



# APPENDIX B

**Natural Environmental Report  
(Savanta Inc., 2015)**

**CAMBRIDGE EAST  
BOUNDARY ROAD**

**NATURAL ENVIRONMENT  
REPORT**

December 2015



Environment Data Collection Summary  
East Boundary Road, Cambridge ON

December 2015

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**1.0 INTRODUCTION**

**1.1 Project Overview and Study Area**

Savanta Inc. (Savanta) was retained, in partnership with MTE Consultants Inc. and URS Canada Inc., to conduct the Natural Environment component of the Cambridge East Boundary Road Corridor Environmental Assessment (EA). The Study Area boundaries are located within the Township of Puslinch, the Township of North Dumfries and the City of Cambridge (herein referred to as the Study Area) (**Figure 1, Appendix A**).

**1.1.1 Project Study Area and Surrounding Landscape**

**Natural Heritage Corridors and Wetlands**

In addition to the Study Area, information was assessed in this report related to other important natural heritage features and associated functions in the local landscape. Natural heritage features and designated natural areas within and beyond the study area are shown on **Figure 2, Appendix A**.

Two major natural heritage system corridors traverse the Study Area. Mill Creek Wetland Complex and Moffat Creek Swamp Wetland are both Significant Wetland complexes. A smaller wetland complex, the Sheffield Rockton Wetland Complex, also overlaps with the southeast corner of the Study Area.

The Mill Creek Wetland Complex surrounds Mill Creek proper and its tributaries, entering the north boundary of the Study Area at the intersection of Gore Road and Shellard Road.

The Moffat Creek Swamp surrounds the main stem of Moffat Creek. It enters the middle portion of the Study Area at Shellard Road, south of Clyde Road, and traverses the mid-portion of the Study Area in a northeast to southwest direction.

In the southeast corner of the study area to the south of Old Beverly Road, are several smaller wetland pockets associated with the Sheffield Rockton Wetland Complex near Dundas Street. These wetland areas are associated with the headwaters of Fairchild Creek, a warmwater stream system that enters the Grand River downstream of Brantford.

Immediately to the northeast of the Study Area in Puslinch Township, a large portion of the wetland complex also contains the Galt (Mill) Creek and the Forests Life Science Area of Natural and Scientific Interest (ANSI); the ANSI is outside of the Study Area boundary.

**Subwatersheds, Aquatic Habitat and Fisheries**

Three main subcatchments comprise the drainage of the Study Area: Mill Creek, Moffat Creek and Fairchild Creek.

Mill Creek, a coldwater stream supporting brook trout and brown trout, flows to Shade's Mills reservoir, a 32 ha (80 acre) flood control facility and dam owned and operated by the Grand River Conservation Authority (GRCA). The Shade's Mills Conservation Area is located on the north side of the reservoir.

Approximately 2100 m upstream of the Shade's Mill Dam, a small dam is present on Mill Creek behind the residences on Grandy Lane. This dam has created a backwater reaching as far upstream as Shellard Sideroad. The dam is privately owned and operated; however, any modifications or alterations to the dam would require permits from GRCA and the Ministry of Natural Resources and Forestry (MNRF).

Moffat Creek enters the middle portion of the Study Area at Shellard Road. Throughout the Study Area, Moffat Creek is classified as a warmwater stream, supporting primarily baitfish species.

The wetland areas of the Sheffield Rockton Complex in the southeast corner of the Study Area are associated with the headwaters of Fairchild Creek, a warmwater stream system that enters the Grand River downstream of Brantford. Based on MNRF records, many of the culvert and channel areas examined over time exhibit intermittent conditions and at best, may provide seasonal habitat for species of cyprinids (minnows).

## 2.0 SUMMARY OF DATA COLLECTION APPROACHES & METHODS

### 2.1 Background References

Savanta has relied, in part, upon supporting background information and previous site surveys/investigations to provide additional insight into the overall character of the Study Area.

Examples of these background sources and agencies are:

- Federal and Provincial SAR websites;
- Ontario Ministry of Natural Resources, Guelph District;
- MNRF Fishdot data and background fisheries information;
- GIS mapping from GRCA;
- Rare vegetation communities data from MNRF;
- Species at Risk occurrence data from MNRF;
- Natural Environment Study Field Data and Constraints Analysis, South Boundary Corridor Class EA (EcoServices, 2008); and,
- Environmental Update, Bosdale Development, City of Cambridge (IBI, 2014)

#### 2.1.1 LIO Natural Features Summary

Based on a search of the MNRF Land Information Ontario (LIO) geographic database (2015), there are three Significant Wetland Complexes within the Study Area. As discussed in the previous section, these complexes are Mill Creek Wetland Complex, Moffat Creek Swamp Wetland and Sheffield Rockton Complex. One ANSI, Galt (Mill) Creek Forest, is found outside of the northwest boundary of the Study Area in Puslinch Township (**Figure 2, Appendix A**). No Environmentally Significant/Sensitive Areas (ESAs) were identified within or adjacent to the Study Area.

### 2.2 Pre-Consultation and Agency Discussions

#### Ministry of Natural Resources and Forestry (MNRF)

The Guelph District MNRF provided a desktop list for both species at risk (that were known to exist within Waterloo Region) and rare vegetation communities within the vicinity of the Study Area in August 2012 (**Table 1, Appendix B**).

A meeting was held with MNRF on March 19, 2014 to discuss approaches to salamander surveys and permits required to conduct those activities. The Study Team also met with MNRF staff on May 22, 2015 to provide an update on the field data collections, including a review of

the findings of the salamander surveys conducted in 2014. This meeting also included a discussion on how field data was used in the generation of route alternatives.

### **Grand River Conservation Authority (GRCA)**

GRCA was consulted at the onset of the project and has provided guidance on various aspects of natural heritage as well as their Regulated Areas mapping during the study. Various GIS layers pertaining to wetlands, regulation limits and other natural heritage layers have been obtained from GRCA sources to assist in assessing the route alternatives.

A meeting was held with GRCA staff on May 12, 2015 to discuss field survey results and to provide an update on the incorporation of field data into the development of route alternatives.

### **2.3 Field Investigations**

Savanta completed various field surveys and natural environment inventories in 2012, 2013 and 2014. Field data collections in 2012 and 2013 were preliminary and investigative. A finalized Study Area and preliminary route alternatives were provided in late winter, 2013. Following the delineation of preliminary route alternatives, a targeted and comprehensive field program was completed in 2014. The field results provided in the sections below reflect data collected from 2014.

All field investigations were conducted only where property access was provided. The field investigations included Ecological Land Classification (ELC) of vegetation communities, botanical inventories, salamander habitat assessments, salamander trapping and tissue sampling, amphibian call count surveys, reptile surveys, breeding bird surveys and incidental wildlife observations. The 2014 surveys are summarized in **Table 2 (Appendix B)**.

## **3.0 ENVIRONMENTAL SETTING AND CHARACTERISTICS**

### **3.1 Terrestrial Ecology: Habitat Assessment and Species Occurrences**

#### **3.1.1 Vegetation**

#### **Survey Methods – Ecological Land Classification and Botanical Inventories**

Following a satellite image interpretation, a preliminary map of potential vegetation types and land use features was created. During the field surveys, the mapping units were confirmed, sampled and revised, if necessary, using the sampling protocol of the Ecosystem Land Classification (ELC) for Southern Ontario (Lee et al. 1998). Botanical investigations were carried out during two survey years: in 2012 (August 22) and in 2014 (May 29, June 18, July 11).

The provincial status of common plant species is based on Newmaster et al. (1998), with updates from the database of the Natural Heritage Information Centre (NHIS website). The provincial status of at-risk plant species is based on the most current version of the Species at Risk in Ontario list (O.Reg. 230/08). Identification of potentially sensitive plant species is based on the assignment of a coefficient of conservatism value (CC) to each native species in southern Ontario (Oldham et al., 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters that characterize natural, undisturbed ecosystems.

#### **Survey Results – Ecological Land Classification and Botanical Inventories**

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

The Subject Lands have a diverse vegetation cover of forests, wetlands and meadows within the matrix of agricultural fields and rural and sub-urban settlements. **Figure 3, Appendix A** (two sheets), maps the ELC communities. Areas where access was not available for surveying are also noted.

**Table 3 (Appendix B)** provides details of the ELC community types that were delineated and classified within the Study Area.

##### ***Botanical Inventory***

A total of 261 species of vascular plants were identified within the Study Area. Of that number, 171 (or 66%) species are provincially native and 90 (or 34%) species are exotic.

The majority of the native species (94%) are ranked S5 (Secure – common, widespread and abundant in Ontario), with ten species (or 6%) ranked S4 (Apparently Secure – uncommon, but not rare in Ontario):

- Arrow-leaved Aster (*Aster urophyllus*) – common in old field meadows;
- Giant Blue Cohosh (*Caulophyllum giganteum*) – common in sugar maple dominated forests (e.g., FOD5-1, FOD5-2, and FOD5-11);
- American Beech (*Fagus grandifolia*) – an S4? species; common;
- Black Walnut (*Juglans nigra*);
- White Ash (*Fraxinus americana*) – an S4? species; common in units FOD5-2 and FOD5-11;
- Northern Evening-primrose (*Oenothera parviflora*) – an S4? species, occasional in old field meadows;
- Long-fruited Anemone (*Anemone cylindrica*) – local in dry old field meadows and open thickets;
- Tuckerman’s Sedge (*Carex tuckermanii*) – occasional in units SWD2-2, SWD3-2, and SWD3-3;
- Big Bluestem (*Andropogon gerardii*) – several plants along the railway right-of-way, west of Shellard Road and north of Clyde Road; and,
- Herbaceous Carrion Flower (*Smilax herbacea*) – occasional in several upland forest types.

Fifteen locally (Region of Waterloo) rare species were recorded (rankings for the neighbouring County of Wellington are also provided, for comparison; however, they are not analyzed). Species denoted with an asterisk (\*) are deemed to be significant “but with the expectation that additional research may prove otherwise”; those with a cross (†) are “significant only if demonstrably indigenous”.

- Interrupted Fern (*Osmunda claytoniana*) – local in unit SWD2-2;
- Common Juniper\* (*Juniperus communis*) – abundant in the woodlands and thickets at Old Beverly Road;
- White Spruce\* (*Picea glauca*) – planted;
- Speckled Alder\* (*Alnus incana* ssp. *rugosa*) – occasional to abundant in all thicket swamps;
- Cow-parsnip (*Heracleum maximum*) – an S4? species; local in SWD2-2 between Main Street and Dundas Street;
- Longleaf Stitchwort (*Stellaria longifolia*) – local in deciduous swamps;
- Black Walnut\*\* (*Juglans nigra*) – common in edge habitats and hedgerows, possibly planted;
- Long-fruited Anemone (*Anemone cylindrica*) – local in dry old field meadows and open thickets;
- Wild Licorice (*Galium circaezans*) – local in sugar maple deciduous forests;
- American Prickly-ash\* (*Zanthoxylum americanum*) – local in open mixed woods;
- Broad-leaved Sedge (*Carex platyphylla*) – occasional in sugar maple deciduous forests;

- Burreed Sedge\* (*Carex sparganioides*) – occasional in sugar maple deciduous forests;
- Tuckerman’s Sedge (*Carex tuckermanii*) – occasional in units SWD2-2, SWD3-2, and SWD3-3;
- Big Bluestem (*Andropogon gerardii*) – several plants along railway right-of-way, west of Shellard Road and north of Clyde Road; and
- Sheathed Dropseed (*Sporobolus vaginiflorus*) – local in dry roadside and edges of fields.

No nationally or provincially rare, threatened or endangered species were recorded from the Study Area.

A full species list is included in **Table 4, Appendix B. Table 7 (Appendix B)** provides wildlife information. Wildlife components are addressed in the following sections.

### 3.1.2 Amphibians

#### Methods – Salamander Surveys

Due to the potential presence of Jefferson Salamander in the Study Area, a comprehensive survey program was developed to sample various vernal and permanent pools in areas affected by route alternatives. The salamander surveys required various forms of provincial approval. Savanta received a Wildlife Scientific Collector’s Authorization from the Guelph District MNRF and an Animal Care Protocol approval on March 31st, 2014 from the MNRF Wildlife Animal Care Committee (Protocol #14-317). Savanta also registered a ‘Notice of Activity Form and Other Notices under the ESA, 2007’ and received registration confirmation on March 18, 2013 (Confirmation ID X-102-0000000208).

Sampling methods were derived from the ‘Sampling Protocol for Determining the Presence of Jefferson Salamander (*Ambystoma jeffersonianum*) in Ontario’ prepared by the Jefferson Salamander Recovery Team (June 2013), as well as through consultation with Guelph District MNRF staff on March 19, 2014.

#### Salamander Habitat Suitability Assessment

Salamander habitat suitability assessments were completed in all accessible properties that contained potentially suitable habitat conditions. Through consultation, Guelph District MNRF staff provided the following survey guidelines:

Four criteria must be met in order for a pond to be considered suitable and mapped as regulated habitat:

1. Water retention duration: Most years there is water in the pond long enough for the Jefferson's Salamander larvae to develop and emerge. Since Jefferson's Salamander is long lived, a dry pond one year does not rule out breeding. Therefore, if the survey is done in a dry year, or after a low snow cover the preceding winter, it may take more than 1 year

to determine this.

2. There is amphibian breeding (consider to be any of: mating, calling, eggs, larvae) occurring in the pond.
3. There are no predatory fish in the pond. Small fish, such as sticklebacks and minnows are not considered to be predatory fish.
4. There are egg attachment sites (woody debris and shrubs are frequently used and sometimes herbaceous vegetation is used if woody vegetation is lacking).

In addition to the four criteria provided by the Guelph District MNRF, the following conditions and characteristics were also recorded to thoroughly assess each potential pond:

- Shape and approximate size of the pond/vernal pool;
- Approximate water depth;
- Percentage of canopy cover over the pond;
- Surrounding ELC community;
- Presence and species of emergent vegetation; and,
- Incidental observations, especially if other amphibians or reptiles are using the pond.

**Salamander Adult Tissue Sampling – Minnow Trapping**

Minnow traps were set in suitable ponds/vernal pools. The total number of traps depended on the size of each pond/vernal pool. Each trap was well anchored, provided with a unique identifier, flagged and marked with pond/vernal pool UTM coordinates. The traps were set on appropriate evenings once salamanders had migrated to their breeding habitat. The traps were then checked early the following morning. Minnow traps were removed from ponds/vernal pools when sampling was not taking place.

Tissue samples (3 mm to 5 mm tail tips) were collected from each salamander caught. Each tissue sample was provided with an ID code, a UTM and ID of each pond/vernal pool. All trapped salamanders were immediately released to the breeding pond/vernal pool after the tail tip was collected and properly documented. The tissue samples were delivered to Dr. James Bogart at the University of Guelph to conduct genetic analyses for each sample.

The trapping survey involved up to five nights of trap setting. However, if 20 tissue samples were collected in less than five settings from the same pond, the surveys were then considered complete and no further sampling occurred at that pond.

**Results – Salamander Surveys**

A total of 43 ponds/vernal pools were identified as suitable salamander habitat and were sampled using the above methods (**Figure 4, Appendix A**). Of the 43 ponds/vernal pools, salamanders and tissue samples were collected at the following 11 sites: AF1, AF2, C3, D, R2, R3, Q1, Q2, Q3, V1 and Y2. Therefore, a total of 11 sites are considered salamander breeding ponds. A final assessment of each salamander pond determined that AF1 and AF2 are one pond collectively identified as AF below, R2 and R3 are one pond identified as R below, and Q1, Q2 and Q3 are one pond, identified below as Q.

A total of 68 tissue samples were collected and sent for genetic analysis to Dr. Bogart at the University of Guelph. The following number of salamanders were collected and sampled at the following ponds:

POND	# COLLECTED	# SAMPLED
AF	19	19
C3	11	11
D1	1	1
Q	12	11
R	49	23
V1	1	1
Y2	1	1

All collected samples were identified as Blue-spotted salamanders. No Jefferson Salamanders (JESA) were found within the sampled ponds/vernal pools.

**Methods – Amphibian Call Count Surveys**

Amphibian call count surveys were conducted on the evenings of April 22 and 23 (Round 1); May 13 and 14 (Round 2); and June 16, 2014. Survey station locations were determined through a combination of the assessment of ortho-photography, vegetation communities and ground observations. Locations of survey stations are depicted on **Figure 5, Appendix A**.

Surveys were conducted at night, in accordance with the Marsh Monitoring Program (Crewe et al., 2006). The call count surveys began approximately 30 minutes after sunset until midnight. Each station was surveyed three times (once in April, once in May and once in June) during optimal weather conditions (low wind levels, no heavy rain). The protocol required minimum night air temperatures were adhered to during each round of surveys, and surveys were conducted at least 15 days apart. All calls heard within a survey station were recorded as well as any call observations outside of the Study Area on adjacent lands.

### **Results – Amphibian Call Count Surveys**

A total of 28 amphibian call count stations were surveyed within the Study Area (**Table 6, Appendix B**). Stations were located within wetland habitats such as swamps, marshes and ponds (**Figure 5, Appendix A**).

A total of seven amphibian species were heard calling within the Study Area during the three rounds of call count surveys. All of these species are provincially ranked S5 (common and secure) or S4 (apparently common and secure).

No breeding amphibians were identified at stations 3, 5, 9, 14 and 18 during all three rounds of surveys. Breeding amphibians were recorded during all three rounds at stations 1, 2, 6, 11, 12, 16, 22 and 23. Highly active amphibian calling stations (full chorus [call code level of 3] and > 4 species) included the following stations: 1, 6, 12, 13, 16 and 26. Also of note, at station 1 during a May rain event, numerous Spring Peepers, Gray Tree Frogs and American Toads were found on or crossing the road. A large number of mortalities were also observed.

#### **3.1.3 Reptiles**

##### **Methods – Turtle Surveys**

Three rounds of reptile surveys were completed, occurring on June 5, 16 and 26, 2014. Survey sites were identified through a preliminary review of aerial photography to identify potential summer foraging pond locations, which were further verified in the field. Surveys were focused in June to maximize species nesting observations. Surveys were conducted either before 13:00 or after 17:00 on sunny days when temperatures were between 10°C to 25°C, or after a day of rain.

Water bodies were observed for ten minutes from each observation point for turtle presence. The edges of the water body, rocks and logs were scanned for basking turtles using binoculars to confirm species and number. The surface of the water body was scanned for submerged shells and emergent heads. Approximately 50 m of the Mill Creek shoreline was also walked and surveyed for signs of turtles. Additionally, roadsides were surveyed for mortalities, test pits and predated nests.

##### **Results – Turtle Surveys**

The existing Mill Creek crossing by Shellard Road and two ponds were surveyed for evidence of turtle basking and nesting (**Figure 6, Appendix A**).

Station 1 is located at the intersection of Shellard Sideroad and Gore Road. No turtles were observed at this station; however, three predated nests (two Midland Painted Turtle nests and one Snapping Turtle nest) were recorded.

The majority of turtles were observed at Station 2. This station consisted of a large pond located at the southeast corner of the intersection of Shellard Sideroad and Clyde Road. A total of 24 Midland Painted Turtle observations and four Snapping Turtle observations were recorded over the three visits. Two Midland turtle test pits, as well as possible signs of Snapping turtle nesting were observed along Clyde Road at Station 2.

Three Midland Painted turtles (two adults and one young of the year) were observed dead on the road at Station 3, a pond along the west side of Shellard Sideroad.

##### **Methods – Breeding Bird Surveys**

Breeding bird surveys were conducted on May 29 and 30 (round 1) and June 23 and 24 (round 2). The survey protocol was based on a combination of the Ontario Breeding Bird Atlas (Cadman et al., 2005), the Forest Bird Monitoring Program (CWS, 2005) and the Marsh Monitoring Program (Crewe et al., 2006).

Surveys were conducted between dawn and five hours after dawn with suitable wind conditions, in the absence of thick fog or precipitation. Point count stations were located in various vegetation communities within the Study Area to help determine the presence, diversity and abundance of bird species. Each point count station was surveyed for 10 minutes (**Figure 7, Appendix A**). All birds that were heard or observed within the 100 m radius of the point count station were recorded.

Open grassland habitat, including pasture, hay fields and fallow areas, was surveyed according to provincial Ministry of Natural Resources (MNR) Guidelines for Bobolink and Eastern Meadowlark (MNR, 2012). Point count stations (discussed above) were located within open grassland habitat. Where this habitat was greater than 250 m wide or long, two-point count stations were completed (point count stations are set up every 250 m in large habitats). Transects, or walking the open grassland habitat (area searches), were also conducted in addition to the 10-minute point count stations to determine the presence of these grassland bird species at risk.

##### **Results – Breeding Bird Surveys**

A total of thirteen-point count stations (PCs) were surveyed within the Study Area. Stations were located within lowland deciduous forests, pine plantations, open meadow, wetlands, hayfields, wet meadows and thickets. (**Figure 7, Appendix A**).

A total of 69 bird species were observed within the Subject Lands (**Table 5, Appendix B**). Of this total, 11 species are confirmed breeders, 41 are probable breeders and 16 are possible breeders. The remaining bird species (1) is considered a non-breeder, flyover or migrant.

A total of 64 (93%) of the confirmed, probable or possible breeders are provincially ranked S5 (common and secure) and S4 (apparently common and secure) or SNA (introduced species

such as Rock Pigeon and European Starling). The remaining 5 bird species are considered S1 – S3 (critically imperiled to vulnerable) and are discussed below.

**Species at Risk and Provincially Significant Species (S1 – S3)**

<p><b>Barn Swallow</b> <i>(threatened)</i></p>	<ul style="list-style-type: none"> <li>Birds were observed at PCs 3, 4, 5, 12 and 21.</li> <li>Most observations involved small numbers of foraging birds. However, the barn structures at PC 21 hosted a number of nesting birds.</li> <li>Additionally, a number of recently fledged young (5) were seen near PC 11 on June 24 and were presumed to have come from a nearby decrepit building.</li> </ul>
<p><b>Bobolink</b> <i>(threatened)</i></p>	<ul style="list-style-type: none"> <li>Singing males were observed at PCs 3, 4 and 12.</li> <li>The only female observed was at PC 3 in a hayfield with suitable breeding habitat.</li> <li>The males at the other two-point count stations were in fields that had been cut about two weeks previous and were growing back.</li> <li>Another male was observed along Clyde Road on May 29 in suitable habitat.</li> </ul>
<p><b>Eastern Meadowlark</b> <i>(threatened)</i></p>	<ul style="list-style-type: none"> <li>Birds were observed at PCs 3 and 5.</li> <li>A presumed breeding pair was present at PC 3 while two singing males were heard at PC 5; one male was on the east side of Shellard Line and the other was on the west side of the large pond, both in suitable habitat.</li> <li>Another individual was singing along Clyde Road on May 29 in suitable habitat.</li> </ul>
<p><b>Eastern Wood Pewee</b> <i>(special concern)</i></p>	<ul style="list-style-type: none"> <li>This site had birds on territory in 2013 as well.</li> <li>Singing males were detected at PC 6 and 14.</li> <li>Two males were present at PC 14 on May 29.</li> <li>Another singing male was heard near PC 22 on May 30 and another south of PC 9 in a woodlot on June 24.</li> </ul>
<p><b>Wood Thrush</b> <i>(special concern)</i></p>	<ul style="list-style-type: none"> <li>Singing males were detected at PCs 1 and 8.</li> <li>No other breeding evidence was observed.</li> </ul>

**Area-sensitive Species**

The following area sensitive species were recorded in the Study Area. Minimum size requirements of forested areas specific to each species are provided below:

SPECIES	MINIMUM AREA REQUIREMENTS (HA)
Cooper's Hawk	4-50+
Hairy Woodpecker	10
Pileated Woodpecker	30-50
White-breasted Nuthatch	10
Brown Creeper	30
Veery	10-20
Ovenbird	20
Northern Waterthrush	20
American Redstart	20-30
Pine Warbler	15-30
White-throated Sparrow	20

**Regionally Significant Species**

Twenty-six of the breeding bird species are listed as regionally significant (Region of Waterloo). These include: Wood Duck, Hooded Merganser, Pied-billed Grebe, Green Heron, Cooper's Hawk, Turkey Vulture, Black-billed Cuckoo, Ruby-throated Hummingbird, Red-bellied Woodpecker, Hairy Woodpecker, Pileated Woodpecker, Willow Flycatcher, Red-breasted Nuthatch, Brown Creeper, Veery, Ovenbird, Northern Waterthrush, Blue-winged Warbler, American Redstart, Pine Warbler, Swamp Sparrow, White-throated Sparrow, Orchard Oriole and Purple Finch.

**3.2 Aquatic Systems**

The review of aquatic systems (watercourses, streams, rivers) has been largely completed through an assessment of existing background information. At this point in the study, sufficient

information is available to analyze various route alternatives. With linear road corridor projects, the criteria for screening alternatives generally involves an examination of the number of potential watercourse crossings associated with each alternative. For the East Boundary Corridor study, Mill Creek and Moffat Creek represent the most sensitive watercourses. For the assessment of alternatives, both Mill Creek and Moffat Creek will be crossed at some location along their respective lengths. The examination of additional watercourses, including intermittent systems and minor tributaries to each of the major systems, was undertaken as a desktop exercise, with reconnaissance carried out during other, more detailed surveys related to amphibian habitat.

More detailed analyses of potential crossing areas are expected as preliminary route alternatives are screened out and the study moves towards preliminary design.

#### 4.0 SUMMARY

The East Boundary Road Corridor Environmental Assessment process is intended to identify a preferred corridor alignment for a future arterial road designed to link Townline Road in the north end of the study area to the South Boundary Road intersection at Dundas Street in the south end of the study area. The natural environment component is one of a series of criteria that are examined to arrive at a preferred alternative, with other components such as social impacts, transportation effectiveness and geometry, archaeology and cultural heritage and cost also playing a role in the determination of the preferred alternative.

This report documents the various desktop and field survey activities that were undertaken to identify and to characterize the natural environment within the study area as input to the larger evaluation process led by MTE Consulting Inc. Detailed field surveys identified various areas of significant and sensitive environmental features and functions (e.g., wildlife habitat and vegetation communities). That information informed the development of potential alternative route locations for the future East Boundary Road.

Technical information generated and summarized in this report provides the basis from which potential impacts associated with each alternative, can be assessed and evaluated. This information will also inform any minor adjustments to alternative routes to further avoid and/or minimize potential effects, and will inform broad mitigation recommendations when advancing a preferred alternative. Subsequent to this report, an evaluation report will be prepared building upon the information in this Data Collection Summary Report.

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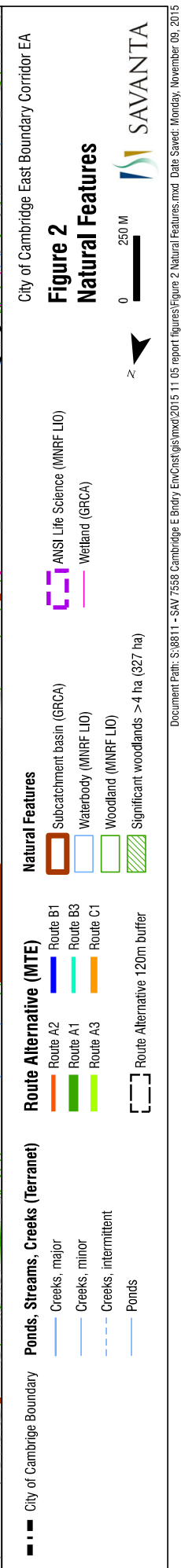
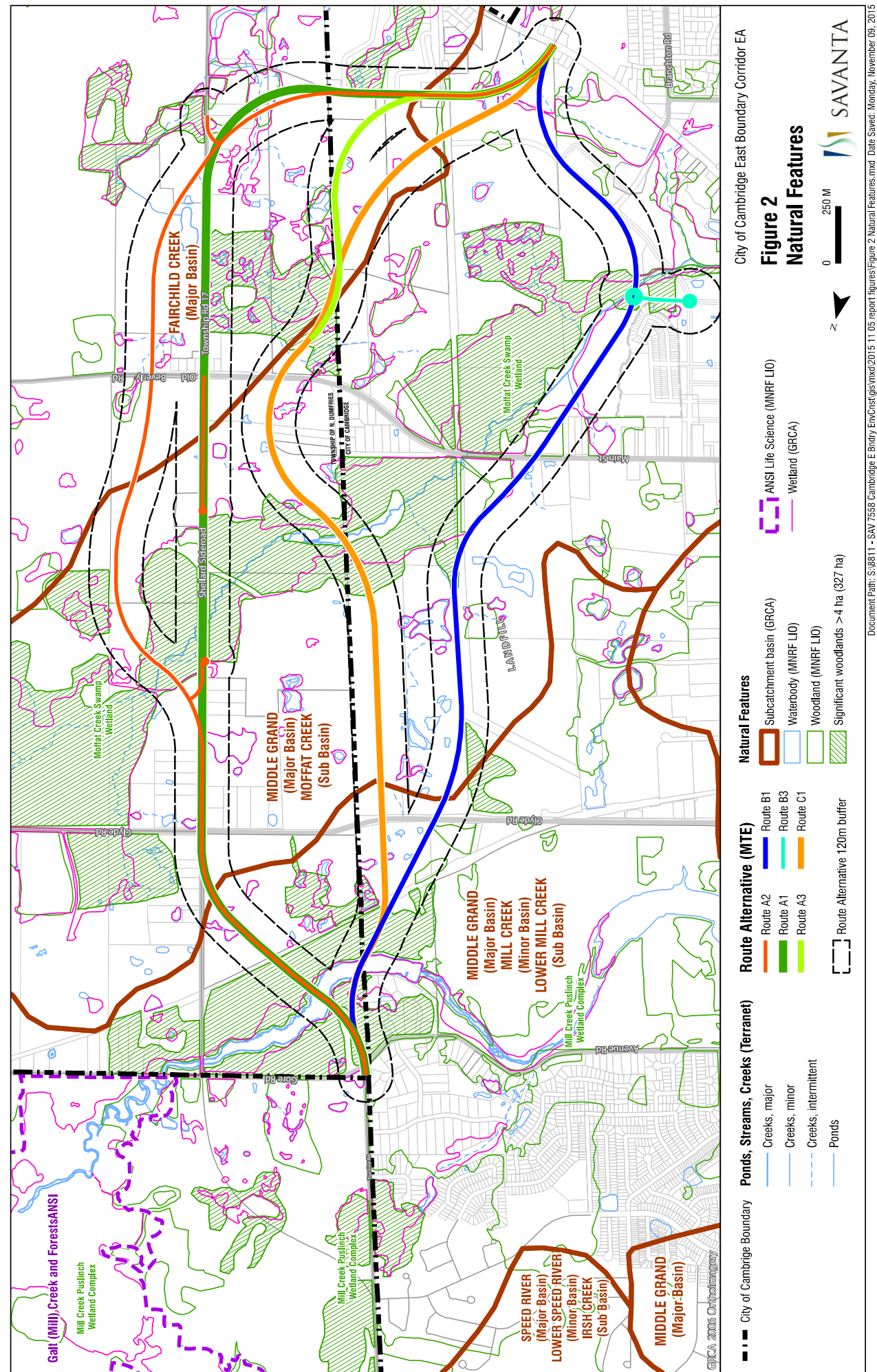
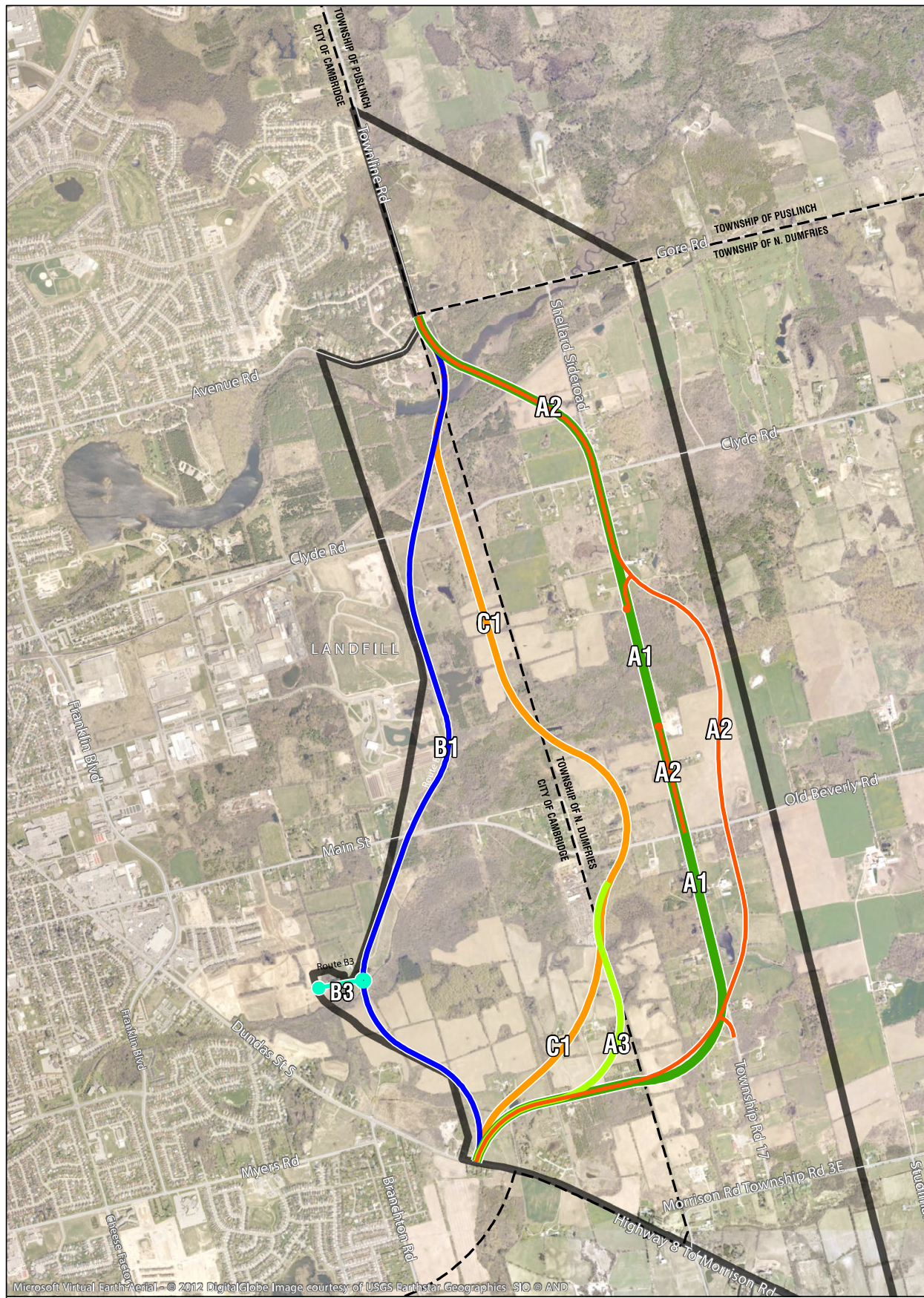


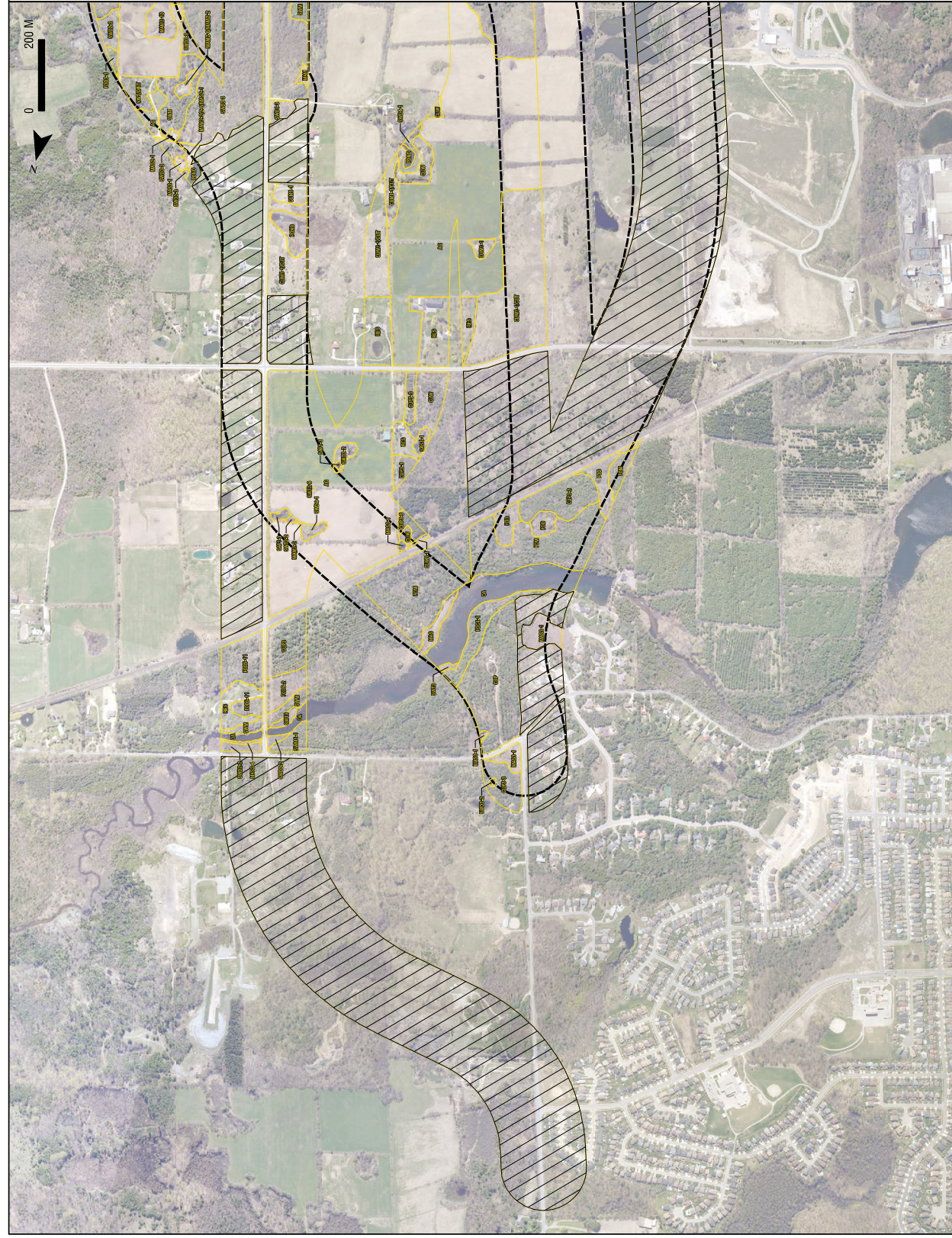
Tom Hilditch  
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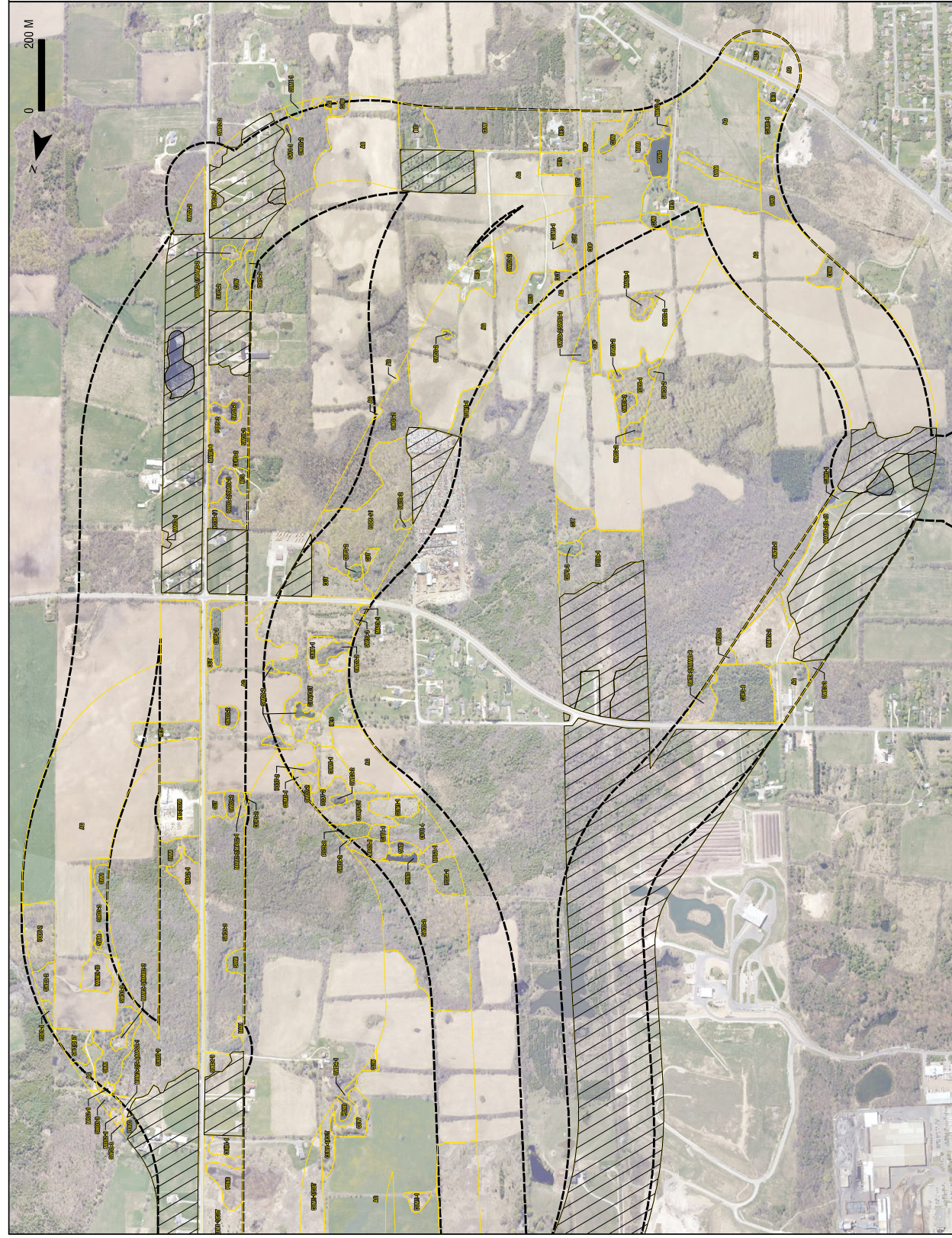
## APPENDIX A: FIGURES





