NATURAL HERITAGE REPORT

MCLAUGHLIN ROAD IMPROVEMENTS
FROM BRISTOL ROAD WEST TO BRITANNIA ROAD WEST
CITY OF MISSISSAUGA, REGION OF PEEL
MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

prepared for:

IBI GROUP

MISSISSAUGA
Leading today for tomorrow

prepared by:

LGL LIMITED
environmental research associates

OCTOBER 2015

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OCTOBER 2015

LGL Project # TA8181

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1.0 INTRODUCTION

The City of Mississauga is undertaking a Schedule 'C' Municipal Class EA Study for improvements to McLaughlin Road between Bristol Road West and Britannia Road West. The study area is presented in **Figure 1**. This Class EA Study is being conducted by IBI Group on behalf of the City of Mississauga. LGL Limited, as a sub-consultant to IBI Group, is providing natural heritage services. This Natural Heritage Report documents the results of data collection and analysis in the summer and fall of 2012. Due to project timing constraints, spring surveys were not conducted during this study. The potential effects of this project on natural heritage, including environmental protection measures, are also presented in this report. A detailed tree inventory and assessment was completed to address the Britannia Farm woodlot, and is presented under separate cover, *Tree Protection and Edge Management Plan* (LGL 2015).

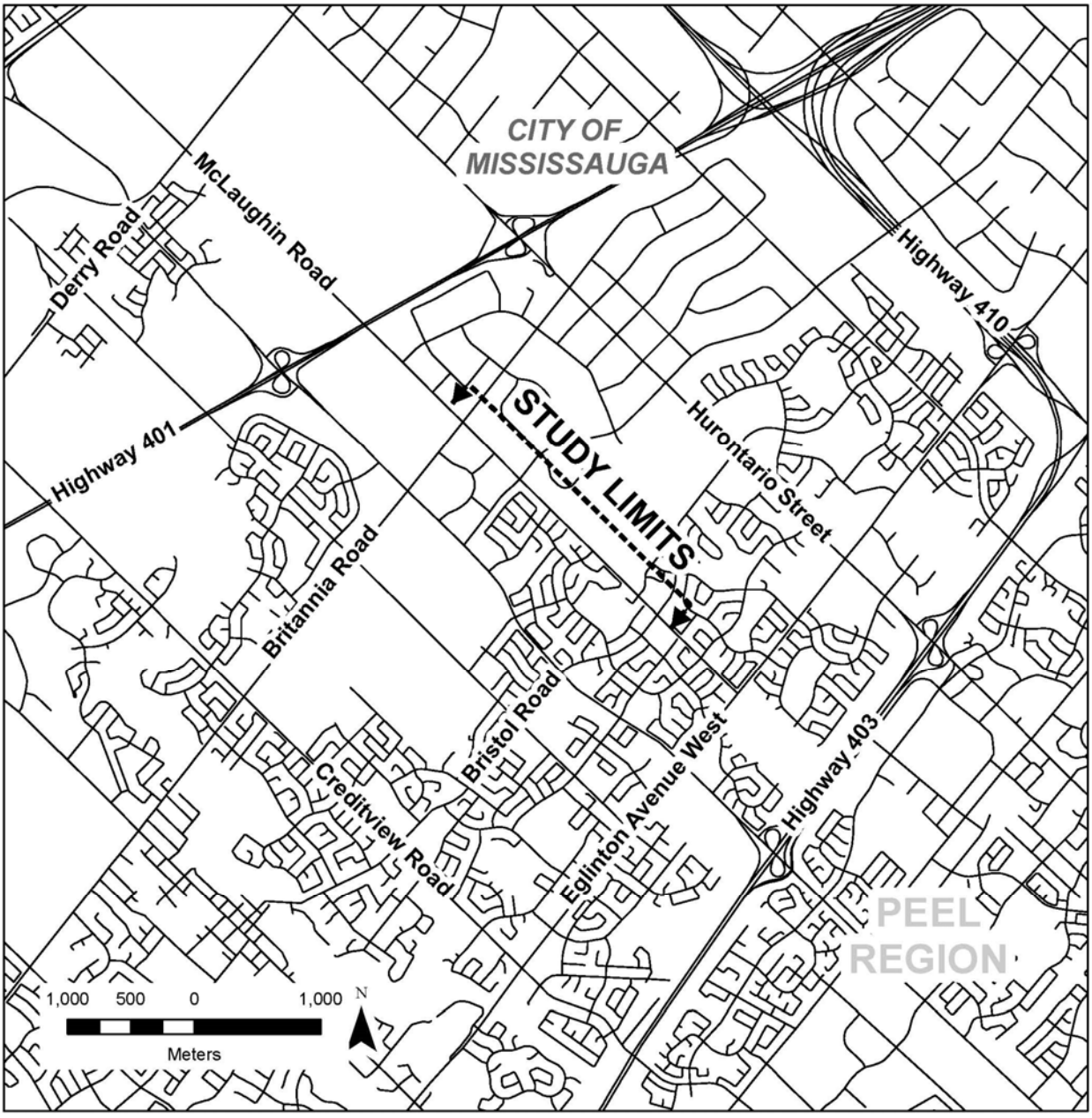

FIGURE 1. KEY PLAN

2.0 EXISTING CONDITIONS

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

2.1 Physiography and Soils

The study area is located within the South Slope physiographic region. This physiographic region occupies approximately 2,400 km^2 and extends from the Niagara Escarpment in the west to the Trent River in the east (Chapman and Putnam 1984). The South Slope predominately consists of shallow shale and till plains which slope gently in a southeasterly direction towards Lake Ontario. The topography is mostly subdued and includes low-relief drumlins and moraines.

The soils within the study limits include Oneida clay loam, Jeddo clay loam, Chingacousey clay loam and Bottom Lands (Hoffman and Richards 1953). These soils are described below.

2.1.1 Oneida clay loam

Oneida clay loams are found in southern areas of the Region of Peel and have developed from fine textured shale and limestone till on smooth moderately sloping topography. Oneida clay loam soils are slowly permeable, but are well-drained due to rapid run-off. These soils are susceptible to erosion. Oneida clay loam soils are located throughout the study limits (Hoffman and Richards 1953).

2.1.2 Jeddo clay loam

Jeddo clay loam is the poorly drained member of the Oneida catena, occurring is small areas in the southern portion of Peel Region. Jeddo soils occur in areas with a smooth and gently sloping topography. A band of Jeddo clay loam soils crosses McLaughlin Road in a west-east direction, just north of Bristol Road West (Hoffman and Richards 1953).

2.1.3 Chingacousey clay loam

Chingacousey soils are the imperfectly drained member of the Oneida catena. Areas with this soil series are typically smooth and gently sloping. In the study area, Chingacousey soils are recorded adjacent to the Bottom Lands, at Matheson Boulevard West and Regal Drive (Hoffman and Richards 1953).

2.1.4 Bottom Land

Bottom lands are associated with low lying areas along stream courses. Bottom land soils are prone to flooding, are poorly drained and show little soil horizon differentiation. These soils are recorded in a band that crosses McLaughlin Road between Matheson Boulevard West and Regal Drive. It should be noted that there is no longer a watercourse or valleyland at this location (Hoffman and Richards 1953).

2.2 Aquatic Habitats and Communities

The study area is located within the Cooksville Creek sub-watershed of the Credit River watershed; however, the closest watercourse is located parallel to McLaughlin Road, approximately 700 m to 800 m east of the study limits (between Matheson Boulevard and Bristol Road West). Based on a review of Credit Valley Conservation (CVC) sub-watershed mapping and correspondence with CVC Staff on October 29, 2012, it was confirmed that there are no watercourses located within the study limits.

2.3 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of the vegetation communities were identified through air photo interpretation and a field investigation. Air photos were interpreted to determine the limits and characteristics of the vegetation communities in the study area. A field investigation of the vegetation communities along McLaughlin Road between Britannia Road West and Bristol Road West was conducted on August 11 and 12, 2012 within the right-of-way and 10 metres beyond, to the extent possible. The field investigation was carried out to ground truth the boundaries of the vegetation communities and to conduct a botanical survey. A spring site visit was not conducted due to project schedule constraints; therefore, it is recommended that a spring survey be conducted during detail design.

The vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee *et al*. 1998). A plant list and a description of the general structure of vegetation were recorded during the field investigations. Plant species status was reviewed for Ontario (Oldham 2009, Credit Valley Conservation Authority (CVC 2002) and for Region of Peel (Riley 1989, Varga 2000). Vascular plant nomenclature follows Newmaster *et al*. (1998) with a few exceptions that have been updated to Newmaster *et al*. (2005).

2.3.1 Vegetation Communities

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

Four ELC vegetation community types were identified within the study limits during LGL's botanical survey, including: dry-moist old field meadow (CUM1-1); mineral cultural thicket (CUT1); dry- fresh sugar maple deciduous forest (FOD5); and, dry-fresh deciduous forest (FOD4). All of the vegetation communities identified within the study area are considered widespread and common in Ontario and are secure globally. These vegetation communities are delineated in **Figures 2A and 2B** and are described in **Table 1.** There are several vegetation communities that are not recognized by ELC such as areas of manicured grass (M) which include mown lawns, gardens and planted trees.

