrapped around them, nor shall any contaminants be dumped within protected areas;
- All removals must be felled into the work zone to ensure that damage does not occur to trees within the TPZ;

- Should any additional, incidental or accidental tree injuries occur during construction, a qualified Arborist should be consulted to determine whether additional mitigation measures should be employed; and,
- Tree clearing shall not be conducted during the *Migratory Bird Convention Act* (MBCA) breeding season commonly considered April 1 to August 31, unless under appropriate permitting.

4.2.3.3 Root Pruning

All root pruning should be undertaken by an ISA Certified Arborist or an Ontario College of Trades 444A Arborist or Arborist Apprentice. The following practices should be implemented for any root pruning:

- Prior to root pruning low pressure hydro-vac excavation should be undertaken in a 0.5 m wide section within and along the length of the TPZ to a depth of 500 mm to expose the roots;
- No roots greater than 6 cm in diameter shall be pruned;
- Exposed roots should not be allowed to dry out, where roots are exposed they should be covered by dampened mulch or topsoil to prevent desiccation;
- All pruning should maintain the integrity of the root bark ridge;
- A slow release deep root low nitrogen fertilizer should be applied to any trees requiring root pruning to increase vigour; and,
- Backfilling should occur as soon as possible and should occur with clean native uncontaminated topsoil.

4.2.3.4 Canopy Pruning

All canopy and clearance pruning should be undertaken by an ISA Certified Arborist or an Ontario College of Trades 444A Arborist or Arborist Apprentice. Any branches that overhang the work site and require pruning are to be pruned using good arboricultural practices in accordance with American National Standard (ANSI) A300 (Part 1) – 2008 Pruning.

4.2.4 Designated Natural Areas

There are no designated natural areas located within the project limits. Portions of the Birch Avenue/Burlington Street intersection lie within the Hamilton Conservation Authority Ontario Regulation 161/06 regulated area and will require an application to be prepared and submitted for approval during detail design.

4.3 WILDLIFE

The proposed works will result in minimal impact to wildlife and wildlife habitat. Impacts such as temporary disturbance or displacement of habitat resulting from construction will not have any significant effects on wildlife. The minor impacts associated with habitat removal due to the proposed works and opportunistic nature of those species that have the potential to be affected will allow them to move to nearby vegetation communities and re-establish. Disturbance to wildlife from the presence of a constructed road and multi-use trail (noise, odours, etc.) may cause some local wildlife species to re-locate or move to nearby habitats. However, based on the presence of existing roadways, informal trails, litter, and other anthropogenic influences, the study area already experiences a high level of disturbance. Clearly visible waste disposal containers should also be included to reduce littering in the area. Since the road is currently lit by streetlights, no additional light impacts on nocturnal animals such as frogs and birds, are anticipated.

Three SAR birds were identified during the survey conducted by LGL in 2019; however, no nesting habitat was noted, and these species are likely using the study area exclusively for foraging. As a precaution, before removal of bridge structures, an inspection should be completed to screen for any Barn Swallow nests.

Additionally, as noted above, the potential exists for several bat SAR to occupy trees within the vicinity of the study area. As a precaution to protect bats, a timing window for tree removal is recommended. It is recommended that no tree removal occur between April 1 and September 30, of a given year.

No impacts to SAR are anticipated as a result of the proposed works. No permitting under the ESA or SARA is anticipated given the low likelihood of species at risk presence within the study area. However, the results of this investigation should be communicated to MECP, to determine if any permitting requirement exists.

The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or damaging, destroying, removing or disturbing of nests. Migratory insectivorous and non-game birds are protected year-round, and migratory game birds are protected from March 10 to September 1. Environment Canada provides Nesting Periods when migratory birds are most likely to be nesting, within a respective geographic zone. The study area falls within Environment Canada's Nesting Zone C2 (Nesting Period: end of March – end of August). This timing restriction will avoid the

destruction or disturbance of bird species using the available habitat in the study area. Should this not be possible, a nesting bird survey will be undertaken immediately prior to any vegetation clearing. If active nests are found, vegetation removal will not be permitted until the nestlings have fledged and left the nest.