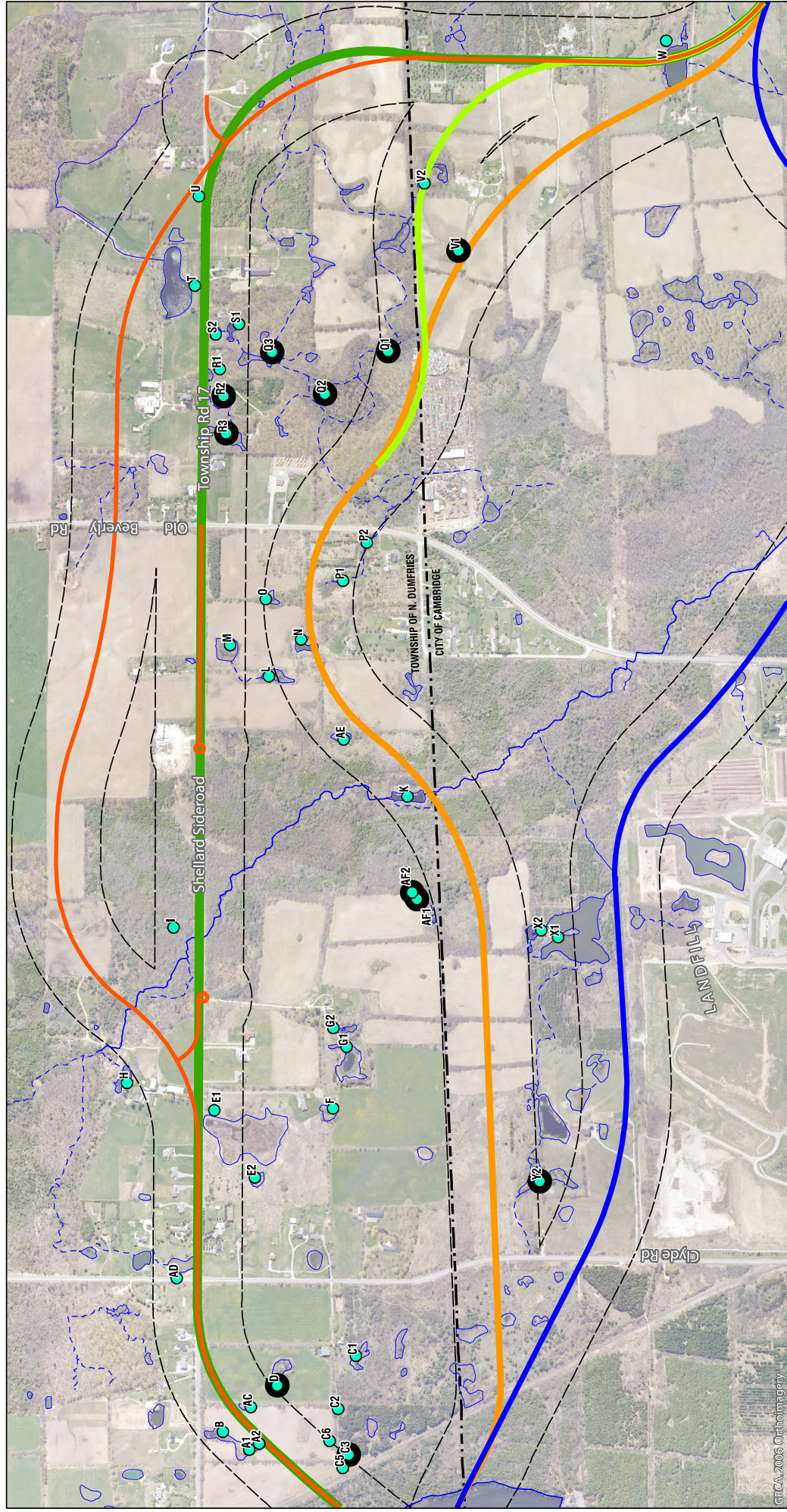
- ELC LEGEND**
- FOREST**  
 FOC2-2 Dry-Fresh White Cedar Coniferous Forest  
 FOC4-1 Fresh-Moist White Cedar Coniferous Forest  
 FOM Mixed Forest  
 FOD Deciduous Forest  
 FOD3-1 Dry-Fresh Poplar Deciduous Forest  
 FOD5-1 Dry-Fresh Sugar Maple Deciduous Forest  
 FOD5-2 Dry-Fresh Sugar Maple-Beech Deciduous Forest  
 FOD5-11 Dry-Fresh Sugar Maple-Hardwood Deciduous Forest  
 FOD5-2 Fresh-Moist Ash Lowland Deciduous Forest  
 FOD6-1 Fresh-Moist Poplar Deciduous Forest
- SWAMP**  
 SWD2-2 Deciduous Swamp  
 SWD2-2 Green Ash Mineral Deciduous Swamp  
 SWD3-2 Silver Maple Mineral Deciduous Swamp  
 SWD3-3 Swamp Maple Mineral Deciduous Swamp  
 SWD4-1 Willow Mineral Deciduous Swamp  
 SWD4-3 Poplar Mineral Deciduous Swamp  
 SWM Mixed Swamp  
 SWMT-1 White Cedar-Hardwood Mineral Mixed Swamp  
 SWT Thicket Swamp  
 SWT2-2 Willow Mineral Thicket Swamp  
 SWT2-5 Red-osier Mineral Thicket Swamp  
 SWT2-8 Silky Dogwood Mineral Thicket Swamp  
 SWT3 Mixed Organic Thicket Swamp  
 SWT3-2 Willow Organic Thicket Swamp
- MARSH**  
 MAM Meadow Marsh  
 MAM2-2 Reed-canary Grass Mineral Meadow Marsh  
 MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh  
 MAM2-10 Forb Mineral Meadow Marsh  
 MAM3-6 Broad-leaved Sedge Organic Meadow Marsh  
 MAS Shallow Marsh  
 MAS2-1 Cattail Mineral Shallow Marsh  
 MAS3-1 Cattail Organic Shallow Marsh  
 MAS3-4 Broad-leaved Sedge Organic Shallow Marsh
- SHALLOW WATER**  
 SAF1-3 Duckweed Floating-leafed Shallow Aquatic  
 SAS1-1 Pondweed Submerged Shallow Aquatic
- CULTURAL**  
 CUP Plantation  
 CUP3 Coniferous Plantations  
 CUP3-2 White Pine Coniferous Plantation  
 CUP3-3 Scots Pine Coniferous Plantation  
 CUP3-8 White Spruce Cultural Plantation  
 CUT Cultural Thicket  
 CUT-1 Grey Dogwood Cultural Thicket  
 CUW Cultural Woodland  
 CUM1-1 Dry-Moist Old Field Meadow
- \*not listed in Southern Ontario ELC
- AG Agricultural  
 POND Pond  
 DIST Disturbed  
 IND Industrial
- Route Alternative 120m buffer  
 Ecological land classification  
 Areas not accessible
- City of Cambridge East Boundary Corridor EA**
- Figure 3**  
**Ecological Land Classification**  
**SHEET 1 OF 2**
- SAVANTA

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- ELC LEGEND**
- FOREST**  
 FOC2-2 Dry-Fresh White Cedar Coniferous Forest  
 FOC4-1 Fresh-Moist White Cedar Coniferous Forest  
 FOM Mixed Forest  
 FOD Deciduous Forest  
 FOD3-1 Dry-Fresh Poplar Deciduous Forest  
 FOD5-1 Dry-Fresh Sugar Maple Deciduous Forest  
 FOD5-2 Dry-Fresh Sugar Maple-Beech Deciduous Forest  
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 FOD5-2 Fresh-Moist Ash Lowland Deciduous Forest  
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 SWD2-2 Green Ash Mineral Deciduous Swamp  
 SWD3-2 Silver Maple Mineral Deciduous Swamp  
 SWD3-3 Swamp Maple Mineral Deciduous Swamp  
 SWD4-1 Willow Mineral Deciduous Swamp  
 SWD4-3 Poplar Mineral Deciduous Swamp  
 SWM Mixed Swamp  
 SWMT-1 White Cedar-Hardwood Mineral Mixed Swamp  
 SWT Thicket Swamp  
 SWT2-2 Willow Mineral Thicket Swamp  
 SWT2-5 Red-osier Mineral Thicket Swamp  
 SWT2-8 Silky Dogwood Mineral Thicket Swamp  
 SWT3 Mixed Organic Thicket Swamp  
 SWT3-2 Willow Organic Thicket Swamp
- MARSH**  
 MAM Meadow Marsh  
 MAM2-2 Reed-canary Grass Mineral Meadow Marsh  
 MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh  
 MAM2-10 Forb Mineral Meadow Marsh  
 MAM3-6 Broad-leaved Sedge Organic Meadow Marsh  
 MAS Shallow Marsh  
 MAS2-1 Cattail Mineral Shallow Marsh  
 MAS3-1 Cattail Organic Shallow Marsh  
 MAS3-4 Broad-leaved Sedge Organic Shallow Marsh
- SHALLOW WATER**  
 SAF1-3 Duckweed Floating-leafed Shallow Aquatic  
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 CUP3 Coniferous Plantations  
 CUP3-2 White Pine Coniferous Plantation  
 CUP3-3 Scots Pine Coniferous Plantation  
 CUP3-8 White Spruce Cultural Plantation  
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 CUT-1 Grey Dogwood Cultural Thicket  
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 Areas not accessible
- City of Cambridge East Boundary Corridor EA**
- Figure 3**  
**Ecological Land Classification**  
**SHEET 2 OF 2**
- SAVANTA

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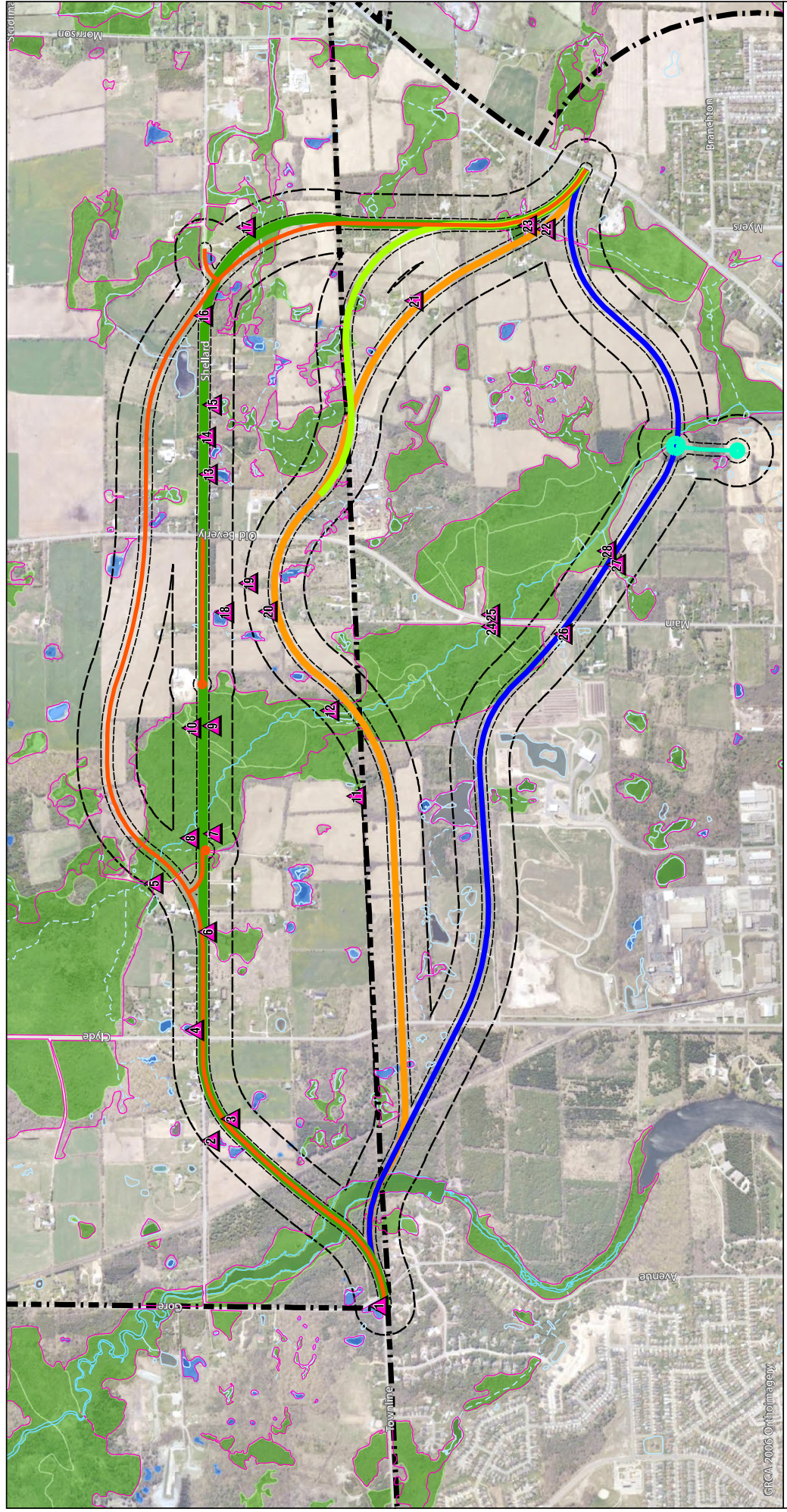


City of Cambridge East Boundary Corridor EA  
**Figure 4**  
**Salamander Ponds**

- Route Alternative 120m buffer
- City of Cambridge Boundary
- Ponds, Streams, Creeks (Terranet)
  - Creek, major
  - Creek, minor
  - Creek, intermittent
  - Pond
- Route Alternative (MTE)
  - Route A2
  - Route A1
  - Route A3
  - Route B1
  - Route B3
  - Route C1
- Location of Potential Salamander Ponds
  - Salamander present at time of survey

0 100 M  
 SAVANTA

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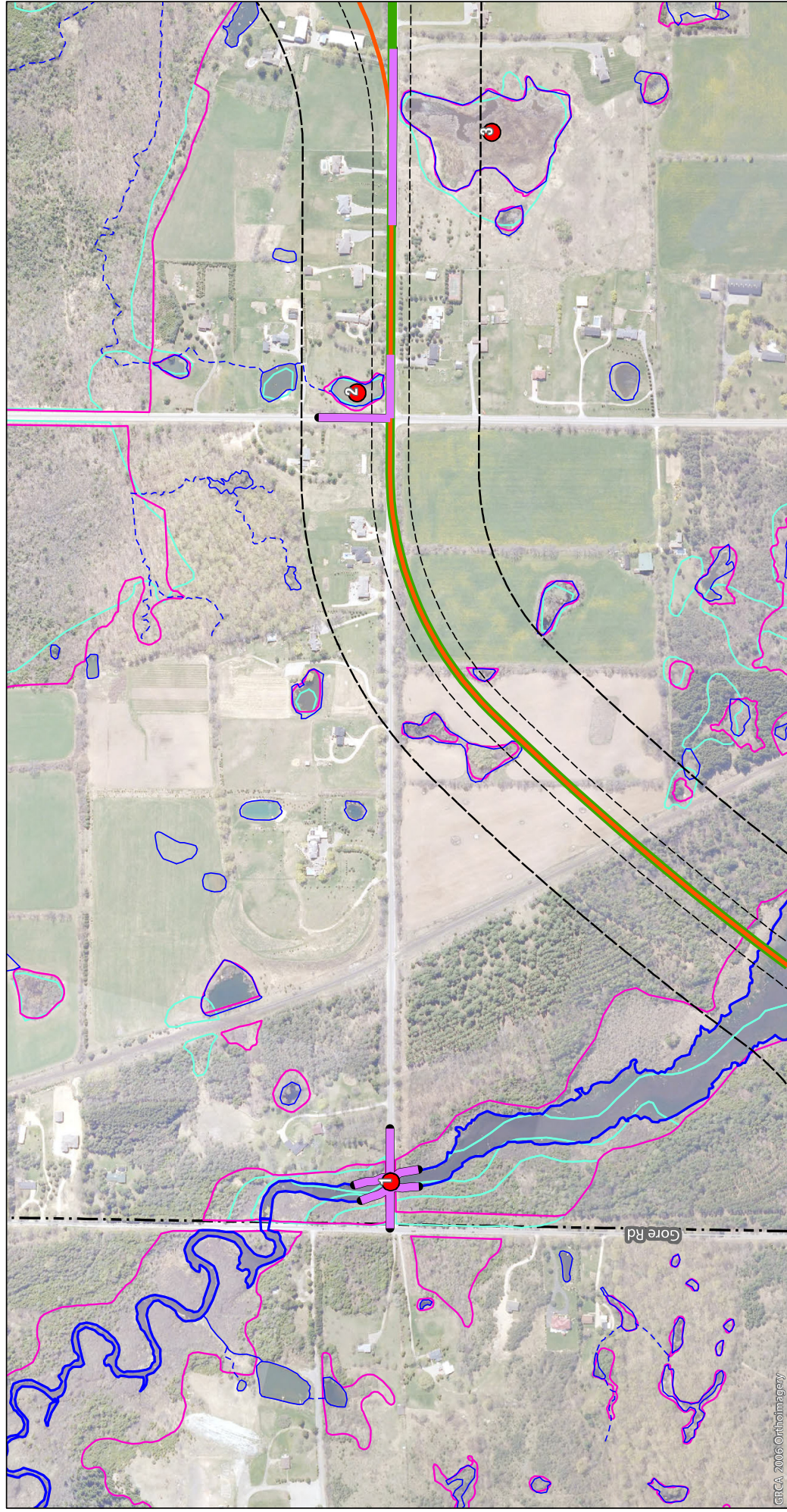


City of Cambridge East Boundary Corridor EA  
**Figure 5**  
**Amphibian Call Count Stations**

- Route Alternative 120m buffer
- Route Alternative 25m buffer
- City of Cambridge Boundary
- Wetland (GRCA)
- Wetland Evaluated-Provincial (MNRF LIO)
- Wetland Not evaluated per OWES (MNRF LIO)
- Ponds, Streams, Creeks (Terranet)
  - Creeks, intermittent
  - Creeks, major
  - Creeks, minor
  - Ponds
- Route Alternative (MTE)
  - Route A2
  - Route A1
  - Route A3
  - Route B1
  - Route B3
  - Route C1
- Amphibian call count station

0 200 Meters  
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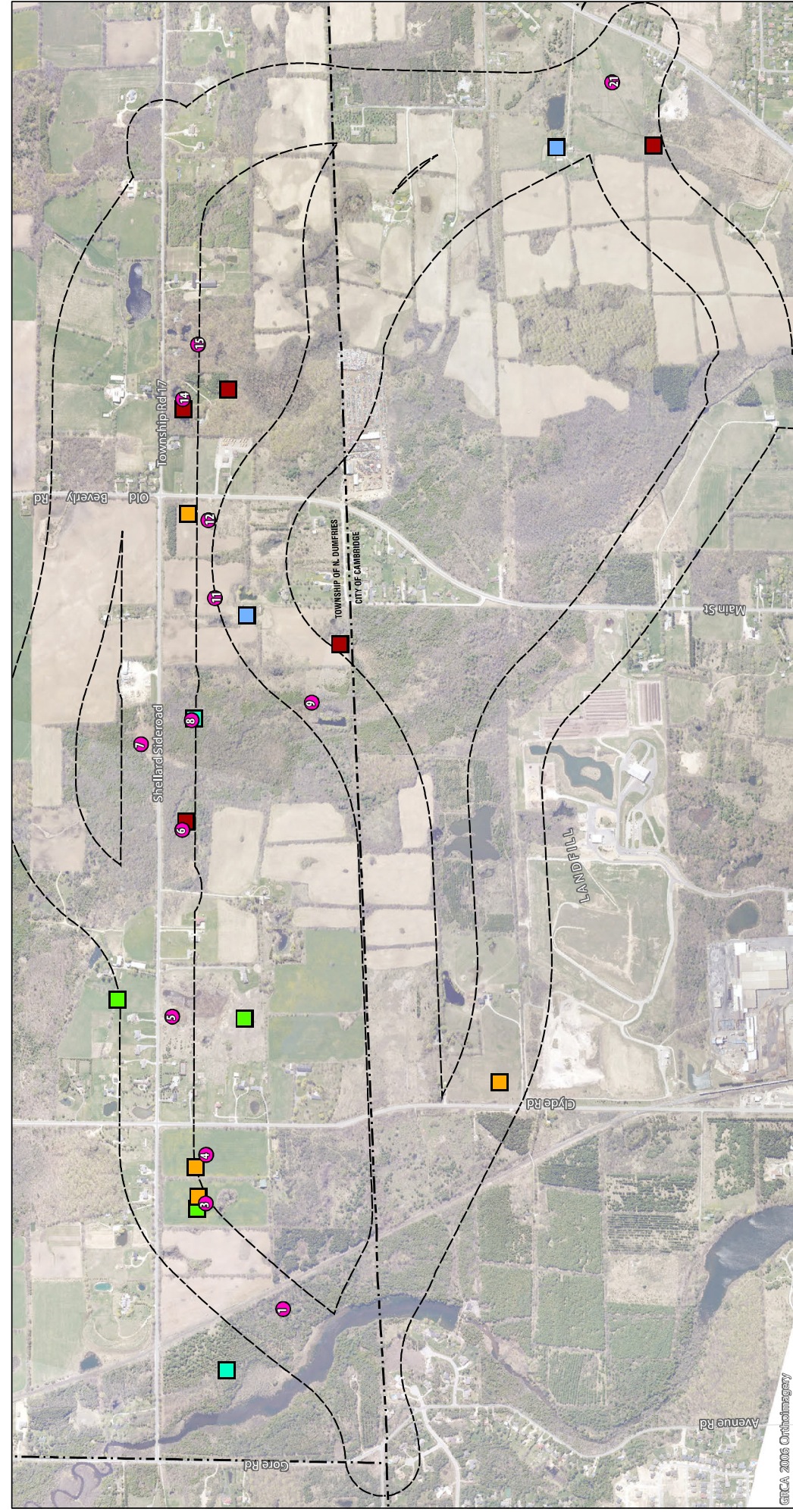
City of Cambridge East Boundary Corridor EA  
**Figure 6**  
 Reptile Survey Stations 2014

Scale: 1:5,000, 100 M

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<ul style="list-style-type: none"> <li>Route Alternative 25m buffer</li> <li>Route Alternative 120m buffer</li> <li>City of Cambridge Boundary</li> <li>Wetland (GRCA)</li> <li>Wetland (MNR)</li> </ul>	<ul style="list-style-type: none"> <li>Ponds, Streams, Creeks (Terranet)</li> <li>CREEKS_INTERMITTENT</li> <li>CREEKS_MAJOR</li> <li>CREEKS_MINOR</li> <li>PONDS</li> </ul>	<ul style="list-style-type: none"> <li>Route Alternative (MTE)</li> <li>Route A2</li> <li>Route A1</li> <li>Route A3</li> <li>Route B1</li> <li>Route B3</li> <li>Route C1</li> </ul>	<ul style="list-style-type: none"> <li>Turtle survey station</li> <li>Turtle road survey location</li> </ul>
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City of Cambridge East Boundary Corridor EA  
**Figure 7**  
 Breeding Bird Point Count Stations 2014

Scale: 250 M

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<ul style="list-style-type: none"> <li>City of Cambridge Boundary</li> <li>Route Alternative 120m buffer</li> </ul>	<ul style="list-style-type: none"> <li>Breeding bird point count stations</li> <li>2014</li> </ul>	<ul style="list-style-type: none"> <li>Species at Risk</li> <li>Barn Swallow (nest structures only)</li> <li>Bobolink</li> <li>Eastern Meadowlark</li> <li>Eastern Wood Pewee</li> <li>Wood Thrush</li> </ul>
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**APPENDIX B: ECOLOGICAL SURVEY RESULTS**

**Table 1: MNRF LIST OF SAR AND RARE VEGETATION COMMUNITIES ON, OR IN, THE SURROUNDING CAMBRIDGE VICINITY OF STUDY AREA**

<ul style="list-style-type: none"> <li>• Jefferson Salamander</li> <li>• Blanding's Turtle</li> <li>• Eastern Ribbonsnake</li> <li>• Milksnake</li> <li>• Northern Map Turtle</li> <li>• Queensnake</li> <li>• Snapping Turtle</li> <li>• Wood Turtle</li> <li>• Acadian Flycatcher</li> <li>• Bald Eagle</li> <li>• Barn Swallow</li> <li>• Black Tern</li> <li>• Bobolink</li> <li>• Canada Warbler</li> <li>• Cerulean Warbler</li> </ul>	<ul style="list-style-type: none"> <li>• Chimney Swift</li> <li>• Common Nighthawk</li> <li>• Eastern Meadowlark</li> <li>• Golden-winged Warbler</li> <li>• Henslow's Sparrow</li> <li>• Hooded Warbler</li> <li>• Least Bittern</li> <li>• Louisiana Waterthrush</li> <li>• Northern Bobwhite</li> <li>• Olive-sided Flycatcher</li> <li>• Peregrine Falcon</li> <li>• Red-headed Woodpecker</li> <li>• Short-eared Owl</li> <li>• Whip-poor-will</li> <li>• Yellow-breasted Chat</li> </ul>	<ul style="list-style-type: none"> <li>• Monarch Butterfly</li> <li>• Rusty-patched Bumble Bee</li> <li>• West Virginia White</li> <li>• American Badger</li> <li>• Black Redhorse</li> <li>• Silver Shiner</li> <li>• Rainbow Mussel</li> <li>• Wavy-rayed Lampmussel</li> <li>• Pygmy Pocket Moss</li> <li>• American Chestnut</li> <li>• American Ginseng</li> <li>• Butternut</li> <li>• Eastern Flowering Dogwood</li> <li>• Green Dragon</li> <li>• Kentucky Coffee-tree</li> </ul>
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**Table 2: Summary of Natural Heritage Field Investigations (Savanta Inc. 2014)**

FIELD SURVEY DATE (2014)	FIELD WORK TYPE
• March (various dates)	• Salamander habitat assessments to determine appropriate locations for trap sampling
• April 9, 10, 13, 14, 15, 16, 17	• Salamander trapping and tissue sampling
• April 22, 23 • May 13, 14 • June 16	• Amphibian call count surveys
• June 5, 16, 26	• Reptile surveys
• May 29, 30 • June 23, 24	• Breeding bird surveys
• May 29 • June 18 • July 11	• Ecological Land Classification (ELC) and Botanical inventories

**Note:**

- Detailed survey methods and results are provided in **Section 3** of the report.

**Table 3 ELC Community Types**

ELC TYPE	COMMUNITY DESCRIPTION
<b>FOREST</b>	
<b>FOC2-2</b> Dry-fresh white cedar coniferous forest	<ul style="list-style-type: none"> <li>• This forest type is composed almost entirely of white cedar in all woody strata.</li> <li>• Due to shading, acidic soils and competition, there is very little development of the herb layer.</li> </ul>
<b>FOC4-1</b> Fresh-moist white cedar coniferous forest	Structurally and floristically very similar to FOC2-2, it differs in its moister soil conditions and location in low-lying areas.
<b>FOM</b> Mixed forest	<ul style="list-style-type: none"> <li>• This is a general group incorporating various stands of coniferous and deciduous tree species.</li> </ul>
<b>FOD3-1</b> Dry-fresh poplar deciduous forest	<ul style="list-style-type: none"> <li>• These are upland communities of trembling aspen, with some presence of sugar maple, white birch and white ash.</li> </ul>
<b>FOD5-1</b> Dry-fresh sugar maple deciduous forest	<ul style="list-style-type: none"> <li>• These are usually mature stands of predominantly sugar maple, with minor presence of beech, basswood, white ash and shagbark hickory.</li> <li>• The shrub layer is moderately well developed, while in the diverse herb layer such common species as may-apple, jack-in-the-pulpit, enchanter's nightshade, bloodroot, and many woodland sedges are present.</li> </ul>
<b>FOD5-2</b> Dry-fresh sugar maple-beech deciduous forest	<ul style="list-style-type: none"> <li>• Sugar maple, the dominant canopy species, is accompanied by beech and sometimes white ash, black cherry, shagbark hickory and white elm.</li> </ul>
<b>FOD5-11*</b> Dry-fresh sugar maple-hardwood deciduous forest	<ul style="list-style-type: none"> <li>• Sugar maple, the dominant canopy species, is accompanied by several other hardwoods, including white ash, beech, white elm, black cherry, and ironwood.</li> </ul>
<b>FOD7-2</b> Fresh-moist ash lowland deciduous forest	<ul style="list-style-type: none"> <li>• These stands are dominated by green ash, with admixtures of several other species, such as white elm, sugar maple, beech, white and yellow birch and bur oak.</li> </ul>
<b>FOD8-1</b> Fresh-moist poplar deciduous forest	<ul style="list-style-type: none"> <li>• In addition to trembling aspen, green ash, sugar maple and white pine are present.</li> <li>• Common buckthorn is the main tall shrub species, followed by glossy buckthorn, nannyberry, inserted Virginia-creeper, and cranberry viburnum. Herbs include jack-in-the-pulpit, common woodland sedges, rough-leaved goldenrod and enchanter's nightshade.</li> </ul>
<b>SWAMP</b>	
<b>SWD2-2</b> Green ash mineral deciduous swamp	<ul style="list-style-type: none"> <li>• This is the most common and largest land coverage vegetation type in the Study Area.</li> <li>• The dominant green ash is frequently associated with silver and swamp maple, less so with yellow birch, white elm, black ash, bur oak, and trembling aspen.</li> <li>• The shrub layer is typically well developed and composed of such species as glossy buckthorn, dwarf raspberry, poison ivy and common buckthorn.</li> </ul>

ELC TYPE	COMMUNITY DESCRIPTION
	<ul style="list-style-type: none"> <li>The herb layer is diverse and rich in species, including sensitive fern, enchanter's nightshade, rough-leaved goldenrod, foam-flower, ostrich fern, yellow avens, jewelweed, fowl meadow grass, and many others.</li> <li>Most of the stands are extensively flooded in the spring.</li> </ul>
<b>SWD3-2</b> Silver maple mineral deciduous swamp	<ul style="list-style-type: none"> <li>Together with related types SWD2-2 and SWD3-3, it forms part of swamp complexes that dominate bottomland areas.</li> <li>Silver maple occurs either as a sole canopy tree, or is associated with willow and green ash, often forming rings of vegetation around shallow pools and ponds.</li> <li>Shrubs are glossy buckthorn and riverbank grape.</li> <li>Herbs grow mostly on hummocks and tree bases and include sensitive fern, Tuckerman's sedge, marsh fern and false nettle.</li> </ul>
<b>SWD3-3</b> Swamp maple mineral deciduous swamp	<ul style="list-style-type: none"> <li>This type is related to SWD2-2, with the two frequently intergrading. Swamp maple is accompanied by silver maple, yellow birch, white elm and green ash.</li> <li>The shrub layer is relatively well developed and composed of poison ivy, dwarf raspberry, spicebush and tree saplings. In the herb layer grow fowl meadow grass, sensitive fern, marsh marigold, jack-in-the-pulpit, rough-leaved goldenrod and jewelweed.</li> <li>These communities are among the most heavily flooded from spring through early summer.</li> </ul>
<b>SWD4-1</b> Willow mineral deciduous swamp	<ul style="list-style-type: none"> <li>These units are often associated with pools and swales, where reddish willow forms the upper canopy and Manitoba maple a secondary layer.</li> </ul>
<b>SWD4-3</b> Poplar mineral deciduous swamp	<ul style="list-style-type: none"> <li>These stands are dominated by trembling aspen, cottonwood or balsam poplar. The herbaceous understorey is typically well developed.</li> </ul>
<b>SWM1-1</b> White cedar-hardwood mineral mixed swamp	<ul style="list-style-type: none"> <li>White cedar is accompanied by several hardwood species, for example white and yellow birch, white elm and poplar.</li> </ul>
<b>SWT2-2</b> Willow mineral thicket swamp	<ul style="list-style-type: none"> <li>Tall shrub thicket dominated by various species of willow, often with admixtures of red-osier and silky dogwood.</li> </ul>
<b>SWT2-5</b> Red-osier mineral thicket swamp	<ul style="list-style-type: none"> <li>These shrub-dominated wetlands are dominated by red-osier dogwood, with secondary presence of shrub willow species.</li> <li>The herb layer is usually well developed.</li> </ul>
<b>SWT2-8</b> Silky dogwood mineral thicket swamp	<ul style="list-style-type: none"> <li>This tall shrub thicket is dominated by silky dogwood, usually accompanied by red-osier dogwood and willow shrubs.</li> </ul>
<b>SWT3</b> Mixed organic thicket swamp	<ul style="list-style-type: none"> <li>Various species of tall shrubs form these diverse communities, including red-osier dogwood, silky dogwood, willow shrubs, and nannyberry.</li> </ul>
<b>SWT3-2</b> Willow organic thicket swamp	<ul style="list-style-type: none"> <li>Bebb's willow, the dominant shrub species, is accompanied by pussy willow and silky and red-osier dogwood. The herb layer is dominated by lake-bank sedge and spotted Joe-Pye-weed.</li> </ul>

ELC TYPE	COMMUNITY DESCRIPTION
<b>MARSH</b>	
<b>MAM2-2</b> Reed-canary grass mineral meadow marsh	<ul style="list-style-type: none"> <li>These meadows are dominated, often entirely, by densely growing reed canary grass, to the exclusion of other wetland species, which may be represented by swamp aster, tall goldenrod and tall white aster.</li> </ul>
<b>MAM3-6</b> Broad-leaved sedge organic meadow marsh	<ul style="list-style-type: none"> <li>These communities often occur in complexes with other open wetland types. Lake-bank sedge dominates the medium-height herb layer, together with swamp aster, cattail, blue-joint grass and sensitive fern.</li> <li>A few shrubs or even single short trees may be present, including glossy buckthorn, narrow-leaved meadow-sweet, white cedar, green ash and elm.</li> </ul>
<b>MAS2-1</b> Cattail mineral shallow marsh	<ul style="list-style-type: none"> <li>Glauconous and broad-leaved cattail are the dominant tall graminoid species.</li> <li>Shorter herbs are reed-canary grass, hemlock water-parsnip and duckweed floating on the surface of the water, where present. In less wet areas, shrubs such as silky dogwood, may occur.</li> </ul>
<b>MAS3-1</b> Cattail organic shallow marsh	<ul style="list-style-type: none"> <li>These communities are very similar to MAS2-2, but developed on organic soils.</li> </ul>
<b>MAS3-4</b> Broad-leaved sedge organic shallow marsh	<ul style="list-style-type: none"> <li>Lake-bank sedge is the dominant species in this marsh community.</li> </ul>
<b>SHALLOW WATER</b>	
<b>SAF1-3</b> Duckweed floating-leaved shallow aquatic	<ul style="list-style-type: none"> <li>These are the simplest of ELC associations consisting of lesser duckweed floating on the surface of water of ponds.</li> </ul>
<b>Cultural</b>	
<b>CUP3</b> Coniferous plantations	<ul style="list-style-type: none"> <li>A composite unit of variously composed coniferous plantations, with no leading dominant. Possible species include white pine, white spruce, Norway spruce and Austrian pine.</li> </ul>
<b>CUP3-2</b> White pine coniferous plantation	<ul style="list-style-type: none"> <li>Dominated by white pine, often with white spruce, these are simply structured coniferous stands. The invasive glossy buckthorn is the main shrub species. The mostly weedy and poorly developed herb layer contains garlic mustard, dame's rocket and dandelion.</li> </ul>
<b>CUP3-3</b> Scots pine coniferous plantation	<ul style="list-style-type: none"> <li>Within these simply-structured plantations, composed of Scots pine, the relatively well developed herb cover is dominated by old field meadow species.</li> </ul>
<b>CUP3-8</b> White spruce cultural plantation	<ul style="list-style-type: none"> <li>These are often poorly growing communities of white spruce with admixtures of white pine and a few hardwoods establishing (green ash, white elm, balsam poplar). Many stands are heavily infested with glossy buckthorn. The herb layer is variously developed, mostly within canopy gaps, and composed of common species of old field meadows.</li> </ul>
<b>CUT</b> Cultural thicket	<ul style="list-style-type: none"> <li>This is a composite unit of many possible associations dominated by such species as grey dogwood, hawthorn, common buckthorn, and saplings of deciduous trees.</li> </ul>
<b>CUT1-4</b> Grey dogwood cultural thicket	<ul style="list-style-type: none"> <li>Grey dogwood is usually accompanied by nannyberry and hawthorn species in these tall shrub communities. The herb cover is similar to that of old field meadows.</li> </ul>

ELC TYPE	COMMUNITY DESCRIPTION
<b>CUW</b> Cultural woodland	These are extremely variable communities of many possible tree species, both deciduous and coniferous, for example Manitoba and Norway maple, sugar maple, black walnut, black cherry, basswood, white cedar, etc.
<b>CUM1-1</b> Dry-moist old field meadow	These communities occupy areas of former agricultural lands—crop fields or pastures. Although the dominant species is generally tall goldenrod, many other—both exotic weeds of European origin and native plants of weedy character—are found, for example wild carrot, tufted vetch, Canada thistle, red-top, teasel, new England aster, and many others