The Mississauga Natural Areas Survey was conducted to inventory all natural areas within the City of Mississauga, including woodlands, wetlands, creeks, and streams. As part of this survey, the woodlot on the west and east sides of McLaughlin Road was inventoried, and was mapped as "H03". There is a small woodland feature on the west side of McLaughlin Road, beyond the cul-de-sac at Parkwood Place, which was not inventoried as part of this Class EA Study as it is beyond the area of investigation. However, this feature is classified as a dry-fresh sugar maple – oak deciduous forest (FOD5-3). On the east side of McLaughlin Road is a larger woodland. The northerly portion of this feature is also classified as an FOD5-3 vegetation community. Since permission to enter was not available for lands beyond the right-of-way, the area is classified as FOD5 based on the plant list that was collected (**Figure 2A**). The FOD5 vegetation community is approximately 330 m, measured from west-east, and approximately 200 m, measured from north-south. The FOD5 vegetation community is approximately 6.6 ha in size, and provides interior habitat (habitat located greater than 100 m from the edge of the forest).

FIGURE 2A. NATURAL HERITAGE EXISTING CONDITIONS

FIGURE 2B. NATURAL HERITAGE EXISTING CONDITIONS

TABLE 1.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Community Characteristics
TERRESTRIAL – NATURAL/ SEMI-NATURAL			
FOD	Deciduous Forest		
FOD5	Dry- Fresh Sugar Maple Deciduous Forest	**Canopy:** includes sugar maple (*Acer saccharum* ssp. *saccharum*), black walnut (*Juglans nigra*), red oak (*Quercus rubra*), and white elm (*Ulmus americana*). **Understory**: includes common buckthorn (*Rhamnus cathartica*), riverbank grape (*Vitis riparia*), and sugar maple. **Ground cover**: includes garlic mustard (*Alliaria petiolata*), dame's rocket (*Hesperis matronalis*), white trillium (*Trillium grandiflorum*), and white baneberry (*Actaea pachypoda*).	• Tree cover >60 % (FO). • Deciduous trees >75 % of canopy cover (D). • Sugar maple forest (5). • Site conditions and substrate types variable.
FOD4	Dry- Fresh Deciduous Forest	**Canopy:** includes sugar maple, paper birch (*Betula papyrifera*), ironwood (*Ostyra virginiana*), and white ash (*Fraxinus americana*). **Understory**: includes common buckthorn, tartarian honeysuckle (*Lonicera tatarica*), and riverbank grape (*Vitis riparia*). **Ground cover**: includes garlic mustard, white baneberry, orchard grass (*Dactylis glomerata*), and Canada goldenrod (*Solidago canadensis*).	• Tree cover >60 % (FO). • Deciduous trees >75 % of canopy cover (D). • Tree species associations that are either relatively uncommon or a result of disturbance or management (4).
TERRESTRIAL – CULTURAL			
CUM	Cultural Meadow		
CUM1-1	Dry-Moist Old Field Meadow	**Ground cover:** includes New England aster (*Symphyotrichum novae-angliae*), Canada goldenrod, common St. John's wort (*Hypericum perforatum*), red clover (*Trifolium pratense*), and common evening-primrose (*Oenothera biennis*).	• Cultural community resulting from, or maintained by, cultural or anthropogenic-based disturbance (CU). • Tree cover and shrub cover < 25 % (M). • Parent mineral material or mineral soil (1). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). Grasses and forbs are dominant (-1).

TABLE 1.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Community Characteristics
CUT	Cultural Thicket		
CUT1	Mineral Cultural Thicket	**Canopy**: includes red oak (*Quercus rubra*), sugar maple, bur oak (*Quercus macrocarpa*), blue spruce (*Picea pungens*), white elm, and American beech (*Fagus grandifolia*). **Understory:** includes common buckthorn, staghorn sumac (*Rhus typhina*), hawthorn (*Crataegus* sp.), riverbank grape, and cherry (*Prunus* sp.). **Canopy:** includes garlic mustard, dame's rocket, scarlet strawberry (*Fragaria virginiana* ssp. *virginiana*), yellow avens (*Geum aleppicum*).	• Cultural community (CU). • Tree cover < 25 % (T). • This community can occur on a wide range of soil moisture regimes (Dry-Moist) (-1). • Pioneer community resulting from, or maintained by, anthropogenic-based influences.
Other*	Manicured		
M (a-b)	Manicured grasses and planted shrubs and/or trees	Areas where large expanses of grass/shrubs/trees are maintained and/or planted. **Planted trees/shrubs:** includes Norway maple, blue grass (*Poa* sp.), Austrian pine (*Pinus nigra*), blue spruce, and honey locust (*Gleditsia triacanthos*).	

* Not identified as an ELC vegetation community by Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. *Ecological Land Classification for Southern Ontario: First Approximation and Its Application*. Natural Heritage Information Centre.

The site investigations conducted within the FOD5-3 vegetation (identified as FOD5 in **Figure 2A**) community during the Natural Areas Survey indicate that the red oak (*Quercus rubra*) trees typically have a DBH of 40 cm and sugar maples (*Acer saccharum* spp. *saccharum*) are typically 30 cm DBH, which form a dense canopy. Regeneration within the FOD5-3 is dominated by sugar maple seedlings, with white ash (*Fraxinus americana*), red oak, and black cherry (*Prunus serotina*). In addition, this woodland is mature (60 to 100 years old) with greater than 60% forest cover (City of Mississauga 2011).

The southerly portion of the larger woodland on the east side of McLaughlin Road is classified in the Natural Areas Survey as deciduous forest (FOD4) adjacent to McLaughlin Road, and dry-moist old field meadow (CUM1-1) and cultural woodland (CUW1) further east. The deciduous forest was previously an old hedgerow, and is a relatively narrow band of scattered trees. The cultural meadow is dominated by Canada goldenrod (*Solidago Canadensis*), Timothy (*Phleum pratensis*), orchard grass (*Dactylis glomerata*), Kentucky blue grass (*Poa pratensis* ssp. *Pratensis*), burdock (*Arctium minus* ssp. *Minus*) and wild carrot (*Daucus carota*) (City of Mississauga 2011). The cultural woodland contains similar species to the cultural meadow, but is dominated by Austrian pine (*Pinus nigra*) (City of Mississauga 2011). The cultural meadow and cultural woodland are not described in **Table 1**, as access was not available to these lands; however, it is anticipated that these vegetation communities are outside the impact zone of this project. The limits of the cultural meadow and cultural woodland are delineated through air photo interpretation in **Figures 2A and 2B**.

The above vegetation communities have been disturbed through a range of activities, including historic logging and wanton pedestrian trails. A floristic quality assessment was completed for the site as part of the Natural Areas Survey. The Floristic Quality Index (FQI) and Native Mean Coefficient of Conservatism, provide a comparison of vegetation quality of natural areas (Oldham et al. 1995). The results of the analysis completed as part of the Natural Areas Survey produced a native FQI of 33.11, which is medium, and a native mean coefficient of 3.68, which is medium (City of Mississauga 2011), indicating that the feature is of moderate significance.

The Credit Valley Conservation Authority undertook a study to evaluate the natural heritage system in the City of Mississauga, which incorporated the data collected as part of the Natural Areas Survey. Using a Landscape Scale Analysis, natural areas were assessed using a range of criteria, such as connectivity and ecological function at the local, sub-regional and regional/provincial scales. By evaluating existing natural areas, the analysis also identified opportunities to expand the current natural heritage system. The results identified the natural area on the east side of McLaughlin Road as High Functioning based on the criteria for woodlands, wetlands, and successional habitat, and habitat diversity. This natural area east of McLaughlin Road is identified as a 'Core ecofunction' habitat patch category of the CVC Natural Heritage System. Efforts should be made to reduce the amount of land required from the east side of McLaughlin Road, where possible, to minimize impacts to this feature.

2.3.2 Vegetation

A total of 73 plant species were recorded by LGL within the study area. Five of these plants could only be identified to genus. Of the 68 plant species identified to species, 38 (56%) plant species identified are native to Ontario and 30 (44%) plant species are considered introduced and non-native to Ontario. A list of vascular plants is presented in **Appendix A**.

2.3.3 Species at Risk

No plant species that are regulated under the Ontario *Endangered Species Act* or the Canada *Species at Risk Act* were encountered during LGL's botanical investigation within the study area (those plant species regulated as Endangered, Threatened, or Special Concern).

A number of plant species considered rare in the City of Mississauga or CVC Species of Conservation Concern were recorded as part of the Natural Areas Survey. These included: summer grape (*Vitis aestivalis*) and linear-leaved willow-herb (*Epilobium leptophyllum*), which are rare in the City; ground juniper (*Juniperus communis*), which is uncommon in the City; and, 19 CVC flora Species of Conservation Concern. These species were not documented during the site visit. Due to the timing of study commencement, it was not feasible to conduct spring surveys to assess the presence of these rare plant species.