As the study area is already highly fragmented, the proposed works will not pose any additional obstacle to wildlife moving through the area.

5.0 RECOMMENDATIONS AND CONCLUSIONS

The proposed works can be constructed and maintained with no significant adverse effects on natural heritage features/areas or their ecological functions. The following recommendations for the proposed works will be implemented by the City of Hamilton:

- Tree protection barrier will be erected in accordance with OPSS 801, trees will be close cut in accordance with OPSS 201 and trees will be felled into the work zone;
- Erosion and sediment controls will be installed in accordance with OPSS 805;
- Vegetation will be cleared outside of the migratory bird nesting window (April 1 to August 31) to prevent incidental take of migratory birds and disturbance to other wildlife during the sensitive breeding season. In the event that vegetation clearing must occur during the migratory bird nesting window, a nest survey will be performed by an avian specialist prior to vegetation removal. No active migratory bird nests will be removed during construction/demolition activities; and,
- Trees will be removed outside of the sensitive timing window for bats (April 1 to September 30).

Based on our review of secondary source information, field investigations, and screening of existing habitat conditions for the potential presence of species at risk, it is our opinion that the proposed works will not kill, harm or harass species at risk, or destroy or damage the habitat of species at risk, in accordance with Sections 9 and 10 of the Ontario *Endangered Species Act*. As a result, a permit or registration of the project under the Ontario *Endangered Species Act* is not anticipated to be required.

6.0 REFERENCES

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APPENDIX A.

LIST OF VASCULAR PLANTS RECORDED DURING FLORA SURVEYS

Appendix A.
Vascular Plant List

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Hamilton	CUM1-1	CUT1	Manicured
	GINKGOACEAE	**GINKGO FAMILY**								
*	*Ginkgo biloba*	maiden-hair tree								X
	PINACEAE	**PINE FAMILY**								
	Picea glauca	white spruce	G5	S5					X	
*	*Pinus nigra*	Austrian pine	G?	SE2					X	
	CUPRESSACEAE	**CEDAR FAMILY**								
	Juniperus virginiana	eastern red cedar	G5	S5						X
	ULMACEAE	**ELM FAMILY**								
	Celtis occidentalis	common hackberry	G5	S4			X		X	
*	*Ulmus pumila*	Siberian elm	G?	SE3				X	X	
	MORACEAE	**MULBERRY FAMILY**								
*	*Morus alba*	white mulberry	G?	SE5			X			X
	BETULACEAE	**BIRCH FAMILY**								
	Corylus colurna	turkish hazel								X
	CARYOPHYLLACEAE	**PINK FAMILY**								
*	*Silene vulgaris*	catchfly	G?	SE5			X	X		
	POLYGONACEAE	**SMARTWEED FAMILY**								
*	*Rumex crispus*	curly-leaf dock	G?	SE5			X	X		
	TILIACEAE	**LINDEN FAMILY**								
*	*Tilia cordata*	small leaf linden	G?	SE1						X
	BRASSICACEAE	**MUSTARD FAMILY**								
*	*Hesperis matronalis*	dame's rocket	G4G5	SE5			X		X	
*	*Alliaria petiolata*	garlic mustard	G5	SE5			X		X	
	ROSACEAE	**ROSE FAMILY**								