\*not listed in Lee et al, 1998

SAVANTA INC,  
Table 4: Plant List

CAMBRIDGE EAST BOUNDARY ROAD  
DATA COLLECTION SUMMARY REPORT

Species Latin Name	Synonyms	Species Common Name	Coefficient of Conservation	Wetness Index	Wetness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Waterloo	Local Status Wellington	Reference
<b>Dennstaedtiaceae</b> <i>Pteridium aquilinum</i>		<b>Bracken Fern Family</b> Bracken Fern	2	3		S5			G5			Frank and Anderson 2009
<b>Dryopteridaceae</b> <i>Athyrium filix-femina</i> <i>Cystopteris bulbifera</i> <i>Dryopteris carthusiana</i> <i>Matteuccia struthiopteris</i> var. <i>pennsylvanica</i> <i>Onoclea sensibilis</i> <i>Polystichum acrostichoides</i>	<i>Dryopteris spinulosa</i>	<b>Wood Fern Family</b> Lady Fern Bulblet Fern Spinulose Wood Fern Ostrich Fern Sensitive Fern Christmas Fern	4 5 5 5 4 5	0 -2 -2 -3 -3 5		S5 S5 S5 S5 S5 S5			G5 G5 G5 G575 G5 G5			Frank and Anderson 2009
<b>Equisetaceae</b> <i>Equisetum arvense</i> <i>Equisetum hyemale</i> ssp. <i>affine</i>		<b>Horsetail Family</b> Field Horsetail Scouring-rush	0 2	0 -2		S5 S5			G5 G575			
<b>Osmundaceae</b> <i>Osmunda claytoniana</i>		<b>Royal Fern Family</b> Interrupted Fern	7	-1		S5			G5	R	R2	
<b>Thelypteridaceae</b> <i>Thelypteris palustris</i>	<i>Dryopteris thelypteris</i>	<b>Marsh Fern Family</b> Marsh Fern	5	-4		S5			G5			
<b>Cupressaceae</b> <i>Juniperus communis</i> <i>Juniperus virginiana</i> <i>Thuja occidentalis</i>		<b>Cedar Family</b> Common Juniper Eastern Red Cedar Eastern White Cedar		3 -3		S5 S5 S5			G5 G5 G5	R+ G5 G5	X X X	

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												Frank and Anderson 2009
												Region of Waterloo 1999
<b>Pinaceae</b>		<b>Pine Family</b>										
<i>Larix laricina</i>		Tamarack	7	-3		S5			G5		X	
<i>Picea abies</i>		Norway Spruce				SVA			G5		X	
<i>Picea glauca</i>		White Spruce	6	3	-1	S5			G5	R+	X	
<i>Pinus nigra</i>		Austrian Pine				SVA			GNA		X	
<i>Pinus strobus</i>		Eastern White Pine	4	3		S5			G5		X	
<i>Pinus sylvestris</i>		Scotch Pine				SVA			GNA		X	
<b>Aceraceae</b>		<b>Maple Family</b>										
<i>Acer negundo</i>		Manitoba Maple	0	-2		S5			G5		X	
<i>Acer platanoides</i>		Norway Maple				SVA			GNA		X	
<i>Acer rubrum</i>		Red Maple	4	0		S5			G5		X	
<i>Acer saccharinum</i>		Silver Maple	5	-3		S5			G5		X	
<i>Acer saccharum ssp. saccharum</i>		Sugar Maple	4	3		S5			G5T5		X	
<i>Acer x freemanii</i>		Freeman's Maple				SVA			GNA		X	
<b>Anacardiaceae</b>		<b>Sumac or Cashew Family</b>										
<i>Toxicodendron rydbergii</i>		Rydberg's Poison Ivy	0	0		S5			G5T		X	
<i>Rhus typhina</i>		Staghorn Sumac	1	5		S5			G5		X	
<b>Apiaceae</b>		<b>Carrot or Parsley Family</b>										
<i>Aegopodium podagraria</i>		Goutweed				SVA			GNR		X	
<i>Cicuta maculata</i>		Spotted Water-hemlock	6	-5		S5			G5		X	
<i>Daucus carota</i>		Wild Carrot				SVA			GNR		X	
<i>Heracleum maximum</i>		Cow-parsnip	3	-3		S5			G5	R	X	
<i>Sium suave</i>		Hemlock Water-parsnip	4	-5		S5			G5		X	

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												Frank and Anderson 2009
												Region of Waterloo 1999
<b>Apocynaceae</b>		<b>Dogbane Family</b>										
<i>Apocynum androsaemifolium ssp. androsaemifolium</i>		Spreading Dogbane	3	5		S5			G5T5		X	
<b>Araliaceae</b>		<b>Ginseng Family</b>										
<i>Aralia nudicaulis</i>		Wild Sarsaparilla	4	3		S5			G5		X	
<b>Asclepiadaceae</b>		<b>Milkweed Family</b>										
<i>Asclepias incarnata</i>		Swamp Milkweed	6	-5		S5			G5		X	
<i>Asclepias syriaca</i>		Common Milkweed	0	5		S5			G5		X	
<i>Cynanchum rossicum</i>	<i>Vincetoxicum rossicum</i>	European Swallow-wort				SVA			GNR		X	
<b>Asteraceae</b>		<b>Composite or Aster Family</b>										
<i>Achillea millefolium</i>		Yarrow				S5			G5		X	
<i>Ambrosia artemisiifolia</i>		Annual Ragweed	0	3	-1	S5			G5		X	
<i>Arctium minus</i>		Common Burdock	5	-2		SVA			GNR		X	
<i>Artemisia vulgaris</i>		Common Mugwort	5	-1		SVA			GU		X	
<i>Symphotrichum ericoides</i> var. <i>ericoides</i>	<i>Aster ericoides</i> ssp. <i>ericoides</i>	White Heath Aster				S5			G5T5		X	
<i>Symphotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	<i>Aster lanceolatus</i> ssp. <i>lanceolatus</i>	Tall White Aster	3	-3		S5			G5T5		X	
<i>Symphotrichum lateriflorum</i>	<i>Aster lateriflorus</i>	Starved Aster	3	-2		S5			G5		X	
<i>Symphotrichum novae-angliae</i>	<i>Aster novae-angliae</i>	New England Aster	2	-3		S5			G5		X	
<i>Symphotrichum puniceum</i> var. <i>puniceum</i>	<i>Aster puniceus</i> var. <i>puniceus</i>	Swamp Aster				S5			G5T5		X	
<i>Symphotrichum urophyllum</i>	<i>Aster urophyllus</i> , <i>Aster sagittifolius</i>	Arrow-leaved Aster	6	5		S4			G4G5		X	

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Reference											
Region of Waterloo 1999 2009											
<i>Centaurea stoebe</i>	<i>Centaurea maculosa</i>	Spotted Knapweed	5	-3	SVA	GNR			GNR		X
<i>Centaurea nigra</i>		Black Knapweed			SVA	GNR			GNR		X
<i>Leucanthemum vulgare</i>	<i>Chrysanthemum leucanthemum</i>	Oxeye Daisy	5	-1	SVA	GNR			GNR		X
<i>Cichorium intybus</i>		Chicory	5	-1	SVA	GNR			GNR		X
<i>Cirsium arvense</i>		Canada Thistle	3	-1	SVA	GNR			GNR		X
<i>Cirsium vulgare</i>		Bull Thistle	4	-1	SVA	GNR			GNR		X
<i>Conyza canadensis</i>		Horseweed	0	1	S5	G5			G5		X
<i>Erigeron strigosus</i>		Daisy Fleabane	0	1	S5	G5			G5		X
<i>Eutrochium maculatum</i> var.	<i>Eupatorium maculatum</i> var. <i>maci</i>	Spotted Joe Pye Weed	3	-5	S5	G5			G5		X
<i>Euthamia graminifolia</i>		Grass-leaved Goldenrod	2	-2	S5	G5			G5		X
<i>Pilosella aurantiaca</i>	<i>Hieracium aurantiacum</i>	Orange Hawkweed	5	-2	SVA	GNR			GNR		X
<i>Pilosella piloselloides</i>	<i>Hieracium piloselloides</i>	Tall Hawkweed	5	-2	SVA	GNR			GNR		X
<i>Lactuca serriola</i>		Prickly Lettuce	0	-1	SVA	GNR			GNR		X
<i>Rudbeckia hirta</i>		Black-eyed Susan	0	3	S5	G5			G5		X
<i>Solidago altissima</i>		Tall Goldenrod	1	3	S5	G5			G5		X
<i>Solidago gigantea</i>		Smooth Goldenrod	4	-3	S5	G5			G5		X
<i>Solidago nemoralis</i> ssp. <i>nemoralis</i>		Gray Goldenrod	2	5	S5	G5			G5		X
<i>Solidago rugosa</i>		Rough-leaf Goldenrod	4	-1	S5	G5			G5		X
<i>Sonchus arvensis</i> ssp. <i>arvensis</i>		Field Sow-thistle			SVA	GNR			GNR		X
<i>Tanacetum vulgare</i>		Common Tansy	5	-1	SVA	GNR			GNR		X
<i>Taraxacum officinale</i>		Common Dandelion	3	-2	SVA	G5			G5		X
<i>Tragopogon pratensis</i>		Meadow Goat's-beard	5	-1	SVA	GNR			GNR		X
<i>Tussilago farfara</i>		Colt's Foot	3	-2	SNR	GNR			GNR		X
<b>Balsaminaceae</b>											
<i>Impatiens capensis</i>		Spotted Jewelweed	4	-3	S5	G5			G5		X

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Reference											
Region of Waterloo 1999 2009											
<b>Berberidaceae</b>											
<i>Caulophyllum thalictroides</i>		Barberry Family									
<i>Podophyllum peltatum</i>		Giant Blue Cohosh	5	3	S4?	G4G5Q			G5		X
<i>Podophyllum peltatum</i>		May Apple			S5	G5			G5		X
<b>Betulaceae</b>											
<i>Alnus incana</i> ssp. <i>rugosa</i>		Speckled Alder	6	-5	S5	G5			G5	R*	X
<i>Betula alleghaniensis</i>		Yellow Birch	6	0	S5	G5			G5		X
<i>Betula papyrifera</i>		White Birch	2	2	S5	G5			G5		X
<i>Ostrya virginiana</i>		Eastern Hop-hornbeam	4	4	S5	G5			G5		X
<b>Boraginaceae</b>											
<i>Echium vulgare</i>		Blueweed	5	-2	SVA	GNR			GNR		X
<i>Myosotis laxa</i>		Small Forget-me-not	6	-5	S5	G5			G5		X
<i>Myosotis scorpioides</i>		True Forget-me-not	0	-1	SNA	G5			G5		X
<b>Brassicaceae</b>											
<i>Alliaria petiolata</i>	<i>Alliaria officinalis</i>	Garlic Mustard	0	-3	SNA	GNR			GNR		X
<i>Barbarea vulgaris</i>		Yellow Rocket	0	-1	SNA	GNR			GNR		X
<i>Capsella bursa-pastoris</i>		Common Shepherd's Purse	1	-1	SNA	GNR			GNR		X
<i>Cardamine diphylla</i>	<i>Dentaria diphylla</i>	Two-leaf Toothwort	7	5	S5	G5			G5		X
<i>Erucastrum gallicum</i>		Common Dogmustard	5	-1	SNA	G5			G5		X
<i>Erysimum cheiranthoides</i>		Worm-seed Mustard	3	-1	SNA	G5			G5		X
<i>Hesperis matronalis</i>		Dame's Rocket	5	-3	SNA	G4G5			G4G5		X
<i>Lepidium campestre</i>		Field Pepper-grass	5	-1	SNA	GNR			GNR		X
<i>Nasturtium microphyllum</i>		Small-leaved Water-cress	-5	-3	SNA	GNR			GNR		X
<i>Sisymbrium officinale</i>		Common Tumble Mustard	5	-1	SNA	GNR			GNR		X

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Reference

Frank and Anderson  
2009

<i>Thlaspi arvense</i>		Field Penny-cress	5	-1	SNA			GNR		
<b>Caprifoliaceae</b>		<b>Honeysuckle Family</b>								
<i>Lonicera tatarica</i>		Tartarian Honeysuckle	3	-3	SNA			GNR		X
<i>Sambucus racemosa</i>	<i>Sambucus pubens</i>	Red Elderberry	5	2	S5			G5		X
<i>Viburnum lentago</i>		Nannyberry	4	-1	S5			G5		X
<i>Viburnum opulus</i>		Cranberry Viburnum	0	-1	S5			G5		X
<b>Caryophyllaceae</b>		<b>Pink Family</b>								
<i>Arenaria serpyllifolia</i>		Thyme-leaf Sandwort	0	-2	SNA			GNR		X
<i>Cerastium fontanum</i>	<i>Cerastium vulgatum</i>	Common Mouse-ear Chickweed	3	-1	SNA			GNR		X
<i>Silene latifolia</i>	<i>Silene alba</i> , <i>S. pratensis</i>	White Campion	5	5	SNA			GNR		X
<i>Silene vulgaris</i>	<i>Silene cucubalus</i>	Maiden's Tears	5	-1	SNA			GNR		X
<i>Stellaria longifolia</i>		Longleaf Stitchwort	2	-4	S5			G5	R	X
<b>Celastraceae</b>		<b>Staff-tree Family</b>								
<i>Celastrus scandens</i>		Climbing Bittersweet	3	3	S5			G5		X
<i>Euonymus obovatus</i>		Running Strawberry-bush	6	5	S5			G5		X
<b>Chenopodiaceae</b>		<b>Goosefoot Family</b>								
<i>Chenopodium album</i> var. <i>album</i>		White Goosefoot	1	-1	SNA			G5TNR		X
<b>Cornaceae</b>		<b>Dogwood Family</b>								
<i>Cornus amomum</i>		Silky Dogwood	5	-4	S5			G5		X
<i>Cornus foemina</i>		Grey Dogwood	2	-2	S5			GNR		X
<i>Cornus sericea</i>	<i>Cornus stolonifera</i>	Red-osier Dogwood	2	-3	S5			G5		X

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Reference

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2009

<b>Cucurbitaceae</b>		<b>Gourd Family</b>								
<i>Echinocystis lobata</i>		Wild Mock-cucumber	3	-2	S5			G5		X
<b>Elaeagnaceae</b>		<b>Oleaster Family</b>								
<i>Elaeagnus angustifolia</i>		Russian Olive	4	-1	SNA			GNR		X
<i>Elaeagnus umbellata</i>		Autumn Olive	3	-3	SNA			GNR		X
<b>Euphorbiaceae</b>		<b>Spurge Family</b>								
<i>Euphorbia cyparissias</i>		Cypress Spurge	5	-2	SNA			G5		X
<b>Fabaceae</b>		<b>Pea Family</b>								
<i>Securigera varia</i>		Common Crown-vetch	5	-2	SNA			GNR		X
<i>Lathyrus latifolius</i>	<i>Coronilla varia</i>	Broad-leaf Peavine	5	-1	SNA			GNR		X
<i>Lotus corniculatus</i>		Bird's-foot Trefoil	1	-2	SNA			GNR		X
<i>Medicago lupulina</i>		Black Medic	1	-1	SNA			GNR		X
<i>Medicago sativa</i> ssp. <i>sativa</i>		Alfalfa	5	-1	SNA			GNRTNR		X
<i>Melilotus albus</i>		White Sweetclover	3	-3	SNA			G5		X
<i>Melilotus officinalis</i>		Yellow Sweetclover	3	-1	SNA			GNR		X
<i>Robinia pseudoacacia</i>		Black Locust	4	-3	SNA			G5		X
<i>Trifolium pratense</i>		Red Clover	2	-2	SNA			GNR		X
<i>Trifolium repens</i>		White Clover	2	-1	SNA			GNR		X
<i>Vicia cracca</i>		Tufted Vetch	5	-1	SNA			GNR		X
<b>Fagaceae</b>		<b>Beech Family</b>								
<i>Fagus grandifolia</i>		American Beech	6	3	S4			G5		X
<i>Quercus alba</i>		White Oak	6	3	S5			G5		X
<i>Quercus macrocarpa</i>		Bur Oak	5	1	S5			G5		X

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												Frank and Anderson 2009
<i>Quercus rubra</i>		Northern Red Oak	6	3		S5			G5		X	
<b>Grossulariaceae</b>		<b>Currant Family</b>										
<i>Ribes americanum</i>		Wild Black Currant	4	-3		S5			G5		X	
<i>Ribes rubrum</i>		Northern Red Currant	5	-2		SNA			G4G5		X	
<b>Guttiferae</b>		<b>St. John's-wort Family</b>										
<i>Hypericum perforatum</i>		Common St. John's-wort	5	-3		SNA			GNR		X	
<b>Hydrophyllaceae</b>		<b>Water-leaf Family</b>										
<i>Hydrophyllum virginianum</i>		Virginia Waterleaf	6	-2		S5			G5		X	
<b>Juglandaceae</b>		<b>Walnut Family</b>										
<i>Carya ovata</i>		Shagbark Hickory	6	3		S5			G5		R1	
<i>Juglans nigra</i>		Black Walnut	5	3		S4			G5	R+*	X	
<b>Lamiaceae</b>		<b>Mint Family</b>										
<i>Ajuga reptans</i>		Carpet Bugle	5	-1		SNA			GNR		X	
<i>Lamium amplexicaule</i>		Common Deadnettle	5	-1		SNA			GNR		X	
<i>Lycopus americanus</i>		American Bugleweed	4	-5		S5			G5		X	
<i>Monarda fistulosa</i>		Wild Bergamot Beebalm	6	3		S5			G5		X	
<i>Prunella vulgaris ssp. lanceolata</i>		Self-heal	5	5		S5			G5T5		X	
<i>Salvia pratensis</i>		Meadow Sage	5	-1		SNA			GNR		X	
<b>Lauraceae</b>		<b>Laurel Family</b>										
<i>Lindera benzoin</i>		Spicebush	6	-2		S5			G5		R1	

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												Frank and Anderson 2009
<b>Lythraceae</b>		<b>Loosestrife Family</b>										
<i>Lythrum salicaria</i>		Purple Loosestrife	-5	-3		SNA			G5		X	
<b>Moraceae</b>		<b>Mulberry Family</b>										
<i>Morus alba</i>		White Mulberry	0	-3		SNA			GNR		X	
<b>Oleaceae</b>		<b>Olive Family</b>										
<i>Fraxinus americana</i>		White Ash	4	3		S4?			G5		X	
<i>Fraxinus nigra</i>		Black Ash	7	-4		S5?			G5		X	
<i>Fraxinus pennsylvanica</i>		Red Ash	3	-3		S5			G5		X	
<b>Onagraceae</b>		<b>Evening-primrose Family</b>										
<i>Circaea alpina</i>		Small Enchanter's Nightshade	6	-3		S5			G5		X	
<i>Circaea luteitana</i>		Enchanter's Nightshade	3	3		S5			G5		X	
<i>Chamerion angustifolium</i>	<i>Epilobium angustifolium</i>	Fireweed	3	0		S5			G5		R1	
<i>Oenothera parviflora</i>		Northern Evening-primrose	1	3		S4?			G4?		X	
<b>Oxalidaceae</b>		<b>Wood Sorrel Family</b>										
<i>Oxalis stricta</i>		Upright Yellow Wood-sorrel	0	3		S5			G5		X	
<b>Papaveraceae</b>		<b>Poppy Family</b>										
<i>Chelidonium majus</i>		Greater Celandine	5	-3		SNA			GNR		X	
<i>Sanguinaria canadensis</i>		Bloodroot	5	4		S5			G5		X	
<b>Plantaginaceae</b>		<b>Plantain Family</b>										
<i>Plantago major</i>		Common Plantain	-1	-1		S5			G5		X	

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Reference											
Region of Waterloo 1999											
Frank and Anderson 2009											
<b>Polygonaceae</b>											
<i>Polygonum aviculare</i> ssp. <i>aviculare</i>		<b>Smartweed Family</b>									
<i>Rumex crispus</i>		Prostrate Knotweed	1	-1	SNA				GNR		X
		Curly Dock	-1	-2	SNA				GNR		X
<b>Primulaceae</b>											
<i>Anagallis arvensis</i>		<b>Primrose Family</b>									
<i>Lysimachia ciliata</i>		Scarlet Pimpernel	4	-1	SNA				GNR		X
<i>Lysimachia thyrsoiflora</i>		Fringed Loosestrife	4	-3	S5				G5		X
		Tufted Loosestrife	7	-5	S5				G5		X
<b>Ranunculaceae</b>											
<i>Actaea pachypoda</i>		<b>Buttercup Family</b>									
<i>Anemone acutiloba</i>		White Baneberry	6	5	S5				G5		X
<i>Anemone cylindrica</i>		Sharp-lobed Hepatica	6	5	S5				G5		X
<i>Anemone virginiana</i>		Long-fruited Anemone	7	5	S4				G5	R	X
<i>Caltha palustris</i>		Virginia Anemone	4	5	S5				G5		X
<i>Ranunculus abortivus</i>		Marsh-marigold	5	-5	S5				G5		X
<i>Ranunculus acris</i>		Kidney-leaf Buttercup	2	-2	S5				G5		X
<i>Thalictrum dioicum</i>		Tall Buttercup	5	2	SNA				G5		X
<i>Thalictrum pubescens</i>		Early Meadow-rue	5	2	S5				G5		X
		Tall Meadow-rue	5	-2	S5				G5		X
<b>Rhamnaceae</b>											
<i>Rhamnus cathartica</i>		<b>Buckthorn Family</b>									
<i>Frangula alnus</i>	<i>Rhamnus frangula</i> , <i>Alnus frangula</i>	Common Buckthorn	3	-3	SNA				GNR		X
		Glossy Buckthorn	-1	-3	SNA				GNR		X
<b>Rosaceae</b>											
<i>Fragaria vesca</i>		<b>Rose Family</b>									
<i>Geum aleppicum</i>		Woodland Strawberry	4	4	S5				G5		X
		Yellow Avens	2	-1	S5				G5		X

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Table 4: Plant List

Species Latin Name	Synonyms	Species Common Name	Coefficient of Conservation	Wetness Index	Wetness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Waterloo	Local Status Wellington
Reference											
Region of Waterloo 1999											
Frank and Anderson 2009											
<b>Geum canadense</b>											
<i>Potentilla norvegica</i> ssp. <i>norvegica</i>		White Avens	3	0	S5				G5		X
<i>Potentilla recta</i>		Norwegian Cinquefoil			S5				G5		X
<i>Prunus serotina</i>		Sulphur Cinquefoil	5	-2	SNA				GNR		X
<i>Prunus virginiana</i>		Black Cherry	3	3	S5				G5		X
<i>Rubus allegheniensis</i>		Choke Cherry	2	1	S5				G5		X
<i>Rubus idaeus</i> ssp. <i>strigosus</i>		Alleghany Blackberry	2	2	S5				G5		X
<i>Rubus pubescens</i>		Red Raspberry	0	-2	S5				G5T5		X
		Dwarf Raspberry	4	-4	S5				G5		X
		Narrow-leaved Meadow-sweet	3	-4	S5				G5		X
<b>Rubiaceae</b>											
<i>Galium circaezans</i>		<b>Madder Family</b>									
<i>Galium trifidum</i>		Wild Licorice	7	4	S5				G5	R	X
		Small Bedstraw	5	-4	S5				G5		X
<b>Rutaceae</b>											
<i>Zanthoxylum americanum</i>		<b>Rue Family</b>									
		American Prickly-ash	3	5	S5				G5	R*	X
<b>Salicaceae</b>											
<i>Populus balsamifera</i>		<b>Willow Family</b>									
<i>Populus deltoides</i> ssp. <i>deltoides</i>		Balsam Poplar	4	-3	S5				G5		X
<i>Populus tremuloides</i>		Eastern Cottonwood	4	-1	S5				G5T5		X
<i>Salix bebbiana</i>		Trembling Aspen	0	0	S5				G5		X
<i>Salix discolor</i>		Bebb's Willow	4	-4	S5				G5		X
<i>Salix eriocephala</i>		Pussy Willow	3	-3	S5				G5		X
<i>Salix interior</i>		Heart-leaved Willow	4	-3	S5				G5		X
<i>Salix petiolaris</i>	<i>Salix exigua</i>	Sandbar Willow	3	-5	S5				GNR		X
<i>Salix purpurea</i>		Meadow Willow	3	-4	S5				G5		X
		Basket Willow	-3	-1	SNA				G5		X

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Table 4: Plant List

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												Frank and Anderson Waterloo 1999 2009
<i>Sisyrinchium montanum</i>		Montane Blue-eyed-grass		-1		S5			G5		X	
<b>Juncaceae</b>		<b>Rush Family</b>										
<i>Juncus articulatus</i>		Jointed Rush	5	-5		S5			G5		X	
<i>Juncus bufonius</i>		Toad Rush	1	-4		S5			G5		X	
<i>Juncus effusus</i> var. <i>solutus</i>		Soft Rush	4	-5		S5?			G5T5		X	
<b>Lemnaceae</b>		<b>Duckweed Family</b>										
<i>Lemna minor</i>		Lesser Duckweed	2	-5		S5			G5		X	
<i>Lemna trisulca</i>		Star Duckweed	4	-5		S5			G5		X	
<b>Liliaceae</b>		<b>Lily Family</b>										
<i>Convallaria majalis</i>		Lily-of-the-valley	5	-2		SNA			G5		X	
<i>Erythronium americanum</i>		Yellow Trout-lily	5	5		S5			G5		X	
<i>Hemerocallis fulva</i>		Orange Day-lily	5	-3		SNA			GNA		X	
<i>Maianthemum canadense</i>		Wild Lily-of-the-valley	5	0		S5			G5		X	
<i>Maianthemum racemosum</i>		False Solomon's Seal	4	3		S5			G5T		X	
<i>Maianthemum stellatum</i>	<i>Smilacina racemosa</i>	Star-flowered Solomon's Seal	6	1		S5			G5		X	
<i>Trillium grandiflorum</i>	<i>Smilacina stellata</i>	White Trillium	5	5		S5			G5		X	
<b>Orchidaceae</b>		<b>Orchid Family</b>										
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	<i>Cypripedium calceolus</i> var. <i>pubescens</i>	Yellow Lady's Slipper	5	-1		S5			G5T5		X	
<b>Poaceae</b>		<b>Grass Family</b>										
<i>Agrostis gigantea</i>		Redtop		0	-2	SNA			G4G5		X	
<i>Agrostis stolonifera</i>		Redtop		-3		S5			G5		X	
<i>Andropogon gerardii</i>		Big Bluestem	7	1		S4			G5	R	R1	

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												Frank and Anderson Waterloo 1999 2009
<i>Bromus inermis</i>		Awntless Brome		5	-3	SNA			G5TNR		X	
<i>Calamagrostis canadensis</i>		Blue-joint Grass	4	-5		S5			G5		X	
<i>Dactylis glomerata</i>		Orchard Grass	3	-1		SNA			GNR		X	
<i>Elymus repens</i>		Quack Grass	3	-3		SNA			GNR		X	
<i>Eragrostis cilianensis</i>		Stink Grass	3	-1		SNA			GNR		X	
<i>Schedonorus pratensis</i>	<i>Festuca pratensis</i>	Meadow Fescue	4	-1		SNA			G5		X	
<i>Glyceria striata</i>		Fowl Meadow Grass	3	-5		S5			G5		X	
<i>Lolium perenne</i>		English Rye Grass	3	-1		SNA			GNR		X	
<i>Oryzopsis asperifolia</i>		White-grained Mountain-rice	6	5		S5			G5		X	
<i>Panicum capillare</i>		Witch Grass	0	0		S5			G5		X	
<i>Phalaris arundinacea</i>		Reed Canary Grass	0	-4		S5			G5		X	
<i>Phleum pratense</i>		Timothy	3	-1		SNA			GNR		X	
<i>Poa pratensis</i> ssp. <i>pratensis</i>		Kentucky Bluegrass	0	1		S5			G5T5		X	
<i>Schizachne purpurascens</i>		False Melic Grass	6	2		S5			G5		X	
<i>Setaria pumila</i>	<i>Setaria glauca</i>	Yellow Foxtail	0	-1		SNA			GNR		X	
<i>Sporobolus vaginiflorus</i>		Sheathed Dropseed	1	5		S5			G5	R*	R1	
<b>Smilacaceae</b>		<b>Catbrier Family</b>										
<i>Smilax herbacea</i>		Herbaceous Carrion Flower	5	0		S4			G5		X	
<b>Sparganiaceae</b>		<b>Bur-reed Family</b>										
<i>Sparganium eurycarpum</i>		Broad-fruited Bur-reed	3	-5		S5			G5		X	
<b>Typhaceae</b>		<b>Cattail Family</b>										
<i>Typha angustifolia</i>		Narrow-leaved Cattail	3	-5		SNA			G5		X	
<i>Typha latifolia</i>		Broad-leaved Cattail	3	-5		S5			G5		X	
<i>Typha x glauca</i>		Glaucous Cattail	3	-5		SNA			GNA		X	

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Table 4: Plant List

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Reference										
Region of Waterloo 1999 2009										
Frank and Anderson										

STATISTICS

Species Richness

Total Number of Species: 261

Native Species: 171

Exotic Species: 90

66%

34%

0%

6%

94%

0

10

161

3.9

59

88

11

0

49

-1.7

45

20

21

52%

23%

24%

0.7

59

24%

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Table 4: Plant List

Species Latin Name	Synonyms	Species Common Name	Coefficient of Conservation	Weedness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Waterloo 1999	Local Status Wellington
Reference										
Region of Waterloo 1999 2009										
Frank and Anderson										

facultative upland

59

24%

47

19%

52

21%

31

13%

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TABLE 5: BIRD LIST

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	National Status (G Rank)	COSSARO (MNR)	COSEWIC (Federal)	Area Sensitive	Highest Breeding Evidence
<b>Anseriformes</b>								
<b>Anatidae</b>								
Canada Goose	CANG	<i>Branta canadensis</i>	S5	G5				P
Trumpeter Swan	TRUS	<i>Cygnus buccinator</i>	S4	G4				SH
Wood Duck	WODU	<i>Aix sponsa</i>	S5	G5				P
Mallard	MALL	<i>Anas platyrhynchos</i>	S5	G5				T
Hooded Merganser	HOME	<i>Lophodytes cucullatus</i>	S5B,S5N	G5				SH
<b>Galliformes</b>								
<b>Phasianinae</b>								
Wild Turkey	WITU	<i>Meleagris gallopavo</i>	S5	G5				T
<b>Gaviiformes</b>								
<b>Gaviidae</b>								
<b>Podicipediformes</b>								
<b>Podicipedidae</b>								
Pied-billed Grebe	PBGR	<i>Podilymbus podiceps</i>	S4B,S4N	G5				
<b>Suliformes</b>								
<b>Phalacrocoracidae</b>								
<b>Pelecaniformes</b>								
<b>Ardeidae</b>								
Green Heron	GRHE	<i>Butorides virescens</i>	S4B	G5				SH
<b>Pelecanidae</b>								
<b>Accipitriformes</b>								

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TABLE 5: BIRD LIST

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	National Status (G Rank)	COSSARO (MNR)	COSEWIC (Federal)	Area Sensitive	Highest Breeding Evidence
<b>Cathartidae</b>								
Turkey Vulture	TUVU	<i>Cathartes aura</i>	S5B	G5				SH
<b>Pandionidae</b>								
<b>Accipitridae</b>								
Cooper's Hawk	COHA	<i>Accipiter cooperii</i>	S4	G5			4-50+	D
<b>Gruiformes</b>								
<b>Rallidae</b>								
<b>Gruidae</b>								
<b>Charadriiformes</b>								
<b>Charadriidae</b>								
Killdeer	KILL	<i>Charadrius vociferus</i>	S5B, S5N	G5				SH
<b>Scelopacidae</b>								
Spotted Sandpiper	SPSA	<i>Actitis macularius</i>	S5	G5				SH
<b>Laridae</b>								
<b>Columbiformes</b>								
<b>Columbidae</b>								
Mourning Dove	MODO	<i>Zenaida macroura</i>	S5	G5				T
<b>Cuculiformes</b>								
<b>Cuculidae</b>								
Black-billed Cuckoo	BBCU	<i>Coccyzus erythrophthalmus</i>	S5B	G5				SM
<b>Strigiformes</b>								
<b>Strigidae</b>								

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Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	National Status (G Rank)	COSSARO (MNR)	COSEWIC (Federal)	Area Sensitive	Highest Breeding Evidence
<b>Caprimulgiformes</b>								
<b>Caprimulgidae</b>								
<b>Apodiformes</b>								
Ruby-throated Hummingbird	RTHU	<i>Archilochus colubris</i>	S5B	G5				SH
<b>Coraciiformes</b>								
<b>Alcedinidae</b>								
<b>Piciformes</b>								
<b>Picidae</b>								
Red-bellied Woodpecker	RBWO	<i>Melanerpes carolinus</i>	S4	G5				T
Downy Woodpecker	DOWO	<i>Picoides pubescens</i>	S5	G5				T
Hairy Woodpecker	HAWO	<i>Picoides villosus</i>	S5	G5			10	P
Northern Flicker	NOFL	<i>Colaptes auratus</i>	S4B	G5				P
Pileated Woodpecker	PIWO	<i>Dryocopus pileatus</i>	S5	G5			30-50*	T
<b>Falconiformes</b>								
<b>Falconidae</b>								
<b>Passeriformes</b>								
<b>Tyrannidae</b>								
Eastern Wood-Pewee	EAWP	<i>Contopus virens</i>	S4B	G5	SC	SC		T
Willow Flycatcher	WIFL	<i>Empidonax traillii</i>	S5B	G5				T
Eastern Phoebe	EAPH	<i>Sayornis phoebe</i>	S5B	G5				T
Great Crested Flycatcher	GCFL	<i>Myiarchus crinitus</i>	S4B	G5				T
Eastern Kingbird	EAKI	<i>Tyrannus tyrannus</i>	S4B	G5				P
<b>Laniidae</b>								
<b>Vireonidae</b>								

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TABLE 5: BIRD LIST

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	National Status (G Rank)	COSSARO (MNR)	COSEWIC (Federal)	Area Sensitive	Highest Breeding Evidence
Warbling Vireo	WAVI	<i>Vireo gilvus</i>	S5B	G5				T
Red-eyed Vireo	REVI	<i>Vireo olivaceus</i>	S5B	G5				T
<b>Corvidae</b>								
Blue Jay	BLJA	<i>Cyanocitta cristata</i>	S5	G5				P
American Crow	AMCR	<i>Corvus brachyrhynchos</i>	S5B	G5				FY
Common Raven	CORA	<i>Corvus corax</i>	S5	G5				P
<b>Alaudidae</b>								
<b>Hirundinidae</b>								
Tree Swallow	TRES	<i>Tachycineta bicolor</i>	S4B	G5				T
Northern Rough-winged Swal	NRWS	<i>Stelgidopteryx serripennis</i>	S4B	G5				SH
Bank Swallow	BANS	<i>Riparia riparia</i>	S4B	G5	THR	THR		X
Barn Swallow	BARS	<i>Hirundo rustica</i>	S4B	G5	THR	THR		AE
<b>Paridae</b>								
Black-capped Chickadee	BCCH	<i>Poecile atricapillus</i>	S5	G5				
<b>Sittidae</b>								
Red-breasted Nuthatch	RBNU	<i>Sitta canadensis</i>	S5	G5			0	SH
White-breasted Nuthatch	WBNU	<i>Sitta carolinensis</i>	S5	G5			10	A
<b>Certhiidae</b>								
Brown Creeper	BRCR	<i>Certhia americana</i>	S5B	G5			30	SM
<b>Troglodytidae</b>								
House Wren	HOWR	<i>Troglodytes aedon</i>	S5B	G5				T
<b>Poliopitidae</b>								
<b>Regulidae</b>								

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TABLE 5: BIRD LIST

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	National Status (G Rank)	COSSARO (MNR)	COSEWIC (Federal)	Area Sensitive	Highest Breeding Evidence
<b>Turdidae</b>								
Veery	VEER	<i>Catharus fuscescens</i>	S4B	G5			10-20	T
Wood Thrush	WOTH	<i>Hylocichla mustelina</i>	S4B	G5	SC	THR		T
American Robin	AMRO	<i>Turdus migratorius</i>	S5B	G5				FY
<b>Mimidae</b>								
Gray Catbird	GRCA	<i>Dumetella carolinensis</i>	S4B	G5				V
<b>Sturnidae</b>								
European Starling	EUST	<i>Sturnus vulgaris</i>	SNA	G5				FY
<b>Motacillidae</b>								
<b>Bombycillidae</b>								
Cedar Waxwing	CEDW	<i>Bombycilla cedrorum</i>	S5B	G5				P
<b>Calcaridae</b>								
<b>Parulidae</b>								
Ovenbird	OVEN	<i>Seiurus aurocapilla</i>	S4B	G5			20	SM
Northern Waterthrush	NOWA	<i>Parkesia noveboracensis</i>	S5B	G5			20	T
Blue-winged Warbler	BWVA	<i>Vermivora cyanoptera</i>	S4B	G5				T
Common Yellowthroat	COYE	<i>Geothlypis trichas</i>	S5B	G5				A
American Redstart	AMRE	<i>Setophaga ruticilla</i>	S5B	G5			20-30	SM
Yellow Warbler	YWAR	<i>Setophaga petechia</i>	S5B	G5				T
Pine Warbler	PIWA	<i>Setophaga pinus</i>	S5B	G5			15-30	T
<b>Emberizidae</b>								
Chipping Sparrow	CHSP	<i>Spizella passerina</i>	S5B	G5				T
Savannah Sparrow	SAYS	<i>Passerculus sandwichensis</i>	S4B	G5				T
Song Sparrow	SOSP	<i>Melospiza melodia</i>	S5B	G5				FS

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Swamp Sparrow	SWSP	<i>Melospiza georgiana</i>	S5B	G5				FS
White-throated Sparrow	WTSP	<i>Zonotrichia albicollis</i>	S5B	G5			20	SM
<b>Cardinalidae</b>								
Northern Cardinal	NOCA	<i>Cardinalis cardinalis</i>	S5	G5				T
Rose-breasted Grosbeak	RBGR	<i>Pheucticus ludovicianus</i>	S4B	G5				T
Indigo Bunting	INBU	<i>Passerina cyanea</i>	S4B	G5				P
<b>Icteridae</b>								
Bobolink	BOBO	<i>Dolichonyx oryzivorus</i>	S4B	G5	THR	THR	10	FS
Red-winged Blackbird	RWBL	<i>Agelaius phoeniceus</i>	S4	G5				FS
Eastern Meadowlark	EAME	<i>Sturnella magna</i>	S4B	G5	THR	THR		P
Common Grackle	COGR	<i>Quiscalus quiscula</i>	S5B	G5				FY
Brown-headed Cowbird	BHCO	<i>Molothrus ater</i>	S4B	G5				P
Orchard Oriole	OROR	<i>Icterus spurius</i>	S4B	G5				FS
Baltimore Oriole	BAOR	<i>Icterus galbula</i>	S4B	G5				FY
<b>Fringillidae</b>								
Purple Finch	PUFI	<i>Carpodacus purpureus</i>	S4B	G5				SM
House Finch	HOFI	<i>Carpodacus mexicanus</i>	SNA	G5				SM
American Goldfinch	AMGO	<i>Spinus tristis</i>	S5B	G5				P
<b>Passeridae</b>								
House Sparrow	HOSP	<i>Passer domesticus</i>	SNA	G5				V

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Round	Station	NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Water Y/N
1	AMC 1					3		1(1)		1(2)				
2	AMC 1		1(1)		2(4)	3								
3	AMC 1				1(2)				1(2)		1(3)			
1	AMC 2					2(5)		1(1)		1(2)				
2	AMC 2								1(1)					
3	AMC 2				1(1)									
1	AMC 3	x												
2	AMC 3	x												
3	AMC 3	x												
1	AMC 4	x												
2	AMC 4	x												
3	AMC 4										1(1)			
1	AMC 5	x												
2	AMC 5	x												
3	AMC 5	x												
1	AMC 6					3								
2	AMC 6				1(1)	3			1(1)	1(1)				
3	AMC 6				3			1(1)			1(5)			
1	AMC 7							1(1)						
2	AMC 7	x												
3	AMC 7	x												
1	AMC 8	x												
2	AMC 8	x												
3	AMC 8	x									1(3)			
1	AMC 9	x												
2	AMC 9	x												
3	AMC 9	x												
1	AMC 10	x												
2	AMC 10				3	3								
3	AMC 10										2(5)			
1	AMC 11					3								
2	AMC 11					3								
3	AMC 11										1(2)			
1	AMC 12					3		1(2)		1(2)				

Round	Station	NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Water Y/N
2	AMC 12				1(1)	3			1(1)	1(1)				
3	AMC 12										3			
1	AMC 13	x												
2	AMC 13		1(2)		1(3)	3								
3	AMC 13										1(2)			
1	AMC 14	x												
2	AMC 14	x												
3	AMC 14	x												
1	AMC 15	x												
2	AMC 15				1(1)	1(2)					1(2)			
3	AMC 15													
1	AMC 16					3		1(1)						
2	AMC 16		1(2)			2(5)								
3	AMC 16										1(1)			
1	AMC 17	x												
2	AMC 17					1(2)								
3	AMC 17	x												
1	AMC 18	x												
2	AMC 18	x												
3	AMC 18	x												
1	AMC 19					1(1)		1(1)						
2	AMC 19					1(1)			1(1)	1(1)				
3	AMC 19	x												
1	AMC 20	x												
2	AMC 20					1(2)								
3	AMC 20										2(5)			
1	AMC 21	x												
2	AMC 21					1(1)								
3	AMC 21				3									
1	AMC 22					3				1(1)				
2	AMC 22					1(3)								
3	AMC 22													
1	AMC 23									1(2)				
2	AMC 23				1(1)	1(4)					1(1)			
3	AMC 23										1(4)			

TABLE 6: AMPHIBIAN CALL COUNT

Round	Station	NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Water Y/N
1	AMC 24	x												
2	AMC 24	x												
3	AMC 24		1(1)								1(2)			
1	AMC 25	x												
2	AMC 25		1(1)											
3	AMC 25	x												
1	AMC 26					3		1(2)						
2	AMC 26	x												
3	AMC 26		1(1)								1(1)			
1	AMC 27	x												
2	AMC 27					1(1)								
3	AMC 27		3								1(4)			
1	AMC 28	x												
2	AMC 28					1(3)								
3	AMC 28										1(1)			

Sepcies Code	Common Name	Scientific Name
NOAM	No Amphibians	
FOTO	Folwers Toad	<i>Anaxyrus fowleri</i>
GRTR	Gray Tree Frog	<i>Hyla versicolor</i>
SPPE	Spring Peeper	<i>Pseudacris crucifer</i>
CHFR	Chorus Frog	<i>Pseudacris triseriata</i>
WOFR	Wood Frog	<i>Lithobates sylvatica</i>
NLFR	Northern Leopard Frog	
PIFR	Pickereel Frog	<i>Lithobates pipiens</i>
GRFR	Green Frog	<i>Lithobates palustris</i>
BULL	Bullfrog	<i>Lithobates clamitans</i>
MIFR	Mink Frog	<i>Lithobates catesbeiana</i> <i>Lithobates septentrionalis</i>

**Amphibian Call Codes**  
x = No amphibians heard  
2 = Calls overlap but can be reliably estimated  
3 = Calls overlap too much to estimate number

**Reference**

Bird Studies Canada (BSC). 2003. Marsh Monitoring Program training kit and instructions for surveying marsh birds, amphibians and their habitats. Long Point Bird Observatory and Environment Canada, 41 pp.