2.4 Tree Inventory

An ISA Certified Arborist conducted an inventory of tree resources along McLaughlin Road between Britannia Road West and Bristol Road West on October 26, 29, 31, and November 2, 2012. The investigation included an analysis of all trees 10 cm diameter at breast height (DBH) within the right-of-way and 10 m beyond, where possible. A stem count for trees less than 10 cm DBH was also undertaken to capture all remaining trees. **Please note, additional tree assessment work was completed after this assessment was complete. The detailed inventory and assessment of impacts to trees is documented under separate cover*, Tree Protection and Edge Management Plan* (LGL 2015).**

For the trees with a DBH of 10 cm or greater, the following information was recorded: species identification; DBH at 1.37 m above the ground; tree condition using a matrix of trunk integrity, canopy structure, and crown vigour; and, general comments, where warranted. Trees were identified and affixed with an aluminium numbered tag during this field investigation. Trees located outside of the right-of-way were not tagged; however, these trees were assessed and given an LGL ID number. Tree locations were captured using a TOPCON GSR-1 GPS unit and this information was translated for geographical information system (GIS) mapping.

A stem count was conducted within the naturalized areas along McLaughlin Road between Britannia Road West and Bristol Road West on November 2, 2012. The investigation included a tally of all woody species measuring less than 10 cm DBH within the right-of-way and 10 m beyond, where possible. Polygons were delineated to record the locations where stems were counted, and the total number of stems and their species were recorded.

All surveyed trees were screened to determine the presence of any species at risk, including those species regulated as 'Endangered', 'Threatened', or 'Special Concern' under the Ontario *Endangered Species Act* and/or the Canada *Species at Risk Act*. A summary of this screening is presented in **Section 2.4.3**.

2.4.1 Tree Preservation By-laws and Policies

The Region of Peel has prepared an Urban Forest Strategy that is intended to provide the framework and strategic direction for the protection and enhancement of the urban forest. The Plan includes strategic goals, including the preparation of urban forest management plans and policy frameworks. As part of this strategy, an analysis of the City of Mississauga's urban forest was undertaken and documented in the City of Mississauga Urban Forest Study – Technical Report. In this report, a number of recommendations were made to better manage the urban forest, including a review of existing Street Tree By-law 474-05, establishment of a comprehensive public tree bylaw to protect trees on publicly owned lands, and establishment of a Tree Protection Policy that outlines enforceable guidelines for tree protection, among others. As such, the policy framework that applies to tree protection in the City of Mississauga may be subject to change.

There are three by-laws that regulate trees in the City of Mississauga: Street Tree By-law 91-75, Tree Permit By-law 474-05, and Encroachment By-law 0057-2004. The Street Tree By-law regulates the protection of City owned trees along road right-of-ways; however, this by-law is currently being updated to better address

the City's needs. Individual tree removals on private land are regulated by the City of Mississauga through By-law 474-05, which requires a permit for the removal of five or more trees that are 15 cm in diametre and greater. The Encroachment By-law is intended to address encroachment of private landowners onto City property, and would not apply to this type of undertaking. There are no by-laws at the regional level that regulate woodlands. Tree protection measures and compensation for the removal of trees within the study area will be undertaken in accordance with City By-laws and guidelines.

2.4.2 Summary of Results

Tree Inventory (trees > 10 cm DBH)
A total of 1,188 trees consisting of 30 species were examined and assessed within the right-of-way and 10 m beyond. A total of 18 (60 %) of the tree species assessed are considered native to Ontario. A list of the species identified during the tree inventory is presented in **Table 2.** A detailed summary of all living trees within the study area and the location of these trees on an air photo base are presented in **Appendix C**.

Overall, trees within the study area range in size from 5 to 77 cm DBH and are generally considered to be in good to fair condition with the exception of a few in poor condition. The beech trees found within the study area did not exhibit bark typical of the species which indicates that the trees may have beech bark disease.

The majority of trees observed (751 (63%) of the total number of trees) were planted as streetscape or amenity features on commercial properties. The majority of tree species (54%) identified within this portion of the study area are native to Ontario. A large portion of the trees within the manicured areas have exposed roots which is an indication of a shallow root system, making these trees more suspectible to windthrow and root damage.

The woodlot on the east side of McLaughlin Road within the area of investigation contains 116 trees (10% of the total number of trees) within the study area. The majority of trees species (88%) identified within this portion of the study area are native to Ontario. The trees within the woodlot range in size from 10 to 77 cm DBH. A total of 11 trees identified within the woodlot measure greater than 50 cm DBH. Of these 11 trees, 10 are red oak (Tree # E24, E69, E97, E104, E106, E113, E116-115, E122, and E133) and one is sugar maple (Tree # E114). Large trees of this size are significant in the urban landscape and efforts should be made to retain these trees to the extent possible.

TABLE 2.
SUMMARY OF TREE SPECIES INVENTORIED

Scientific Name	Common Name	Total Number of Trees
Acer negundo	Manitoba maple	1
Acer platanoides	Norway maple	109
Acer rubrum	red maple	34
Acer saccharum ssp. *saccharum*	sugar maple	231
Acer saccharinum	silver maple	11
Carya ovata	shagbark hickory	2
Catalpa sp.	catalpa	1
Celtis occidentalis	hackberry	2
Fagus grandifolia	American beech	17
Fraxinus americana	white ash	10
Fraxinus excelsior	European ash	23
Fraxinus pennsylvanica	red ash	59
Gleditsia triacanthos	honey locust	22
Malus sp.	apple	1

TABLE 2.
SUMMARY OF TREE SPECIES INVENTORIED

Scientific Name	Common Name	Total Number of Trees
Ostyra virginiana	ironwood	11
Picea glauca	white spruce	58
Picea pungens	blue spruce	177
Pinus nigra	Austrian pine	55
Pinus strobus	white pine	26
Pinus sylvestris	Scots pine	23
Prunus serotina	black cherry	3
Prunus sp.	cherry	7
Quercus alba	white oak	3
Quercus macrocarpa	bur oak	43
Quercus rubra	red oak	115
Syringa vulgaris	lilac	5
Tilia americana	basswood	51
Tilia cordata	little-leaf linden	25
Ulmus americana	American elm	35
Ulmus pumila	Siberian elm	28
	Total	1188

Stem Count

A survey was undertaken within forest and cultural thicket communities on McLaughlin Road between Britannia Road West and Bristol Road West within the right-of way and extending 10 m beyond to document the total number of trees/stems measuring less than 10 cm DBH. The findings of the survey have been described below in four separate areas identified as polygons A to D. These four areas are illustrated on the maps in **Appendix C** and a list of the species recorded is presented in **Table 3**.

Polygon A

Polygon A is located within the woodlands on the east side of McLaughlin Road. Species composition within the polygon is not considered to be significant. A total of 854 stems comprised of 12 species were recorded within polygon A. These species included: cherry (*Prunus* sp.), white ash (*Fraxinus americana*), sugar maple (*Acer saccharum* ssp. *saccharum*), red osier dogwood (*Cornus sericea*), American beech (*Fagus grandifolia*), American elm (*Ulmus americana*), common buckthorn (*Rhamnus cathartica*), red oak (*Quercus rubra*), basswood (*Tilia americana*), tatarian honeysuckle (*Lonicera tatarica*), black walnut (*Juglans nigra*), and hawthorn (*Crataegus* sp.). Of the species identified, 10 (83%) are considered native to Ontario. The species identified within Polygon A are well adapted to persist with regular disturbance as a result of the existing roadway.

TABLE 3.
SUMMARY OF TREE STEM COUNT

Scientific Name	Common Name	Polygon A	Polygon B	Polygon C	Polygon D	Native (n)/ Exotic (e)
Prunus sp.	cherry	184	24	33	7	*e*
Fraxinus americana	white ash	20				*n*
Acer saccharum ssp. *saccharum*	sugar maple	184	33	34	37	*n*
Cornus sericea	red osier dogwood	54		20		*n*
Fagus grandifolia	American beech	12	3			*n*
Ulmus americana	American elm	44	8			*n*

TABLE 3.
SUMMARY OF TREE STEM COUNT

Scientific Name	Common Name	Polygon A	Polygon B	Polygon C	Polygon D	Native (n)/ Exotic (e)
Rhamnus cathartica	common buckthorn	93	57	65	10	*e*
Quercus rubra	red oak	63	17	20	14	*n*
Tilia Americana	basswood	33	25	2		*n*
Rhus typhina	staghorn sumac	63	13	5		*n*
Lonicera tatarica	tatarian honeysuckle	45	24			*e*
Juglans nigra	black walnut	20				*n*
Crataegus sp.	hawthorn	35	35	17		*n*
Acer platanoides	Norway maple	4	8			*e*
Hammelis virginiana	witch-hazel		9	3		*n*
Sambucus sp.	elderberry		6	2		*n*
Ulmus pumila	Siberian elm		12			*e*
Quercus macrocarpa	bur oak			4		*n*
Picea glauca	white spruce				7	*n*
Pinus nigra	Austrian pine				3	*e*
	Total	**854**	**274**	**205**	**78**	
	Grand Total	**911**				
	Exotics	**569**				
	Natives	**342**				

Please note that the data presented herein is an approximation.

Polygon B
A total of 274 stems comprised of 14 species were recorded within Polygon B. These species included: cherry, sugar maple, American beech, American elm, common buckthorn, red oak, basswood, staghorn sumac, tatarian honeysuckle, hawthorn, Norway maple, witch-hazel, elderberry, and Siberian elm.