	Amelanchier sp.	Juneberry								X
*	*Rosa multiflora*	multiflora rose	G?	SE4			X		X	
	Fragaria virginiana ssp. virginiana	scarlet strawberry	G5T?	SU			X		X	
	Rubus idaeus ssp. melanolasius	wild red raspberry	G5T	S5			X		X	
	Crataegus sp.	hawthorn							X	
	Geum aleppicum	yellow avens	G5	S5			X		X	
	FABACEAE	**PEA FAMILY**								
	Gymnocladus dioicus	Kentucky coffee-tree	G5	S2	THR	THR			X	
	Gleditsia triacanthos	honey locust	G5	S2			X			X
*	*Lotus corniculatus*	bird's-foot trefoil	G?	SE5				X		
*	*Coronilla varia*	variable crown-vetch	G?	SE5				X		
*	*Trifolium pratense*	red clover	G?	SE5			X	X		
*	*Vicia cracca*	tufted vetch	G?	SE5			X	X		
*	*Melilotus alba*	white sweet-clover	G?	SE5			X	X		
*	*Medicago lupulina*	black medick	G?	SE5			X	X		
	RHAMNACEAE	**BUCKTHORN FAMILY**								
*	*Rhamnus cathartica*	common buckthorn	G?	SE5			X	X		
	VITACEAE	**GRAPE FAMILY**								
	Vitis riparia	riverbank grape	G5	S5			X		X	
	Parthenocissus inserta	inserted Virginia-creeper	G5	S5			X		X	
	ACERACEAE	**MAPLE FAMILY**								
*	*Acer platanoides*	Norway maple	G?	SE5					X	X
*	*Acer campestre*	hedge maple	G?	SE1						X
*	*Acer ginnala*	amur maple	G?	SE1						X
	Acer negundo	manitoba maple	G5	S5			X		X	
	ANACARDIACEAE	**SUMAC FAMILY**								
	Rhus typhina	staghorn sumac	G5	S5			X		X	
	SIMAROUBACEAE	**AILANTHUS FAMILY**								
*	*Ailanthus altissima*	tree-of-heaven	G?	SE5					X	X

	APIACEAE	**PARSLEY FAMILY**								
*	*Daucus carota*	wild carrot	G?	SE5			X	X		
	APOCYNACEAE	**DOGBANE FAMILY**								
*	*Vinca minor*	periwinkle	G?	SE5			X		X	
	ASCLEPIADACEAE	**MILKWEED FAMILY**								
	Asclepias syriaca	common milkweed	G5	S5			X	X		
	SOLANACEAE	**POTATO FAMILY**								
*	*Solanum dulcamara*	bitter nightshade	G?	SE5			X	X	X	
	CONVOLVULACEAE	**MORNING-GLORY FAMILY**								
*	*Convolvulus arvensis*	field bindweed	G?	SE5					X	
	LAMIACEAE	**MINT FAMILY**								
*	*Leonurus cardiaca ssp. cardiaca*	common motherwort	G?T?	SE5			X		X	
*	*Glechoma hederacea*	creeping Charlie	G?	SE5			X		X	
	PLANTAGINACEAE	**PLANTAIN FAMILY**								
*	*Plantago major*	common plantain	G5	SE5			X	X		
*	*Plantago lanceolata*	ribgrass	G5	SE5			X	X		
	OLEACEAE	**OLIVE FAMILY**								
	Fraxinus pennsylvanica	red ash	G5	S5			X		X	
	CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**								
*	*Viburnum opulus*	guelder rose	G5	SE4			X		X	
*	*Lonicera tatarica*	tartarian honeysuckle	G?	SE5			X		X	
	ASTERACEAE	**ASTER FAMILY**								
*	*Cichorium intybus*	chicory	G?	SE5			X	X		
	Ambrosia artemisiifolia	common ragweed	G5	S5			X	X	X	
*	*Arctium minus ssp. minus*	common burdock	G?T?	SE5				X	X	
	Aster ericoides ssp. ericoides	white heath aster	G5T?	S5			X	X		
	Solidago canadensis	canada goldenrod	G5	S5			X	X	X	
*	*Chrysanthemum leucanthemum*	ox-eye daisy	G?	SE5			X	X		