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SAVANTA INC.  
TABLE 7: WILDLIFE LIST

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterloo	Source	Area Sensitive Reference
River Jewelfwing	<i>Calopteryx aequabilis</i>	S5	G5				HU					
Ebony Jewelfwing	<i>Calopteryx maculata</i>	S5	G5									
American Rubyspot	<i>Hetaerina americana</i>	S4	G5				HR					
Smoky Rubyspot	<i>Hetaerina titia</i>	S2	G5									
Spotted Spreadwing	<i>Lestes congener</i>	S5	G5				HU					
Amber-winged Spreadwing	<i>Lestes aurinus</i>	S3	G4				HR					
Sweetflag Spreadwing	<i>Lestes forcipatus</i>	S4	G5									
Elegant Spreadwing	<i>Lestes inaequalis</i>	S4	G5									
Lyre-tipped Spreadwing	<i>Lestes rectangularis</i>	S5	G5				HU					
Swamp Spreadwing	<i>Lestes unguiculatus</i>	S4	G5									
Eastern Red Damself	<i>Lestes vigilax</i>	S4	G5				HR					
Blue-fronted Dancer	<i>Argia apicalis</i>	S4	G5				HR					
Violet Dancer	<i>Argia fumipennis violacea</i>	S5	G5T5				HU					
Powdered Dancer	<i>Argia moesta</i>	S5	G5				HR					
Blue-ringed Dancer	<i>Argia sedula</i>	S2	G5				HR					
Blue-tipped Dancer	<i>Argia tibialis</i>	S3	G5									
Dusky Dancer	<i>Argia translata</i>	S2	G5				HR					
Aurora Damself	<i>Chromagrion conditum</i>	S5	G5									
Prairie Bluet	<i>Coenagrion angulatum</i>	SH	G5									
Subarctic Bluet	<i>Coenagrion interrogatum</i>	S4	G5									
Taiga Bluet	<i>Coenagrion resolutum</i>	S5	G5				HR					
River Bluet	<i>Enallagma arna</i>	S2	G5									
Rainbow Bluet	<i>Enallagma antennatum</i>	S4	G5				HR					
Azure Bluet	<i>Enallagma aspersum</i>	S3	G5				HR					
Double-striped Bluet	<i>Enallagma boreale</i>	S3	G5									
Boreal Bluet	<i>Enallagma boreale</i>	S5	G5				HR					
Tule Bluet	<i>Enallagma carunculatum</i>	S5	G5				HR					
Familiar Bluet	<i>Enallagma civile</i>	S5	G5									
Alkali Bluet	<i>Enallagma clausum</i>	S1	G5									
Spring Northern Bluet	<i>Enallagma vernale</i>	S4	G4									
Stream Bluet	<i>Enallagma exulans</i>	S5	G5				HR					
Skimming Bluet	<i>Enallagma geminatum</i>	S4	G5				HR					
Hagen's Bluet	<i>Enallagma hageni</i>	S5	G5				HR					
Orange Bluet	<i>Enallagma signatum</i>	S4	G5				HR					
Vesper Bluet	<i>Enallagma triviatum westfalli</i>	S1	G5									
Citrine Forktail	<i>Ischnura vesperum</i>	S4	G4									
Fragile Forktail	<i>Ischnura hastata</i>	SNA	G5									
Mosaic Darner	<i>Mehalleria gracilis</i>	S4	G5				HR					
Canoe Darner	<i>Aeshna sp.</i>											
Mottled Darner	<i>Aeshna canadensis</i>	S5	G5				HU					
Lance-tipped Darner	<i>Aeshna clepsydra</i>	S3	G4									
Lake Darner	<i>Aeshna stricta</i>	S5	G5									
Variable (Interrupted) Darner	<i>Aeshna eremita</i>	S5	G5				HR					
Variable (Lineate) Darner	<i>Aeshna interrupta interrupta</i> <i>Aeshna interrupta lineata</i>	S2	G5T5									

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterfloo	Source	Area Sensitive Reference
Sedge Darter	<i>Aeshna juncea</i>	S3?	G5									
Spatterdock Darter	<i>Aeshna mutata</i>	S1	G4									
Azure Darter	<i>Aeshna septentrionalis</i>	S1S3	G5									
Zigzag Darter	<i>Aeshna sitchensis</i>	S4	G5									
Subarctic Darter	<i>Aeshna subarctica</i>	S2S3	G5									
Black-Tipped Darter	<i>Aeshna tuberculifera</i>	S4	G4									
Shadow Darter	<i>Aeshna umbrosa</i>	S5	G5				HU					
Green-striped Darter	<i>Aeshna verticalis</i>	S3	G5				HR					
Common Green Darter	<i>Anax junius</i>	S5	G5									
Comet Darter	<i>Anax longipes</i>	SNA	G5									
Springtime Darter	<i>Baetiscaenia janata</i>	S5	G5				HR					
Ocellated Darter	<i>Boyeria grafiana</i>	S4	G5									
Fawn Darter	<i>Boyeria vinosa</i>	S5	G5				HR					
Swamp Darter	<i>Epireschna heros</i>	S2S3	G5				HR					
Harlequin Darter	<i>Gomphaeschna fuscillata</i>	S3	G5									
Cyano Darter	<i>Nesiaeschna pentacantha</i>	S3	G5									
Horned Clubtail	<i>Argemphus cornutus</i>	S3	G4									
Lilypad Clubtail	<i>Argemphus furcifer</i>	S3	G5				HR					
Unicorn Clubtail	<i>Argemphus villosipes</i>	S2S3	G5				HU					
Black-shouldered Spinyleg	<i>Dromogomphus spinosus</i>	S5	G5									
Flag-tailed Spinyleg	<i>Dromogomphus spoliatus</i>	S1	G4G5									
Moustached Clubtail	<i>Gomphus adelphus</i>	S4	G4									
Beaverpond Clubtail	<i>Gomphus borealis</i>	S3	G4									
Harpoon Clubtail	<i>Gomphus descriptus</i>	S3	G4									
Lancet Clubtail	<i>Gomphus exilis</i>	S5	G5				HU					
Midland Clubtail	<i>Gomphus fraternus</i>	S4	G5				HR					
Pronghorn Clubtail	<i>Gomphus graslinellus</i>	S3	G5				HR					
Ashy Clubtail	<i>Gomphus lividus</i>	S4	G5				HR					
Rapids Clubtail	<i>Gomphus quadricolor</i>	S1	G3G4	END	END							
Dusky Clubtail	<i>Gomphus spicatus</i>	S5	G5				HU					
Cobra Clubtail	<i>Gomphus vastus</i>	S1	G5									
Skillet Clubtail	<i>Gomphus ventricosus</i>	SH	G3									
Green-faced Clubtail	<i>Gomphus viridifrons</i>	S1	G3G4									
Dragonhunter	<i>Hagenius brevistylus</i>	S5	G5									
Extra-striped Snaketail	<i>Ophiogomphus anomalus</i>	S3	G4									
Rifle Snaketail	<i>Ophiogomphus carolus</i>	S2S3	G5									
Boreal Snaketail	<i>Ophiogomphus colubrinus</i>	S4	G5									
Maine Snaketail	<i>Ophiogomphus malinensis</i>	S1	G4									
Rusty Snaketail	<i>Ophiogomphus rupinulensis</i>	S4	G5					HR				
Pygmy Snaketail	<i>Ophiogomphus howei</i>	S1	G3	END	SC							
Common Sanddragon	<i>Progomphus obscurus</i>	S1	G5									
Eastern Least Clubtail	<i>Stylogomphus albistylus</i>	S4	G5									
Riverine Clubtail	<i>Stylurus amnicola</i>	S1	G4	END	END							
Laura's Clubtail	<i>Stylurus laurae</i>	S1	G4	END	END							
Elusive Clubtail	<i>Stylurus notatus</i>	S2	G3									
Russet-tipped Clubtail	<i>Stylurus plagiatus</i>	SH	G5									
Zebra Clubtail	<i>Stylurus scudderii</i>	S4	G4									

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterfloo	Source	Area Sensitive Reference
Arrow Clubtail	<i>Stylurus spiniceps</i>	S2	G5									
Delta-spotted Spiketail	<i>Cordulegaster diastatops</i>	S4	G5				HR					
Twin-spotted Spiketail	<i>Cordulegaster maculata</i>	S4	G5				HR					
Arrowhead Spiketail	<i>Cordulegaster obliqua</i>	S1	G4									
Stream Cruiser	<i>Didymops transversa</i>	S4	G5									
Illinois River Cruiser	<i>Macromia illinoensis</i>	S4	G5									
American Emerald	<i>Macromia taeniolata</i>	S1	G5									
Racket-tailed Emerald	<i>Cordulia shurtzeffi</i>	S5	G5									
Beaverpond baskettail	<i>Dorocordulia libera</i>	S5	G5									
Common Baskettail	<i>Epitheca canis</i>	S5	G5				HU					
Prince Baskettail	<i>Epitheca cynosura</i>	S5	G5				HU					
Spiny Baskettail	<i>Epitheca princeps</i>	S5	G5				HR					
Uhler's Sundragon	<i>Epitheca spinigera</i>	S5	G5				HR					
Stygian Shadowdragon	<i>Helocordulia uhleri</i>	S3	G5									
Ringed Emerald	<i>Neurocordulia yamaskanensis</i>	S4	G5									
Lake Emerald	<i>Somatochlora albicincta</i>	S4?	G5									
Ski-tailed Emerald	<i>Somatochlora cingulata</i>	S4	G5									
Plains Emerald	<i>Somatochlora elongata</i>	S3?	G5									
Hine's Emerald	<i>Somatochlora ensigera</i>	S1	G4									
Forcipate Emerald	<i>Somatochlora hiireana</i>	S1	G2G3	END								
Delicate Emerald	<i>Somatochlora forcipata</i>	S3	G5									
Hudsonian Emerald	<i>Somatochlora franklini</i>	S4	G5									
Incurvate Emerald	<i>Somatochlora hudsonica</i>	S2S3	G5									
Kennedy's Emerald	<i>Somatochlora incurvata</i>	S1	G4									
Mocha Emerald	<i>Somatochlora kennedyi</i>	S4	G5									
Ocellated Emerald	<i>Somatochlora linearis</i>	S1	G5									
Muskeg Emerald	<i>Somatochlora minor</i>	S4	G5									
Clamp-tipped Emerald	<i>Somatochlora septentrionalis</i>	S2S3	G5									
Brush-tipped Emerald	<i>Somatochlora tenebrosa</i>	S2S3	G5				HR					
Whitehouse's Emerald	<i>Somatochlora walshii</i>	S4	G5				HU					
Williamson's Emerald	<i>Somatochlora whitehousei</i>	S2S3	G5									
Ebony Boghaunter	<i>Somatochlora williamsoni</i>	S4	G5									
Calico Pennant	<i>Williamsonia fletcheri</i>	S2	G4									
Halloween Pennant	<i>Celithemis elisa</i>	S5	G5									
Banded Pennant	<i>Celithemis eponina</i>	S4	G5				HR					
Eastern Pondhawk	<i>Celithemis fasciata</i>	SNA	G5									
Chalk-fronted Corporal	<i>Erythemis simplicicollis</i>	S5	G5									
Boreal Whiteface	<i>Ladona julia</i>	S5	G5									
Frosted Whiteface	<i>Leucorrhinia borealis</i>	S1S3	G5									
Crimson-ringed Whiteface	<i>Leucorrhinia frigida</i>	S5	G5									
Hudsonian Whiteface	<i>Leucorrhinia glacialis</i>	S4	G5									
Dot-tailed Whiteface	<i>Leucorrhinia hudsonica</i>	S5	G5									
Canada Whiteface	<i>Leucorrhinia intacta</i>	S5	G5									
Red-waisted Whiteface	<i>Leucorrhinia patricia</i>	S2S3	G4									
Slaty Skimmer	<i>Leucorrhinia proxima</i>	S5	G5				HR					
Four-spotted Skimmer	<i>Libellula incesta</i>	S4	G5				HR					
	<i>Libellula quadrimaculata</i>	S5	G5									

TABLE 7: WILDLIFE LIST

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterloo	Source	Area Sensitive Reference
Painted Skimmer	<i>Libellula semifasciata</i>	S2	G5				HR					
Great Blue Skimmer	<i>Libellula vibrans</i>	S1	G5									
Elfin Skimmer	<i>Nannothemis bella</i>	S4	G4									
Blue Dasher	<i>Pachydiplax longipennis</i>	S5	G5									
Wandering Glider	<i>Pantala flavescens</i>	S4	G5				HR					
Spot-winged Glider	<i>Pantala hymenaea</i>	S4	G5				HR					
Eastern Amberwing	<i>Perithemis tenera</i>	S4	G5				HU					
Common Whitetail	<i>Plathemis lydia</i>	S5	G5									
Blue-faced Meadowhawk	<i>Sympetrum ambiguum</i>	SNA	G5									
Variegated Meadowhawk	<i>Sympetrum corruptum</i>	S3	G5									
Saffron-bordered Meadowhawk	<i>Sympetrum costiferum</i>	S4	G5				HR					
Black Meadowhawk	<i>Sympetrum danae</i>	S4	G5									
Cherry-faced Meadowhawk	<i>Sympetrum internum</i>	S5	G5									
Ruby Meadowhawk	<i>Sympetrum rubicundulum</i>	S5	G5									
Band-winged Meadowhawk	<i>Sympetrum semicinctum</i>	S4	G5				HU					
Yellow-legged Meadowhawk	<i>Sympetrum vicinum</i>	S5	G5				HU					
Carolina Saddlebags	<i>Tramea carolina</i>	SNA	G5									
Black Saddlebags	<i>Tramea lacerata</i>	S4	G5									
Red Saddlebags	<i>Tramea onusta</i>	SNA	G5									
<b>BUTTERFLIES</b>												
Silver Spotted Skipper	<i>Epargyreus clarus</i>	S4	G5					m				
Southern Cloudwings	<i>Thorybes bathyllus</i>	S3	G5									
Northern Cloudwings	<i>Thorybes pylades</i>	S5	G5				H					
Dreamy Duskywing	<i>Erynnis icelus</i>	S5	G5					m				
Sleepy Duskywing	<i>Erynnis bizo</i>	S1	G5									
Juvenal's Duskywing	<i>Erynnis juvenalis</i>	S5	G5									
Mottled Duskywing	<i>Erynnis martialis</i>	S2	G3	END	END		HR	H				
Columbine Duskywing	<i>Erynnis lucilius</i>	S4	G4				HR	m				
Wild Indigo Duskywing	<i>Erynnis baptisiae</i>	S4	G5									
Common Sooty Wing	<i>Pholisora catullus</i>	S3	G5				HR	m				
Arctic Skipper	<i>Cartorocephalus palaemon</i>	S5	G5					H				
Least Skipper	<i>Ancyloxypha numitor</i>	S5	G5									
Leonard's Skipper	<i>Hesperia leonardus</i>	S4	G4				HR	H				
Indian Skipper	<i>Hesperia sassacus</i>	S4	G5				HR					
Peck's Skipper	<i>Polites peckius</i>	S5	G5									
Tawny-edged Skipper	<i>Polites themistocles</i>	S5	G5									
Crossline Skipper	<i>Polites origenes</i>	S4	G5									
Long Dash Skipper	<i>Polites mystic</i>	S5	G5									
Northern Broken-Dash	<i>Wallengrenia egermet</i>	S5	G5									
Little Glasswing	<i>Pompeilus verna</i>	S4	G5									
Delaware Skipper	<i>Anatrytone logan</i>	S4	G5									
Mulberry Wing	<i>Poanes massasoit</i>	S4	G4				HR	H				
Hobomok Skipper	<i>Poanes hobomok</i>	S5	G5									
Broad-winged Skipper	<i>Poanes viator</i>	S4	G5				HU					
Black Dash	<i>Euphyes conspicua</i>	S3	G4				HR	m				
Dion Skipper	<i>Euphyes dion</i>	S3	G4				HU	m				

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TABLE 7: WILDLIFE LIST

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterloo	Source	Area Sensitive Reference
Two-spotted Skipper	<i>Euphyes bimaculata</i>	S4	G4				HR	H				
Dun Skipper	<i>Euphyes vestris</i>	S5	G5									
Roadside Skipper	<i>Amblyscirtes vialis</i>	S4	G5				HR					
Pipe Vine Swallowtail	<i>Battus philenor</i>	SNA	G5				HR	H				
Black Swallowtail	<i>Papilio polyxenes</i>	S5	G5				HR					
Giant Swallowtail	<i>Papilio cresphontes</i>	S3	G5					m				
Canadian Tiger Swallowtail	<i>Papilio canadensis</i>	S5	G5									
Eastern Tiger Swallowtail	<i>Papilio glaucus</i>	S5	G5									
Spicebush Swallowtail	<i>Pterourus troilus</i>	S4	G5				HR	H				
Mustard White	<i>Pieris oleracea</i>	S4	G4G5					m				
West Virginia White	<i>Pieris virginianensis</i>	S3	G3G4					m				
Cabbage White	<i>Pieris rapae</i>	SNA	G5									
Large Marble	<i>Euchloe ausonides</i>	S3	G5									
Olympia Marble	<i>Euchloe olympia</i>	S4	G4G5									
Clouded Sulphur	<i>Colias philodice</i>	S5	G5									
Orange Sulphur	<i>Colias eurytheme</i>	S5	G5									
Pink-edged Sulphur	<i>Colias interior</i>	S5	G5				HR	H				
Harvester	<i>Fenitsea tarquinius</i>	S4	G4					m				
American Copper	<i>Lycæna phlaeas</i>	S5	G5				HR	H				
Bronze Copper	<i>Lycæna hylus</i>	S5	G5				HU	m				
Bog Copper	<i>Epidemia epixanthe</i>	S4S5	G4G5				HU	H				
Dorcus Copper	<i>Lycæna dorcas</i>	S5	G5									
Purplish Copper	<i>Lycæna helioides</i>	S3	G5									
Coral Hairstreak	<i>Harknellenus titus</i>	S5	G5				HU	m				
Acadian Hairstreak	<i>Satyrium acadicum</i>	S4	G5				HU					
Edward's Hairstreak	<i>Satyrium edwardsii</i>	S4	G4				HR	H				
Banded Hairstreak	<i>Satyrium calanus</i>	S4	G5									
Hickory Hairstreak	<i>Satyrium caryaevorum</i>	S3	G4					m				
Striped Hairstreak	<i>Satyrium liparops</i>	S5	G5									
Brown Elfin	<i>Callophrys augustinus</i>	S5	G5									
Hoary Elfin	<i>Callophrys polios</i>	S4	G5									
Henry's Elfin	<i>Incisalia henrici</i>	S4	G5									
Eastern Pine Elfin	<i>Callophrys niphon</i>	S5	G5				HU	H				
Eastern Tailed Blue	<i>Everes comyntes</i>	S5	G5									
Spring Azure	<i>Celastrina ladon</i>	S5	G5									
Silvery Blue	<i>Glaucopsyche lygdamus</i>	S5	G5					H				
Great Spangled Fritillary	<i>Speyeria cybele</i>	S5	G5									
Aphrodite Fritillary	<i>Speyeria aphrodite</i>	S5	G5				HU	m				
Atlantis Fritillary	<i>Speyeria atlantis</i>	S5	G5									
Silver-bordered Fritillary	<i>Boloria selene</i>	S5	G5				HU	m				
Meadow Fritillary	<i>Boloria bellona</i>	S5	G5				HU					
Silvery Checkerspot	<i>Chlosyne nycteis</i>	S5	G5				HU					
Harris' Checkerspot	<i>Chlosyne harrisii</i>	S4	G4									
Tawny Crescent	<i>Phycodes batellii</i>	S4	G4				HR					
Baltimore Checkerspot	<i>Euphydryas phaeton</i>	S4	G4				HU	m				
Question Mark	<i>Polygonia interrogationis</i>	S5	G5									
Eastern Comma	<i>Polygonia comma</i>	S5	G5									

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TABLE 7: WILDLIFE LIST

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterfloo	Source	Area Sensitive Reference
Green Comma	<i>Polygona faunus</i>	S4	G5					H				
Grey Comma	<i>Polygona progné</i>	S5	G4G5				HR	m				
Compton Tortoiseshell	<i>Nymphalis vaualbum</i>	S5	G5				HU	m				
Mourning Cloak	<i>Nymphalis antiopa</i>	S5	G5									
Milbert's Tortoiseshell	<i>Nymphalis milberti</i>	S5	G5				HR	H				
American Lady	<i>Vanessa virginiensis</i>	S5	G5									
Painted Lady	<i>Vanessa cardui</i>	S5	G5				HR					
Red Admiral	<i>Vanessa atalanta</i>	S5	G5									
White Admiral	<i>Limenitis arthemis</i>	S5	G5					m				
Red-spotted Purple	<i>Limenitis arthemis astyanax</i>	S5	G5T5				HR	H				
Common Buckeye	<i>Junonia coenia</i>	SNA	G5									
Viceroy	<i>Limenitis archippus</i>	S5	G5									
Hackberry Emperor	<i>Asterocampa celtis</i>	S2	G5									
Tawny Emperor	<i>Asterocampa clyton</i>	S2S3	G5				HR					
Eyed Brown	<i>Satyrodes eurydice</i>	S5	G4									
Appalachian Brown	<i>Satyrodes appalachia</i>	S4	G4									
Common Wood-Nymph	<i>Ceryxotis pegala</i>	S5	G5									
Chryxus Arctic	<i>Oeneis chryxus</i>	S5	G5									
Jutta Arctic	<i>Oeneis jutta</i>	S4	G5									
Monarch	<i>Danaus plexippus</i>	S4B, S2N	G5	SC								
<b>OTHER ARTHROPODS</b>												
Bogbean Buckmoth	<i>Hemileuca sp.</i>	S1	GIQ	END								
Polyphemus Moth	<i>Antheraea polyphemus</i>	S5	G5									
Aweme Borer Moth	<i>Papaipema aweme</i>	S1	GIQ	END								
Rusty-Patch Bumble Bee	<i>Bombus affinis</i>	S1	GU	END								
Northern Barrens Tiger Beetle	<i>Cicindela patruela</i>	S1	G3	END								
Hungerford's Crawling Water Beetle	<i>Brychius hungerfordi</i>	S1	G1	END								
Digger Crayfish	<i>Fallicambarus fodiens</i>	S4	G5									
Meadow Crayfish	<i>Cambarus diogenes</i>	S3	G5									
<b>AMPHIBIANS</b>												
Mudpuppy	<i>Necturus maculosus</i>	S4	G5			10	HR	H	L2			
Red-spotted Newt	<i>Notophthalmus viridescens</i>	S5	G5T5					m	L1			
Blue-spotted Salamander	<i>Ambystoma laterale</i>	S4	G5				HR	m	L1			
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	S2	G5	END			HU	H	L1			
Spotted Salamander	<i>Ambystoma maculatum</i>	S4	G5				HU	m	L1			
Small-mouthed Salamander	<i>Ambystoma texanum</i>	S1	G5									
Northern Two-lined Salamander	<i>Eurycea bislineata</i>	S4	G5									
Four-toed Salamander	<i>Hemidactylum scutatum</i>	S4	G5				HR	H	L2			
Northern Redback Salamander	<i>Plethodon cinereus</i>	S5	G5									
Fowler's Toad	<i>Anaxyrus fowleri</i>	S2	G5	END								
Gray Treefrog	<i>Hyla versicolor</i>	S5	G5						L2			
Western Chorus Frog (great lakes - shield)	<i>Pseudacris triseriata</i>	S3	G5	THR					L2			

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Western Chorus Frog (carolinian)	<i>Pseudacris triseriata</i>	S4	G5						L2			
Spring Peeper	<i>Pseudacris crucifer</i>	S5	G5						L2			
American Bullfrog	<i>Lithobates catesbeiana</i>	S4	G5			1	HU	m	L1			
Pickrel Frog	<i>Lithobates palustris</i>	S4	G5				HU	H	L2			
Mink Frog	<i>Lithobates septentrionalis</i>	S5	G5						L2			
Northern Dusky Salamander	<i>Desmognathus fuscus</i>	S1	G5									
<b>REPTILES</b>												
Snapping Turtle	<i>Chelydra serpentina</i>	S3	G5	SC					L3			
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	S3	G5	SC			HR	H	L2			
Midland Painted Turtle	<i>Chrysemys picta marginata</i>	S5	G5T5									
Pond Slider	<i>Trachemys scripta</i>	SNA	G5									
Northern Map Turtle	<i>Graptemys geographica</i>	S3	G5	SC		30-50	HR	H				
Blanding's Turtle	<i>Emydoidea blandingi</i>	S3	G4	THR			HR	H	L2			
Wood Turtle	<i>Glyptemys insculpta</i>	S2	G4	END		25	THR					
Spotted Turtle	<i>Clemmys guttata</i>	S3	G5	END								
Eastern Spiny Softshell	<i>Apalone spinifera spinifera</i>	S3	G5	THR			HR	H				
Five-lined Skink (south shield)	<i>Eumeces fasciatus</i>	S3	G5	SC								
Five-lined Skink (carolinian)	<i>Eumeces fasciatus</i>	S2	G5	END								
Blue Racer	<i>Coluber constrictor flaviventris</i>	S1	G5T5	END								
Eastern Gartersnake	<i>Thamnophis sirtalis</i>	S5	G5									
Butler's Gartersnake	<i>Thamnophis butleri</i>	S2	G4									
Eastern Ribbon Snake	<i>Thamnophis sauritus</i>	S3	G5	SC			HR	H	L2			
Common Watersnake	<i>Nerodia sipedon sipedon</i>	S5	G5T5			1	HU	m	L2			
Lake Erie Watersnake	<i>Nerodia sipedon insularum</i>	S2	G5T2	END								
Queen Snake	<i>Regina septemvittata</i>	S2	G5	END								
Northern Red-Bellied Snake	<i>Storeria occipitomaculata</i>	S5	G5					m	L3			
Dekay's Brownsnake	<i>Storeria dekayi</i>	S5	G5									
Smooth Greensnake	<i>Ophedrys vernalis</i>	S4	G5				HR	m	L3			
Ring-necked Snake	<i>Diadophis punctatus</i>	S4	G5				HR	H	L2			
Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>	S3	G5	THR		5	THR					
Gray Ratsnake (Frontenac)	<i>Pantherophis spiloides</i>	S3	G5T5	THR			THR					
Gray Ratsnake (carolinian)	<i>Pantherophis spiloides</i>	S1	G5T5	END								
Eastern Foxsnake (Georgian Bay)	<i>Pantherophis gloydi</i>	S1	G3	THR								
Eastern Foxsnake (carolinian)	<i>Pantherophis gloydi</i>	S1	G3	THR								
Eastern Milksnake	<i>Lampropeltis triangulum</i>	S3	G5	SC					L3			
Eastern Massasauga (Great Lakes/ St)	<i>Sistrurus catenatus</i>	S1	G3G4T3	THR								
Eastern Massasauga (Carolinian)	<i>Sistrurus catenatus</i>	S1	G3G4T4	END								
Timber Rattlesnake	<i>Crotalus horridus</i>	SX	G4									
<b>BIRDS</b>												
Greater White-fronted Goose	<i>Anser albifrons</i>											
Snow Goose	<i>Chen caerulescens</i>	S5B	S5									

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Ross's Goose	<i>Chen rossii</i>											
Brant	<i>Branta bernicla</i>											
Mute Swan	<i>Cygnus olor</i>	SNA	G5				HU					
Tundra Swan	<i>Cygnus columbianus</i>	S4	G5									
Gadwall	<i>Anas strepera</i>	S4	G5				HU	H		X		
American Wigeon	<i>Anas americana</i>	S4	G5				HU	H		X		
Blue-winged Teal	<i>Anas discors</i>	S4	G5				HU	H	L2			
Northern Shoveler	<i>Anas clypeata</i>	S4	G5				H	H		X		
Northern Pintail	<i>Anas acuta</i>	S5	G5				H	H		X		
Green-winged Teal	<i>Anas crecca</i>	S4	G5				H	H	L3	X		
Canvasback	<i>Aythya valisineria</i>											
Redhead	<i>Aythya americana</i>	S2B, S4N	G5				H	H	L3			
Ring-necked Duck	<i>Aythya collaris</i>	S5	G5							X		
Greater Scaup	<i>Aythya marila</i>	S4	G5									
Lesser Scaup	<i>Aythya affinis</i>	S4	G5									
Surf Scoter	<i>Melanitta perspicillata</i>											
White-winged Scoter	<i>Melanitta fusca</i>											
Black Scoter	<i>Melanitta americana</i>											
Long-tailed Duck	<i>Clangula hyemalis</i>	S4	G5									
Bufflehead	<i>Bucephala albeola</i>	S5	G5									
Common Goldeneye	<i>Bucephala clangula</i>											
Barrow's Goldeneye	<i>Bucephala islandica</i>											
Common Merganser	<i>Mergus merganser</i>	S5B, S5N	G5							X		
Red-breasted Merganser	<i>Mergus serrator</i>	S4B, S5N	G5				HU					
Ruddy Duck	<i>Oxyura jamaicensis</i>	S4B, S4N	G5		10							
Gray Partridge	<i>Perdix perdix</i>	SNA	G5				HR					
Ring-necked Pheasant	<i>Phasianus colchicus</i>	SNA	G5									
Ruffed Grouse	<i>Bonasa umbellus</i>	S4	G5		20			m	L3			Sandilands 2005
Spruce Grouse	<i>Falco peregrinus canadensis</i>											
Northern Bobwhite	<i>Colinus virginianus</i>	S1	G5	END	END					X		
Common Loon	<i>Gavia immer</i>	S5B, S5N	G5		70					X		
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	S5B	G5		20				L3			Sandilands 2005
American Bittern	<i>Botaurus lentiginosus</i>	S4B	G4		10		HR	H	L2	X		
Least Bittern	<i>Ixobrychus exilis</i>	S4B	G5	THR	THR		HR	H	L2	X		
Great Blue Heron	<i>Ardea herodias</i>	S4	G5					m	L3	X		
Great Egret	<i>Ardea alba</i>	S2B	G5									
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	S3B, S3N	G5				HU	H	L3	X		
American White Pelican	<i>Pelecanus erythrorhynchos</i>	S2B	G4	THR								
Osprey	<i>Pandion haliaetus</i>	S5B	G5				HR	H	L3	X		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S4B, S2N	G4	SC								
Northern Harrier	<i>Circus cyaneus</i>	S4B	G5			55	HU	H	L3	X		Sandilands 2005
Sharp-shinned Hawk	<i>Accipiter striatus</i>	S5	G5		20-30		HU	H	L3	X		Sandilands 2005
Northern Goshawk	<i>Accipiter gentilis</i>	S4	G5		100		HU	H	L2	X		Sandilands 2005
Red-shouldered Hawk	<i>Buteo lineatus</i>	S4B	G5		50-70		HR	H	L2	X		Sandilands 2005

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Broad-winged Hawk	<i>Buteo platypterus</i>	S5B	G5			100	HR	H	L2	X		Sandilands 2005
Red-tailed Hawk	<i>Buteo jamaicensis</i>	S5	G5									
Rough-legged Hawk	<i>Buteo lagopus</i>	S1B, S4N	G5									
Golden Eagle	<i>Aquila chrysaetos</i>	S2B	G5	END	NAR							
Yellow Rail	<i>Coturnicops noveboracensis</i>	S4B	G4	SC	SC				L2			
King Rail	<i>Rallus elegans</i>	S2B	G4G5	END	END	100						
Virginia Rail	<i>Rallus limicola</i>	S5B	G5					m	L3	X		
Sora	<i>Porzana carolina</i>	S4B	G5				HU	m	L3	X		
Common Gallinule	<i>Gallinula galeata</i>	S4B	G5				HR	H	L3	X		
American Coot	<i>Fulica americana</i>	S4B	G5			50			L3	X		
Black-bellied Plover	<i>Pluvialis squatarola</i>	S4N	G5							X		
American Golden-Plover	<i>Pluvialis dominica</i>											
Semipalmated Plover	<i>Charadrius semipalmatus</i>											
Piping Plover	<i>Charadrius melodus</i>	S1B	G3	END	END							
Solitary Sandpiper	<i>Tringa solitaria</i>	S4B	G5									
Greater Yellowlegs	<i>Tringa melanoleuca</i>	S4B, S4N	G5									
Lesser Yellowlegs	<i>Tringa flavipes</i>	S4B, S4N	G5									
Upland Sandpiper	<i>Bartramia longicauda</i>	S4B	G5			25	HR		L3	X		
Whimbrel	<i>Numenius phaeopus</i>											
Hudsonian Godwit	<i>Limosa haemastica</i>											
Marbled Godwit	<i>Limosa fedoa</i>											
Ruddy Turnstone	<i>Arenaria interpres</i>											
Red Knot	<i>Calidris canutus (rufa)</i>	S1N	G4T2	END	END							
Sanderling	<i>Calidris alba</i>	S5N	G5									
Semipalmated Sandpiper	<i>Calidris pusilla</i>											
Least Sandpiper	<i>Calidris minutilla</i>											
White-rumped Sandpiper	<i>Calidris fuscicollis</i>											
Baird's Sandpiper	<i>Calidris bairdii</i>											
Pectoral Sandpiper	<i>Calidris melanotos</i>											
Purple Sandpiper	<i>Calidris maritima</i>											
Dunlin	<i>Calidris alpina</i>	S4B, S5N	G5									
Stilt Sandpiper	<i>Calidris himantopus</i>											
Short-billed Dowitcher	<i>Limnodromus griseus</i>											
Wilson's Snipe	<i>Gallinago delicata</i>	S5B	G5				HU	H		X		
American Woodcock	<i>Scolopax minor</i>	S4B	G5						L3			
Wilson's Phalarope	<i>Phalaropus tricolor</i>	S3B	G5									
Red-necked Phalarope	<i>Phalaropus lobatus</i>											
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	S4B, S4N	G5									
Little Gull	<i>Hydrocoleus minutus</i>											
Herring Gull	<i>Larus argentatus</i>	S5B, S5N	G5					m	L3			
Iceland Gull	<i>Larus glaucooides</i>											
Lesser Black-backed Gull	<i>Larus fuscus</i>											
Glaucous Gull	<i>Larus hyperboreus</i>	S4N	G5									
Great Black-backed Gull	<i>Larus marinus</i>	S2B	G5				H					
Caspian Tern	<i>Hydroprogne caspia</i>	S3B	G5				m		L3			

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Black Tern	<i>Chlidonias niger</i>	S3B	G4	SC		20			L2	X		Dunn and Agro, 1995
Common Tern	<i>Sterna hirundo</i>	S4B	G5					m	L3			
Forster's Tern	<i>Sterna forsteri</i>	S2B	G5			300						
Rock Pigeon	<i>Columba livia</i>	SNA	G5									
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	S4B	G5				HR	H	L3	X		
Barn Owl	<i>Tyto alba</i>	S1	G5	END	END							
Eastern Screech-Owl	<i>Megascops asio</i>	S4	G5					m				
Great Horned Owl	<i>Bubo virginianus</i>	S4	G5					m				
Snowy Owl	<i>Bubo scandiacus</i>	SNA	G5									
Barred Owl	<i>Strix varia</i>	S5	G5			100			L2	X		
Long-eared Owl	<i>Asio otus</i>	S4	G5				HR	H	L3	X		
Short-eared Owl	<i>Asio flammeus</i>	S2N, S4B	G5	SC	SC	75		H	L3	X		
Boreal Owl	<i>Aegolius funereus</i>	S4	G5									
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	S4	G5					H	L3	X		
Common Nighthawk	<i>Chordeiles minor</i>	S4B	G5	SC	THR		HR	H	L3	X		
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	S4B	G5	THR	THR	100	HR	H	L2	X		
Chimney Swift	<i>Chaetura pelagica</i>	S4B, S4N	G5	THR	THR		HU	m				
Belted Kingfisher	<i>Megasceryle alcyon</i>	S4B	G5				HR	H	L3	X		
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	S4B	G5	SC	THR		HR	H	L3	X		
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	S5B	G5			30-50	HU	H	L3	X		
Black-backed Woodpecker	<i>Picoides arcticus</i>	S4	G5									
American Kestrel	<i>Falco sparverius</i>	S4	G5					m				
Merlin	<i>Falco columbarius</i>	S5B	G5				HU					
Peregrine Falcon	<i>Falco peregrinus</i>	S3B	G4	SC	SC			H				
Olive-sided Flycatcher	<i>Contopus cooperi</i>	S4B	G5	SC	THR							
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	S5B	G5						L2			
Acadian Flycatcher	<i>Empidonax virescens</i>	S2S3B	G5	END	END	30-36	H	H	L3	X		Austen 1994, Page and C
Alder Flycatcher	<i>Empidonax alnorum</i>	S5B	G5					m		X		
Least Flycatcher	<i>Empidonax minimus</i>	S4B	G5				HU	m	L3	X		
Loggerhead Shrike	<i>Lanius ludovicianus</i>	S2B	G5	END	END	25	HR	m	L2	X		
Northern Shrike	<i>Lanius excubitor</i>	SNA	G5									
White-eyed Vireo	<i>Vireo griseus</i>	S2B	G5									
Yellow-throated Vireo	<i>Vireo flavifrons</i>	S4B	G5			30	HR	m	L3	X		
Blue-headed Vireo	<i>Vireo solitarius</i>	S5B	G5			100	HU	H	L3	X		
Philadelphia Vireo	<i>Vireo philadelphicus</i>	S5B	G5									
Gray Jay	<i>Perisoreus canadensis</i>	S5	G5									
Horned Lark	<i>Eremophila alpestris</i>	S4B	G5				HU					
Purple Martin	<i>Progne subis</i>	S4B	G5				HU	m		X		
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	S4B	G5					m				
Boreal Chickadee	<i>Poecile hudsonicus</i>	S5	G5									
Tufted Titmouse	<i>Baeolophus bicolor</i>	S4	G5				HU	H		X		
Carolina Wren	<i>Troglodytes ludovicianus</i>	S4	G5				HR	H		X		
Winter Wren	<i>Troglodytes hiemalis</i>	S5B	G5			30	HU	m	L3	X		Hejl et al. 2002
Sedge Wren	<i>Cistothorus platensis</i>	S4B	G5				HU	H	L3	X		
Marsh Wren	<i>Cistothorus palustris</i>	S4B	G5					H	L2	X		