Polygon C
A total of 205 stems comprised of 10 species were recorded within Polygon C. These species included: cherry, sugar maple, red osier dogwood, common buckthorn, red oak, basswood, hawthorn, witch-hazel, elderberry, and bur oak.

Polygon D
A total of 78 stems comprised of 6 species were recorded within Polygon D. These species included: cherry, sugar maple, common buckthorn, red oak, white spruce (*Picea glauca*), and Austrian pine (*Pinus nigra*).

2.4.3 Species at Risk

No tree species that are regulated under the Ontario *Endangered Species Act* or the Canada *Species at Risk Act* were encountered during LGL's tree inventory within the study area (those tree species regulated as Special Concern, Endangered, Rare or Threatened).

2.5 Wildlife and Wildlife Habitat

Field investigations were conducted within the study area along McLaughlin Road between Bristol Road West and Britannia Road West in the City of Mississauga on July 13 and 19, 2012. The field work was completed just outside of the breeding bird window (after July 10), as defined by the Bird Studies Canada Breeding Bird Atalas protocol (Cadman et al., 2007), due to the timing of project commencement. It is recommended that a breeding bird survey be conducted during detail design to confirm species presence/absence. The purpose of this field investigation was to document wildlife and wildlife habitat and to characterize the nature, extent and significance of animal usage (e.g. breeding bird activity) within the project limits. Direct observations, sounds and odours, plus indirect indicators such as signs (feeding evidence, tracks, scats, and runways) were used to record wildlife presence within the study area.

Due to the warmer than usual temperatures, surveys commenced at 0500 hours each day to get the most observations before the weather became too hot and wildlife became inactive. Weather conditions during the survey on July 13 were partly cloudy skies, with little to no wind and 26°C, whereas July 19 was overcast with a southeasterly wind and 20°C.

2.5.1 Wildlife Habitat

Most of the habitat along McLaughlin Road between Bristol Road West and Britannia Road West comprised manicured grasses with short stretches of planted trees. A small fenced-in cultural meadow existed on the east side of McLaughlin Road just south of Britannia Road West. However, approximately 700 meters of continuous natural heritage features is present on the east side of McLaughlin Road, north of Bristol Road West. This habitat consisted primarily of deciduous forest along the east side of McLaughlin Road with a cultural thicket and cultural meadow along its eastern border. Most of the forest showed signs of human disturbance (walking trails, garbage, etc). The cultural thicket and cultural meadows behind the forest looked relatively undisturbed. No significant wildlife habitat was identified within the study area.

2.5.2 Fauna

A total of 40 species of wildlife fauna were recorded over the two days of field investigations conducted within the study area (**Table 4**). Only one herpetofaunal species, Eastern Gartersnake (*Thamnophis sirtalis*), was included in the species list based on the presence of suitable habitat within the study area. No amphibians or reptiles were found during the field surveys. The lack of any aquatic habitats may have contributed to this finding.

The bird fauna recorded around the commercial and residential areas were generally considered urban species tolerant of human disturbances. Species such as American Robin (*Turdus migratorius*), Chipping Sparrow (*Spizzela passerina*), Northern Cardinal (*Cardinalis cardinalis*) and House Finch (*Carpodacus mexicanus*) were all observed in and around the commercial and residential sections of the study area. Most of the species recorded, however, are not as tolerant of human presence and were concentrated within the forests and cultural meadows at the southeast limit of the McLaughlin Road study area. The forest contained species such as Northern Flicker (*Colaptes auratus*), Downy Woodpecker (*Picoides pubescens*), Red-breasted Nuthatch (*Sitta canadensis*), Cedar Waxwing (*Bombycilla cedrorum*), Great Crested Flycatcher (*Myiarchus crinitus*), Red-eyed Vireo (*Vireo olivaceus*) and Baltimore Oriole (*Icterus galbula*). Investigations into the cultural meadow and cultural thicket along the east side of the forest revealed bird species such as Red-tailed Hawk (*Buteo jamaicensis*), Gray Catbird (*Dumetella carolinensis*), Indigo Bunting (*Passerina cyanea*), Barn Swallow (*Hirundo rustica*) and American Goldfinch (*Carduelis tristis*). Barn Swallow is regulated as a Threatened species under the Ontario *Endangered Species Act*. This species is further described in **Section 2.5.3**.

TABLE 4.
WILDLIFE SPECIES DOCUMENTED WITHIN THE STUDY AREA

Wildlife	Scientific Name	Common Name	Species Status under Legislation/Local Sensitivity				Breeding Bird Evidence		
			COSEWIC/SARA	Ontario ESA	Legal Status	Local	Y	N	?
Herpetofauna	*Thamnophis sirtalis*	Eastern Gartersnake							
Birds	*Buteo jamaicensis*	Red-tailed Hawk	NAR	NAR	FWCA(P)		X		
	Charadrius vociferus	Killdeer			MBCA			X	
	Larus delawarensis	Ring-billed Gull			MBCA			X	
	Columba livia	Rock Pigeon						X	
	Zenaida macroura	Mourning Dove			MBCA			X	
	Picoides pubescens	Downy Woodpecker			MBCA		X		
	Colaptes auratus	Northern Flicker			MBCA		X		
	Myiarchus crinitus	Great Crested Flycatcher			MBCA		X		
	Vireo olivaceus	Red-eyed Vireo			MBCA		X		
	Corvus brachyrhynchos	American Crow					X		
	Hirundo rustica	Barn Swallow	THR – COSEWIC No Status – SARA	THR	MBCA	BSC		X	
	Poecile atricapillus	Black-capped Chickadee			MBCA	BSC	X		
	Sitta canadensis	Red-breasted Nuthatch			MBCA	BSC			X
	Sitta carolinensis	White-breasted Nuthatch			MBCA				X
	Troglodytes aedon	House Wren			MBCA		X		
	Turdus migratorius	American Robin			MBCA		X		
	Dumetella carolinensis	Gray Catbird			MBCA	BSC	X		
	Sturnus vulgaris	European Starling					X		
	Bombycilla cedrorum	Cedar Waxwing			MBCA		X		
	Spizella passerina	Chipping Sparrow			MBCA		X		
	Melospiza melodia	Song Sparrow			MBCA		X		
	Cardinalis cardinalis	Northern Cardinal			MBCA		X		

TABLE 4.
WILDLIFE SPECIES DOCUMENTED WITHIN THE STUDY AREA

Wildlife	Scientific Name	Common Name	Species Status under Legislation/Local Sensitivity				Breeding Bird Evidence		
			COSEWIC/SARA	Ontario ESA	Legal Status	Local	Y	N	?
Birds (continued)	*Passerina cyanea*	Indigo Bunting			MBCA		X		
	Quiscalus quiscula	Common Grackle					X		
	Molothrus ater	Brown-headed Cowbird					X		
	Icterus galbula	Baltimore Oriole			MBCA				X
	Carpodacus mexicanus	House Finch			MBCA		X		
	Carduelis tristis	American Goldfinch			MBCA	BSC	X		
	Passer domesticus	House Sparrow					X		
Mammals	*Sylvilagus floridanus*	Eastern Cottontail			FWCA(G)				
	Tamias striatus	Eastern Chipmunk			FWCA(P)				
	Sciurus carolinensis	Gray Squirrel			FWCA(G)				
	Microtus pennsylvanicus	Meadow Vole							
	Mephitis mephitis	Striped Skunk			FWCA(F)				
	Vulpes vulpes	Red Fox			FWCA(F)				
	Canis latrans	Coyote			FWCA(F)				
	Procyon lotor	Raccoon			FWCA(F)				
	Odocoileus virginianus	White-tailed Deer			FWCA(G)				

All acronyms used in this table are defined in **Appendix B** (Acronyms and Definitions Used in Species Lists).

Legislation Referenced in the Table:
COSEWIC – Committee on the Status of Endangered Wildlife in Canada
SARA – Canada *Species at Risk Act*
ESA – Ontario *Endangered Species Act*
MBCA – *Migratory Bird Convention Act*
FWCA – *Fish and Wildlife Conservation Act*

Local Ranks:
BSC – Bird Studies Canada, Species of Conservation Priority.

Atlas of Breeding Birds of Ontario, 2001-2005 (Cadman et al., 2007)
Y - bird species meets one or more of the breeding bird criteria
N - bird species does not meet any of the breeding bird criteria
? - bird species was singing on territory but only seen once

Although it was considered late in the breeding season for birds, numerous species could still be recorded as successfully breeding within the study area based on particular breeding bird behaviours established by the *Atlas of Breeding Birds of Ontario* criteria for breeding birds (Cadman et al. 2007). Some breeding bird species, like American Goldfinch, Indigo Bunting, Song Sparrow and House Wren (*Troglodytes aedon*) were calling on territory each week the study area was surveyed. Chipping Sparrow and Indigo Bunting were carrying food to their young, and newly fledged individuals, such as American Robin and Gray Catbird, were flying around their territories. Based on Bird Studies Canada (BSC) criteria, 20 of the 29 species of birds recorded in the study area were considered breeding birds. Three species, Baltimore Oriole (*Icterus galbula*), Red-breasted Nuthatch (*Sitta canadensis*) and White-breasted Nuthatch (*Sitta carolinensis*), were only seen once and although there is a strong possibility that they were breeding in the area, their activity did not meet the BSC criteria for breeding bird evidence.