*	*Cirsium arvense*	Canada thistle	G?	SE5			X	X		
*	*Taraxacum officinale*	common dandelion	G5	SE5			X	X	X	
	Euthamia graminifolia	flat-topped bushy goldenrod	G5	S5				X		
*	*Sonchus arvensis ssp. arvensis*	field sow-thistle	G?T?	SE5			X	X		
*	*Matricaria maritima ssp. maritima*	seaside camomile	G5T?	SE?				X		
	Aster novae-angliae	New England aster	G5	S5			X	X		
	POACEAE	**GRASS FAMILY**								
*	*Bromus inermis ssp. inermis*	awnless brome	G4G5T?	SE5			X	X	X	
	Poa pratensis ssp. pratensis	Kentucky bluegrass	G5T	S5			X	X	X	
	Poa compressa	Canada blue grass	G?	S5			X	X		X
*	*Phleum pratense*	timothy	G?	SE5			X	X		
	Phalaris arundinacea	reed canary grass	G5	S5			X	X		
*	*Hordeum jubatum ssp. jubatum*	squirrel-tail grass	G5T?	SE5			X	X		
	LILIACEAE	**LILY FAMILY**								
*	*Asparagus officinalis*	garden asparagus	G5?	SE5			X	X		

APPENDIX B

ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

G-Rank Global Rank

Global ranks are assigned by a consensus of the network of Conservation Data Centres, scientific experts, and the Nature Conservatory to designate a rarity rank based on the range-wide status of a species, subspecies or variety.

The most important factors considered in assigning global ranks are the total number of known, extant sites world-wide, and the degree to which they are potentially or actively threatened with destruction. Other criteria the number of known populations considered to be securely protected, the size of the various populations, and the ability of the taxon to persist at its known sites. The taxonomic distinctness of each taxon has also been considered. Hybrids, introduced species, and taxonomically dubious species, subspecies and varieties have not been included.

G1=	Extremely rare; usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2 =	Very rare; usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
G3 =	Rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4 =	Common; usually more than 100 occurrences; usually not susceptible to immediate threats.
G5 =	Very common; demonstrably secure under present conditions.
GH =	Historic, no records in the past 20 years.
GU =	Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.
GX =	Globally extinct. No recent records despite specific searches.
? =	Denotes inexact numeric rank (i.e. G4?).

G" " =	A "G" (or "T") followed by a blank space means that the NHIC has not yet obtained the Global Rank from The Nature Conservancy.
G? =	Unranked, or, if following a ranking, rank tentatively assigned (e.g. G3?).
Q =	Denotes that the taxonomic status of the species, subspecies, or variety is questionable.
T =	Denotes that the rank applies to a subspecies or variety.

S-Rank Provincial Rank

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

S1 =	Critically imperiled in Ontario because of extreme rarity (often 5 or fewer occurrences) or because of some factor (s) such as very steep declines making it especially vulnerable to extirpation.
S2 =	Imperiled in Ontario because of rarity due to very restricted range, very few populations (often 20 or fewer occurrences) steep declines or other factors making it very vulnerable to extirpation.
S3 =	Vulnerable in Ontario due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 =	Apparently secure - uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 =	Secure - common, widespread, and abundant in Ontario.
SX =	Presumed Extirpated - specie or community is believed to be extirpated from Ontario.
SNR =	Unranked - conservation status in Ontario not yet assessed
SU =	Unrankable - currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA =	Not applicable - a conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# =	Range rank - a numeric range rank (e.g. S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g. SU is used rather than S1S4).
SE# =	Exotic – not believed to be a native component of Ontario’s flora.

COSEWIC Committee On The Status Of Endangered Wildlife in Canada

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species that are considered to be at risk in Canada.

Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

COSSARO/OMNR Committee On The Status Of Species At Risk In Ontario/Ontario Ministry Of Natural Resources

The Committee on the Status of Species at Risk in Ontario (COSSARO)/Ontario Ministry of Natural Resources (OMNR) assess the provincial status of wild species that are considered to be at risk in Ontario.

Extinct (EXT)	A species that no longer exists anywhere.
Extirpated (EXP)	A species that no longer exist in the wild in Ontario but still occurs elsewhere.
Endangered (Regulated) (END-R)	A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's *Endangered Species Act*.
Endangered (END)	A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act.
Threatened (THR)	A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
Special Concern (SC)	A species with characteristics that make it sensitive to human activities or natural events.
Not at Risk (NAR)	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)	A species for which there is insufficient information for a provincial status recommendations.