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Blue-gray Gnatcatcher	<i>Poliophtia caerulea</i>	S4B	G5			30	HU	m		X		
Golden-crowned Kinglet	<i>Regulus satrapa</i>	S5B	G5			0	HR	H	L3	X		
Ruby-crowned Kinglet	<i>Regulus calendula</i>	S4B	G5						L3	X		
Eastern Bluebird	<i>Sialia sialis</i>	S5B	G5				HU	m		X		
Gray-cheeked Thrush	<i>Catharus minimus</i>	S4B	G5									
Swainson's Thrush	<i>Catharus ustulatus</i>	S4B	G5							X		
Hermit Thrush	<i>Catharus guttatus</i>	S5B	G5			20-30	HU		L3	X		
Northern Mockingbird	<i>Mimus polyglottos</i>	S4	G5					m	L3	X		
Brown Thrasher	<i>Toxostoma rufum</i>	S4B	G5						L3	X		
American Pipit	<i>Anthus rubescens</i>	S4	G5									
Bohemian Waxwing	<i>Bombusilla garrulus</i>											
Lapland Longspur	<i>Calcarius lapponicus</i>	S3B	G5									
Snow Bunting	<i>Plectrophenax nivalis</i>	SNA	G5									
Louisiana Waterthrush	<i>Parkesia motacilla</i>	S3B	G5	SC	SC	100	HR	H		X		
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	S4B	G4	SC	THR		HR	H	L2	X		
Black-and-white Warbler	<i>Mniotilta varia</i>	S5B	G5			100	HU	m	L3	X		
Prothonotary Warbler	<i>Protonotaria citrea</i>	S1B	G5									
Tennessee Warbler	<i>Oreothlypis peregrina</i>	S5B	G5									
Orange-crowned Warbler	<i>Oreothlypis celata</i>	S4B	G5							X		
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	S5B	G5				HR	m	L3	X		
Connecticut Warbler	<i>Oporornis agilis</i>											
Mourning Warbler	<i>Geothlypis philadelphia</i>	S4B	G5			30	HU	m		X		
Hooded Warbler	<i>Setophaga citrina</i>	S4B	G5			15-30	HR		L2	X		
Kirtland's Warbler	<i>Setophaga kirtlandii</i>	S1B	G1	END	END							
Cape May Warbler	<i>Setophaga tigrina</i>	S5B	G5					H	L2	X		
Cerulean Warbler	<i>Setophaga cerulea</i>	S3B	G4	THR	END	100			L2	X		
Northern Parula	<i>Setophaga americana</i>	S4B	G5			100			L2	X		
Magnolia Warbler	<i>Setophaga magnolia</i>	S5B	G5			30	HR	H	L3	X		Robbins, 1979
Bay-breasted Warbler	<i>Setophaga fusca</i>	S5B	G5									
Blackburnian Warbler	<i>Setophaga castanea</i>	S5B	G5			30-50	HR	H	L3	X		
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	S5B	G5				HU	m	L3	X		
Blackpoll Warbler	<i>Setophaga striata</i>	S4B	G5									
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	S5B	G5			30-50	HR	H	L2			
Palm Warbler	<i>Setophaga palmarum</i>	S5B	G5									
Yellow-rumped Warbler	<i>Setophaga coronata</i>	S5B	G5				HR	H	L3	X		
Prairie Warbler	<i>Setophaga discolor</i>	S3B	G5					H		X		
Black-throated Green Warbler	<i>Setophaga virens</i>	S5B	G5			30	HU	H	L3	X		
Canada Warbler	<i>Cardellina canadensis</i>	S4B	G5	SC	THR	30	HR	m	L2	X		
Wilson's Warbler	<i>Cardellina pusilla</i>	S4B	G5									
Yellow-breasted Chat	<i>Icteria virens</i>	S2B	G5	END	END			H		X		
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	S4B	G5				HU	m	L3	X		
Field Sparrow	<i>Spizella pallida</i>	S4B	G5					H	L3	X		
Vesper Sparrow	<i>Spizella pusilla</i>	S4B	G5						L3	X		
Grasshopper Sparrow	<i>Pooecetes gramineus</i>	S4B	G5					m	L3	X		
Henslow's Sparrow	<i>Ammodramus savannarum</i>	S4B	G5				HU	m	L3	X		
Fox Sparrow	<i>Ammodramus henslowii</i>	S4B	G4	END	END	50			L1	X		Herkert, 1991
	<i>Passerella iliaca</i>	S4B	G5									

Project No. 7568

November 2015

TABLE 7: WILDLIFE LIST

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterfloo	Source	Area Sensitive Reference
Lincoln's Sparrow	<i>Melospiza lincolni</i>	S5B	G5						L3			
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	S4B	G5						L3	X		
Scarlet Tanager	<i>Piranga olivacea</i>	S4B	G5			20		m	L3	X		
Western Meadowlark	<i>Sturnella neglecta</i>	S3B	G5					H	L3	X		
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	S2B	G5									
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	S4B	G5									
Pine Grosbeak	<i>Pinicola enucleator</i>	S4B	G5							X		
Red Crossbill	<i>Loxia curvirostra</i>	S4B	G5									
White-winged Crossbill	<i>Loxia leucoptera</i>	S5B	G5									
Common Redpoll	<i>Acanthis flammea</i>	S4B	G5							X		
Pine Siskin	<i>Spinus pinus</i>	S4B	G5									
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	S4B	G5									
<b>MAMMALS</b>												
Virginia Opossum	<i>Didelphis virginiana</i>	S4	G5									
Masked Shrew	<i>Sorex cinereus</i>	S5	G5									
Smoky Shrew	<i>Sorex fumeus</i>	S5	G5						L2			
Pygmy Shrew	<i>Sorex hoyi</i>	S4	G5									
Water Shrew	<i>Sorex palustris</i>	S5	G5					H				
Northern Short-tailed Shrew	<i>Blarina brevicauda</i>	S5	G5									

TABLE 7: WILDLIFE LIST

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterfloo	Source	Area Sensitive Reference
Hairy-tailed Mole	<i>Parascalops breweri</i>	S4	G5					m	L3			
Eastern Mole	<i>Scalopus aquaticus</i>	S2	G5	SC	SC							
Star-nosed Mole	<i>Condylura cristata</i>	S5	G5									
Eastern Small-footed Myotis	<i>Myotis leibii</i>	S2S3	G3	END	END							
Little Brown Myotis	<i>Myotis lucifugus</i>	S4	G5	END	END							
Northern Myotis	<i>Myotis septentrionalis</i>	S3	G4	END	END				L3			
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	S4	G5						L3			
Eastern Pipistrelle	<i>Perimyotis subflavus</i>	S3?	G5									
Eastern Red Bat	<i>Lasiurus borealis</i>	S4	G5									
Big Brown Bat	<i>Eptesicus fuscus</i>	S5	G5									
Hoary Bat	<i>Lasiurus cinereus</i>	S4	G5									
Eastern Cottontail	<i>Sylvilagus floridanus</i>	S5	G5						L3			
Snowshoe Hare	<i>Lepus americanus</i>	S5	G5			20		H				
European Hare	<i>Lepus europaeus</i>	SNA	G5									
Woodchuck	<i>Marmota monax</i>	S5	G5									
Fox Squirrel	<i>Sciurus niger</i>	SNA	G5									
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	S5	G5						H	L2		
Southern Flying Squirrel	<i>Glaucomys volans</i>	S4	G5			20			L2			
White-footed Mouse	<i>Peromyscus leucopus</i>	S5	G5									
Deer Mouse	<i>Peromyscus maniculatus</i>	S5	G5									
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	S5	G5									
Muskrat	<i>Ondatra zibethicus</i>	S5	G5									
Southern Bog Lemming	<i>Synaptomys cooperi</i>	S4	G5									
Meadow Vole	<i>Microtus pennsylvanicus</i>	S5	G5									
Woodland Vole	<i>Microtus pinetorum</i>	S3?	G5	SC	SC			H				
House Mouse	<i>Mus musculus</i>	SNA	G5									
Meadow Jumping Mouse	<i>Zapus hudsonicus</i>	S5	G5						L3			
Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	S5	G5					m	L2			
Porcupine	<i>Erethizon dorsatum</i>	S5	G5						L2			
Coyote	<i>Canis latrans</i>	S5	G5									
Northern Gray Wolf	<i>Canis lupus occidentalis</i>	S4	G4									
Eastern Wolf	<i>Canis lupus lycaon</i>	S4	G4	SC	SC							
Red Fox	<i>Vulpes vulpes</i>	S5	G5	THR	THR							
Grey Fox	<i>Urocyon cinereoargenteus</i>	S1	G5									
American Black Bear	<i>Ursus americanus</i>	S5	G5						L1			
Northern Raccoon	<i>Procyon lotor</i>	S5	G5									
American Marten	<i>Martes americana</i>	S5	G5									
Fisher	<i>Martes pennanti</i>	S5	G5									
Ermine	<i>Mustela erminea</i>	S5	G5					H-m	L3			
Long-tailed Weasel	<i>Mustela frenata</i>	S4	G5									
American Mink	<i>Mustela vison</i>	S4	G5						L3			
American Badger	<i>Taxidea taxus jacksoni</i>	S2	G5	END	END							
North American River Otter	<i>Lutra canadensis</i>	S5	G5						L1			
Canada Lynx	<i>Lynx canadensis</i>	S5	G5									
Bobcat	<i>Lynx rufus</i>	S4	G5									
Mountain Lion	<i>Puma concolor</i>	SU	G5									
Eastern Cougar	<i>Puma concolor cougar</i>	SU	G5TH									

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterfloo	Source	Area Sensitive Reference
MOOSE	<i>Alces alces</i>	S5	G5									
<b>SUMMARY</b>												
Total Odonata:		8										
Total Butterflies:		6										
Total Other Arthropods		0										
Total Amphibians:		4										
Total Reptiles:		0										
Total Birds:		75										
Total Breeding Birds:		68										
Total Mammals:		7										
<b>SIGNIFICANT SPECIES</b>												
Global:		0										
National:		6										
Provincial:		6										
Regional:		26										
Local:		26										
<b>Explanation of Status and Acronyms</b>												
COSSARO: Committee on the Status of Species at Risk in Ontario												
COSEWIC: Committee on the Status of Endangered Wildlife in Canada												
REGION: Rare in a Site Region												
S1: Critically Imperiled—Critically imperiled in the province. (often 5 or fewer occurrences)												
S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer).												
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)												
S4: Apparently Secure—Uncommon but not rare												
S5: Secure—Common, widespread, and abundant in the province												
SX: Presumed extirpated												
SH: Possibly Extirpated (Historical)												
SNR: Unranked												
SU: Unrankable—Currently unrankable due to lack of information												
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												
S#B- Breeding status rank												
S#N- Non Breeding status rank												
?: Indicates uncertainty in the assigned rank												
G1: Extremely rare globally; usually fewer than 5 occurrences in the overall range												
G1G2: Extremely rare to very rare globally												
G2: Very rare globally; usually between 5-10 occurrences in the overall range												
G2G3: Very rare to uncommon globally												
G3: Rare to uncommon globally; usually between 20-100 occurrences												
G3G4: Rare to common globally												

COMMON NAME	SCIENTIFIC NAME	SRANK	GLOBAL STATUS	COSSARO	COSEWIC	AREA SENSITIVE (ha)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Waterfloo	Source	Area Sensitive Reference
G4: Common globally; usually more than 100 occurrences in the overall range												
G4G5: Common to very common globally												
G5: Very common globally; demonstrably secure												
GU: Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.												
T: Denotes that the rank applies to a subspecies or variety												
Q: Denotes that the taxonomic status of the species, subspecies, or variety is <b>questionable</b> .												
END: Endangered												
THR: Threatened												
SC: Special Concern												
NAR: Not At Risk												
IND: Indeterminant, insufficient information to assign status												
DD: Data Deficient												
6: Rare in Site Region 6												
7: Rare in Site Region 7												
Area: Minimum patch size for area-sensitive species (ha)												
H- highly significant in Hamilton Region (i.e. rare)												
H- moderately significant in Hamilton Region (i.e. uncommon)												
L1- extremely rare locally (Toronto Region)												
L2- very rare locally (Toronto Region)												
L3- rare to uncommon locally (Toronto Region)												
HR- rare in Halton Region, highly significant												
HU- uncommon in Halton Region, moderately significant												
* The Pileated Woodpecker will incorporate smaller woodlots into its homerange, therefore it may not be a true area-sensitive species (Naylor et al. 1996)												
<b>LATEST STATUS UPDATE</b>												
Odonata: August 2014												
Butterflies: August 2014												
Other Arthropods: August 2014												
Amphibians: August 2014												
Reptiles: August 2014												
Birds: August 2014												
Mammals: August 2014												
<b>NOTE</b>												
All rankings for birds refer to breeding birds unless the ranking is followed by N												
<b>REFERENCES</b>												
COSSARO Status												
Endangered Species Act, 2007 (Bill 184). Species at Risk in Ontario List (O. Reg. 230/08).												
COSEWIC Status												
COSEWIC, 2007. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada.												
<b>Local Status</b>												
Dwyer, Jill K. 2003. Nature Counts Project Hamilton Natural Areas Inventory 2003. Species Checklists. Hamilton Naturalists Club.												
Halton Natural Areas Inventory 2006: Volume 2 Species Checklists (ISBN 0-9732488-7-4)												



## Tom Hilditch B.Sc. President & CEO



### Curriculum Vitae

#### PRIVATE SECTOR WORK

Tom has completed hundreds of site-specific impact studies, to satisfy regulatory requirements. These projects have required the design and implementation of scientific inventories, assessments of significance and sensitivity to potential development related effects and the development of sound mitigation measure recommendations. He has worked amongst various stakeholders, many involving the design and restoration of rare habitats for plant and wildlife Species at Risk.

Tom has been actively involved and directed the Natural Heritage components of the planning and design of future healthy communities, in approximately 5,000 hectares of future urban lands in Southern Ontario. In that landscape scale work, he completed baseline surveys, impact assessment work and designed and implemented new Natural Heritage Systems as integral components of development.

Working with some of Canada's largest land development companies, Tom has assisted them in strategic planning for land acquisition and disposition, and he is currently working with numerous clients in the consideration of ecosystem monetization and preparation for adaptation requirements associated with climate change.

#### SCIENTIFIC AND INDUSTRY ASSOCIATION WORK

Active in a number of scientific and industry committees and associations over the years, Tom began a five year term in 2009, serving as the Chair of the Species at Risk Program Advisory Committee (SARPAC), a body that reports to Ontario's Ministry of Natural Resources and Forests, regarding the implementation of the Ontario Endangered Species Act, 2007. He also served as Director on the Ontario Board for Nature Conservancy Canada, served as the Special Advisor to the Board of Directors of the Ontario Stone, Sand and Gravel Association (OSSGA) for all matters related to the environment and Natural Heritage, and remains an

active participant in the Building and Land Development Industry of Ontario (BILD).

Tom has served as the President of the Canadian Chapter of the Society of Wetland Scientists and for the Canadian Land Reclamation Association in Ontario.

#### SELECT PUBLICATIONS AND PRESENTATIONS

Provincial Policy Statement 2014: A Comparison of Recent Changes to the PPS with a Focus on Natural Heritage System Policies. Presented at: Ontario Bar Association; 2015 February 5; Toronto, Canada.

Provincial Planning Statement and Environmental Protection. Presented at: Land Development & Planning Forum; 2014 June 17-18; Toronto, Canada.

Founder and Chair of The Ontario Endangered Species Act Conference; 2013 April 8-9; Royal Ontario Museum, Toronto, Canada.

Innovations in Endangered Species Legislation. Presented at: 2nd World Biodiversity Congress; 2011 September 8-12; Kuching, Malaysia.

Endangered Species Legislation as a Stimulus for Habitat Restoration. Presented at: Society for Ecological Restoration 4th World Conference on Ecological Restoration; 2011 August 21-25; Merida, Mexico.

The Presqu'île Bay Species at Risk Outreach Project Case Study. Presented at: The International Association for Great Lakes Research 53rd Annual Conference on Great Lakes Research; 2010 May 17-21; Toronto, Canada.

Endangered Species Act, 2007: Implications and Opportunities. Presented at: Ontario Stone, Sand and Gravel Rehabilitation Tour: 2008 September 11 and September 25; Bowmanville, Canada.

Endangered Species Act, 2007: Consequences and Opportunities. Presented at: Ontario East Municipal Conference; 2008 September 10-12; Kingston, Canada.

Endangered Species Act, 2007: A Private Sector Perspective. Presented at: Ontario Bar Association; 2008 September 11; Toronto, Canada.

A Private Sector Species at Risk Initiative: St. Mary's Cement & Great Lakes Wetland Stewardship. Presented at: A.D. Latorell Conservation Symposium; 2007 November 14-16; Alliston, Canada.

An Overview of Canadian Environmental Technologies. Presented at: Environment 2001 Conference; 2001 4-8 February; Abu Dhabi, United Arab Emirates.

Achieving Excellence in Natural Heritage Planning. Presented with D. Charlton and R. Hubbard at: Ontario Provincial Planners Conference; 2000 Niagara Falls, Canada.

Biodiversity Planning; Multi-layered Stakeholder Consensus Building, A Model for Success. Presented at: International Association for Impact Assessment Annual Meeting; 1998; Christchurch, New Zealand.

Provincial Wetlands Policy, Environmental Impact Study Requirements. Presented at: Society of Wetland Scientists; 1994; Washington, United States.

Brick Wetlands Complex, An EIS Case Study. Presented at: Wetlands Boundaries, Buffers and Gradients Conference; 1994; Waterloo, Canada.

Wetland Impact Mitigation Techniques, A Case Study. Presented at: Ontario Ministry of Natural Resources and Transportation; 1994; Ontario, Canada.

Wetland Policy Statement Implementation Issues and Experiences, Long Range Planning Directions; 1993; Ontario, Canada.

Woodland Evaluation Systems – Their Use and Application in Municipal Planning. Presented at: The Significant Woodlands Workshop, Ontario Ministry of Natural Resources; 1993; Dorset, Canada.

Buffers for the Protection of Wetland Ecological Integrity – A Model for Buffer Determination. Presented at: International Association of Ecology 4th International Wetlands Conference; 1992 September; Ohio, United States.

GIS – A Tool for Ecological Mapping and Impact Assessment of an Environmentally Sensitive Area. Presented at: The International Association for Impact Assessment Annual Meeting; 1992 August; Washington, D.C., United States.

### SELECT PROJECT EXPERIENCE

Grandview Resort Golf Course Development EIA, Huntsville

Environmental Baseline, Impact Assessment and Natural Heritage System Design Study, Heritage Heights, Brampton

Nelson Burlington Quarry License Expansion and Rehabilitation Design

Environmental Inventory Reporting, North Oakville Secondary Plan Implementation

EIAs for Clublink Corporation: Kings Riding, Cherry Downs, Rolling Hills

EIAs for Kaneff Group Golf Course developments: Royal Ontario Lionhead

EIA for golf course, resort and confo development, Grand Niagara, Niagara Falls

Eagle Heights Environmental Impact Assessment, Environmental Monitoring and Expert Testimony

St. Mary's Cement Greenfield Quarry EIA and ARA Application, Flamborough

Brighton, Presqu'île Species at Risk Conservation and Restoration Planning, St. Mary's Cement

American Badger Strategic Assessment of Range and Soils/Habitat; Creation of Innovative Recovery Tools

Airport Expansion, Screening Level Environmental Assessment, Equatorial Guinea, Africa

Mai Po Wetland EIS and Conservation Planning Investigation, Hong Kong, PRC

Niagara Waterfront Planning Study; Master Planning for Economic Rejuvenation

Municipal Class Environmental Assessment, Scarborough Golf Club Road, Rail Separation

Municipal Class Environmental Assessment Jackson District Sanitary and Storm Sewer

Horseshoe Valley Resort Corporation, Sewage Treatment Class Environmental Assessment

Kingston Area Waste Management Master Plan

GO Transit Class EA, Rail Line Upgrade, Toronto

Swan Lake Wetland Management Concept Plan, Weihai Province, PRC

Downsview National Urban Park Design and Green Infrastructure Plan

Greening of the Official Plan, Regional Municipality of York

Elephant Conservation ENGO Observations & Opportunities, Confidential Exploratory Document

## EDUCATION

- B.Sc., Agr., Resources Management, University of Guelph

## PROFESSIONAL AND OTHER AFFILIATIONS

- Society for Conservation Biology
- International Association for Impact Assessment
- Ontario Field Ornithologists
- Canadian Society of Environmental Biologists
- International Association for Environmental Philosophy
- The International Society for Ecological Economics
- Ontario Stone, Sand and Gravel Association
- Society for Ecological Restoration
- Canadian Land Reclamation Association

## EMPLOYMENT HISTORY

- Savanta Inc. 2006 – Current: Founder, President & CEO
- Stantec Consulting 2005 – 2006: Vice President
- Stantec Consulting 2005: Senior Principal
- Stantec Consulting 2003 – 2005: Principal
- ESG International Inc. 2001 – 2003: President
- ESG International Inc. 1997 – 2001: Vice President
- ESG International Inc. 1994 – 1997: Senior Ecologist, Principal
- Gartner Lee Ltd. 1989 – 1994: Senior Ecologist, Associate
- Gartner Lee Ltd. 1983 – 1989: Ecologist
- Lake Simcoe Region Conservation Authority 1981 – 1983: Forest and Wetland Technician
- Ecologistics Ltd. 1981: Manager, Field Biology Team
- Toronto and Region Conservation Authority 1979 – 1981: Field Biologist, Environmentally Significant Areas of Study

## Shannon Catton M.Sc. Manager, Environmental Consulting



### Curriculum Vitae

Shannon brings a decade of experience working on environmental approvals, impact assessment studies, natural heritage reviews, ecological restoration and Species at Risk assignments for various private interests. Shannon has provided environmental expertise to major oil and gas pipeline expansion projects, limestone quarry expansions, power transmission and electricity infrastructure renewal projects, wind and solar power project approvals and various residential developments. She brings positive energy, insight and mindfulness to the resolution of complex environmental approval challenges.

Shannon's project management experience has included preparing, coordinating and implementing of annual field program and annual work programs, as well as budget requirements, technical reporting and Species at Risk permit applications, as well as on-going collaboration with various government agencies and other stakeholders. Terrestrial surveys included salamander migration and egg mass surveys, tissue sampling (in conjunction with the Ministry of Natural Resources) and amphibian call count surveys.

Shannon has also performed terrestrial surveys including tree inventories, vegetation community assessments (Ecological Land Classification and Ontario Wetland Evaluation Systems), habitat assessments, winter wildlife surveys, and reptile hibernacula surveys. She has also performed Natural Heritage Reviews for various residential development projects in the Oak Ridges Moraine and Niagara Escarpment Plan areas.

Shannon provided on-going provincial guidance for a cross-country pipeline regarding terrestrial policies such as the Species at Risk field programs, Endangered Species Act and Migratory Bird Convention Act and municipal permitting. Shannon also provided senior review for technical reports and the Environmental Assessment Report for the NEB application.

## SELECT PROJECT EXPERIENCE

- Dufferin Aggregates Action Quarry Extension, Action, Ontario
- Terrestrial Sureveys for various pit and quarry implementation and extension projects, Ontario
- Timberland Homes Subdivision, LaSalle, Ontario
- Natural Heritage Evaluations for various residential development projects, Ontario
- Environmental Impact Studies for various residential development projects, Ontario
- TransCanada Pipelines Energy East Expansion Project, Alberta to New Brunswick
- TransCanada Pipelines Parkway Loop, Greater Toronto Area, Ontario
- NOVA Chemicals Pipeline Extension Project, Sarnia, Ontario
- Union Gas Bluewater River Crossing Replacement Project, Sarnia, Ontario
- Hydro One Networks Inc. Midtown Electricity Infrastructure Renewal Project, Toronto, Ontario
- Hydro One Networks Inc. Darlington Power Plant, Pickering Ontario
- St. Columban Wind Projects, St. Columban, Ontario
- Almonte Solar Project, Almonte, Ontario

## SELECT PUBLICATIONS AND PRESENTATIONS

- Catton, S. The Ontario Endangered Species Act: Project Implications and Proactive Management. Presentation for various clients and Stantec offices in Ontario, 2012.
- Matthew, U., P.J. Richardson, S. Catton, C.D. Stabler, D.W. Larson. The quarry-to-alvar initiative: Creating new alvar habitat from abandoned limestone quarries. *Canadian Reclamation*, 2:10-15, 2009.
- Tomlinson, S., U. Matthes, P.J. Richardson, D.W. Larson. The ecological equivalence of quarry floors to alvars. *Applied Vegetation Science*, 11:73-82, 2008.
- A comparative analysis of the seed bank, vegetation and environmental conditions of abandoned limestone quarry floors of southern Ontario and alvars on the Bruce Peninsula, Canada. Presentation to the World Conference on Ecological Restoration by the Society of Ecological Restoration (SER), Spain, 2005.
- Biological and physical comparisons of quarry floors and alvars. Presentation to the Aggregate Producers' Association of Ontario Pit and Quarry Restoration Workshop, Hamilton, Ontario, 2005.
- Using alvars as a reference ecosystem to restore abandoned limestone quarries. Poster Presentation at the A.D. Latornell Conservation Symposium, Aliston, Ontario, 2004.
- A comparative analysis of the seed bank, vegetation and environmental characteristics of abandoned limestone quarry floors of southern Ontario and alvars on the Bruce Peninsula. Presentation to the Ontario Ecology and Ethology Colloquium (OEEC), Mississauga, Ontario, 2004.
- The quarry-to-alvar initiative: progress report. The Ontario Aggregate Resources Corporation (TOARC) Annual Report, Burlington, Ontario, 2003.
- The quarry-to-alvar initiative: restoring value to abandoned quarries. The Ontario Aggregate Resources Corporation (TOARC) Annual Report, Burlington, Ontario, 2002.

## EDUCATION

M.Sc., Botany, University of Guelph, 2006

B.A., B.Sc., Sociology and Biology (Hons), University of Guelph, 2003

## CERTIFICATES AND TRAINING

Ontario Ministry of Natural Resources Ontario Wetland Evaluation

Systems (OWES) Certification, North Bay, Ontario, 2008

Ontario Ministry of Natural Resources Ecological Land Classification for southern Ontario (ELC) Certification, Turkey Point, Ontario, 2006

## EMPLOYMENT HISTORY

Savanta Inc., 2014 – 2015: Manager, Environmental Consulting

Savanta Inc., 2013 – 2014: Terrestrial Ecologist, Project Manager

Stantec Consulting, 2012 – 2013: Terrestrial Team Lead

Stantec Consulting, 2010 – 2012: Senior Terrestrial Ecologist and Project Manager

Stantec Consulting, 2007 – 2010: Project Manager

Stantec Consulting, 2006 – 2007: Terrestrial Ecologist

Hamilton Conservation Authority, April – October 2006: Natural Heritage Technical Lead

## Adele Mochrie B.Sc. Senior Project Manager



### Curriculum Vitae

Adele is a talented communicator and strategic thinker with 17 years of environmental planning experience. She is well known and highly regarded for her skills in project and consulting team management, permitting and approvals, and meaningful consultation and stakeholder engagement.

Adele is always mindful of the public and stakeholder interest in the projects, utilizing her strong consultation and communication skills to address concerns effectively. She has worked with municipalities on joint initiatives, requiring a working knowledge of the Municipal Class EA, such as developer driven improvements adjacent to the provincial infrastructure.

### PROJECT MANAGEMENT EXPERIENCE

Currently, Adele is managing the Baseline Ecological Studies for a large group of Landowners invested in planning and strategic activities related to the Milton South Urban Area (Phase 4). The work completed to date provides the baseline natural heritage data which will support the Subwatershed Study (SWS) that is being initiated by the Town of Milton.

In other key projects, Adele is leading Savanta's team of ecologists through strategic environmental field studies to determine ecological features, constraints/opportunities and development limits and consulting with local Conservation Authorities on O.Reg. 166/06 Permit Applications.

Adele spent the last 13 years leading the environmental component of large, complex projects through the MTO Class Environmental Assessment for Provincial Transportation Facilities. She has a keen awareness of the larger project goals and ensures the environmental deliverables are prepared within typically tight timelines while maintaining a high quality standard.

### ENVIRONMENTAL PLANNING EXPERIENCE

Adele has spent significant time providing environmental expertise on Preliminary and Detailed Design projects for Highway 401 expansion projects in the Kitchener-Waterloo-Cambridge area, ensuring that all federal legislation (NPA, Fisheries Act), provincial legislation (EPA, ESA), guidelines (MTO Class EA, MTO Environmental Standards and Practices) and consultant acquisition processes (RAQS, Environmental Reference for Design, EOs and RFPs) requirements were met.

She has led the environmental component of numerous projects, ensuring timelines, budgets and all environmental obligations are met, including permits and approvals. Adele has been responsible for monitoring construction activities to determine the effectiveness of environmental mitigation measures included in contracts. Such work included documenting compliance with the Ministry's environmental policies and commitments made to the public and external agencies, making recommendations for changes to the contract or to policy.

During Preliminary Design projects, Adele was responsible for the scope and review of all project-related environmental technical reports. She assisted in the development and evaluation of design alternatives and selection of recommended plan, ensuring the Transportation Environmental Study Report (TESR) documented all environmental impacts, additional work identified for design and proposed mitigation measures.

During Detailed Design projects, Adele has ensured all environmental commitments made during Preliminary Design are carried forward and continue with consultation. She reviewed proposed mitigation measures and confirmed all environmental commitments made were included in the contract package.

Adele has ample experience working with agencies to secure environmental permits and approvals. She has represented the MTO in negotiations with the MNRF through the Endangered Species Act, 2007, application process, as well as negotiations of environmental issues with the public, external agencies and First Nations, regarding "Mega" projects, engaging in face-to-face meetings with affected property owners, as well as strategy meetings with MNR and CAs, collaborating with the Sarnia Greenbelt Committee for Highway 402 landscaping plans.

Adele has also collaborated with local CAs to identify opportunities to fund portions of their projects that demonstrate overall benefit to impacted species of risk. She has also reviewed PTTW application packages, DFO submissions and has negotiated NPA permit details.

### WASTE AND CONTAMINATED PROPERTY EXPERIENCE

With a strong background in waste and contaminated sites, Adele is aware of the potential impacts to the soil, groundwater and surface water from both temporary works (i.e. construction) and long-term effects resulting from the proposed improvements, striving to ensure these impacts are avoided or mitigated.

## SELECT PROJECT EXPERIENCE

Milton South Urban Area (Phase 4) Ecological Studies and Base-line Inventories.

EIS for several Wyndfield West developments (Empire Homes, Losani Homes) in Brantford.

EIA for golf course, resort and condo development, Grand Niagara, Niagara Falls.

Endangered Species Act Permits for Redside Dace, Black Redhorse and Wavy-Rayed Lampmussels, Project Registration for Barn Swallows.

Design, construction oversight and coordination of 2 year monitoring program of SAR Turtle Ecopassage under Highway 24, Brant County.

Pilot Project with Saugeen First Nation and CSPI for innovative design of prefab liner for fish passage through 8% grade culvert.

Active participant in the Ontario Road Ecology Group (OREG).

MTO Class EA: Highway 401 Expansion, Hwy 8 easterly to Wellington/Halton boundary, Preliminary and Detail Design.

MTO Class EA: Highway 402 Expansion, Sarnia, Detail Design and Post Construction Landscaping Plan at three new Storm Water Management Ponds.

## EDUCATION

- B.Sc., Environmental Sciences, University of Western Ontario

## CERTIFICATION AND TRAINING

- Environmental Monitoring for Construction Projects (Course) Vancouver Island University (2013)
- Erosion and Sediment Control (Course) Vancouver Island University (2012)
- Environmental Compliance in Civil Construction (Certificate) Ontario Road Builders Association (2010)
- Module 1 Value Management Training Workshop (Certificate) SAVE International (2007)

## VOLUNTEER WORK

- 2011 – 2015, OPSEU Co-Chair of Local Employee Relations Committee (LERC)
- 2011 – 2012, Coordinator of the “Grabba Java” Knowledge Sessions within the Exeter Road Ontario government building to share information and knowledge from various work-related disciplines.
- 2011 – 2012, Co-Chair of the Volunteer Initiative Committee (VIC), leading Federated Health and United Way fundraising activities in the Exeter Road Ontario government complex.
- 2002 – 2006, Provided palliative care to terminally ill residents at The Carpenter Hospice, Burlington.

## EMPLOYMENT HISTORY

- Savanta: April 2015 - present
- Ministry of Transportation: 2002 – 2015
  - Senior Environmental Planner (2013 – 2015)
  - Environmental Planner (2006 – 2013)
  - Environmental Planner – Waste Specialist (2002 – 2006)
- Trow Consulting Engineers Ltd: 1998 – 2002, Environmental Scientist and Project Manager

## Sean Geddes B.Sc. Senior Aquatic Ecologist



### Curriculum Vitae

Sean has 25 years of experience in the fisheries and aquatic habitat field, including fish habitat assessments, impact analyses and site monitoring for projects in the aggregate, waste management, energy, transportation, and land planning and development sectors. His experience includes a mix of private and public sector work, with projects ranging from streams to large rivers and small inland lakes to the Great Lakes environments.

Sean served as a plan review aquatic biologist with the Grand River Conservation Authority (GRCA). With the GRCA, he was responsible for the review of projects under Section 35 of the Federal Fisheries Act on behalf of Fisheries and Oceans Canada as part of a Level 3 Agreement with the agency. Sean has developed extensive experience in the permits and approvals process, including developing and negotiating fish habitat mitigation and compensation approaches as they are outlined in formal Letters of Intent and Fisheries Act authorizations.

During his tenure with the Grand River Conservation Authority, Sean served as the principal reviewer for a wide variety of permit and planning applications, Municipal Class EAs and other planning studies that had the potential to affect fisheries and aquatic habitat. He was also responsible for the review of projects under Section 35 of the Federal Fisheries Act on behalf of the DFO as part of a Level 3 Agreement between the DFO and the provincial conservation authority.

As Senior Aquatic Ecologist with Savanta, Sean applies his combined public and private sector knowledge and experience to a variety of projects where aquatic habitat issues and concerns need to be addressed. He has conducted numerous assessments of stream corridors and river systems to determine potential impacts. He has also been responsible for the development of habitat enhancement plans aimed at achieving the best productivity result for both short and long term time frames.

### SELECT PROJECT EXPERIENCE

Project Aquatic Biologist, North Markham Land Use Planning and Secondary Plan Development, Markham

Project Aquatic Biologist, Northwest Brampton Conceptual Fisheries Compensation Plan, Brampton

Project Aquatic Biologist, Nelson Aggregates Proposed Burlington Quarry Extension, Burlington

Project Ecologist, Proposed Flamborough Quarry Haul Route Study

Project Manager, Grand River Wall Repairs and Species at Risk Assessments, Paris

Project Manager, King Road Development Area Environmental Impact Statement, Burlington

Project Manager, Ellesmere Medical Health Centre Natural Heritage Impact Assessment, Scarborough

Project Aquatic Biologist, Eagle Heights Development Area, Burlington

Project Aquatic Biologist, North Newmarket Land Use Planning (Secondary Plan), Newmarket

Project Manager, Area 48 Master Environmental Servicing Plan, Phases 1 & 2, Brampton

Project Manager, Brantford Industrial Park Site Development and Fisheries Compensation

Project Manager, Piers 22 & 27 Site Development, Hamilton Harbour

Project Co-Manager, Redside Dace Management Approaches in the Golden Horseshoe, MNR / BILD

Project Biologist, Columbia Lake Dam Removal and Lake Enhancement Design, Waterloo

## EDUCATION

- Specialized Honours Bachelor of Science, University of Guelph
  - Area of Specialization: Fisheries Biology
  - Strong emphasis in Wildlife Biology

## CERTIFICATION AND TRAINING

- Burlington DFO Central/Arctic Region Fisheries Act Training - Fisheries Protection Program, 2015
- TRCA Sediment and Erosion Control Workshop, 2003.
- Advanced Fish Habitat Training Sessions (numerous), 1998-2003.
- Fluvial Geomorphology Introductory and Advanced Training Courses, 2002.
- Dam Removal and Restoration of Biological Integrity, 2001.
- Design Standards for Improving Fish Habitat Management, 2001.
- Stream Restoration: Natural Channel Design, 2000.
- Regional Habitat Enforcement Training Course, 2000.
- Second International Conference on Natural Channel Systems, 1999.

## EMPLOYMENT HISTORY

- Savanta Inc., 2009 - Current: Senior Aquatic Ecologist
- Stantec Consulting, 2003 – 2009: Associate/Senior Project Manager
- Grand River Conservation Authority, 1997 – 2003: Aquatic Biologist, Plan Review
- Ecoplans Ltd., 1993 – 1997: Aquatic Biologist
- Dance Environmental Inc., 1992 – 1993: Contract Fisheries Biologist
- Grand River Conservation Authority, 1992: Critical Habitat Technician
- Grand River Conservation Authority, 1991: Fish Habitat Restoration Technician
- University of Guelph, 1991: Fish Genetics Technician
- Ministry of the Environment, 1990: Aquatic Survey Technician
- Ministry of Natural Resources, Lake Erie Research Unit, 1986-1990: Aquatic Technician, Fisheries and Limnology

## Christopher Zoladeski Ph.D. Botanist, Senior Ecologist



### Curriculum Vitae

Chris has 25 years of environmental consulting experience on projects ranging from biological surveys to comprehensive natural heritage strategies and sustainable forestry audits. He has an extensive knowledge of forest, wetland and applied plant ecology and Ecological Land Classification and flora of southern and central Ontario.

Chris implemented conservation biology principles in the development of biodiversity, watershed and natural heritage policy planning. He conducted numerous Environmental Impact Assessments including habitat restoration, species at risk management and wetland delineation for projects ranging from housing and golf course developments to comprehensive assessments of aggregate sites.

### HABITAT RESTORATION

Chris had a lead role in several projects involving major habitat restoration initiatives, in particular those carried out by aggregate resources operators and major land developers. For example, he provided a template for a tallgrass prairie restoration and rehabilitation strategy at sites in southern Ontario. In northwest Brampton, he was a member of a multidisciplinary team devising a natural heritage system along re-aligned watercourse and valley channel.

### IMPACT ASSESSMENT

Participating in various roles, Chris has completed field investigations and data analysis as well as project management duties in hundreds of site-specific environmental impact studies for housing, industrial and pipeline developments. These assignments significantly included proposals for mitigation measures to lessen the impacts on the natural habitats and species, while ensuring a balanced approach to land use.