All of the mammal species recorded are tolerant to human disturbance. Species such as Eastern Cottontail (*Sylvilagus floridanus*), Gray Squirrel (*Sciurus carolinensis*), Eastern Chipmunk (*Tamias striatus*), Raccoon (*Procyon lotor*), Striped Skunk (*Mephitis mephitis*), Eastern Coyote (*Canis latrans*) and White-tailed Deer (*Odocoileus virginianus*) were identified inhabiting the commercial, residential and natural heritage areas. Numerous movement corridors (as identified by well established trails) for these species were observed along McLaughlin Road. Corridors (as identified by tracks and well established trails) for smaller mammals were observed parallel to and along each side of McLaughlin Road through the tree planted areas. Some corridors lead to crossing points over McLaughlin Road to connect areas on both sides of the road. Most of the corridors, especially for the larger species such as Eastern Coyote and White-tailed Deer, were located in the forest and cultural meadows. Corridors occurred parallel to McLaughlin Road through the forest while other corridors connected the forest corridors to the cultural meadows and cultural thickets that bordered the forest. Although wildlife was recorded in the forest, evidence showed that the activity was minimal for a forest of this type and that human disturbance may be a contributing factor.

2.5.3 Species at Risk

Of the 29 species of birds recorded, one species, Barn Swallow is regulated as Threatened under the Ontario *Endangered Species Act* (ESA), and is listed as 'Threatened' by COSEWIC (Committee on the Status of Endangered Wildlife in Canada). On the July 19 visit, two Barn Swallows were observed foraging over the cultural meadow, approximately 200 meters east of the forest along the east side of McLaughlin Road.

The wildlife surveys conducted for the City of Mississagua Natural Areas Survey documented Eastern Wood-pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*) in the vicinity of the study area. These species were not documented during the field investigations. However, Eastern Wood-pewee and Wood Thrush are listed on the Species at Risk in Ontario List as 'Special Concern'; however, they are not regulated and consequently do not receive habitat protection under the Ontario *Endangered Species Act*.

Background information collected from Natural Heritage Information Center (NHIC) database revealed two species at risk previously reported within or adjacent to the study area. Henslow's Sparrow (*Ammodramus henslowii*), which is regulated as 'Endangered' under the ESA and SARA, was recorded in 1932. Musk Turtle (*Sternotherus odoratus*), which is listed as 'Special Concern' under the ESA and 'Threatened' under the SARA, was recorded in 1969. Each element occurrence record for these these species is considered historic in nature and habitats considered suitable to support them were not identified. Neither species were observed during the field investigations.

Twenty-two bird species are protected under the *Migratory Birds Convention Act* and one is protected under the *Fish and Wildlife Conservation Act* (**Table 4**). Five bird species are considered birds of conservation priority for Southern Ontario by Bird Studies Canada. Three of these, American Goldfinch, Barn Swallow and Red-breasted Nuthatch, are considered area-sensitive birds, meaning that a reduction in habitat can

directly affect their breeding success. Of the nine species of mammals recorded, eight are protected under the *Fish and Wildlife Conservation Act*.

2.6 Designated Natural Areas

Designated natural areas include areas identified for protection by the Ontario Ministry of Natural Resources (OMNR), CVC, the Regional Municipality of Peel, and City of Mississauga. A review of the OMNR Natural Heritage Information Centre indicates that there are no Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), or Environmentally Sensitive Areas (ESAs) located within 120 m of the study area.

Region of Peel Official Plan

The Peel Region Greenlands System is comprised of Core Areas, Natural Areas, and Corridors, and Protected Natural Areas and Corridors. The recognition, protection and stewardship of this system supports and strengthens the integrity and long term sustainability of the ecosystems in Peel and area municipalities (Peel Region Official Plan, 2.3). Schedule A of the Peel Region Official Plan indicates that the woodlot on the east side of McLaughlin Road is within the "Core Areas of the Greenlands System." The Official Plan defines Core Areas as those that "contain ecological features, forms and/or functions that provide favourable conditions for uninterrupted natural systems and maximum diversity" (Peel Region Official Plan, 2.3). The Region of Peel directs lower tier municipalities to include these areas in their Official Plan and to include policies for the interpretation, protection, enhancement, proper management and stewardship of Core Areas. Development and site alteration is prohibited in Core Areas, with the exception of certain land use activities, including essential infrastructure exempted, pre-approved or authorized under an environmental assessment process (Peel Region Official Plan, 2.3.2.6).

City of Mississauga Official Plan

The City of Mississauga Official Plan identifies Natural Heritage System, including natural areas, woodlands, wetlands, and valley and watercourse corridors. Based on a review of Schedule 3 (Natural System) of the City of Mississauga Official Plan, the woodlands located along McLaughlin Road are designated as 'Significant Natural Areas and Natural Green Spaces' and 'Special Management Areas' within the Natural Area System of the City of Mississauga. Accordint to Policy 6.3.26 of the Official Plan, "lands identified as or meeting the criteria of a Significant Natural Area, as well as their associated buffers will be designated Greenlands and zoned to ensure their long term protection. Uses will be limited to conservation, flood and/or erosion control, essential infrastructure and passive recreation". In addition, work is not permitted in or adjacent to a Significant Natural Area unless all reasonable alternatives have been considered and any negative impacts minimized. Unavoidable impacts will be mitigated through restoration and enhancement to the greatest extent possible, as demonstrated in accordance with the requirements of the *Environmental Assessment Act* (6.3.27).

The City's Natural Areas Survey Fact Sheet classifies it as a "Natural Site." The data that was collected during the Natural Areas Survey has been incorporated into all the existing conditions summaries contained in this report. A natural linkage connects the larger woodlands on the east side of McLaughlin Road to another natural system located along the Cooksville Creek valleylands.

Region of Peel and CVC Natural Areas Inventory

The Natural Areas Inventory for Peel Region was reviewed to identify any additional natural area data. However, none of the natural areas inventoried for Peel Region are located within the study limits.

CVC Natural Heritage System
The woodlands described in **Section 2.3** are part of the CVC Natural Heritage System, and are identified as High Functioning on the east side of McLaughlin Road. This natural area east of McLaughlin Road is identified as a 'Core ecofunction' habitat patch category of the CVC Natural Heritage System.

3.0 PROJECT DESCRIPTION

The recommended design proposes widening of McLaughlin Road from Bristol Road West to Britannia Road West. The following summary provides an overview of the recommended design for the north section, McLaughlin Road between Matheson Boulevard West and Britannia Road West, and the south section, McLaughlin Road between Bristol Road West and Matheson Boulevard West.

North Section: Matheson Boulevard West to Britannia Road West
The section of McLaughlin Road between Matheson Boulevard West and Britannia Road West will be widened to 4 lanes with an urban cross-section and a centre turn lane. There will be 1.5 m on-road bike lanes and a sidewalk on both sides of McLaughlin Road.

South Section: Bristol Road West to Matheson Boulevard West
The section of McLaughlin Road between Bristol Road West and Matheson Boulevard West will be widened to four lanes with an urban cross-section, including a 4 m sharrow/curb lane. Given the sensitivity of the Britannia woodlot within this section of McLaughlin Road, the proposed right-of-way is much narrower (approximately 23 m) than that proposed for the north section of McLaughlin Road (30 m). The centre turn lane that is proposed in the north section of McLaughlin Road is not proposed within this section. In addition, other measures have been incorporated into the design to minimize the impact of the road improvements on the natural heritage features within the study area:

- Narrow inner and auxiliary lane widths (3.1 to 3.35 m);
- 3.5 to 6.9 m pavement widening;
- 2.0 m curbside sidewalks, except no sidewalk on east side from Faith to Ceremonial;
- Relocate overhead hydro to underground;
- Reduced left turn lengths; and,
- Use retaining walls and monolithic sidewalk to reduce grading impacts.

The potential effects of the preferred design on fish and fish habitat, vegetation and vegetation communities, wildlife and wildlife habitat, and designated natural areas is discussed in **Section 4.0**. The potential for a permit to be required under the Ontario *Endangered Species Act* is also discussed.

4.0 IMPACT ASSESSMENT AND ENVIRONMENTAL PROTECTION

4.1 Soil Disturbance and Potential for Erosion

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

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

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

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

4.2 Aquatic Habitats and Communities

Since no watercourses are located within or adjacent to the study limits, no impacts to fish and fish habitat will occur related to this project. There is a watercourse located approximately 700 m east of McLaughlin Road that is located within the CVC Regulation Limit. There will be no direct impacts to this watercourse and any indirect impacts will be managed by implementing an erosion and sediment control plan prior to and during construction.

4.3 Vegetation and Vegetation Communities

Improvements to McLaughlin Road from Bristol Road West to Britannia Road West have the potential to result in impacts to vegetation and vegetation communities. Effects on vegetation related to these modifications could include:

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

4.3.1 Displacement of/Disturbance to Vegetation and Vegetation Communities

A review of the proposed grading limits was undertaken to determine the areas within the identified vegetation communities, where vegetation clearing will be required to accommodate the proposed road improvements to McLaughlin Road. A summary of the total areas of vegetation communities within the proposed grading limits is presented in **Table 5**.