Local Status **Hamilton Brant** (Riley 1989)

Species status within the Niagara Haldimand was used to determine local vascular plant status for the study area.

R-# = R- Native species present and rare; # - number of stations at which the species has been identified.

U = Uncommon

X = Not classified as rare or uncommon within Niagara Haldimand

APPENDIX C

TREE RESOURCES

Project: TA8927

Client: IBI Date: November 22, 2019

Collectors: LMC Area: Birch Avenue from Barton Street to Burlington Street

Tree #	Scientific Name	Common Name	DBH (cm)	Additional Stems	CONDITION																Tree Protection Measures					COMMENTS
					TI	CS	CV	Radial Dripline (m)	Canopy Die Back (%)	Co-dominant stem	Included Bark	Lean, Dir.	Fungus	Insects	Cavity	Rot	Wound	Frost Crack	Epicormic	EAB	Canker	Tree Protection Zone (m)	Protect	Remove	Impact	ESA/SARA	
1	*Ulmus pumila*	Siberian elm	12.0	10,10	g	g	g	2														3.00		x			
2	*Ailanthus altissima*	tree of heaven	10.0		g	g	g	1														2.00		x			
3	*Ulmus pumila*	Siberian elm	10.0		g	g	g	1														2.00		x			
4	*Acer negundo*	Manitoba maple	10.0	8,2	g	g	g	1												x		2.00		x			
5	*Acer negundo*	Manitoba maple	12.0	9.0	g	g	g	2		x	x											3.00		x			
6	*Acer negundo*	Manitoba maple	15.0	11,12	g	g	g	2		x	x							x		x		3.00		x			
7	*Ulmus pumila*	Siberian elm	10.0	7,6	g	g	g	2														3.00		x			
8	*Acer negundo*	Manitoba maple	11.0	11,15	g	g	g	2														3.00		x			
9	*Acer negundo*	Manitoba maple	14.0	12,13	g	g	g	2		x	x							x				3.00		x			
10	*Corylus colurna*	Turkish hazel	8.0	4.0	g	g	g	1														2.00			x		
11	*Corylus colurna*	Turkish hazel	7.0	3.0	g	g	g	1														2.00	x				
12	*Acer ginnala*	Amur maple	9.0	3,2,1	g	g	g	1														2.00	x				
13	*Acer platanoides*	Norway maple	36.0		g	g	g	4														5.00	x				
14	*Ginkgo biloba*	ginkgo	16.0		g	g	g	2														3.00			x		
15	*Gleditsia triacanthos*	honey locust	38.0		f	f	f	4														5.00		x			
16	*Tilia cordata*	little leaf linden	25.0		g	g	g	4														5.00		x			
17	*Tilia cordata*	little leaf linden	31.0		g	g	g	4														5.00			x		
18	*Acer ginnala*	Amur maple	6.0		g	g	g	1														2.00	x				
19	*Fagus sylvatica*	European beech	4.0		g	g	g	1														2.00	x				
20	*Acer platanoides*	Norway maple	12.0		g	g	g	2														3.00		x			
21	*Acer saccharinum*	silver maple	52.0		g	g	g	5														6.00		x			
22	*Aesculus hippocastanum*	horse chestnut	43.0		g	g	g	4												x		5.00		x			
23	*Celtis occidentalis*	common hackberry	17.0		g	f	f	3												x		4.00			x		
24	*Acer campestre*	hedge maple	25.0		f	f	f	3												x		4.00			x		
25	*Acer negundo*	Manitoba maple	44.0	42.0	f	f	f	5	30	x	x									x		6.00	x				
26	*Celtis occidentalis*	common hackberry	4.0	4.0	p	p	p	1														2.00	x				
27	*Ulmus pumila*	Siberian elm	10.0	3.0	g	g	g	1														2.00	x				
28	*Ulmus pumila*	Siberian elm	10.0	4.0	g	g	g	1														2.00	x				
29	*Ulmus pumila*	Siberian elm	12.0	5.0	g	g	g	2														3.00	x				
30	*Ulmus pumila*	Siberian elm	14.0		g	g	g	3														4.00	x				
31	*Celtis occidentalis*	common hackberry	28.0		g	g	g	4														5.00			x		
32	*Acer platanoides*	Norway maple	14.0		g	g	g	2														3.00			x		
33	*Ulmus pumila*	Siberian elm	39.0	22,20	f	f	f	6														7.00			x		
34	*Acer campestre*	hedge maple	18.0		g	g	g	3												x		4.00	x				
35	*Ulmus pumila*	Siberian elm	18.0	14,12,10	f	f	f	4	20													5.00	x				
36	*Ulmus pumila*	Siberian elm	14.0	12,10	f	p	p	3	40								x			x		4.00	x				
37	*Ulmus pumila*	Siberian elm	55.0	25.0	f	p	p	6	40								x	x		x		7.00	x				
38	*Acer negundo*	Manitoba maple	44.0		f	g	g	1														2.00	x				
39	*Gymnocladus dioicus*	Kentucky coffee tree	15.0		g	g	g	2														3.00	x			x	
40	*Ulmus pumila*	Siberian elm	15.0		g	g	g	2	30													3.00	x				
41	*Ulmus pumila*	Siberian elm	45.0		g	g	g	4	30													5.00	x				
42	*Ulmus pumila*	Siberian elm	24.0		f	g	f	3	20									x		x		4.00	x				