## WETLAND DELINEATION AND SIGNIFICANT WOODLANDS

Based on his knowledge of wetland vegetation, flora, soils and habitat features and functions, Chris has completed numerous wetland delineations and analyses. The results contributed to a better understanding of these ecosystems and better decisions regarding development limits. Similarly, using the criteria established by municipalities and the province, he delineated and analyzed many sites containing Significant Woodland areas.

## SELECT PUBLICATIONS

### Books

Zoladeski, C.A., Delorme, R.J., Wickware, G.M., Corns, I.G.W. and Allan, D.T. 1998. Forest ecosystem toposequences in Manitoba. Special Report 12, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta, 63p.

Zoladeski, C.A., Cowell, D.W. and Ecosystem Classification Advisory Committee. 1996. Ecosystem classification for the southeast Yukon: field guide, first approximation; Yukon Renewable Resources, Canadian Forest Service, Department of Indian and Northern Affairs and Northern Development, Whitehorse, Yukon, 409p.

Zoladeski, C.A., Wickware, G.M., Delorme, R.J., Sims, R.A. and Corns, I.G.W. 1995. Forest ecosystem classification for Manitoba: field guide, special report 2; UBC Press, Vancouver, B.C., 205p.

### Articles in Periodicals

Zoladeski, C.A. 1991. Vegetation zonation in dune slacks on the Leba Bar, Polish Baltic Sea coast; *Journal of Vegetation Science*, v.2, p.255-258.

Zoladeski, C.A. and Maycock, P.F. 1990. Dynamics of the boreal forest in northwestern Ontario; *American Midland Naturalist*, v.124, p.289-300.

Zoladeski, C.A. 1989. Current status of rare vascular plants on Cape Enragé (Bic), Quebec; *Le Naturaliste canadien*, v.116, p.113-116.

Zoladeski, C.A. 1988. New station for *Malaxis paludosa*, bog adder's-mouth orchid, in northwestern Ontario; *The Canadian Field-Naturalist*, v.102, p.548-549.

Zoladeski, C.A. 1988. Classification and gradient analysis of forest vegetation of Cape Enragé, Bic Park, Quebec; *Le Naturaliste canadien*, v.115, p.9-11.

## SELECT PROJECT EXPERIENCE

Lead Botanist, Churchill Phase IV (Lands to the north) Environmental Impact Study, Orlando Corporation, Brampton

Lead Botanist, Block 47-1 & 47-2 Environmental Impact Study for Block Plan, Brampton

Lead Botanist, West Gormley Wetlands Construction Phase Monitoring as part of the Adaptive Management Plan, Richmond Hill

Lead Botanist, Heritage Heights Secondary Plan Area, Northwest Brampton, Natural Heritage System Planning, Subwatershed Study and Impact Assessment

Lead Botanist, Block 51-1 Mount Pleasant Community, Northwest Brampton, Environmental Implementation Report and Associated Vegetation Surveys, Multidisciplinary and Multi-Agency Analysis, Monitoring Natural Heritage System Implementation

Lead Botanist, Boyne Secondary Plan Area, South Milton, Natural Heritage System Planning, Environmental Baseline and Species at Risk Studies, Subwatershed Impact Studies and Natural Heritage Feature Staking

Environmental Impact Studies for golf course, aggregate and residential developments, Greater Toronto Area and Southern Ontario

Pilot Grassland Restoration Project, The Ontario Aggregate Resources Corporation and Ontario Ministry of Natural Resources

Lake Erie Sand Spit Savannas and Species at Risk: Invasive Species Inventory and Vegetation Restoration Strategy, Ontario Ministry of Natural Resources, Canadian Wildlife Service, Walker Industries, and LESSS Recovery Team

Cherry Birch Recovery Strategy, Ontario Ministry of Natural Resources

State of Aggregate Resources in Ontario Study: Paper 6 – Rehabilitation, Field Assessments, Ontario Ministry of Natural Resources

Sustainable Forest Licence Audits, Ontario Ministry of Natural Resources

## EDUCATION

- Ph.D., Botany, University of Toronto
- M.Sc., Forest Ecology and Soil Science, Laval University

## CERTIFICATION AND TRAINING

- Butternut Health Assessment Certificate
- Environmental Impact Study Training Session, Ontario Ministry of Natural Resources
- Ecological Land Classification Training Course
- Ontario Wetland Evaluation System Training Course

## EMPLOYMENT HISTORY

- Savanta Inc. 2009 – Current: Botanist, Senior Ecologist
- Stantec Consulting 2002 – 2009: Senior Scientist
- Toronto and Region Conservation Authority 1999 - 2000: Co-ordinator, Natural Heritage Systems
- Geomatics International Inc. 1992 – 1999: Senior Ecologist
- Acres International Limited (1990-1992): Ecologist

## Peter Burke B.Sc.

Ornithologist, Senior Ecologist



## Curriculum Vitae

Peter has accumulated 28 years of extensive natural history knowledge that includes wildlife, insect and vegetation communities within Southern Ontario and beyond. He possesses an expert knowledge of birds across North, Central and South America, which includes breeding bird surveys, bird banding, bird field guide illustration and bird tour leading. Peter also possesses expert knowledge of butterfly, dragonfly and damselfly communities in Eastern Canada, including identification of species, both adults and larvae, and field guide illustration. He is experienced in the writing of Management Plans and preparing extensive annotated bibliographies for Species at Risk.

Peter is knowledgeable with regard to Peregrine Falcons, including their biological requirements, reintroduction programs throughout southern Ontario and hacking sites in large cities, including London. He has also been involved with addressing improvements to Barn Swallow replacement nest structures on several recent Savanta projects, working with Savanta team members to design the most effective ways to maximize usage. His familiarity with the scientific literature and field experience have combined to produce meaningful improvements such as nesting cup placement in relation to proximity of cover and audio and visual attractants, that have increased structure usage by Barn Swallows in 2015.

Peter has also been on contract to search for and document potential habitat of the Endangered Kirtland's Warbler in Ontario by the Canadian Wildlife Service. He is a professional tour leader for Field Guides Inc., and is a world-renowned professional illustrator for various bird field identification guides, including National Geographic. Peter has gained extensive work experience as a biologist and consultant for various industries, firms and academic institutions over the last three decades.

## EXPERIENCE

As a biologist for the OMNRF, Peter constructed an annotated bibliography for 25 bird Species at Risk. This included the collection of scientific papers, PhD. dissertations, relevant internet sources, books, and consultations with over 20 experts in Canada and the United States. Covering all SAR in Ontario, information was categorized for various topics ranging from relationship to vegetation management, forestry and agricultural practices, wind turbine energy, aggregates, transportation, pesticides/herbicides, fisheries, mining, and so on. The document exceeded 1200 pages.

As a contract Biologist for Savanta, Peter has conducted field surveys for breeding birds, including SAR species and other wildlife including herptiles, mammals, odonates and lepidoptera. He was responsible for documenting specific breeding information on SAR species and following MNRF protocols while conducting searches for these species. He also reported all species in datasets and provided written summaries of important areas for wildlife found on the subject lands, completed specific reporting on SAR species found on the subject lands, and mapped polygons to delimit specific inhabited areas.

As a biologist for the Canadian Wildlife Service, Peter performed reconnaissance work to detect the endangered and extremely rare Kirtland's Warbler in potential breeding locations in Southern Ontario. This work included site determination via FRI mapping and GIS. This work has involved initiating communications with individuals in the Forestry industry, performing site searches, deploying songmeters, documenting breeding evidence, reporting habitat characteristics, as well as reporting presence /absence, and working to determine what future efforts should take place to secure breeding habitats for this species in Southern Ontario.

During his time with the MNRF and Trent University, Peter conducted yearly breeding bird productivity monitoring studies. He found and monitored the nesting success of forest birds in hardwood communities across several logging practices in Algonquin Park, as well as public and private woodlots in Southwest Ontario. This included banding endangered species such as the Acadian Flycatcher. He also conducted vegetation surveys, which quantified the territory and site level structural characteristics. During this time Peter also participated in salamander monitoring surveys using mark-recapture techniques and cover boards. He also assisted with Southern Flying Squirrel trapping using mark-recapture techniques and live traps.

As a biologist for the Natural Heritage Information Centre (NHIC), Peter conducted surveys on rare species of Odonata throughout numerous sites across Ontario via detection of adult and larval forms. He collected data on site-specific information that described biotic and abiotic features and prepared specimens for museum collection. The final report summarized all species recorded during the surveys.

Additionally, Peter has worked for various organizations, including the Canadian Forest Service and Environment Canada. He has conducted breeding bird surveys, waterfowl surveys via helicopter, and has completed detailed vegetation surveys.

## SELECT PROJECT EXPERIENCE

Contract Biologist, OMNRF; Constructed an annotated 1200+ page bibliography on bird Species at Risk.

Contract Biologist, OMNRF; Created Management Plans for Special Concern Species, the West Virginia White & Black Tern.

Contract Biologist, Savanta; Performed field surveys for SAR species including birds, herptiles, mammals, odonates, lepidoptera, providing documentation, reports, datasets & mapping of specific inhabited areas on the subject lands.

Contract Biologist, Canadian Wildlife Service, Ontario Region; Detecting Kirtland's Warbler in potential breeding locations in Southern Ontario.

Contract Biologist, NHIC; Surveyed rare species of Odonata across Ontario via adult & larval forms. Collected data on site-specific information describing biotic/abiotic features. Specimens prepared for museum collection.

Contract Biologist, MNRF & Trent University, London; Yearly breeding bird productivity monitoring studies.

Biology Consultant; Various organizations, including the Canadian Forest Service and Environment Canada. Conducted breeding bird surveys, waterfowl surveys via helicopter & detailed vegetation surveys.

## EDUCATION

- B.Sc. Biology, Guelph University (1991)

## PROFESSIONAL AND OTHER AFFILIATIONS

- Created Listserve for public use of natural history in Middlesex, Oxford & Elgin Counties: 2009
- Served as Chair of the Ontario Bird Records Committee: 2001
- World renowned illustrator for bird identification guides.

## CERTIFICATION AND TRAINING

- Wilderness First Aid Training
- Wilderness Bear Safety Courses

## EMPLOYMENT HISTORY

- Savanta Incorporated: Biologist June – August 2010-2013 (contract), April 2014 – Present (Full-Time)
- Canadian Wildlife Service: Contract Biologist January 2013 – Present
- Ontario Ministry of Natural Resources and Forestry (OMNRF): Contract Biologist, October 2012 - Present
- Golder & Associates: Contract Biologist April – November 2010
- Natural Heritage Information Centre, MNRF: Contract Biologist June – September 2010, May – September 2003
- MNRF & Trent University: Contract Biologist July 2001 – 2011
- Bird Studies Canada: Field Biologist May 1991 – November 2003
- Various Organizations: Biology Consultant 1987 – 1991 Organizations include: Canadian Forest Service, Canadian Wildlife Service, Environment Canada, Trent University
- Ministry of Natural Resources and Forestry: Interpretive Naturalist June – September (summers) 1987 – 1990

## Rava Lee M.Sc. Ecologist



Rava is an environmental professional specializing in landscape ecology, environmental restoration and conservation biology. During the past four years, she has directed and managed Species at Risk snake distribution and mitigation studies, Species at Risk turtle reintroduction studies and reintroduction program, as well as helped restore Species at Risk habitat including turtle nesting beaches. These projects required the design and implementation of novel research building on current knowledge of Species at Risk ecology. She has worked amongst various stakeholders, and has conducted outreach and education workshops for landowners and the public. Rava specializes in herptofauna surveys and habitat analysis, and is also experienced in conducting bat surveys, bird surveys and small mammal trapping.

In many of her assignments, Rava has reviewed, assessed and applied academic research to natural heritage planning and ecological mitigation. She has a sound understanding of various conservation biology frameworks and population modeling tools.

Through Rava's landscape ecology, conservation biology work and research regarding reintroduction of species and habitat restoration in Canada, she has developed a detailed knowledge base of current habitat and development challenges and solutions.

## CONSERVATION BIOLOGY EXPERIENCE

Rava was the lead Reptile Biologist for two conservation initiatives in Rouge National Park. Rava installed, conducted and analyzed data from Artificial Cover Objects (ACO) in Rouge Park to determine the impact of roads and the urban environment on one of the last large urban population of Eastern Milksnakes in Ontario. Rava initiated and planned the Rouge Park Blanding's Turtle headstart initiative, which included ecological modeling of the current Blanding's Turtle population as well as future populations for a Population Viability Analysis. Rava collected, incubated and hatched the first cohort of headstart Blanding's Turtles to be released into Rouge Park.

Rava is also familiar with the restoration of reptile habitat including the construction and design of artificial snake hibernacula and artificial turtle nesting beaches. She has provided restoration input for a number of development projects, including the Boyne NHS, to increase reptile habitat such as overwintering habitat, basking sites and nesting habitat.

## ECOLOGICAL MONITORING EXPERIENCE

Rava has conducted numerous ACO snake surveys throughout Southern Ontario. She has conducted wildlife surveys and rescues requiring the use of turtle hoopnets and turtle basking traps. Rava has also conducted radio tracking of turtles as well as the installation of radio transmitters and collecting turtle eggs for incubation. Rava analyzes data collected during monitoring to determine habitat corridors and foraging areas as well as the impacts of development on Species at Risk reptiles.

Rava has also conducted small mammal surveys with the Royal Ontario Museum including pitfall traps, mist netting, harp traps and Sherman traps.

## SELECT PROJECT EXPERIENCE

Lead Reptile Biologist Black's Pond Decommissioning and Restoration, Burlington, Ontario

Reptile Biologist for Boyne Natural Heritage System, Milton, Ontario

Mt. Pleasant Stream Realignment, Brampton, Ontario

Lead Reptile Biologist for the Rouge Park Milksnake Coverboard Study, Scarborough, Ontario

Lead Reptile Biologist for Rouge Park Blanding's Turtle Headstart Initiative, Scarborough, Ontario

Lead Reptile Biologist for the Rouge Park Blanding's Turtle Population Viability Analysis

Salamander surveyor for the East Boundary Road proposal, Cambridge, Ontario

Reptile Biologist for Milton Phase 4 proposed residential developments

OWES wetland co-evaluator for North Markham Berczy and Bruce tableland wetlands, Markham, Ontario.

## EDUCATION

- M.Sc. Env, Environmental Science, University of Toronto
- B.Sc. Env., Natural Resources Management, University of Guelph

## EMPLOYMENT HISTORY

- Savanta Inc., 2013 – Current: Ecologist
- Toronto Zoo, 2011 – 2013: Natural Resources Biologist
- Parks Canada, 2010: Resource Conservation Technician

## Cate Collinson BA Ecologist



### Curriculum Vitae

Cate is an environmental professional specializing in ecosystem restoration and biodiversity monitoring. She has experience working in the municipal and provincial government sectors, the public sector as well as the private sector. During her time with Savanta, Cate has obtained her Ontario Stream Assessment Protocol Crew Lead certification and has led a number of field surveys, including headwater drainage feature and aquatic habitat assessments, fish rescues and biomass sampling, calling amphibian surveys, salamander habitat suitability assessments and salamander trapping and tissue sampling. Cate was also responsible for supervising channel and tableland restoration plantings for the Mount Pleasant community Natural Heritage System design and implementation, ensuring native species were planted and planting protocols were followed. She has also contributed to a number of Environmental Impact Studies through the development of proposals, budgets, fieldwork planning, data analysis and drafting final reports.

Cate has previously worked with the Alberta Biodiversity Monitoring Institute (ABMI), the Toronto and Region Conservation Authority (TRCA), Ontario Power Generation (OPG), The Ministry of Natural Resources and Forestry (MNRF), and the Region of York's Forestry Department. Throughout this time she contributed to numerous terrestrial and aquatic enhancement projects, including the DeCew Headlands Habitat Enhancement Plan, the Alfred Kuehne Channel Naturalization Project, Trumpeter Swan habitat construction and installation, various bank stabilization projects using soft engineering solutions, the Adopt-A-Stream Crossing Program and York Region's Greening Strategy.

While in Alberta working with ABMI, a first of its kind, world-class biodiversity monitoring project, Cate had the privilege of working with the Joint Oil Sands Monitoring Project, visiting Alberta's most disturbed and remote sites. Through ABMI, Cate has gained experience collecting, identifying and processing Bryophytes and Lichen species, collecting soil samples to determine organic content, conducting down woody debris analysis, carrying out

vegetative surveys as well as tree stand composition surveys and tree core extraction. Cate's experiences with TRCA afforded her the opportunity to be in the field assisting with the layout and installation of riparian vegetation plantings in a manner consistent with the Ministry of Natural Resources recommendations for Redside Dace habitat enhancement efforts.

Through her experiences, Cate has developed an understanding and passion for collaborative approaches and innovative solutions to solve environmental challenges.

### SELECT PROJECT EXPERIENCE

Mount Pleasant Community Natural Heritage System design implementation, Brampton

Milton Phase 4 Headwater Drainage Feature Assessment, Milton

East Boundary Road Jefferson Salamander Study, Cambridge

Fish Rescue and Biomass Sampling, Mount Pleasant, Brampton

Alfred Kuehne Channel Naturalization Project and Red Side Dace habitat enhancement, Greater Toronto Area

Alberta Biodiversity Monitoring Project and Joint Oil Sands Monitoring Project, Alberta

DeCew Headlands Habitat Enhancement Planning, Ontario Power Generation, Niagara

York Region Adopt-A-Stream Crossing Monitoring Study, York Region

York Region Land Securement Strategy Publication 2009, York Region

## EDUCATION

- Post Graduate Certificate Hons. Ecosystem Restoration, Niagara College
- BA Hons. Environmental Studies and Geography, Con. Environmental Studies, Bishop's University

## CERTIFICATION

- Ontario Stream Assessment Protocol Crew Lead
- Ontario Benthos Biomonitoring Network
- Class 2 Electrofishing Backpack Crew Leader
- Standard First Aid with CPR "C" + AED
- Bear Awareness and Avoidance
- Alberta All Terrain Vehicle Safety Training
- H2S Alive
- Transportation of Dangerous Goods Training
- Alberta Construction Safety System

## AWARDS

- Bishop's University Prize, Environmental Studies and Geography 2010
- Bishop's University, Leadership Excellence Award 2010
- Bishop's University, Student Representative Council Portfolio Award 2010

## EMPLOYMENT HISTORY

- Savanta Inc. 2013-Current: Ecologist
- Toronto and Regional Conservation Authority 2013: Environmental Labourer
- Alberta Biodiversity Monitoring Institute 2013: Environmental Technician
- Ontario Power Generation 2012-2013: Ecosystem Restoration Internship
- Ministry of Natural Resources 2010/2011: Team Lead
- The Regional Municipality of York 2009: Regional Greening Assistant
- The Regional Municipality of York 2007/2008: Forestry Summer Student

March 2, 2016

MTE Consultants Inc.  
520 Bingemans Centre Drive  
Kitchener, Ontario  
N2B 3X9

Attention: Mr. Dave Hallman, P. Eng.  
Vice President

Dear Mr. Hallman:

**RE: East Boundary Road EA Natural Environment Constraint Summary**

This Letter Report summarizes natural environment constraint determination information and analyses completed as input to the refinement and subsequent evaluation of alternative alignments. These materials were developed in early 2015 and have been used and continue to be used and relied upon as input to EA route alternative decision-making. Natural environment factors were assessed by Savanta in an iterative manner with the consulting team. MTE Consultants Inc. (MTE), received the natural environment information and included it as input with other EA factors in the evaluation process.

**IDENTIFICATION OF CONSTRAINT AREAS TO ROUTE ALTERNATIVE LOCATIONS**

A number of policy resources were considered during the identification and development of natural environment constraint areas (e.g., municipal and provincial plans and supporting guidance documents). Constraint areas were identified and ranked reflecting key natural heritage features and their associated functions, according to the following criteria of significance:

- Significant Woodland, as identified by the Ministry of Natural Resources and Forestry (MNRF), Guelph District and Regional Municipality of Waterloo (RMOW) designations;
- Significant Wetlands (provincial), as identified by MNRF mapping;
- Special Concern Species, as identified by the Committee on the Status of Species at Risk in Ontario (COSSARO) and provided in lists from MNRF, Guelph District;
- Threatened and Endangered Species; as identified under the Endangered Species Act (ESA), and provided in lists from MNRF, Guelph District;
- Significant Salamander Breeding Habitat, as identified through field surveys completed by Savanta;
- Significant Turtle Nesting Habitat, as identified through field surveys completed by Savanta; and,
- Significant Calling Amphibian Habitat; as identified through field surveys completed by Savanta.

The above criteria were used to identify natural heritage constraint areas within the Study Area. These constraint areas represent areas of contiguous habitat blocks, and are the more prominent and significant on the local landscape. Contiguous areas were assessed in terms of concentrations of features, habitats and areas and those areas are depicted as 22 different areas on the attached two Figures, which cover the study area. Each of the 22 areas exhibits one or more of the criteria of significance outlined above. The natural features and their provision of habitat for various biota are the subject of more detailed information in the companion report to this letter, Cambridge East Boundary Road, Natural Environment Report (December 2015).

A constraint level was applied to each of the 22 areas as a relative ranking of the features and functions contained within the respective areas. Table 1 (attached) identifies each of the 22 areas and the various natural environment constituents contained within each numbered area. A relative ranking of constraint was then determined for each area based on the number of criteria supported by the area. For example, a Constraint Level 1 (most sensitive) was applied to an area that contained 5 or more of the criteria, while a Constraint Level 4 (least sensitive) was applied for those containing one or less. The colours used in the attached Figures provided some visual guidance to the determination and assessment of alternative routes. This approach assisted with identifying key natural heritage features that should be avoided with refinements to route alternative locations (i.e., shifts to avoid key features to the extent possible). Further definition of the scoring approach is provided in the footnote to Table 1. While it is not possible to avoid all features for every alternative, this initial approach allowed the Study Team to avoid as many key features as possible and to identify areas where mitigation measures may apply, while maintaining regard for other considerations such as road geometry, residence avoidance, cultural heritage avoidance and other considerations that are part of the EA evaluation process.

**ROUTE ALTERNATIVE EVALUATION CRITERIA**

Once the route alternatives were refined to avoid high level constraint areas to the extent possible, three main alternative route locations were finalized to carry forward for further evaluation. These were identified as Routes A1, A2, B1 and C1, and are shown on the attached Figures. Each alternative was reviewed in detail for its impacts related to a number of natural environment criteria. Those criteria were used for the development of constraint areas rankings, along with the following additional criteria.

**A. TERRESTRIAL BIOTA**

**Vegetation**

- Significant Woodlands - Forests > 4 ha as per Waterloo Region Core Environmental Feature threshold;
- Other Woodlands – Forests < 4 ha;
- At Risk Vegetation Communities - based on information provided by MNRF and verified by Savanta;
- At Risk Flora – based on lists provided by MNRF and Savanta botanical survey results;
- Evaluated Wetlands – those identified by MNRF as Provincially Significant; and,

- Unevaluated Wetlands – those not included within PSW mapping, but identified by various mapping sources as wetland pockets.

**Wildlife**

- At Risk Wildlife Species – those listed under the ESA and identified during field surveys;
- Specialized Habitats – including salamander breeding ponds and turtle nesting areas; and,
- Other Seasonal Concentration Areas – determined through amphibian call surveys.

**B. AQUATIC BIOTA**

**Number of Crossings of Aquatic Habitat**

- Intermittent Stream Crossings – number of identified intermittent streams crossed by the alternative as determined through mapping;
- Minor Stream Crossings - number of identified minor streams (not mapped as intermittent) crossed by the alternative as determined through mapping;
- Major Stream Crossings – identified as Mill Creek or Moffat Creek;
- Pond Crossings – identified as mapped open water ponds crossed by an alternative;
- Total New Crossings – represents the total number of new crossings of all types required for an alternative;
- Upgrades to Existing Crossings – where an existing crossing exists, consideration was given for the existing disturbance with recognition that an expanded upgrade would be required; and,
- Fish Habitat – all crossings along each alternative would be of either direct or indirect fish habitat.

It was recognized during the evaluation process that each of the route alternatives will potentially impact the majority of the criteria listed above at some point along their respective routes; the degree of intrusion differs for each alternative. In order to determine the degree of potential impact of each alternative, additional detailed criteria were developed to allow for an assessment of relative impacts when alternatives were compared against each other. For example, for Significant Woodlands, it was recognized that each route alternative would potentially impact a portion of Significant Woodland to some degree. To determine a relative ranking, routes that crossed greater than 1000 linear m of Significant Woodland were assigned a high relative impact rating. Routes that crossed less than 1000 m of Significant Woodland were assigned a medium relative impact rating. The various definitions of impact thresholds are provided in Table 2 for each of the criteria.

The final evaluation for each alternative from a natural environment perspective was then determined through tallying up the relative impact ratings for each criterion to arrive

at totals that reflected alternatives exhibiting the highest relative impact ratings in comparison to medium and low relative impact ratings.

**CONCLUDING REMARKS**

Through the analysis of alternatives, it was determined that the preferred alternative from a natural environment perspective would be Route B1, followed by Route A2, A1 and finally C1. Route B1 tends to avoid most constraint areas, with impacts generally relegated to edge effects at the margins of constraint areas. The largest area of impact to a constraint area is associated with the potential crossing of the Mill Creek corridor and associated wetland, a location that is generally shared by all route alternatives.

The evaluation of route alternatives from a natural environment perspective is one of several evaluations required. Others engaged in this project were responsible for assessments related to cultural heritage impacts, archaeological impacts, transportation and traffic requirements, social impacts, etc. MTE Consultants led the overall assessment of integrated factors. There may be further opportunities for refinements to the preferred alternative to reduce the degree of potential impacts on one or more of these factors, once the preferred alternative for the study is determined.

We trust that you will find the following information helpful during your final analyses and reporting.

Yours truly,

**SAVANTA INC.**



Adele Mochrie  
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 1-800-810-3281 Ext 121  
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Attachments

c: T. Hilditch, Savanta Inc.

Table 1. Natural Environment Constraint Areas Table

Natural Feature ID	Contains Significant Woodland	Contains Provincially Evaluated Wetlands	Contains Species of Special Concern	Contains Threatened or Endangered Species	Contains Significant Salamander Breeding Habitat	Contains Significant Turtle Nesting Habitat	Contains Significant Calling Amphibian Habitat	Total Score*	Constraint Level	Brief Notes
1	X	X	X			X		4	2	<ul style="list-style-type: none"> <li>SNTU &amp; MPTU nests on south riverbank</li> <li>WOTH</li> </ul>
2	X	X			X		X	4	1 (2)**	<ul style="list-style-type: none"> <li>Significant salamander breeding habitat (MNRF records)</li> </ul>
3	X	X						2	3	
4	X	X						2	3	
6	X	X	X		X		X	5	1	<ul style="list-style-type: none"> <li>Area likely a blend of constraint levels; finalizing ELC to confirm</li> <li>EWPE, WOTH &amp; RISN present</li> <li>19 salamanders captured</li> <li>Significant calling habitat: 6 frog species; full chorus at Route C crossing</li> </ul>

Project No: 7185 &amp; 7558

Natural Feature ID	Contains Significant Woodland	Contains Provincially Evaluated Wetlands	Contains Species of Special Concern	Contains Threatened or Endangered Species	Contains Significant Salamander Breeding Habitat	Contains Significant Turtle Nesting Habitat	Contains Significant Calling Amphibian Habitat	Total Score*	Constraint Level	Brief Notes
7								0	4	
8		X	X			X	X	4	2	<ul style="list-style-type: none"> <li>SNTU &amp; MPTU basking</li> <li>Significant calling habitat: 5 frog species; full chorus</li> </ul>
9	X	X			X			3	1 (2)**	<ul style="list-style-type: none"> <li>11 salamanders captured</li> <li>Area blended with plantations</li> </ul>
10	X	X	X		X		X	5	1	<ul style="list-style-type: none"> <li>61 salamanders captured</li> <li>Significant calling habitat: 4 frog species; full chorus</li> <li>EWPE</li> </ul>
11	X	X					X	3	2	<ul style="list-style-type: none"> <li>Significant calling habitat: 4 frog species; full chorus</li> </ul>
12								0	4	

Project No: 7185 &amp; 7558

Natural Feature ID	Contains Significant Woodland	Contains Provincially Evaluated Wetlands	Contains Species of Special Concern	Contains Threatened or Endangered Species	Contains Significant Salamander Breeding Habitat	Contains Significant Turtle Nesting Habitat	Contains Significant Calling Amphibian Habitat	Total Score*	Constraint Level	Brief Notes
13	x	x						2	3	
14			x			x		2	3	
15				x				1	4	BOBO/EAME
16				x				1	4	BOBO/EAME
17				x				1	4	BOBO/EAME
18				x				1	4	BOBO/EAME
19				x				1	4	BARS
20				x				1	4	BOBO/EAME
21				x				1	4	BOBO/EAME
22		x						1	4	

**Notes:**

\*Constraint Levels: Constraint Level 1 = score >5;  
 Constraint Level 2 = score 3 or 4;  
 Constraint Level 3 = score 2; and  
 Constraint Level 4 = score <1

\*\*Total Score: Score totaled a Level 2 constraint; however, level was bumped up to 1 due to agency comments and sensitivity of feature

Project No: 7185 & 7558

Table 2. Natural Environment Route Alternative Evaluation Matrix

EVALUATION CRITERION	MEASURES/ INDICATORS/ SOURCES	ROUTE A1	ROUTE A2	ROUTE B1	ROUTE C1
<b>TERRESTRIAL BIOTA</b>					
<b>VEGETATION – Significant Woodlands</b>	<ul style="list-style-type: none"> <li>Forests greater than 4 ha as per RMW Core Environmental Feature threshold [Source: RMW OP, Map 4, Greenlands Network (under appeal)]</li> </ul>	<ul style="list-style-type: none"> <li>Majority of crossings follow existing infrastructure (e.g. Shellard Road) reducing the number of new feature crossings               <ul style="list-style-type: none"> <li>Crossings in these areas will need to be widened.</li> </ul> </li> <li>1 new crossing (bisection) – new woodland sizes are &lt;4ha: 294m</li> <li>4 existing/edge crossings: 1690m</li> </ul>	<ul style="list-style-type: none"> <li>Same as for Route A1, except Shellard Road crossing removed and possibly restored.</li> </ul>	<ul style="list-style-type: none"> <li>Route follows portion of existing infrastructure (e.g. Hydro Corridor)</li> </ul>	<ul style="list-style-type: none"> <li>Route is mostly greenfield.</li> </ul>
<b>VEGETATION – Other Woodlands</b>	<ul style="list-style-type: none"> <li>Woodlands &lt; 4 ha [Source: desktop assessment of 2014 data (Land Information Ontario, Ministry of Natural Resources and Forestry)]</li> </ul>	<ul style="list-style-type: none"> <li>Route crosses edge of 1 small woodland: 59m</li> </ul>	<ul style="list-style-type: none"> <li>1 new crossing of 206m at Moffat Creek</li> <li>Total crossing of 1249 m along route</li> </ul>	<ul style="list-style-type: none"> <li>5 new crossings (bisection): 748m</li> <li>1 existing/edge crossing: 74m</li> </ul>	<ul style="list-style-type: none"> <li>4 new crossings (bisection): 1440m</li> </ul>
<b>VEGETATION – At Risk Vegetation Communities</b>	<ul style="list-style-type: none"> <li>Nearest at risk communities are prairie relics' south of the study area, along rail lines.               <ul style="list-style-type: none"> <li>Route alternatives do not cross any of these communities. [Sources: RMW OP materials, City of</li> </ul> </li> </ul>	None	None	None	None

EVALUATION CRITERION	MEASURES/INDICATORS/SOURCES	ROUTE A1	ROUTE A2	ROUTE B1	ROUTE C1
	<p>Cambridge natural Heritage materials]</p> <ul style="list-style-type: none"> <li>2014 field results for those properties that provided permission to survey</li> <li>No rare vegetation communities were identified</li> </ul>				
<b>VEGETATION – At Risk Flora</b>	<ul style="list-style-type: none"> <li>No species at risk (provincially endangered, threatened or special concern) flora were identified</li> <li>Source: 2014 field results for those majority of properties that provided permission for botanical survey</li> </ul>	<ul style="list-style-type: none"> <li>No SAR</li> </ul>	<ul style="list-style-type: none"> <li>No SAR</li> </ul>	<ul style="list-style-type: none"> <li>No SAR</li> </ul>	<ul style="list-style-type: none"> <li>No SAR</li> </ul>
<b>VEGETATION – Evaluated Wetlands</b>	<ul style="list-style-type: none"> <li>The Study Area contains 3 Provincially Significant Wetland (PSW) Complexes:                             <ul style="list-style-type: none"> <li>Mill Creek Puslinch Wetland Complex (MCP);</li> <li>Moffat Creek Swamp Wetland (MCS); and</li> <li>Sheffield Rockton Wetland Complex (SRW)</li> </ul> </li> </ul> <p>[Source: desktop assessment of 2014 data (Land Information Ontario, Ministry of Natural Resources and Forestry)]</p>	<ul style="list-style-type: none"> <li>Route crosses through portions of 3 PSWs. Majority of crossings follow existing infrastructure (e.g. Shellard Road) reducing the number of new feature crossings; however, crossings in these areas will need to be widened</li> </ul>	<ul style="list-style-type: none"> <li>Same as for Route A1, except Shellard Road PSW crossing could potentially be removed and possibly restored, or remain as a local access road.</li> </ul>	<ul style="list-style-type: none"> <li>Route crosses through portions of 2 PSWs.</li> <li>Route follows portion of existing infrastructure (e.g. Hydro Corridor)</li> </ul>	<ul style="list-style-type: none"> <li>Route crosses through portions of 2 PSWs.</li> <li>Route is mostly greenfield</li> <li>Possibility of closing Shellard Sideroad PSW crossing and possibly restoring PSW.</li> </ul>

EVALUATION CRITERION	MEASURES/INDICATORS/SOURCES	ROUTE A1	ROUTE A2	ROUTE B1	ROUTE C1
		<ul style="list-style-type: none"> <li>MCP: 1 new crossing 141m</li> <li>MCS: 1 widened existing crossing 647 m</li> <li>SRW: 1 new crossing (bisepts): 235m</li> </ul>	<ul style="list-style-type: none"> <li>MCP: 1 new crossing 141m</li> <li>MCS: 1 new crossing 206 m:</li> <li>SRW: 1 new crossing (bisepts) 235m</li> </ul>	<ul style="list-style-type: none"> <li>MCP: 2 new crossings (bisepts): 162m</li> <li>MCS: 1 new crossing (bisept): 44m</li> <li>3 existing/edge crossings: 177m</li> </ul>	<ul style="list-style-type: none"> <li>MCP: 2 new crossings (bisepts): 162m</li> <li>1 existing/edge crossings: 58m</li> <li>MCS: 1 new crossing (bisept): 191m</li> <li>3 existing/edge crossings: 146m</li> </ul>
<b>VEGETATION – Unevaluated Wetlands</b>	<ul style="list-style-type: none"> <li>The Study Area contains several small pockets of unevaluated wetland units.</li> </ul> <p>[Source: desktop assessment of 2014 data (Land Information Ontario, Ministry of Natural Resources and Forestry and Grand River Conservation Authority)]</p>	<ul style="list-style-type: none"> <li>Route either crosses the edge of, or uses existing infrastructure to cross the edge of 4 wetland pockets.</li> </ul>	<ul style="list-style-type: none"> <li>Route either crosses the edge of, or uses existing infrastructure to cross the edge of 4 wetland pockets.</li> </ul>	<ul style="list-style-type: none"> <li>Route crosses along the edges of, or through portions of 2 wetland pockets.</li> </ul>	<ul style="list-style-type: none"> <li>Route crosses along the edges of, or through portions of 2 wetland pockets.</li> </ul>
		<ul style="list-style-type: none"> <li>4 existing/edge crossings: 102m</li> </ul>	<ul style="list-style-type: none"> <li>4 existing/edge crossings: 102m</li> </ul>	<ul style="list-style-type: none"> <li>1 new crossing (bisepts): 15m</li> <li>1 existing/edge crossing: 74m</li> </ul>	<ul style="list-style-type: none"> <li>1 new crossing (bisepts): 29m</li> <li>1 existing/edge crossing: 74m</li> </ul>

EVALUATION CRITERION	MEASURES/ INDICATORS/ SOURCES	ROUTE A1	ROUTE A2	ROUTE B1	ROUTE C1
Wildlife – <b>At Risk Wildlife Species</b>	<ul style="list-style-type: none"> <li>Species at Risk Suitable Habitat for: <ul style="list-style-type: none"> <li>Bobolink (THR)</li> <li>Eastern Meadowlark (THR)</li> <li>Barn Swallow (THR)</li> <li>Wood Thrush (SC)</li> <li>Eastern Wood Pewee (SC) (species confirmed present)</li> </ul> </li> </ul> <p>Source: 2014 field results for those properties that provided permission to survey</p>	<ul style="list-style-type: none"> <li>Route overlaps with edges of Bobolink and Eastern Meadowlark fields; this should pose minimum impact, if any to breeding BOBO and EAME due to minimal removal of hay field.</li> <li>Route overlaps with edge of Eastern Wood-Pewee and Wood Thrush habitat; this should pose minimum impact, if any to breeding EWPE and WOTH due to vast expanse of remaining intact woodlands.</li> </ul>	<ul style="list-style-type: none"> <li>Route overlaps with edges of Bobolink and Eastern Meadowlark fields; this should pose minimum impact, if any to breeding BOBO and EAME due to minimal removal of hay field.</li> <li>Route overlaps with edge of Eastern Wood-Pewee and Wood Thrush habitat; this should pose minimum impact, if any to breeding EWPE and WOTH due to vast expanse of remaining intact woodlands.</li> <li>Route A2 crosses Moffat Creek corridor at a narrower location, reducing impact to this habitat.</li> <li>Potential removal of Shellard Road PSW crossing and possible restoration could improve habitat.</li> </ul>	<ul style="list-style-type: none"> <li>Route crosses through BOBO and EAME hay field; this may negatively affect the species due to creating two smaller habitat patches.</li> </ul>	<ul style="list-style-type: none"> <li>Route overlaps with edges of Bobolink and Eastern Meadowlark fields; this should pose minimum impact, if any to breeding BOBO and EAME due to minimal removal of hay field.</li> <li>Route may require removal of Barn Swallow habitat which will negatively affect breeding BARS.</li> <li>Potential removal of Shellard Road PSW crossing and possible restoration could improve habitat.</li> </ul>

EVALUATION CRITERION	MEASURES/ INDICATORS/ SOURCES	ROUTE A1	ROUTE A2	ROUTE B1	ROUTE C1
Wildlife – <b>Specialized Habitats</b>	<ul style="list-style-type: none"> <li>Salamander Breeding Habitat for Blue-spotted Salamanders (No Jefferson's Salamander, despite extensive study and genetic testing in cooperation with the University of Guelph). <ul style="list-style-type: none"> <li>High concentrations of individuals were identified along Routes A and C.</li> </ul> </li> </ul> <p>[Source: 2014 field results for those properties that provided permission to survey]</p>	<ul style="list-style-type: none"> <li>Route would remove confirmed salamander breeding ponds along Shellard Road that contained high numbers of individuals (49 salamanders captured in one pond).</li> </ul>	<ul style="list-style-type: none"> <li>Route would avoid confirmed salamander breeding ponds along Shellard Road.</li> </ul>	<ul style="list-style-type: none"> <li>Route would not cross or negatively affect any confirmed salamander breeding ponds.</li> </ul>	<ul style="list-style-type: none"> <li>Route would bisect large wetland that contained medium number of individuals in various pockets of wetland habitat</li> <li>Route adjusted to avoid removal of confirmed salamander breeding ponds that contained medium numbers of individuals (19 salamanders captured in pond).</li> </ul>
Wildlife – <b>Other Seasonal Concentration Areas</b>	<ul style="list-style-type: none"> <li>Turtle Nesting /Overwintering Habitat (Snapping Turtle)</li> </ul> <p>[Source: 2014 field results for those properties that provided permission to survey]</p>	<ul style="list-style-type: none"> <li>Turtle nesting/overwintering areas north of Clyde Road are not impacted by this route.</li> </ul>	<ul style="list-style-type: none"> <li>Turtle nesting/overwintering areas north of Clyde Road are not impacted by this route.</li> </ul>	<ul style="list-style-type: none"> <li>Turtle nesting/overwintering areas were not identified along this route.</li> </ul>	<ul style="list-style-type: none"> <li>Turtle nesting/overwintering areas were not identified along this route.</li> </ul>
	<ul style="list-style-type: none"> <li>Amphibian call count stations. Significant calling activity stations include full choruses and a minimum of 4 different species.</li> </ul> <p>[Source: 2014 field results for those properties that provided permission to survey]</p>	<ul style="list-style-type: none"> <li>Route A1 crosses 3 diverse and active amphibian calling stations. These wetlands will either be reduced in size or removed completely.</li> </ul>	<ul style="list-style-type: none"> <li>Route A2 crosses 2 diverse and active amphibian calling stations. These wetlands will either be reduced in size or removed completely</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Route C crosses 2 diverse and active amphibian calling stations. These wetlands will either be reduced or removed completely.</li> </ul>