Of the total 1.4 ha to be impacted, the largest area of impact will be to the manicured areas in the study area, with a total of 0.95 ha. This impact is not considered to be significant as these are manicured, planted areas.

TABLE 5.
IMPACTS TO VEGETATION COMMUNITIES WITHIN THE STUDY AREA

Vegetation Community	Total Area to be Impacted(m^2)	Total Area to be Impacted(ha)
Dry- Moist Old Field Meadow (CUM1-1)	501	0.05
Mineral Cultural Thicket (CUT1)	1072	0.11
Dry- Fresh Deciduous Forest (FOD4)	2036	0.20
Dry- Fresh Sugar Maple Deciduous Forest (FOD5)	914	0.09
Manicured	9494	0.95
Total Area of Impacted Lands	**14017**	**1.4**

Forest Vegetation Communities

The forest communities (FOD4 and FOD5) have the largest impact of all the naturally occurring vegetation communities. Approximately 0.20 ha of deciduous forest and 0.09 ha of sugar maple deciduous forest will be cleared to accommodate the road widening, for a total of approximately 0.29 ha. Efforts were made by the study team to minimize the impacts to the forest communities in this area, given the local importance of this natural heritage feature. The existing hydro lines will be buried through the study area, to reduce the impacts of the road widening on the deciduous forests. Forest edge management and invasive species management is proposed in the following sections to mitigate the impact of the removal of trees adjacent to McLaughlin Road. Discussions with regulatory agencies will take place during detail design regarding planting of trees within the study area to replace the trees that will be removed to accommodate the recommended plan.

Forest Edge Management

The removal of forest vegetation along the existing edge of the Britannia Farm or the removal of a portion of a forested feature that results in the exposure of a new forest edge will have several negative impacts along the forest borders and within the forest interior. Some of the direct and indirect impacts as a result of newly exposed edges include:

- exposure of the retained vegetation to the effects of increased light, wind, and sun which results in decreased soil moisture;
- exposure to salt spray;
- reduced establishment of shade tolerant plant species and an overall reduction in plant species richness and abundance;
- increased invasion/spread of aggressive non-native plant species;
- loss of native seedbank;
- decreased presence of interior habitat;
- exposure of “edge” trees to windthrow;
- changes in wildlife diversity and abundances;
- destabilization of landforms composed of unconsolidated material and/or soil compaction;
- changes to hydrology; and
- increased noise.

Forest edge management techniques and principles, in accordance with the TRCA *Forest Edge Management Plan Guidelines* (2004), are recommended for the Britannia Farm woodlot. Credit Valley Conservation Authority does not have edge management guidelines and as such, it is recommended that

TRCA guidelines be used. Where new forest edges are exposed, forest management techniques will be implemented to mitigate the associated impacts to the Britannia Farm woodlot. As part of the Forest Edge Management, mitigation measures will include, but not be limited to the following:

- Planting of appropriate native trees, shrubs and ground flora shall be undertaken as soon as possible following vegetation removals. Plantings along the disturbed forest edges will provide a protective buffer. Newly exposed forest edges become exposed to a greater potential for aggressive and invasive species infiltration further into the forest interior causing greater impacts. Micro-habitat conditions are also altered due to a greater incident of light penetrating further into the forest resulting in decreased soil moisture and increased windthrow. Plant species used within the buffer shall be somewhat similar to those in the adjacent habitat and be non-invasive in nature.
- Grading within areas where edges will be newly created shall be designed to meet existing grades a minimum of 3 m away from the tree drip-line, to the extent possible.
- Compaction of soils on lands immediately adjacent to the newly exposed forest edge will be minimized to the extent possible. Construction activities can result in cut roots, and soil compaction due to re-grading and fill placement. Cut tree roots can reduce a tree's capacity to uptake and transfer water and nutrients, and soil compaction can result in a decrease in air spaces within the soil which can reduce the infiltration capacity of the soil, limits soil oxygen and limits root penetration. Decompaction efforts and methodology shall be site specific. Where decompaction is required, it shall extend to a minimum depth of approximately 25 cm.
- Drainage patterns adjacent to newly created edges shall be maintained to avoid changes in soil moisture, this is especially important around wetland areas and forest communities with substrates that maintain increased moisture capacity.
- A plan shall be prepared to immediately mitigate the spread of invasive and/or non-native plant species.
- A monitoring plan shall be developed to ensure that the newly planted material survives and fulfils the intended function and to ensure that the inadvertent spread of invasive and/or non-native plant species is appropriately managed.
- Plant species identified for planting within the newly exposed edges will consist of native species that have been identified within the existing forest communities, or native plant species that are suitable during the initial stages of restoration (i.e., higher light conditions, etc.), which will take up resources that could otherwise be taken up by invasive and/or non-native disturbance tolerant species. As tree and shrub seedlings grow and reduce light conditions, it is expected that those planted ground flora species requiring higher light conditions will be at a competitive disadvantage and those more suitable species already established within the remaining and undisturbed forests, will slowly establish.
- The limit of clearing and grubbing shall be delineated in the field using tree protection barrier in accordance with OPSS 801 and/or City of Mississauga requirements.

The Tree Protection and Edge Management Plan (LGL 2015) shall be reviewed during detail design and modified as necessary to reflect design changes and to ensure that the proposed treatments of the Britannia Forest edge remain effective in maintaining the long-term viability of this woodlot.

Invasive Species Management

Within the study area invasive species such as garlic mustard (*Alliaria petiolata*), and common buckthorn (*Rhamnus cathartica*) have been noted; though their presence within the study area was not documented as extensive. However, disturbance activities can promote the spread of invasive plant species which could substantially alter the structure and function of mature vegetation communities that continue to exist post-construction.

It is not always possible or even desirable to completely remove all non-native species; however, truly invasive species such as buckthorn, swallow-wort (*Cynanchum rossicum*), garlic mustard, and cow vetch (*Vicia cracca*) should be managed over a five year period in support of the establishment of those native and planted species. Active invasive species management over the first five years is important to maintain the quality of restored vegetation communities by reducing competition from invasive species during the early stages of plant establishment and growth within newly planted areas (i.e., where edge management plantings have been undertaken along newly exposed forest and wetland edges, or within forest restoration sites).

An important step in managing aggressive and invasive plant species is implementing concentrated or dense plantings with suitable native plants. In areas where there are higher concentrations of invasive species, replacement will be with dense numbers of plant species that are fast-growing and suitable to the respective micro-habitat conditions. These types of replacement plantings following the removal of any invasive plant species shall be undertaken as soon as possible following removals. This strategy will help to mitigate the regeneration and subsequent spread of invasive and/or non-native plant species through competition.

To further mitigate the spread of invasive species during construction, the following actions shall be taken:

- the extent of the target invasive species within vegetation communities that will be impacted should be indicated on contract drawings and confirmed in the field by an experienced restoration/plant biologist;
- only when required, herbicide treatment/application may be needed to reduce the size and spread of invasive species' population within restored areas. Any herbicide application must be applied by a licensed applicator. The preferred application method would be with an applicator that directly applies the herbicide with a wicking device/wand to mitigate spray drift onto desirable cohort species;
- equipment working in the identified invasive species locations will be thoroughly cleaned prior to moving from the site; and
- soil removed from sites with a high incidence of non-native species will **not** be re-used for any vegetation restoration sites unless it is placed in an area that will be actively and regularly managed. Otherwise, such soils will be buried below impervious surfaces (e.g., road), to the extent possible.

Cultural Vegetation Communities

Approximately 0.16 ha of cultural vegetation communities will be impacted by the preliminary design alternative. This includes 0.05 ha of cultural meadows and 0.11 ha of cultural thicket. Cultural communities typically persist in areas that are regularly disturbed, and as a result, generally contain a high proportion of invasive and non-native plant species that are tolerant of these conditions. Overall, the loss of vegetation within the cultural meadows and woodland are considered to be minor in significance.

Disturbance to cultural vegetation communities within the study area is considered to be minor since the vegetation located within and adjacent to the rights-of-way are adaptable to regular disturbance activities as a result of infrastructure and land-use practices (e.g., agriculture). For example, salt spray is an impact that is associated with the presence of roads. The effects of salt spray on vegetation are considered unavoidable due to safety concerns. Such impacts include vegetation die back, but this is typically limited to the outermost edge of vegetation communities and varies based on the orientation of the transportation corridor, the direction of prevailing winds, the frequency and volume of salt applied and the sensitivity of the receiving vegetation to salt.

It is expected that plant species associated with cultural communities that are displaced and/or disturbed due to road widening will re-colonize available lands adjacent to the new right-of-way post-construction. Disturbance activities often serve to promote the establishment and/or spread of certain plant species such as those disturbance tolerant species identified within the existing rights-of-way.