43	*Ulmus pumila*	Siberian elm	14.0		f	f	f	2	10	x	x							x			3.00	x				
44	*Ulmus pumila*	Siberian elm	25.0		g	f	f	3	30									x			4.00	x				
45	*Ulmus pumila*	Siberian elm	22.0	18.0	g	g	g	3											x			4.00			x		
46	*Ulmus pumila*	Siberian elm	20.0	18,10	g	g	f	4	10										x			5.00			x		
47	*Acer negundo*	Manitoba maple	13.0	12,10	f	f	f	4		x	x							x	x			5.00			x		
48	*Ulmus pumila*	Siberian elm	43.0	10,14	g	g	g	5														6.00			x		
49	*Celtis occidentalis*	common hackberry	26.0		f	f	f	4														5.00			x		
50	*Ulmus pumila*	Siberian elm	30.0		f	f	f	4														5.00			x		
51	*Ailanthus altissima*	tree of heaven	35.0	30,28,13	p	f	f	4														5.00			x		growing through fence
52	*Ulmus pumila*	Siberian elm	30.0	14,18,15	g	g	g	4										x	x			5.00	x				
53	*Ulmus pumila*	Siberian elm	22.0	14,12	g	g	g	3														4.00	x				
54	*Ailanthus altissima*	tree of heaven	14.0	12.0	g	g	g	2										x	x			3.00		x			
55	*Ulmus pumila*	Siberian elm	15.0	12,10	f	f	f	2		x	x								x			3.00	x				
56	*Ulmus pumila*	Siberian elm	14.0	8.0	f	f	f	2														3.00	x				
57	*Ulmus pumila*	Siberian elm	12.0	4,5	g	g	g	2		x	x							x	x			3.00	x				
58	*Ulmus pumila*	Siberian elm	13.0	12.0	f	g	g	2											x			3.00	x				
59	*Ulmus pumila*	Siberian elm	55.0	40.0	g	f	f	5		x	x							x				6.00	x				
60	*Gymnocladus dioicus*	Kentucky coffee tree	17.0		g	g	g	2														3.00			x	x	
61	*Ulmus pumila*	Siberian elm	30.0	12.0	f	g	f	4		x	x											5.00	x				
62	*Acer platanoides*	Norway maple	28.0		f	f	f	3										x	x			4.00			x		
63	*Acer platanoides*	Norway maple	30.0		g	g	g	4											x			5.00			x		
64	*Ulmus pumila*	Siberian elm	14.0		g	g	g	2											x			3.00	x				
65	*Ulmus pumila*	Siberian elm	22.0		g	g	g	3														4.00	x				
66	*Gleditsia triacanthos*	honey locust	34.0		g	g	g	4											x			5.00	x				
67	*Ulmus pumila*	Siberian elm	36.0	20,15,20,18	g	g	g	4		x	x							x				5.00	x				
68	*Pinus nigra*	Austrian pine	26.0		f	f	f	3	30													4.00			x		
69	*Pinus nigra*	Austrian pine	22.0		f	f	f	3	30													4.00			x		
70	*Pinus nigra*	Austrian pine	28.0		f	f	f	3	30													4.00	x				