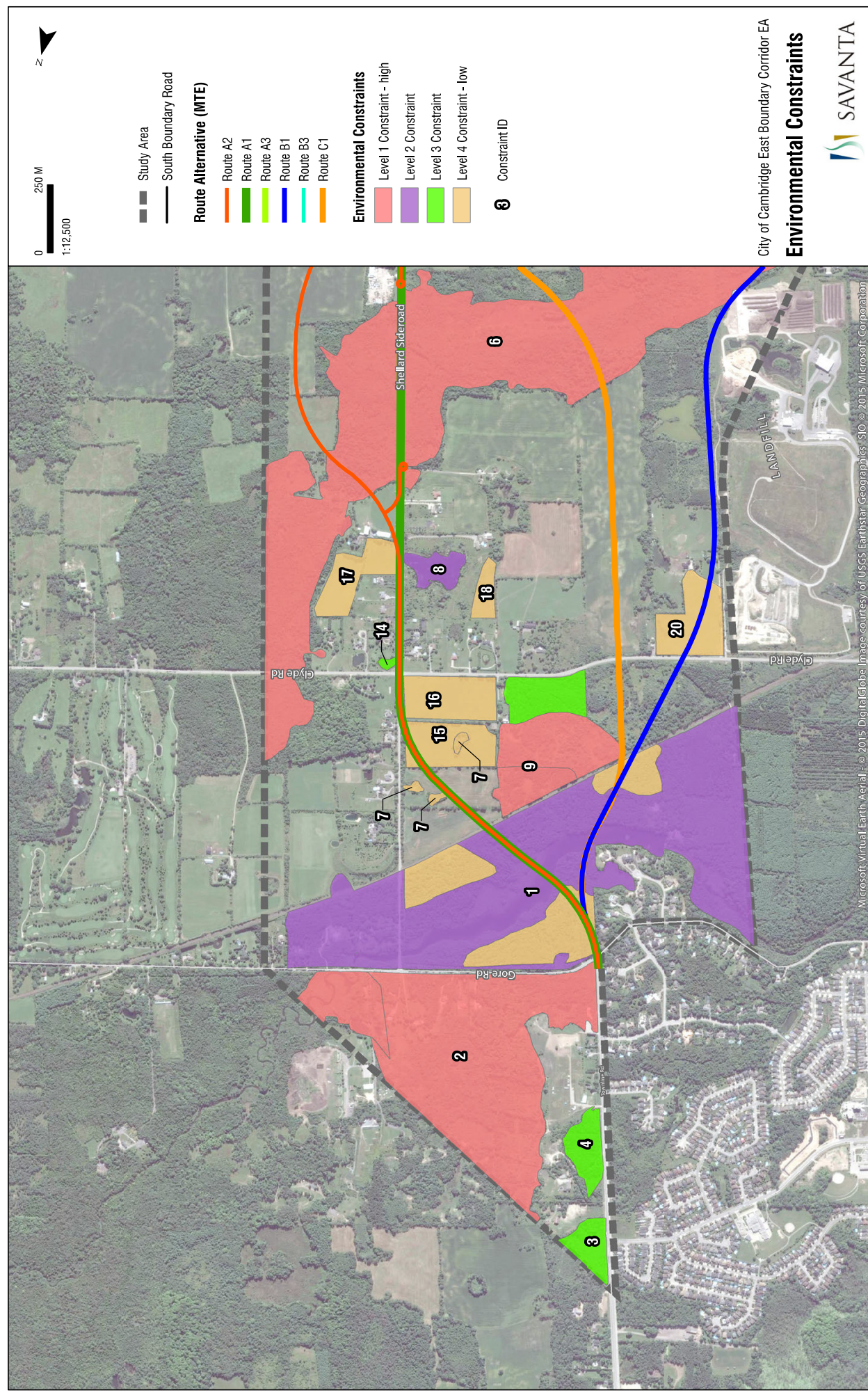
EVALUATION CRITERION	MEASURES/ INDICATORS/ SOURCES	ROUTE A1	ROUTE A2	ROUTE B1	ROUTE C1
<ul style="list-style-type: none"> <li>TERRESTRIAL SUMMARY</li> </ul>	<ul style="list-style-type: none"> <li>Greatest impact to Significant Woodlands</li> <li>Greatest linear footprint impact to Significant Wetlands, however majority is within areas of existing infrastructure where edge impacts are likely present</li> <li>Minor edge impacts to SAR bird habitat</li> <li>Removal of confirmed salamander breeding ponds</li> <li>Greatest impact to calling amphibians</li> </ul>	<ul style="list-style-type: none"> <li>Bisects smaller portion of core Significant Wetland than C1</li> <li>Minor edge impacts to SAR bird habitat</li> </ul>	<ul style="list-style-type: none"> <li>Least impact to Significant Woodlands</li> <li>Least impacts to Significant Wetlands, since all crossings bisect edges</li> <li>Greatest impact to grassland SAR bird habitat</li> <li>Least impact to salamanders, calling amphibians, and turtles</li> </ul>	<ul style="list-style-type: none"> <li>Bisects large portion of core Significant Wetland</li> <li>Possible removal of SAR bird habitat (BARS)</li> <li>Minor edge impacts to grassland SAR bird habitat</li> </ul>	
				<ul style="list-style-type: none"> <li>Preferred from a terrestrial perspective due to the least amount of impact to Significant Woodlands, Significant Wetlands and SAR</li> </ul>	<ul style="list-style-type: none"> <li>Least desirable from a terrestrial perspective due to significant footprint impacts to core features of Significant Wetlands and potential SAR impacts</li> </ul>

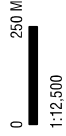
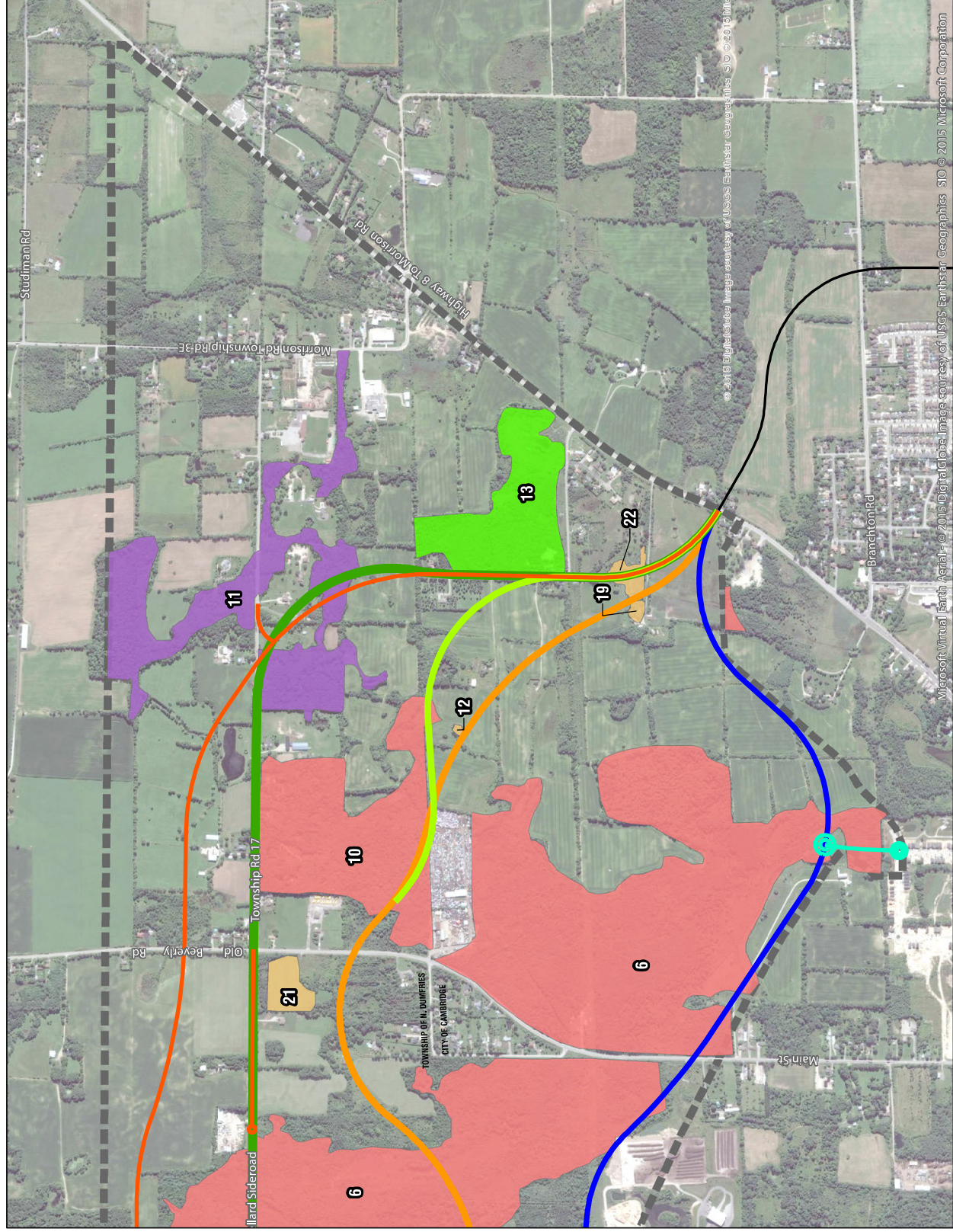
EVALUATION CRITERION	MEASURES/ INDICATORS/ SOURCES	ROUTE A1	ROUTE A2	ROUTE B1	ROUTE C1
<b>AQUATIC BIOTA</b>					
<b>NUMBER OF NEW CROSSINGS OF AQUATIC HABITATS</b>	Source: desktop assessment of data from Land Information Ontario (LIO), Grand River Conservation Authority and Ministry of Natural Resources and Forestry				
<ul style="list-style-type: none"> <li>Intermittent stream crossings</li> <li>Minor stream crossings</li> <li>Major stream crossings</li> <li>Pond crossings</li> </ul>	Number of identified intermittent streams crossed by alignment  Number of identified minor streams crossed by alignment  Number of identified major streams crossed by alignment (Mill Creek, Moffat Creek)  Number of identified ponds crossed by alignment	3  0  1  2	5  0  2  2	3  0  2  1	3  0  2  3
<b>TOTAL NEW CROSSINGS</b>	Total number of new crossings of all types required by alignment	6	9	6	8
<b>UPGRADES TO EXISTING CROSSINGS</b>	Total number of upgrades to existing crossings required by alignment	1 • Moffat Creek	0	0	0
<b>FISH HABITAT</b>	All routes will impact fish habitat				
<b>SPECIES AT RISK</b>	Insufficient data at this level of study				

EVALUATION CRITERION	MEASURES/ INDICATORS/ SOURCES	ROUTE A1	ROUTE A2	ROUTE B1	ROUTE C1
MUSSELS AT RISK	Insufficient data at this level of study				
AQUATIC INVERTEBRATES AT RISK	Insufficient data at this level of study				
<b>AQUATIC SUMMARY</b>		All crossings have the potential to impact fish habitat. Route B1 has the fewest new crossings of major stream crossings. Further fisheries investigations would be required to determine the extent of impact to fish habitat and determine the presence of aquatic SAR.			

**TABLE NOTES AND ASSUMPTIONS:**

1. Various route combinations (e.g., using partial routes and diversions to create a new route) were not assessed for this exercise.
2. These preliminary evaluations are based upon the best available information, including field observations on all accessible lands.
3. The weighting and ranking of these criteria and sub-criteria are in support of the overall evaluation of alternatives.





- Study Area
- South Boundary Road
- Route Alternative (MTE)**
- Route A2
- Route A1
- Route A3
- Route B1
- Route B3
- Route C1

- Environmental Constraints**
- Level 1 Constraint - High
- Level 2 Constraint
- Level 3 Constraint
- Level 4 Constraint - low

③ Constraint ID

City of Cambridge East Boundary Corridor EA  
**Environmental Constraints**



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# APPENDIX C

**Overview of Existing and Planned Land Uses  
(URS, December 2012)**

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**EAST BOUNDARY ROAD CORRIDOR STUDY**  
*CITY OF CAMBRIDGE, TOWNSHIP OF NORTH DUMFRIES, AND TOWNSHIP OF PUSLINCH*

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**Overview of Existing and Planned Land Uses**

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*March 2014*



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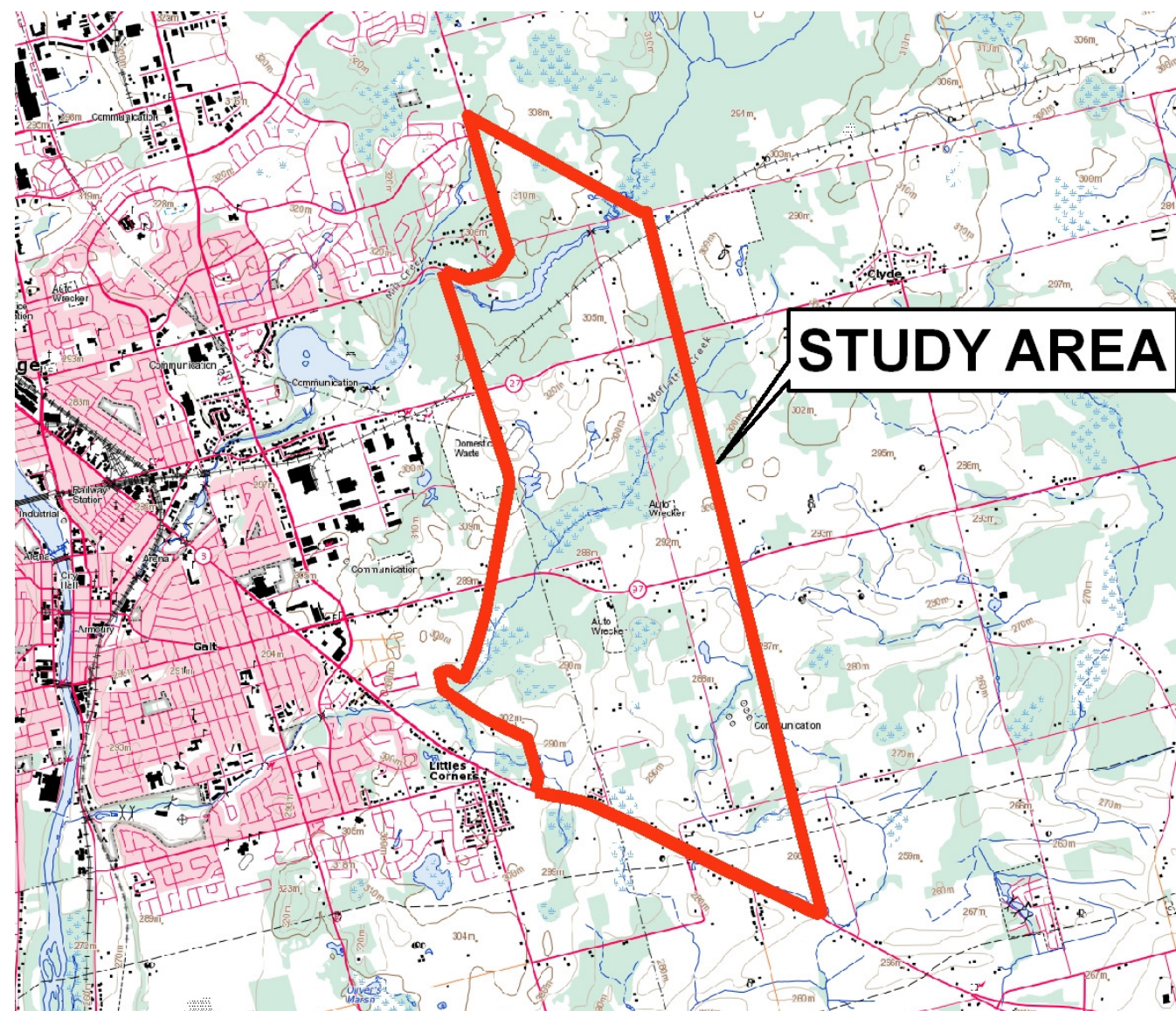
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## 1.0 INTRODUCTION

The purpose of the East Boundary Road Corridor Study is to identify an alignment for the proposed East Boundary Road Corridor that alleviates traffic along the existing arterial roads, accommodates future growth of the City of Cambridge and Region of Waterloo, complies with Regional and Provincial policies, and minimizes impacts on transportation, the natural environment, cultural environment, and socio-economic environment (including development). The work will be undertaken as a Schedule C project under the Municipal Class Environmental Assessment process. The study area is generally defined by a two kilometre wide corridor extending north of Avenue Road/Gore Road to Dundas Street South/Highway 8 in the south (refer to **Figure 1**).

**Figure 1: Study Area**



The purpose of this *Overview of Existing and Planned Land Uses Report* is to summarize the proposed and existing land uses within the study area. This land use information will assist in determining potential impacts to the existing and planned land uses, in conjunction with other potential impacts to the natural environment, heritage and archaeological resources, as well as transportation network issues and contaminated soil or groundwater.

Land use considerations are integral to the development and evaluation of alternative solutions and alternative designs. The land use inventory is used as one means of examining the environmental and technical feasibility of alternatives, with the intent of minimizing the potential for adverse effects while satisfying the objectives of the study. This *Overview of Existing and Planned Land Uses Report* presents a summary of the secondary source information collected, consultation undertaken with local municipalities, and the field investigations undertaken in July 2012 related to existing and planned land uses in the study area.

The following resources were consulted to obtain information on the existing and planned land uses within the study area:

- Aerial photography;
- City of Cambridge 1999 Official Plan;
- City of Cambridge 2012 Official Plan;
- Township of North Dumfries 2008 Official Plan;
- Region of Waterloo, 1995 Regional Official Policies Plan (September 2006 Consolidation);
- Region of Waterloo, 2010 Regional Official Plan;
- Meetings and correspondence with staff from the City of Cambridge, Township of North Dumfries and Region of Waterloo;
- Statistics Canada 2006 and 2011 Census data;
- Growth Plan for the Greater Golden Horseshoe;
- Greenbelt Plan;
- Oak Ridges Moraine Conservation Plan;
- Niagara Escarpment Plan;
- Ministry of Agricultural, Food and Rural Affairs - Land Canada Inventory;
- Grand River Conservation Authority;
- County of Wellington 2013 Official Plan;
- County of Wellington Official Plan Amendment 81 (adopted September 26, 2013); and
- Correspondence with County of Wellington.

## 2.0 GEOGRAPHICAL AND POLICY CONTEXT

### 2.1 GEOGRAPHICAL CONTEXT

The study area is situated in the City of Cambridge, the Township of North Dumfries within the Region of Waterloo, and the Township of Puslinch within the County of Wellington. The study area is generally defined by a two kilometre wide corridor extending north of Avenue Road/Gore Road to Dundas Street South/Highway 8 in the south (refer to **Figure 1**).

**Table 1** summarizes the population and total private dwellings (based on 2011 Statistics Canada census data) and **Table 2** summarizes the place of work status, mode of transportation to work, and the breakdown of industry within the City of Cambridge, Township of North Dumfries, Township of Puslinch, Region of Waterloo, and County of Wellington (based on 2006 Statistics Canada census data).

**Table 1: Population Numbers and Dwellings in the Study Area**

Municipality	Population	Total Private Dwellings
City of Cambridge	126,748 (5.3% increase since 2006) (median age of 38)	47,818
Township of North Dumfries	9,334 (3.0% increase since 2006) (median age of 42.1)	3,288
Region of Waterloo	507,096 (6.1% increase since 2006) (median age of 37.7)	202,121
Township of Puslinch	7,029 (5.1% increase since 2006) (median age of 47.6)	6,935
Wellington County	208,3060 (4.0% increase since 2006) (median age of 39.5)	205,880

Source: Statistics Canada. 2012. Cambridge, Ontario (Code 3530010) and Waterloo, Ontario (Code 3530) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released May 29, 2012. <http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/index.cfm?Lang=E> (accessed June 20, 2012).

Source: Statistics Canada. 2012. North Dumfries, Ontario (Code 3530004) and Waterloo, Ontario (Code 3530) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released May 29, 2012. <http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/index.cfm?Lang=E> (accessed June 20, 2012).

Source: Statistics Canada. 2012. Waterloo, Ontario (Code 3530) and Waterloo, Ontario (Code 3530) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released May 29, 2012. <http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/index.cfm?Lang=E> (accessed June 20, 2012).

Statistics Canada. 2012. Wellington, Ontario (Code 3523) and Ontario (Code 35) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released October 24, 2012. <http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/index.cfm?Lang=E> (accessed September 5, 2013)

Statistics Canada. 2012. Puslinch, Ontario (Code 3523001) and Wellington, Ontario (Code 3523) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released October 24, 2012. <http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/prof/index.cfm?Lang=E> (accessed September 5, 2013)

**Table 2: Place of Work Status, Industry, and Mode of Transportation to Work**

Municipality	Place of Work Status	Industry	Mode of Transportation
City of Cambridge	Worked at Home: 3,340	Agriculture and Other Resource Based Industries: 855	Car, Truck, Van as Driver: 49,405
	Worked Outside: 210	Construction: 4,300	Car, Truck, Van as 5,975

Municipality	Place of Work Status	Industry	Mode of Transportation
	Canada:		Passenger:
	No Fixed Workplace Address: 5,010	Manufacturing: 17,900	Public Transit: 2,195
	Worked at Usual Place: 55,545	Wholesale Trade: 3,855	Walked or Bicycled: 2,580
		Retail Trade: 7,800	All Other Modes: 400
		Finance and Real Estate: 3,360	
		Health Care and Social Services: 5,475	
		Educational Services: 2,935	
		Business Services: 10,900	
		Other: 9,835	
	Township of North Dumfries	Worked at Home: 435	Agriculture and Other Resource Based Industries: 195
Worked Outside Canada: 25		Construction: 415	Car, Truck, Van as Passenger: 285
No Fixed Workplace Address: 410		Manufacturing: 1,080	Public Transit: 15
Worked at Usual Place: 4,345		Wholesale Trade: 295	Walked or Bicycled: 205
		Retail Trade: 545	All Other Modes: 55
		Finance and Real Estate: 310	
		Health Care and Social Services: 440	
		Educational Services: 385	
		Business Services: 915	
		Other: 795	
Region of Waterloo	Worked at Home: 15,875	Agriculture and Other Resource Based Industries: 5,190	Car, Truck, Van as Driver: 189,495
	Worked Outside Canada: 910	Construction: 16,595	Car, Truck, Van as Passenger: 22,415
	No Fixed Workplace Address: 20,860	Manufacturing: 60,375	Public Transit: 10,965
	Worked at Usual Place: 220,010	Wholesale Trade: 13,900	Walked or Bicycled: 16,075
		Retail Trade: 29,450	All Other Modes: 1,920
		Finance and Real Estate: 19,240	
		Health Care and Social Services: 21,845	

Municipality	Place of Work Status	Industry	Mode of Transportation
		Services:	
		Educational Services: 20,515	
		Business Services: 44,485	
		Other: 37,665	
Township of Puslinch	Worked at Home: 505	Agriculture and other resource-based industries: 195	Car, Truck or Van as Driver: 3020
	Worked outside Canada: 20	Construction: 250	Car, Truck or Van as Passenger: 175
	No Fixed Workplace Address: 430	Manufacturing: 575	Public Transit: 60
	Usual Place of Work: 2,910	Wholesale trade: 320	Walked or Bicycled: 75
		Retail Trade: 380	
		Finance and Real Estate: 240	
		Health Care and Social Services: 315	
		Educational Services: 265	
		Business Services: 855	
		Other: 630	
County of Wellington	Worked at Home: 10,405	Agriculture and other resource-based industries: 5,275	Car, Truck or Van as Driver: 77,135
	Worked outside Canada: 370	Construction: 6,470	Car, Truck or Van as Passenger: 8,105
	No Fixed Workplace Address: 9,520	Manufacturing: 25,410	Public Transit: 4,250
	Usual Place of Work: 89,000	Wholesale trade: 5,395	Walked or Bicycled: 7,995
		Retail Trade: 10,515	
		Finance and Real Estate: 5,220	
		Health Care and Social Services: 9,675	
		Educational Services: 10,250	
		Business Services: 17,750	
		Other: 17,610	

Source: Statistics Canada. 2007. Cambridge, Ontario (Code3530010) (table). 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007. <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E> (accessed June 20, 2012).

Source: Statistics Canada. 2007. North Dumfries, Ontario (Code3530004) (table). 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007. <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E> (accessed June 20, 2012).

Source: Statistics Canada. 2007. Waterloo, Ontario (Code3530) (table). 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007. <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E> (accessed June 20, 2012).

Source: Statistics Canada. 2007. *Puslinch, Ontario (Code3523001)* (table). *2006 Community Profiles*. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007. <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E> (accessed September 5, 2013).

Source: Statistics Canada. 2007. *Wellington, Ontario (Code3523)* (table). *2006 Community Profiles*. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007. <http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E> (accessed September 5, 2013).

## 2.2 POLICY CONTEXT

### 2.2.1 Provincial

The *Growth Plan for the Greater Golden Horseshoe* (Growth Plan) by the Ministry of Public Infrastructure Renewal came into effect in June 2006. This document provides policies for managing growth and urban sprawl and building complete communities in the Greater Golden Horseshoe (GGH) to 2031. The Growth Plan specifies density and intensification targets that must be met by GGH municipalities but also includes policies for infrastructure planning such as the development of new transportation corridors in order to support growth.

The Region of Waterloo prepared a new Official Plan based on the provincial Growth Plan. The Official Plan conforms to the new provincial growth plan broad policy and regulatory framework established by the Province and was approved in 2010. Following the approval, the Regional Official Plan was appealed in January 2011 in its entirety before the Ontario Municipal Board. . The City of Cambridge has prepared their new Official Plan in conformity to the Growth Plan and it was approved by the Region on November 30, 2012. The Township of North Dumfries adopted Official Plan Amendment No. 26 in December 2013 in order to bring the Township's Official Plan into conformity with the Growth Plan and the Regional Official Plan.

The *Greenbelt Act and Plan* came into effect in December 2004 which includes 800,000 acres of protected land. The *Greenbelt Plan* identifies where urbanization should not occur in order to provide permanent protection to the agricultural land base and the ecological features and functions occurring on this landscape. The southern tip of the study area is located within the area governed by the *Greenbelt Plan*. For a map of the area, please visit <http://www.mah.gov.on.ca/Asset4326.aspx>.

### 2.2.2 Municipal

#### Regional Municipality of Waterloo

The 2010 Regional Official Plan was approved by the Province in 2010 and combines the broad policy and regulatory framework established by the Province of Ontario with the community planning goals, objectives and policies developed by the Region and the seven area municipalities to ensure Waterloo Region is a sustainable and livable community. All future land-use development, transportation and infrastructure within Waterloo Region must conform to the policies, goals and objectives of the Regional Official Plan. As of January 2011, the Regional Official Plan in its entirety, is under appeal before the Ontario Municipal Board (OMB). As such, both the 2006 and 2010 Regional Official Plans are referenced in this *Overview of Existing and Planned Land Uses Report*.

#### City of Cambridge

The City has been updating the 1999 Official Plan to ensure it reflects the City's full potential in matters related to planning and conforms with the revised provincial and regional policies and plans. On May 7, 2012, Cambridge City Council adopted the 2012 Official Plan for the Corporation of the City of Cambridge, in accordance with Section 17(23) of the Planning Act, R.S.O., 1990, c.P. 13, as amended. Although the Official Plan has been adopted and approved by City Council and by the Regional Municipality of Waterloo, certain section of the Official Plan are currently under appeal before the

Ontario Municipal Board, as such both the 1999 and 2012 Official Plans are referenced in this *Overview of Existing and Planned Land Uses Report*.

### Township of North Dumfries

The Township of North Dumfries Official Plan sets out the land use policy directions for long-term growth and development in the municipality. The Township of North Dumfries adopted Official Plan Amendment No. 26 in December 2013 in order to bring the Township's Official Plan into conformity with the Growth Plan and the Regional Official Plan. The Region is in the process of reviewing this Amendment.

### Township of Puslinch in the County of Wellington

The Township of Puslinch has no Official Plan that sets out land use policy and direction for long-term growth and development within the municipality. As such the Official Plan that governs is set out by the County of Wellington. The Official Plan recently underwent its 5-year review and was adopted in September 2013.

### 3.0 LAND USE

Based on the 2012 City of Cambridge Official Plan, the portion of the study area within the City of Cambridge is a mix of built-up area and designated greenfield area (refer to **Figure 2**). The general land uses within these areas are shown in **Figure 3**. Between Avenue Road/Gore Road and Clyde Road/Regional Road 27, the land surrounding Shade’s Mill Conservation Area is natural open space, with low / medium density residential on the periphery. Between Clyde Road/Regional Road 27 and Main Street East/Old Beverly Road/Regional Road 97 towards the eastern boundary of this quadrant, an area is designated as future urban reserve and this is bounded by pockets of natural open space system and recreation, cemetery and open space. A small pocket of low / medium density residential is present in southeast edge of this quadrant. Between Main Street East/Old Beverly Road/Regional Road 97 and Dundas Street South/Highway 8, the lands are a mix of low / medium residential and natural open space system. There is one pocket of future urban reserve along the eastern City of Cambridge boundary.

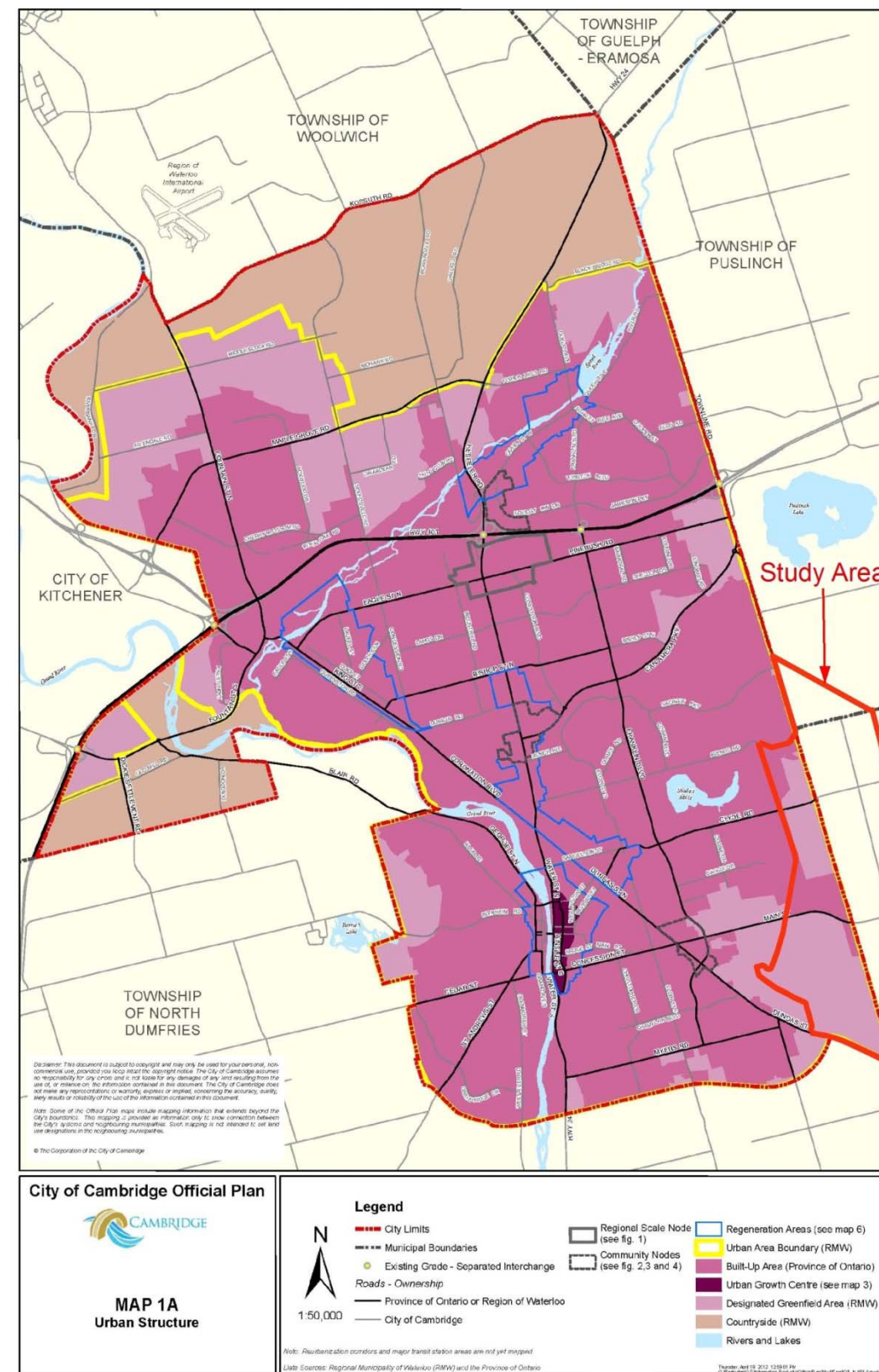
The 1999 City of Cambridge Official Plan classifies the portion of the study area within the City of Cambridge as city urban area. The general land uses identified in the 1999 City of Cambridge Official Plan (refer to **Figure 4**) are generally the same as those identified in the 2012 City of Cambridge Official Plan except:

- The future urban reserve lands located south of Clyde Road/Regional Road 27 are split into Class 1 (prime) agricultural and major recreation open space;
- The natural open space system and recreational, cemetery and open space lands located between Clyde Road/Regional Road 27 and Main Street East/Old Beverly Road/Regional Road 97 are combined and identified as significant natural features;
- The future urban reserve lands located south of Main Street East/Old Beverly Road/Regional Road 97 is identified as Class 2 industrial.

The portion of the study area within the Township of North Dumfries is mainly rural area / agricultural. There are two Rural Settlement Areas (designated in the 1995 ROPP) within the study area, in the Township of North Dumfries. Morrison Rural Settlement Area is located in the southern portion of the study area and is comprised of mainly residential uses as well as some commercial/industrial uses. Mackie Rural Settlement Area is located in the northern portion of the study area and is comprised of residential uses. There are some rural residential uses along Shellard Road, primarily on the west side (refer to **Figure 5** and **Section 3.5.2** for more site specific information).

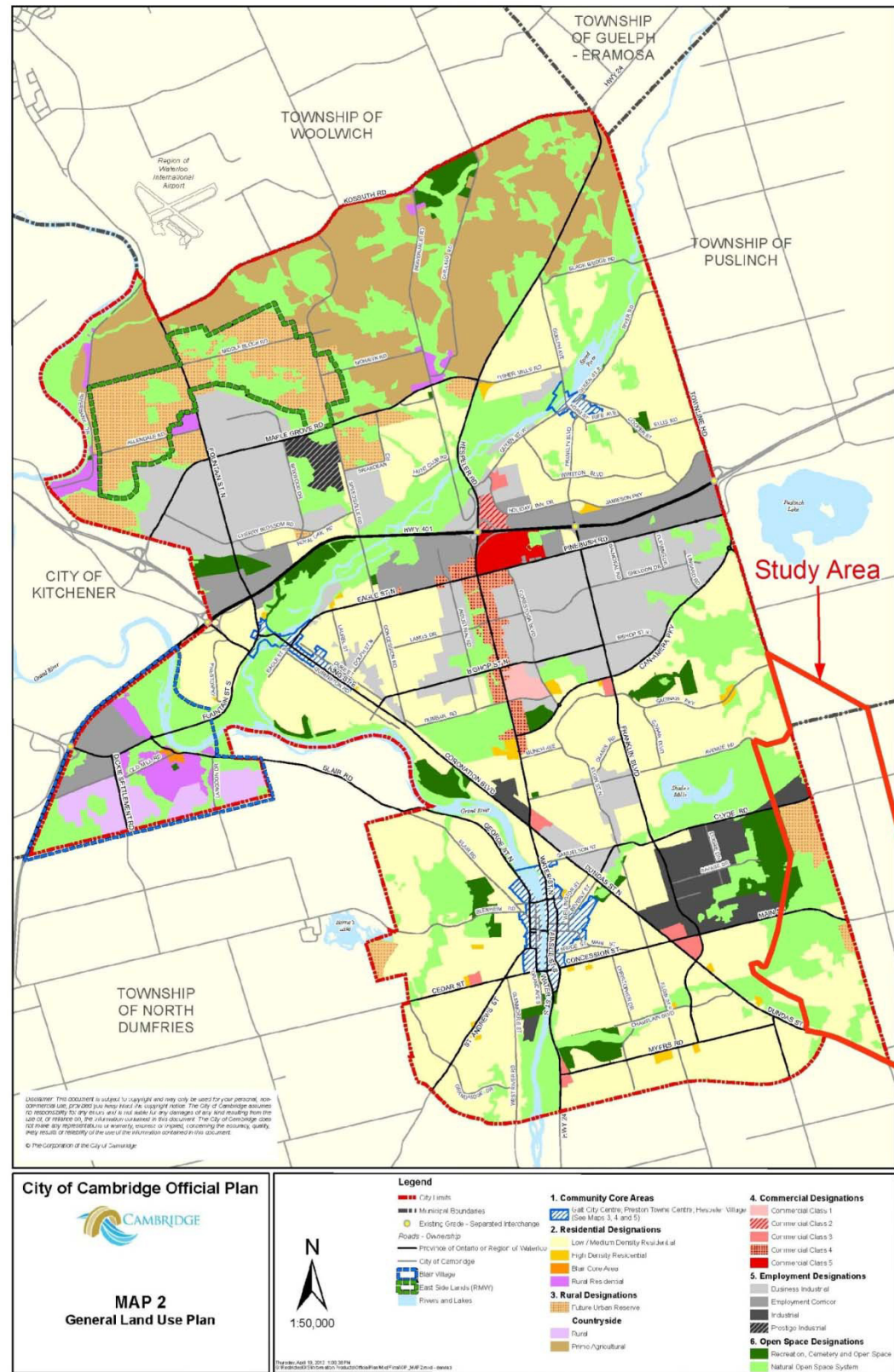
The portion of the study area within the Township of Puslinch is rural area and consists of secondary agricultural lands (refer to **Figure 6**).