4.3.2 Displacement of Plant Species at Risk

As noted in **Section 2.3.3**, no plant species that are regulated under the Ontario *Endangered Species Act* or the Canada *Species at Risk Act* were encountered during LGL's botanical investigation within the study area (those plant species regulated as Endangered, Threatened, or Special Concern). However, a number of plant species considered rare in the City of Mississauga or CVC Species of Conservation Concern have been recorded as part of the Natural Areas Survey. The presence of these species were not confirmed due to the timing of field investigations. Therefore, it is recommended that efforts are made to locate any rare species during detail design, and where appropriate, transplant these species into adjacent protected areas.

4.4 Tree Impacts

A tree inventory was conducted within the study area, as presented in **Section 2.4**; however, additional work was required throughout the study to investigate impacts to the trees within the Britannia Farm woodlot. The detailed inventory and assessment of impacts to trees is documented under separate cover, *Tree Protection and Edge Management Plan* (LGL 2015).

4.5 Wildlife and Wildlife Habitat

Improvements to McLaughlin Road have the potential to result in the displacement of and disturbance to wildlife and wildlife habitat. Effects on wildlife related to these modifications could include:

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

4.5.1 Displacement of Wildlife and Wildlife Habitat

The recommended design will take place within and beyond the existing right-of-way. The more disturbed vegetation communities (CUM1-1 and CUT1) and manicured areas (mown lawn, manicured vegetation) consist of disturbed low quality wildlife habitat. Minor disturbances and habitat removal can be expected where grading limits are extended beyond the existing right-of-way. Most of the species utilizing these areas are tolerant of urban activities and will adapt post-construction.

The widening of McLaughlin Road will result in the removal of a linear strip of deciduous forest adjacent to the road. Efforts have been made by the study team to make design decisions that will reduce the impact of this widening on the deciduous forests, to the extent possible. One of the measures taken to reduce impacts to the forest includes putting the hydro lines underground. The new forest edge will remove existing forest edge habitat that may be suitable habitat for some wildlife species. The amount of trees/habitat that will be removed ranges from approximately 2 m to 7.5 m adjacent to McLaughlin Road. Limited negative effects are anticipated as habitats identified within the study area consist almost entirely of previously modified/disturbed wildlife habitat with low habitat diversity and limited habitat potential. The recommended design is not expected to have any significant impact on wildlife and/or wildlife habitat. For an analysis of vegetation removal per vegetation (habitat) community refer to **Section 4.3**.

4.5.2 Barrier Effects on Wildlife Passage

No new permanent migratory barriers to wildlife will be created as a result of the preferred design. The existing barrier posed by the current McLaughlin Road right-of-way will be greater. A number of local mammal corridors were noted during field investigations parallel to McLaughlin Road and across the road.

However, the mammal species noted are considered highly adaptable and tolerant to anthropogenic influneces. Given the urban/disturbed nature of the lands found within the study area (north of Britannia Farm woodlot), the modifications are not expected to have a significant impact on wildlife passage.

4.5.3 Wildlife/Vehicle Conflicts

The existing McLaughlin Road right-of-way poses a potential barrier to wildlife movement. The recommended design will result in an increase to the width of the travelled surface, resulting in the potential for a minor increase in road mortality for wildlife species that elect to enter the right-of-way. While the increase in width of road increases exposure of wildlife to vehicle conflicts, the potential increase in wildlife mortality above the existing conditions is considered minor.

4.5.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities and patterns. In urban settings, such as the study area (with the exception of the Britannia Farm woodlot), wildlife have become acclimatized to human activities and those fauna that are tolerant of human activities remain. Given that wildlife are acclimatized to the presence of the existing McLaughlin Road right-of-way, the tolerance of the wildlife assemblage to human activities and the limited zone of influence of the proposed widening, disturbance to wildlife from noise, light and visual intrusion will have no significant adverse effects.

At the Britannia Farm woodlot, the removal of a linear segment of the forest will result in the creation of a new forest edge. A discussion of the negative impacts associated with the creation of a new forest edge are further discussed in **Section 4.3.1**. With respect to wildlife, the new forest edge will remove existing forest edge habitat that may be suitable habitat for some wildlife species. The amount of trees/habitat that will be removed ranges from approximately 2 m to 7.5 m adjacent to McLaughlin Road. It is expected that wildlife will adapt to the widening of McLaughlin Road and the associated increase in noise, light and visual intrusion, and will find suitable alternative habitat within Britannia Farm. The edge management plan, including restoration plantings along the new forest edge, will largely offset the adverse effects associated with habitat removal in this woodlot.

4.5.5 Potential Impacts to Migratory Birds

A number of bird species listed under the MBCA are located within the study area. No nests of migratory bird species were found under bridge or culvert structures; however, the following mitigation measures will be implemented. The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests. While migratory insectivorous and non-game birds are protected year-round, migratory game birds are only protected from March 10 to September 1. The subject lands fall within Environment Canada's Nesting Zone C2 (Nesting Period: end of March – end of August). To comply with the requirements of the MBCA, disturbance, clearing or disruption of vegetation where birds may be nesting should be completed outside the window of April 1 to August 31. In the event that these activities must be undertaken between April 1 and August 31, a nest survey will be conducted by a qualified avian biologist to identify and locate active nests of species covered by the MBCA. If an active nest is located, a mitigation plan shall be developed and provided to Environment Canada – Ontario Region for review prior to implementation.

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

Barn Swallow, regulated as Threatened under the Ontario *Endangered Species Act* (ESA), were observed foraging over the cultural meadow, approximately 200 meters east of the forest along the east side of McLaughlin Road. However, this area is located beyond the extent of impact for the proposed improvements.

Two species listed as Special Concern under the ESA, Eastern Wood-pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*), were documented in the vicinity of the study area during the City of Mississagua Natural Areas Survey. These species were not documented during the field investigations as permission to enter the forest communities was not available at the time. The Eastern Wood-pewee prefers the mid-canopy of forest clearings and edges of deciduous and mixed forests. Habitat suitable to support Eastern Wood Pewee has the potential to be found within much of the forested habitat associated with the Britannia Farm woodlot. Wood Thrush is found in mature deciduous and mixed forests in moist stands of trees with well developed undergrowth. It is unlikely that Wood Thrush would be utilizing habitat in the vicinity of the impacted edge of the forest. As noted above, Eastern Wood Pewee and Wood Thrush are listed on the Species at Risk in Ontario List as 'Special Concern'; however, they are not regulated and consequently do not receive habitat protection under the Ontario *Endangered Species Act*.

Historical records of the Endangered Henslow's Sparrow (*Ammodramus henslowii*) in 1932, and the Threatened Musk Turtle (*Sternotherus odoratus*) in 1969 were identified on the Natural Heritage Information Center (NHIC) database. As noted above, each element occurrence record for these these species is considered historic in nature and habitats considered suitable to support them were not identified. Neither species were observed during the field investigations.

It is recommended that the potential presence of species regulated under the ESA be further assessed through a breeding bird survey during detail design.

4.6 Designated Natural Areas

As noted in **Section 2.6**, there are no Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), or Environmentally Sensitive Areas (ESAs) located within 120 m of the study area. The woodlands in the study area are part of the Natural Heritage System and designated 'Significant Natural Areas and Natural Green Spaces' and 'Special Management Areas' in the City of Mississauga Official Plan, and identified as Site H03 in the City's Natural Areas Survey Fact Sheet. The woodlands are part of the CVC Natural Heritage System, and are identified as High Functioning on the east side of McLaughlin Road. A number of alternatives were evaluated and the selected alternative minimizes negative impacts to the woodlands, to the extent possible. The environmental protection and mitigation measures described in the above noted sections will address impacts to this feature.

4.7 Potential Permit Requirements

4.7.1 Ontario Endangered Species Act

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

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

No aquatic or plant species at risk that are regulated under the Ontario ESA are known to be present within the study area. While Barn Swallows were observed, they were utilizing habitat 200 m east of McLaughlin Road and will not be impacted by the proposed improvments. There is habitat suitable to support Eastern

Wood Pewee within much of the forested habitat associated with the Britannia Farm woodlot. However, since this species is listed as 'Special Concern' a permit will not be required under the Ontario ESA. Consideration during detail design should be made to minimize impacts to both these species during construction. ESA requirements will be confirmed during detail design, following the completion of follow up breeding bird surveys.