71	*Pinus nigra*	Austrian pine	23.0		f	f	f	3	30													4.00	x				
72	*Pinus nigra*	Austrian pine	25.0		f	f	f	3	30													4.00	x				
73	*Picea glauca*	white spruce	24.0		g	g	g	3														4.00	x				
74	*Picea glauca*	white spruce	25.0		g	g	g	3														4.00			x		
75	*Gleditsia triacanthos*	honey locust	31.0		g	g	g	3														4.00			x		
76	*Acer campestre*	hedge maple	35.0		g	g	g	4														5.00			x		
77	*Acer campestre*	hedge maple	22.0		g	g	g	3														4.00			x		
78	*Gymnocladus dioicus*	Kentucky coffee tree	19.0		g	g	g	2														3.00	x			x	
79	*Gymnocladus dioicus*	Kentucky coffee tree	37.0		g	g	g	4														5.00	x			x	
80	*Taxus sp.*	yew	8.0	4,8,3,2,2,2	g	g	g	4														5.00			x		
81	*Fraxinus pennsylvanica*	red ash	10.0	4,5,3,2,7	p	p	p	2											x	x		3.00	x				
82	*Ailanthus altissima*	tree of heaven	10.0		g	g	g	2														3.00			x		
83	*Acer negundo*	Manitoba maple	35.0	30.0	g	g	g	3		x	x								x			4.00			x		
84	*Acer negundo*	Manitoba maple	25.0	20.0	g	g	g	3		x	x								x			4.00			x		
85	*Acer negundo*	Manitoba maple	10.0	7,6,5	g	g	g	3		x	x								x			4.00			x		
86	*Gleditsia triacanthos*	honey locust	55.0		g	g	g	5														6.00			x		
87	*Gleditsia triacanthos*	honey locust	55.0		g	g	g	5														6.00			x		
88	*Gleditsia triacanthos*	honey locust	30.0		g	g	g	4														5.00			x		
89	*Gleditsia triacanthos*	honey locust	25.0		g	g	g	3														4.00			x		
90	*Ulmus pumila*	Siberian elm	12.0		f	f	f	3														4.00		x			exposed roots
91	*Acer platanoides*	Norway maple	22.0		g	g	g	2														3.00		x			
92	*Prunus* sp.	cherry	4.0		g	g	g	1														2.00	x				
93	*Acer platanoides*	Norway maple	22.0		p	p	p	2														3.00	x				
94	*Carpinus japonica*	Japense hornbeam			g	g	g	1														2.00		x			
95	*Carpinus japonica*	Japense hornbeam			g	g	g	1											x			2.00		x			
96	*Carpinus japonica*	Japense hornbeam			g	g	g	1											x			2.00		x			
97	*Carpinus japonica*	Japense hornbeam			g	g	g	1											x			2.00		x			
98	*Carpinus japonica*	Japense hornbeam			g	g	g	1											x			2.00		x			

99	*Carpinus japonica*	Japense hornbeam			g	g	g	1											x			2.00		x			
100	*Betula sp.*	birch			g	g	g	1											x			2.00	x				
101	*Acer platanoides*	Norway maple			f	p	f	3											x			4.00	x				
102	*Acer platanoides*	Norway maple			f	p	f	4														5.00			x		
103	*Acer platanoides*	Norway maple			f	p	f	4														5.00			x		
104	*Acer platanoides*	Norway maple			f	p	f	3														4.00			x		
105	*Morus alba*	white mulberry			g	g	g	1														2.00	x				
106	*Juniperus virginiana*	eastern red cedar			g	g	g	1														2.00	x				
107	*Morus alba*	white mulberry			g	g	g	1														2.00	x				
108	*Morus alba*	white mulberry			g	g	g	1														2.00	x				
109	*Morus alba*	white mulberry			g	g	g	1														2.00	x				
110	*Acer platanoides*	Norway maple			g	g	g	4														5.00			x		
111	*Acer platanoides*	Norway maple			g	f	f	4	30									x		x		5.00			x		rasied crown
112	*Ailanthus altissima*	tree of heaven			g	f	f	4														5.00			x		rasied crown

APPENDIX D

BREEDING BIRD SPECIES DOCUMENTED IN THE STUDY AREA BY LGL (2019)

BREEDING BIRD SPECIES DOCUMENTED IN THE STUDY AREA BY LGL (2019)

Birds	Scientific Name	Common Name	SARA[1]	ESA[1]	Legal Status[1]	City of Hamilton Status[4]	BBE	Station #[3]
	Carduelis tristis	American Goldfinch			MBCA	A	Pr,T	1,2,3,4,5
	Turdus migratorius	American Robin			MBCA	A	C,FY	1,2,3,4,5
	Riparia riparia	Bank Swallow		THR	MBCA	C	O,X	5
	Hirundo rustica	Barn Swallow		THR	MBCA	A	O,X	1
	Cyanocitta cristata	Blue Jay			FECA (P)	A	P,H	5
	Chaetura pelagica	Chimney Swift	THR	THR	MBCA	U	O,X	2
	Quiscalus quiscula	Common Grackle			-	A	O,X	1
	Sturnus vulgaris	European Starling			-	I;A	P,H	1,2,3,4,5
	Dumetella carolinensis	Gray Catbird			MBCA	A	Pr,T	2
	Carpodacus mexicanus	House Finch			MBCA	I;A	P,S	1
	Passer domesticus	House Sparrow			-	I;A	Pr,H	1,2,3,4,5
	Passerina cyanea	Indigo Bunting			MBCA	C	P,S	1,4
	Zenaida macroura	Mourning Dove			MBCA	A	Pr,P	1,2,3,4
	Cardinalis cardinalis	Northern Cardinal			MBCA	A	Pr,T	2,3,5
	Mimus polyglottos	Northern Mockingbird			MBCA	U	Pr,T	1,2
	Agelaius phoeniceus	Red-winged Blackbird			-	A	P,H	1,2
	Larus delawarensis	Ring-billed Gull			MBCA	A	O,X	1,2,3,4,5
	Columba livia	Rock Dove (Pigeon)			-	I; A	O,X	5
	Melospiza melodia	Song Sparrow			MBCA	A	P,T	1,2,3,4
	Dendroica petechia	Yellow Warbler			MBCA	A	P,S	4

[1]For definitions of species ranks, refer to **Appendix C**.

[2]BBE - Breeding Bird Evidence (according to Bird Studies Canada):

Possible Breeding:	H - Species observed in its breeding season in suitable nesting habitat. S - Singing male present in its breeding season in suitable nesting habitat.
Probable Breeding:	T - Permanent territory presumed through registration of territorial song on at least two days, a week or so apart, at the same place.
Confirmed Breeding:	A - Agitated behaviour or anxiety calls of an adult. NU - Used nest or egg shell found (occupied or laid within the period of study). FY - Recently fledged young or downy young, including young incapable of sustained flight. CF - Adult carrying food for young. NE - Nest containing eggs. NY - Nest with young seen or heard.

[3]Breeding Bird Point Count Station.

[4]City of Hamilton Status:

R = Rare

C = Common

U = Uncommon

Ext = Extirpated

I = Introduced

A = Abundant