5.0 MONITORING

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

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APPENDIX A
VASCULAR PLANT LIST

APPENDIX A. VASCULAR PLANT LIST

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Peel	CVC	CUM1-1	CUT1	FOD4	FOD5	Manicured A	Manicured B
	PINACEAE	**PINE FAMILY**												
	Picea glauca	white spruce	G5	S5			R3			X			X	
*	*Picea pungens*	Colorado spruce	G5	SE1						X			X	X
*	*Pinus nigra*	Austrian pine	G?	SE2						X				X
	Pinus strobus	eastern white pine	G5	S5			X			X				
*	*Pinus sylvestris*	scotch pine	G?	SE5			X			X			X	
	CUPRESSACEAE	**CEDAR FAMILY**												
	Juniperus communis	common juniper	G5	S5										X
	RANUNCULACEAE	**BUTTERCUP FAMILY**												
	Actaea pachypoda	white baneberry	G5	S5			X				X	X		
	ULMACEAE	**ELM FAMILY**												
	Celtis occidentalis	common hackberry	G5	S4				Rare					X	
	Ulmus americana	white elm	G5?	S5			X			X				X
*	*Ulmus pumila*	Siberian elm	G?	SE3			X			X				
	JUGLANDACEAE	**WALNUT FAMILY**												
	Carya ovata var. *ovata*	shagbark hickory	G5	S5			X			X			X	
	FAGACEAE	**BEECH FAMILY**												
	Fagus grandifolia	American beech	G5	S5			X			X		X		X
	Quercus macrocarpa	bur oak	G5	S5			X			X				X
	Quercus rubra	red oak	G5	S5			X			X	X	X		X
	Betula papyrifera	white birch	G5	S5			X				X	X		
	Ostrya virginiana	ironwood	G5	S5			X							X

APPENDIX A. VASCULAR PLANT LIST

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Peel	CVC	CUM1-1	CUT1	FOD4	FOD5	Manicured A	Manicured B
	GUTTIFERAE	**ST. JOHN'S-WORT FAMILY**												
*	*Hypericum perforatum*	common St. John's-wort	G?	SE5			X		X					
	TILIACEAE	**LINDEN FAMILY**												
	Tilia americana	basswood	G5	S5			X			X			X	X
*	*Tilia cordata*	small leaf linden	G?	SE1									X	
	BRASSICACEAE	**MUSTARD FAMILY**												
*	*Alliaria petiolata*	garlic mustard	G5	SE5			X			X	X	X		
*	*Hesperis matronalis*	dame's rocket	G4G5	SE5			X			X		X		
	ROSACEAE	**ROSE FAMILY**												
	Crataegus sp.	hawthorn								X	X	X		
	Fragaria virginiana ssp. *virginiana*	scarlet strawberry	G5T?	SU			X			X				
	Geum aleppicum	yellow avens	G5	S5			X			X		X		
	Malus sp.	apple											X	
	Prunus serotina	black cherry	G5	S5			X					X		
	Prunus sp.	cherry								X				
	Prunus virginiana var. *virginiana*	choke cherry	G5T?	S5			X			X		X		
	Rosa sp.	rose											X	
*	*Rubus idaeus* ssp. *idaeus*	red raspberry	G5T5	SE1						X	X	X		
	FABACEAE	**PEA FAMILY**												
	Gleditsia triacanthos	honey locust	G5	S2			X						X	X
*	*Trifolium pratense*	red clover	G?	SE5			X		X					
*	*Vicia cracca*	tufted vetch	G?	SE5			X			X				

APPENDIX A. VASCULAR PLANT LIST

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Peel	CVC	CUM1-1	CUT1	FOD4	FOD5	Manicured A	Manicured B
	ONAGRACEAE	**EVENING-PRIMROSE FAMILY**												
	Oenothera biennis	common evening-primrose	G5	S5			U		X					
	CORNACEAE	**DOGWOOD FAMILY**												
	Cornus sericea ssp. *sericea*	red-osier dogwood	G5	S5			X				X			
	CELASTRACEAE	**STAFF-TREE FAMILY**												
*	*Euonymus europaea*	spindle tree	G?	SE2			X						X	X
	RHAMNACEAE	**BUCKTHORN FAMILY**												
*	*Rhamnus cathartica*	common buckthorn	G?	SE5			X			X	X			
	VITACEAE	**GRAPE FAMILY**												
	Parthenocissus quinquefolia	five-leaved Virginia-creeper	G5	S4?								X		
	Vitis riparia	riverbank grape	G5	S5			X			X	X	X		
	ACERACEAE	**MAPLE FAMILY**												
*	*Acer platanoides*	norway maple	G?	SE5			X			X			X	X
	Acer rubrum	red maple	G5	S5			X			X				
	Acer saccharinum	silver maple	G5	S5			X			X			X	
	Acer saccharum var. *saccharum*	sugar maple	G5T?	S5			X			X	X	X		X
	ANACARDIACEAE	**SUMAC FAMILY**												
	Rhus hirta	staghorn sumac	G5	S5			X			X				
	APIACEAE	**PARSLEY FAMILY**												
*	*Daucus carota*	wild carrot	G?	SE5			X		X	X				
	ASCLEPIADACEAE	**MILKWEED FAMILY**												

APPENDIX A. VASCULAR PLANT LIST

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Peel	CVC	CUM1-1	CUT1	FOD4	FOD5	Manicured A	Manicured B
	Asclepias syriaca	common milkweed	G5	S5			X		X					
*	*Cynanchum rossicum*	swallow-wort	G?	SE5			X					X		
	SOLANACEAE	**POTATO FAMILY**												
*	*Solanum dulcamara*	bitter nightshade	G?	SE5			X			X		X		
	LAMIACEAE	**MINT FAMILY**												
*	*Glechoma hederacea*	creeping Charlie	G?	SE5			X			X		X		
*	*Leonurus cardiaca* ssp. *cardiaca*	common motherwort	G?T?	SE5			X					X		
	OLEACEAE	**OLIVE FAMILY**												
	Fraxinus americana	white ash	G5	S5			X				X	X		
*	*Fraxinus excelsior*	European ash	G?	SE2			X						X	
	Fraxinus pennsylvanica	red ash	G5	S5			X			X				X
*	*Syringa vulgaris*	common lilac	G?	SE5			X						X	
	SCROPHULARIACEAE	**FIGWORT FAMILY**												
*	*Verbascum thapsus*	common mullein	G?	SE5			X				X			
	CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**												
*	*Lonicera tatarica*	tartarian honeysuckle	G?	SE5			X			X	X	X		
	Sambucus nigra ssp. *canadensis*	common elderberry	G5	S5			X					X		
	ASTERACEAE	**ASTER FAMILY**												
	Ambrosia artemisiifolia	common ragweed	G5	S5			X		X					
*	*Arctium minus*	common burdock	G?T?	SE5			X		X	X	X			
	Aster lanceolatus ssp. *lanceolatus*	tall white aster	G5T?	S5			X		X					
*	*Cichorium intybus*	chicory	G?	SE5			X		X					
*	*Cirsium arvense*	Canada thistle	G?	SE5			X		X	X	X			

APPENDIX A. VASCULAR PLANT LIST

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Peel	CVC	CUM1-1	CUT1	FOD4	FOD5	Manicured A	Manicured B
	Eurybia macrophylla	large-leaved aster	G5	S5			X					X		
	Solidago canadensis	canada goldenrod	G5	S5			X		X	X	X	X		
	Symphyotrichum novae-angliae	New England aster	G5	S5			X		X					
	POACEAE	**GRASS FAMILY**												
*	*Bromus inermis* ssp. *inermis*	awnless brome	G4G5T?	SE5			X		X	X				
*	*Dactylis glomerata*	orchard grass	G?	SE5			X		X		X			
	Phalaris arundinacea	reed canary grass	G5	S5			X			X				
*	*Phleum pratense*	timothy	G?	SE5			X		X					
	Poa pratensis ssp. *pratensis*	Kentucky bluegrass	G5T	S5			X		X	X	X			
	Poa sp.	blue grass											X	X
	LILIACEAE	**LILY FAMILY**												
*	*Hemerocallis fulva*	orange day-lily	G?	SE5										X
	Trillium grandiflorum	white trillium	G5	S5			X					X		

*- non-native species/ x- indicates presence

Manicured A: indicates manicured areas on the west side of McLaughlin Road
Manicured B: indicates manicured areas on the east side of McLaughlin Road

APPENDIX B
ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

Species Status

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) assesses 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 exists in the wild in Ontario but still occurs elsewhere.
Endangered (Regulated) (END–R)	A species facing imminent extinction or extirpation in Ontario which has be 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 recommendation.

Regulated Species at Risk

SARA Species at Risk Act

The Canada *Species at Risk Act* provides a framework for actions across Canada to ensure the survival of wildlife species and the protection of our natural heritage. It sets out how to decide which species are a priority for action and what to do to protect a species. It identifies ways governments, organizations and individuals can work together, and it establishes penalties for a failure to obey the law. Regulated species are listed in Schedules 1, 2 and 3 of the Act.

Schedule 1 SARA (1)	Species that are currently covered under the Act.
Schedule 2 SARA (2)	Species that are endangered or threatened that have not been re-assessed by COSEWIC for inclusion on Schedule 1.
Schedule 3 SARA (3)	Species that are of special concern that have not yet been re-assessed by COSEWIC for inclusion on Schedule 1.

ESA Endangered Species Act

The Ontario *Endangered Species Act* provides for the conservation, protection, restoration and propagation of species of fauna and flora of the Province of Ontario that are threatened with extinction. Regulated species are listed in Ontario Regulation 338.

Schedule 1 ESA (1)	The species of fauna listed in Schedule 1 are declared to be threatened with extinction.
Schedule 2 ESA (2)	The species of flora listed in Schedule 2 are declared to be threatened with extinction.

GRANK 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 include 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.

SRANK Provincial Rank

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

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

Local Status:

Credit Valley Conservation Authority Species list (2002), Peel (Varga *et al.* 2000; Riley 1999).

CVC (Peel)	
Rare	A species that occurs at fewer than 11 locations in Peel

Peel	
Nat	Naturalized
Int	Introduced
R	Rare
U	Uncommon

APPENDIX C
TREE INVENTORY