**Figure 2: City of Cambridge 2012 Official Plan Urban Structure**



Source: <http://www.cambridge.ca/relatedDocs/OfficialPlan7May2012.pdf>

Figure 3: City of Cambridge 2012 Official Plan General Land Use Plan



East Boundary Road Corridor Study  
 City of Cambridge, Township of North Dumfries and Township of Puslinch

Figure 4: City of Cambridge 1999 Official Plan General Land Use Plan

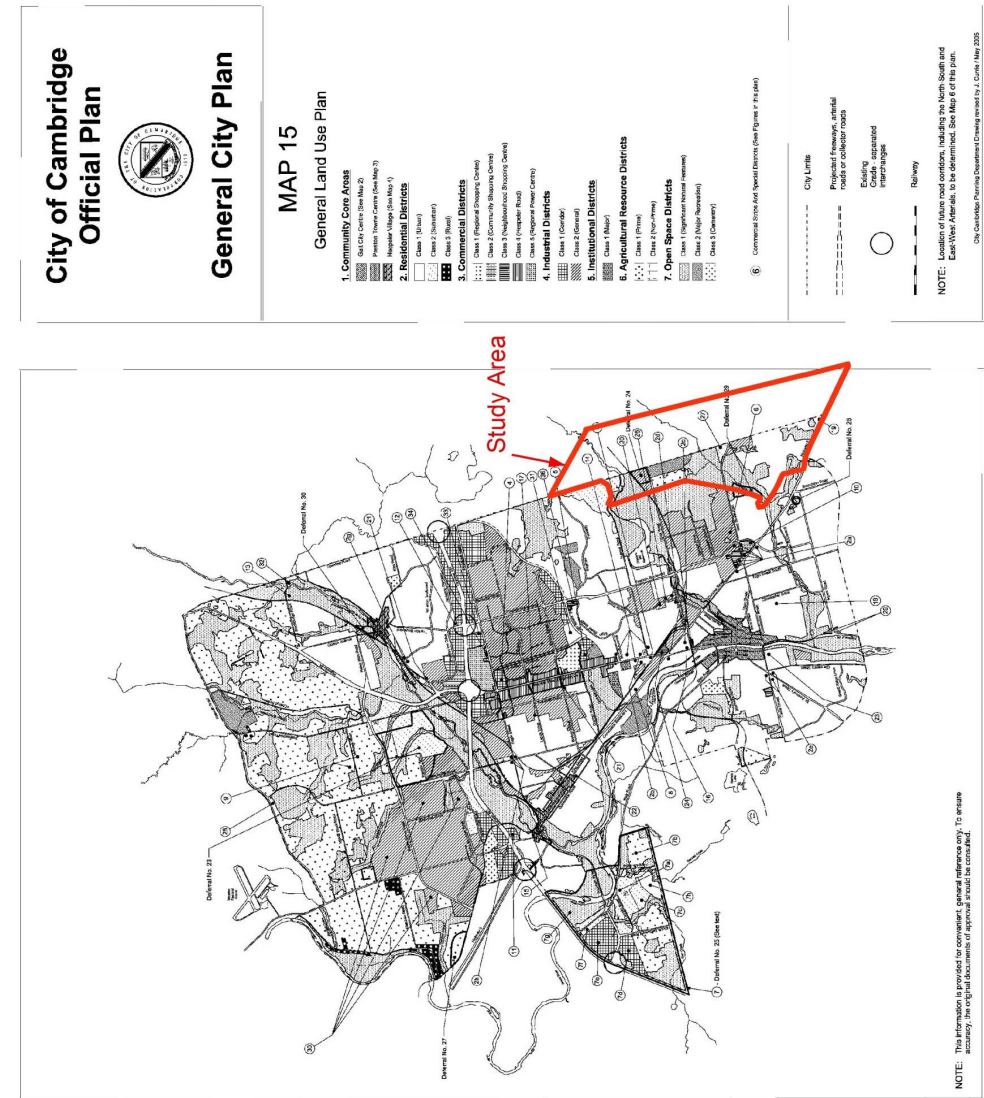


Figure 5: Township of North Dumfries 2008 Official Plan Land Use Map

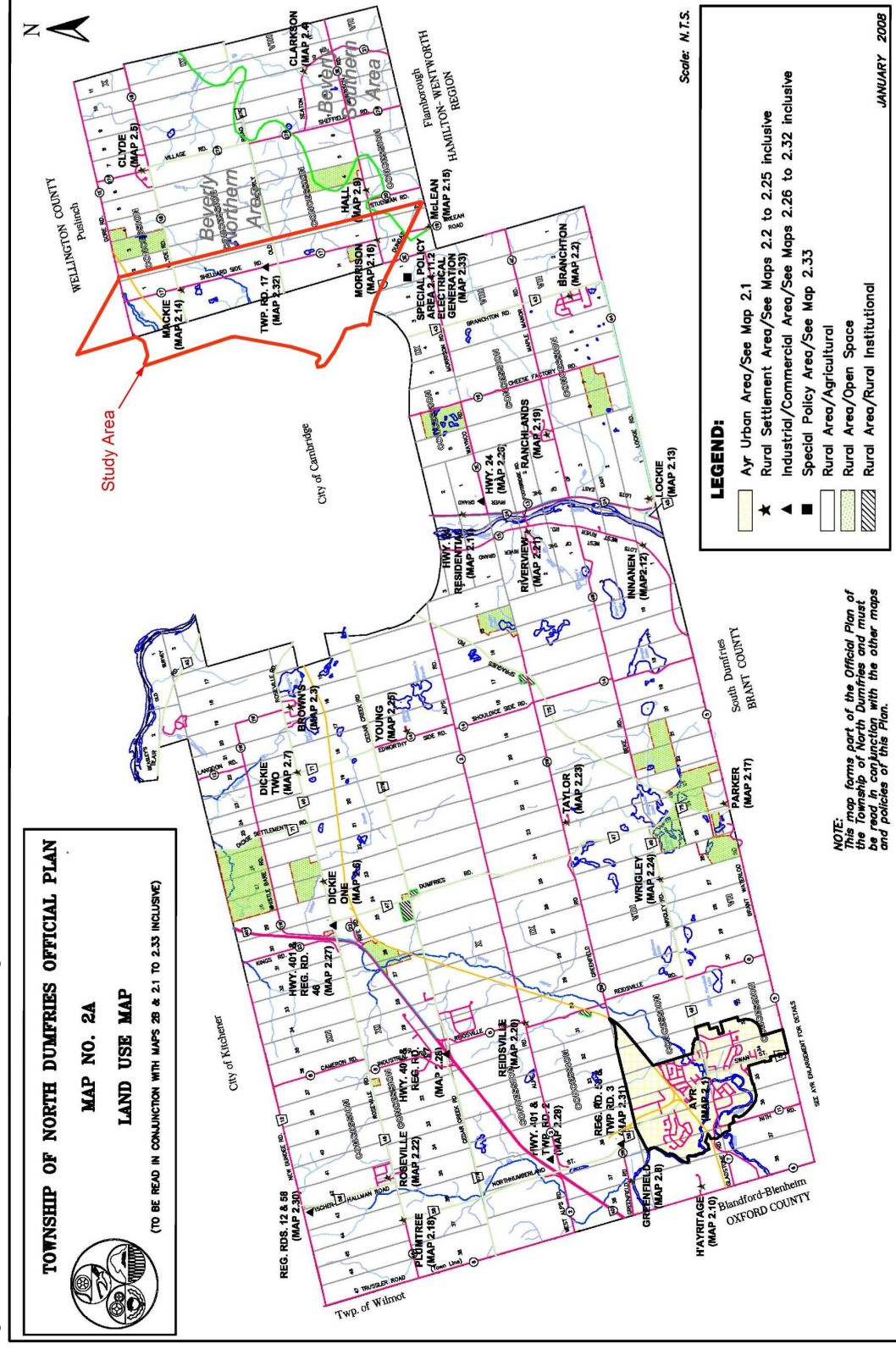
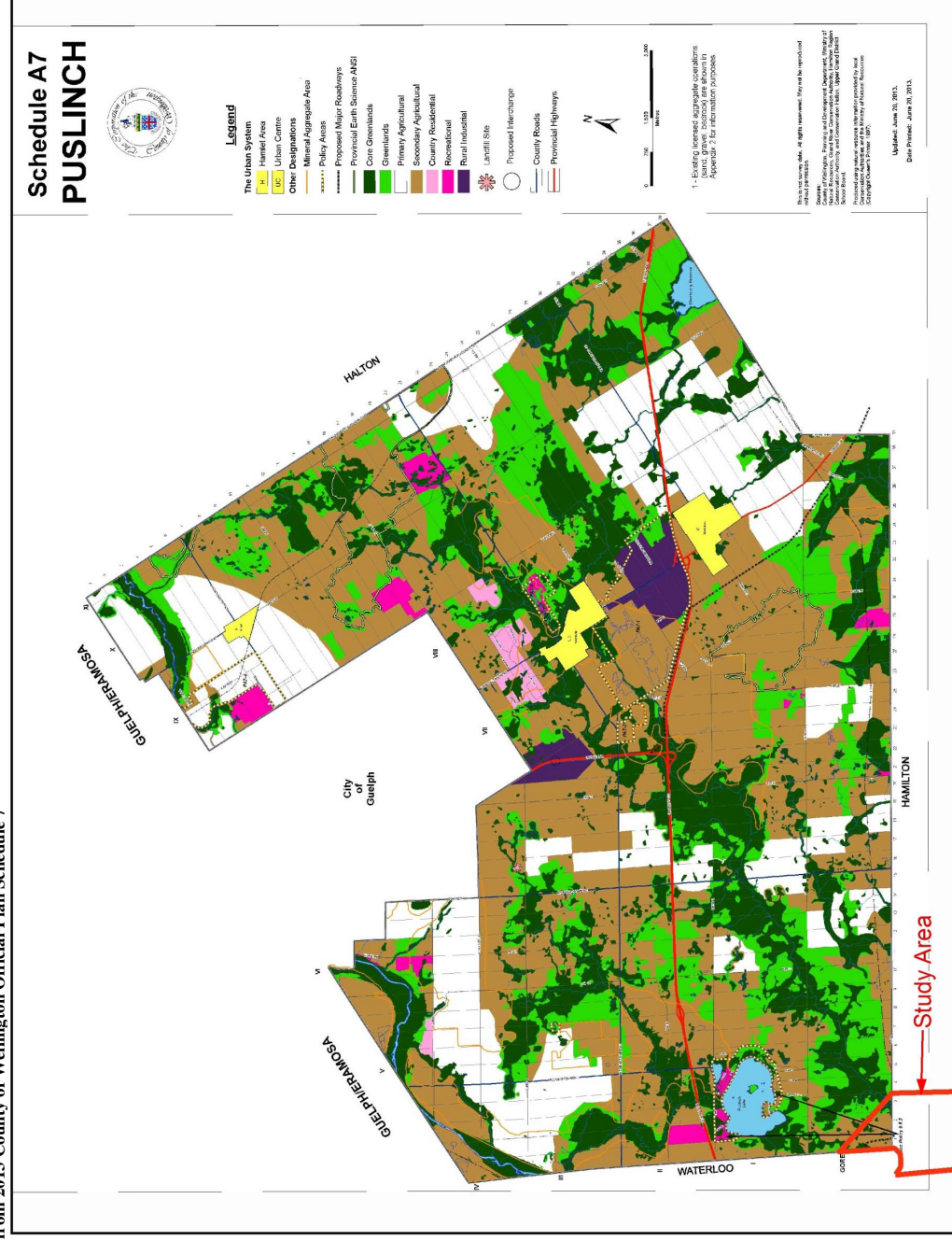


Figure 6: Township of Puslinch from 2013 County of Wellington Official Plan Schedule 7



### 3.1 AGRICULTURAL

Within the portion of the study area designated as rural area / agricultural, the majority of the lands are designated as Class 4 soils (refer to **Figure 7**). Class 4 soils have severe limitations that restrict the range of crops or require special conservation practices, or both. The limitations seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting, choice of crops, and methods of conservation. The soils are low to fair in productivity for a fair range of crops but may have high productivity for a specially adapted crop. There are also fairly small pockets of Class 1 soils (in the vicinity of Vanier Drive), Class 2 soils (in the vicinity of Shellard Side Road and Main Street East/Old Beverly Road/Regional Road 97, and also south of Avenue Road/Gore Road at Townline Road/Regional Road 33), Class 3 soils (at the eastern boundary of the study area north of Morrison Road and in the north portion of the study area by Gore Road and Townline Road), Class 5 soils (in the vicinity of the eastern boundary of the study area and Morrison Road), Class 6 soils (along Shellard Side Road north of Morrison Road), and organic soils (generally abutting the major watercourses). Descriptions of these soils classes are below:

#### **Class 1**

Soils in this class have no significant limitations in use for crops. The soils are deep, are well to imperfectly drained, hold moisture well, and in the virgin state were well supplied with plant nutrients. They can be managed and cropped without difficulty. Under good management, they are moderately high to high in productivity for a wide range of crops.

#### **Class 2**

Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices. The soils are deep and hold moisture well. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management, they are moderately high to high in productivity for a fairly wide range of crops.

#### **Class 3**

Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices. The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage, planting and harvesting, choice of crops, and methods of conservation. Under good management, they are fair to moderately high in productivity for a fair range of crops.

#### **Class 4**

Soils in this class have severe limitations that restrict the range of crops or require special conservation practices, or both. The limitations seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting, choice of crops, and methods of conservation. The soils are low to fair in productivity for a fair range of crops but may have high productivity for a specially adapted crop.

#### **Class 5**

Soils in this class have very severe limitations that restrict their capability of producing perennial forage crops and improvement practices are feasible. The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants, and may be improved by the use of farm machinery. Improvement practices may include cleaning of brush, cultivation, seeding, fertilizer, or water control.

#### **Class 6**

Soils in this class are only capable of producing perennial forage crops and improvement practices are not feasible. The soils provide some sustained grazing for farm animals, but the limitations are so severe that improvement by use of farm machinery is impractical. The terrain may be unsuitable for use of farm machinery, or the soils may not respond to improvement, or the grazing season may be very short.

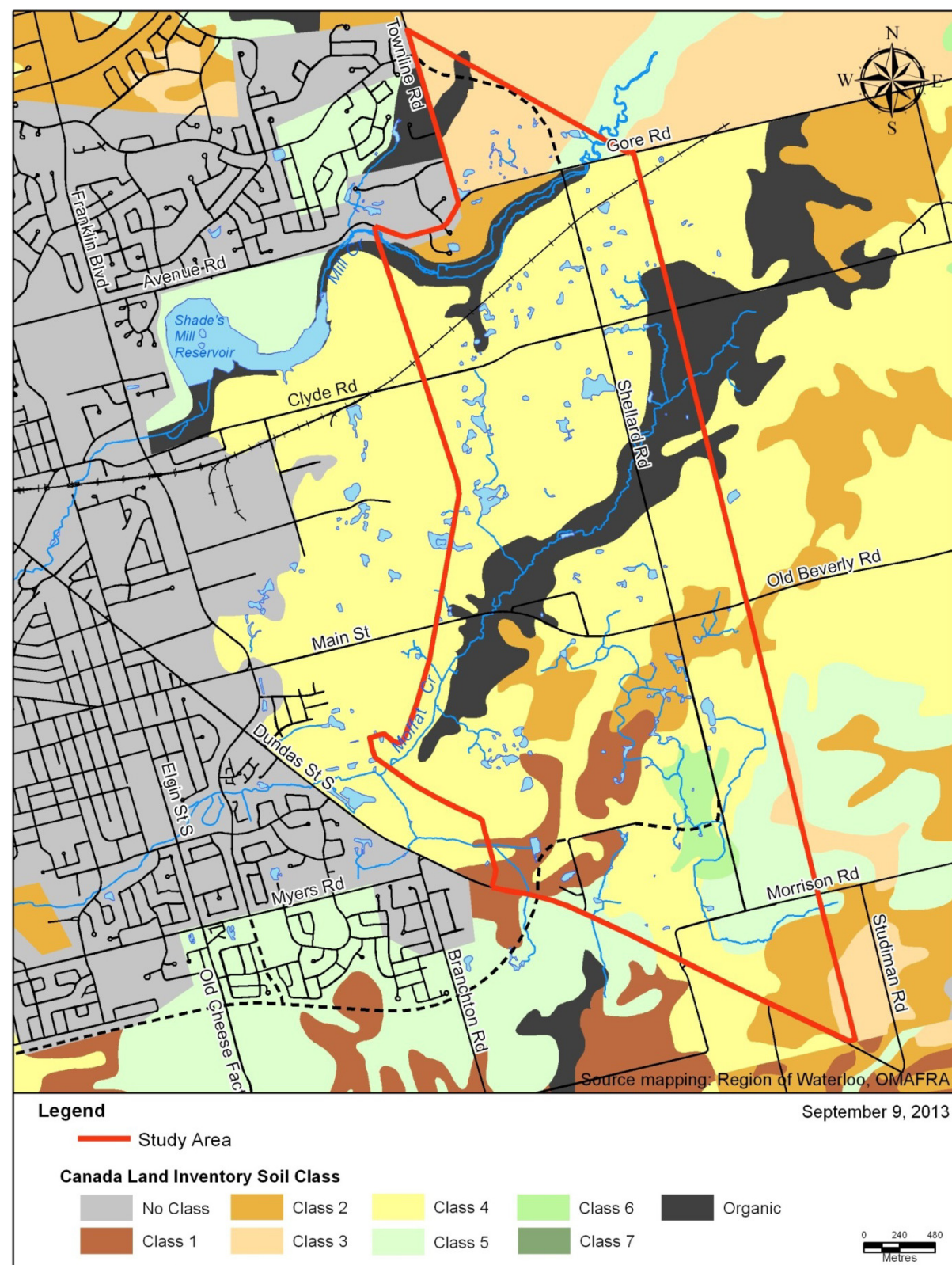
#### **Class 7**

Soils in this class have no capability for arable culture or permanent pasture. This class also includes rockland, other non-soil areas, and bodies of water too small to show on the maps.

#### **Organic**

Organic soils are not categorized in capability classes.

Figure 7: Historical Soil Classes Within the Study Area



Based on the Agricultural Community Profiles from the 2011 Statistics Canada Census, the City of Cambridge, Township of North Dumfries, and Township of Puslinch have a combined total of 309 farms with 435 operators, and the total combined gross farm receipts (excluding forest products sold) was \$93,101,331. **Table 3** breaks down this information by municipality and summarizes the industry groups, tillage practices and operating arrangements of the farms.

Table 3: Place of Work Status, Industry, and Mode of Transportation to Work

Municipality	Total # of Farms, Operators, Gross Farm Receipts	Industry Groups	Tillage Practices	Operating Arrangements
City of Cambridge	21 farms 35 operators \$3,517,675 in gross farm receipts	Cattle ranching and farming (4) Hog and pig farming (0) Poultry and egg production (0) Sheep and goat farming (1) Other animal production (2) Oilseed and grain farming (6) Vegetable and melon farming (3) Fruit and tree nut farming (0) Greenhouse, nursery and floriculture production (2) Other crop farming (3)	19 of the 21 farms reported: No-till seeding or zero-till seeding (9) Tillage retaining most crop residue on the surface (5) Tillage incorporating most crop residue into soil (5)	Sole proprietorship (11) Partnership without an agreement (6) Partnership with an agreement (1) Family corporation (2) Non-family corporation (1)
Township of North Dumfries	124 farms 180 operators \$66,719,391 in gross farm	Cattle ranching and farming (24) Hog and pig farming (2) Poultry and egg production (8)	114 of the 124 farms reported: No-till seeding or zero-till seeding (40) Tillage retaining most crop residue on the	Sole proprietorship (59) Partnership without an agreement (21) Partnership with an agreement (2)

Municipality	Total # of Farms, Operators, Gross Farm Receipts	Industry Groups	Tillage Practices	Operating Arrangements
	receipts	Sheep and goat farming (3) Other animal production (23) Oilseed and grain farming (42) Vegetable and melon farming (2) Fruit and tree nut farming (2) Greenhouse, nursery and floriculture production (5) Other crop farming (13)	surface (43) Tillage incorporating most crop residue into soil (31)	Family corporation (39) Non-family corporation (3)
Township of Puslinch	164 farms 220 operators \$22,867,265 in gross farm receipts	Cattle ranching and farming (27) Hog and pig farming (3) Poultry and egg production (10) Sheep and goat farming (4) Other animal production (54) Oilseed and grain farming (28) Vegetable and melon farming (2)	105 of the 164 farms reported: No-till seeding or zero-till seeding (30) Tillage retaining most crop residue on the surface (30) Tillage incorporating most crop residue into soil (45)	Sole proprietorship (94) Partnership without an agreement (37) Partnership with an agreement (4) Family corporation (24) Non-family corporation (4) Other operating arrangements (1)

Municipality	Total # of Farms, Operators, Gross Farm Receipts	Industry Groups	Tillage Practices	Operating Arrangements
		Fruit and tree nut farming (1) Greenhouse, nursery and floriculture production (9) Other crop farming (26)		

Source: Statistics Canada, 2011 Census of Agriculture, Farm and Farm Operator Data, catalogue no. 95-640-XWE. Source: Statistics Canada, 2011 Census of Agriculture, Farm and Farm Operator Data, catalogue no. 95-640-XWE.

### 3.2 RESIDENTIAL

Based on the 2012 City of Cambridge Official Plan low / medium density residential areas are located on the periphery of Shade’s Mill Conservation Area, and in the area bounded by Main Street East/Old Beverly Road/Regional Road 97, Dundas Street South/Highway 8, and the study area’s eastern boundary.

### 3.3 COMMERCIAL / INDUSTRIAL

Industrial lands are concentrated generally between Clyde Road/Regional Road 27 and Main Street East/Old Beverly Road/Regional Road 97. Notable businesses include:

- Applied Automation Canada – Clyde Road/Regional Road 27 west of Shellard Side Road;

The 2012 City of Cambridge Official Plan highlights one provincially identified former waste disposal site adjacent to the study area, located south of Clyde Road/Regional Road 27 and east of the termination of Savage Drive (refer to **Figure 8**). The area is currently a waste transfer site.

### 3.4 COMMUNITY / RECREATIONAL / INSTITUTIONAL

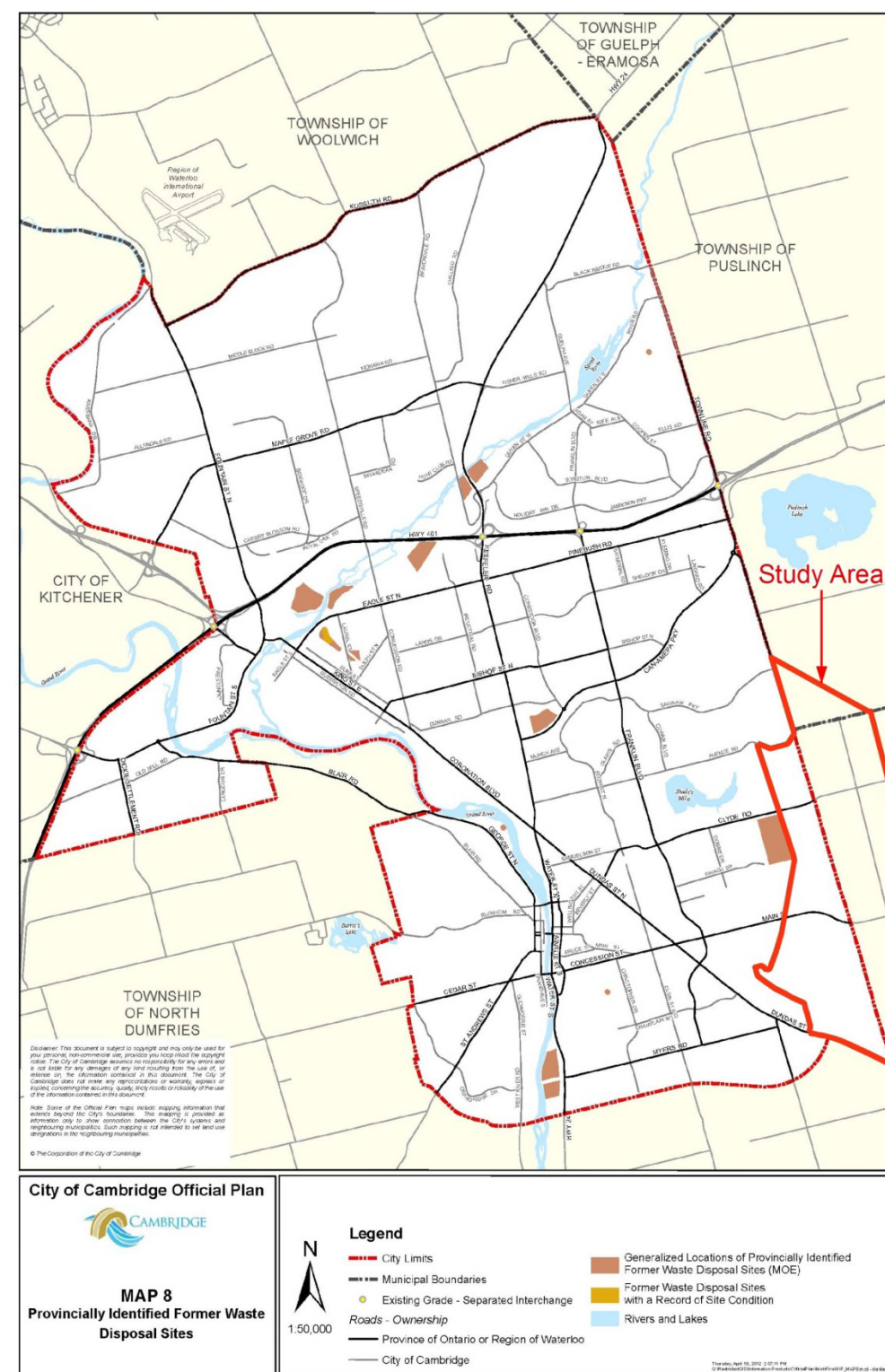
The most notable community and recreational feature within the study area is Shade’s Mill Conservation Area, located between Avenue Road/Gore Road and Clyde Road/Regional Road 27 (refer to **Figure 9**). Shade’s Mill Conservation Area is managed by the Grand River Conservation Authority and hosts activities such as:

- Swimming – buoyed swimming area adjacent to a beach;
- Fishing and ice fishing – in Shade’s Mill reservoir. Summer species include small and largemouth bass, northern pike, yellow perch, black crappie, brown bullheads and sunfish. Winter species include northern pike, yellow perch, black crappie, and sunfish. A catch and release program is in effect;
- Canoeing and boating – a boat launch is present and canoes are available for rent. Gas motors are prohibited, but electric trawlers may be used;
- Hiking - 12 km of hiking trails through a mature hardwood forest that winds along Mill Creek;
- Cycling Trails include the Plantation Trail, Toyota Way Trail, Deer Run Trail, Red Pine Trail, and Snowshoe Trail;

- Picnicing - three large pavilions are available for rent, and there are also plenty of picnic tables throughout the park on a first come first serve basis;
- Disc golf – 9-hole disc golf course. Equipment is available for rent at the gatehouse; and
- Cross country skiing and snowshoeing – 8 km of groomed ski trails which form loops throughout the park and cater to all skill levels, and 2.2 km of snowshoe trails. There is a heated chalet and ski rentals are available.

There are currently no existing regional cycling routes within the study area. Both the Region of Waterloo (2010 Official Plan) and the City of Cambridge (2012 Official Plan) have cycling routes and paved shoulder treatments planned within the study area (refer to **Figure 10** and **Figure 11**).

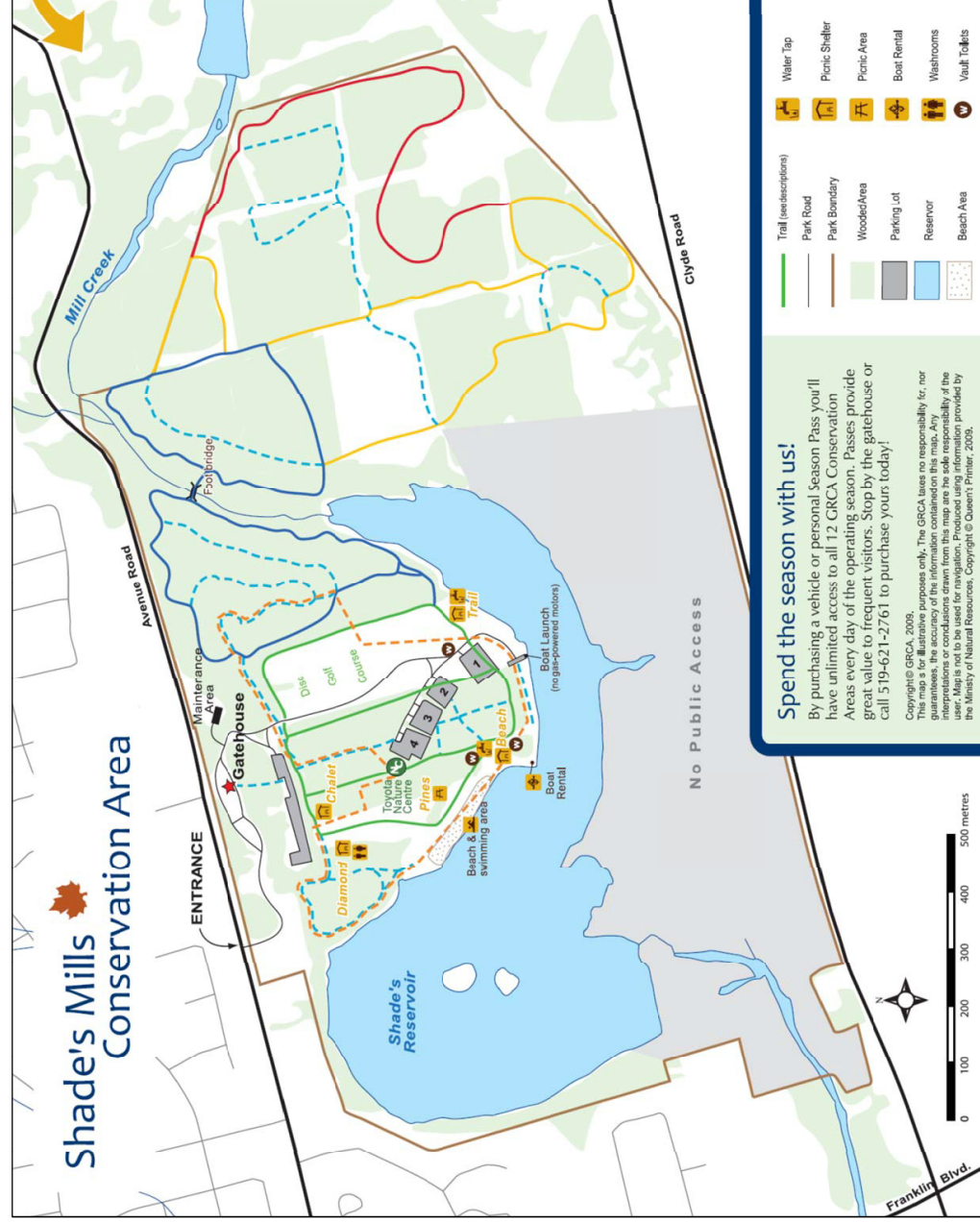
**Figure 8: Provincially Identified Former Waste Disposal Sites**



Source: <http://www.cambridge.ca/relatedDocs/Appendix%207%20Revised%200Psmall.pdf>

East Boundary Road Corridor Study  
City of Cambridge, Township of North Dumfries and Township of Puslinch

Figure 9: Guide to Shade's Mill Conservation Area



East Boundary Road Corridor Study  
City of Cambridge, Township of North Dumfries and Township of Puslinch

Figure 10: Region of Waterloo 2010 Official Plan Cycling Routes

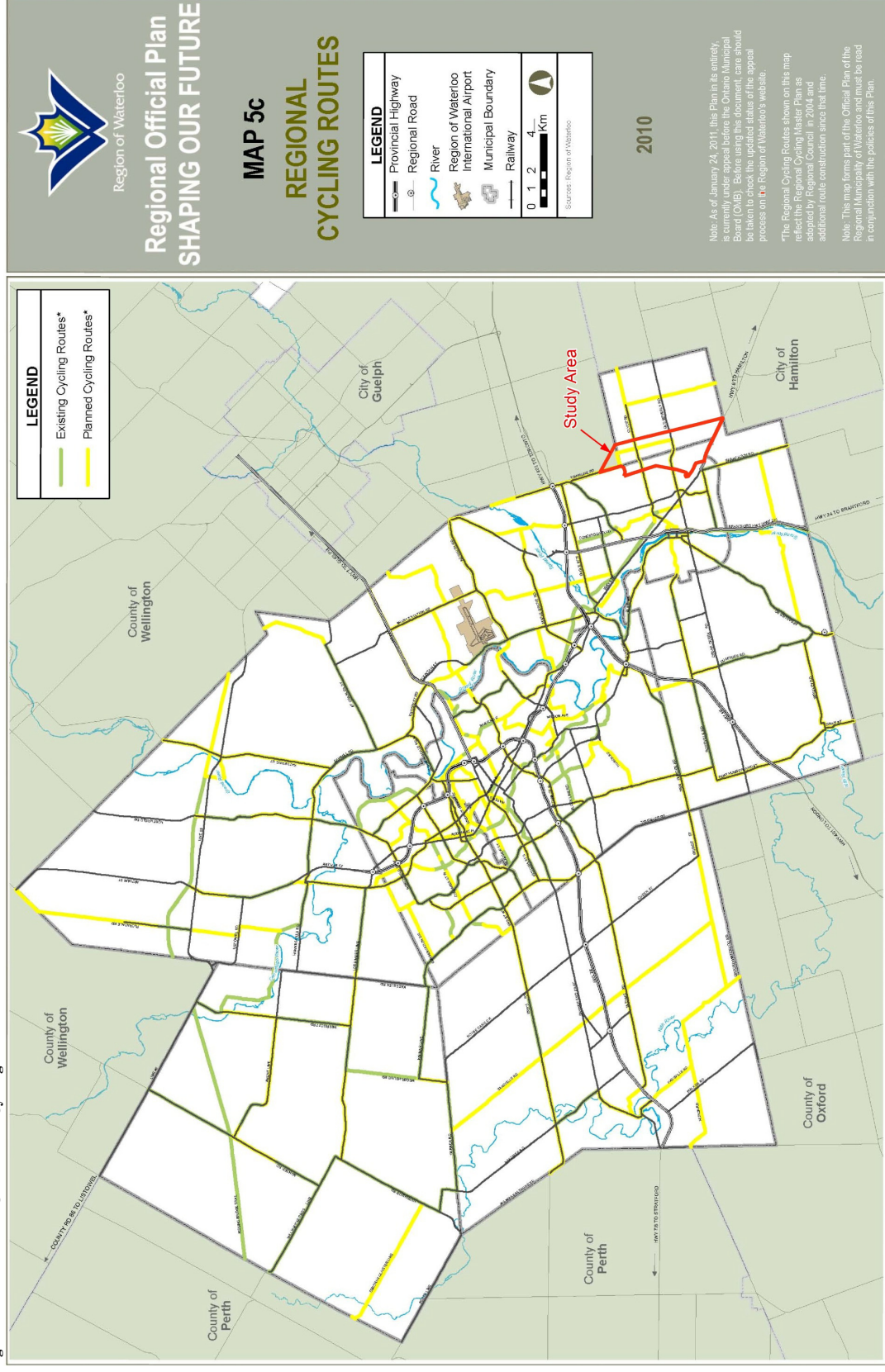
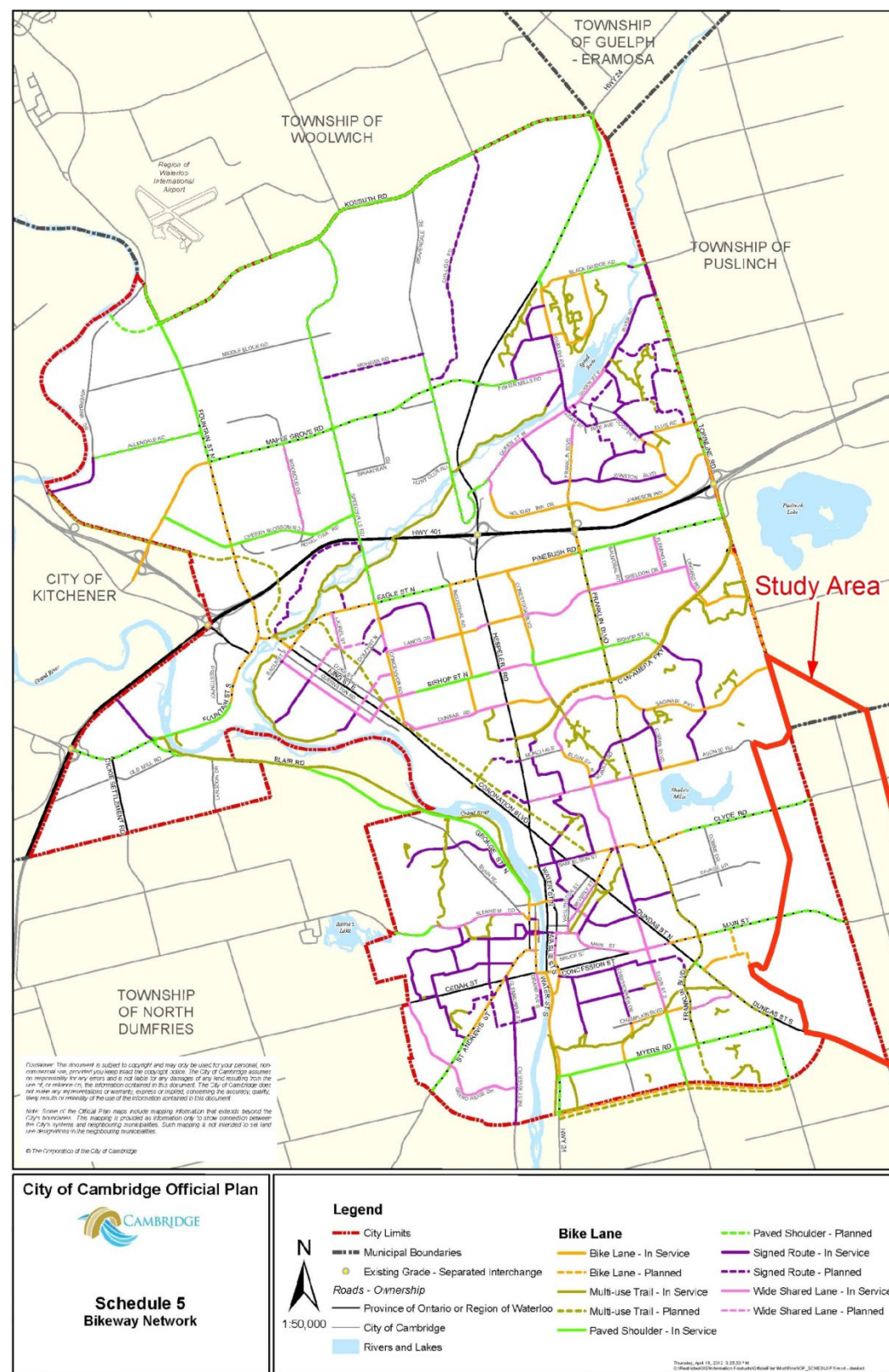


Figure 11: City of Cambridge 2012 Official Plan Cycling Routes



Source: <http://www.cambridge.ca/relatedDocs/2004%20OP%20Consolidation%20incl%20fig%20%20maps.pdf>

The City of Cambridge 2012 Official Plan indicates potential new trails within the study area (refer to **Figure 12**). One trail starts at Franklin Boulevard/Regional Road 36 just south of Avenue Road/Gore Road, then meanders around the south end of Shade's Mills Conservation Area and continues northerly along Townline Road. Another potential new trail connects to this one near its mid-point just north of Clyde Road/Regional Road 27 and travels southerly past Main Street East/Old Beverly Road/Regional Road 97 and then curves westerly to connect to Dundas Street South/Highway 8.

### 3.5 SITE SPECIFIC POLICIES

#### 3.5.1 City of Cambridge 2012 Official Plan Site Specific Policies

Within the study area, the City of Cambridge 2012 Official Plan identifies eight areas with site specific policies (refer to **Figure 13**). The following summarizes the site specific policies for each area:

##### Site 22 – Dundas Street South/Highway 8 at the City of Cambridge Southeast Boundary

The lands designated as low / medium density residential may also be used for a landscape-garden centre.

This area is also identified in the City of Cambridge 1999 Official Plan as the Dundas Street South Special District (refer to **Figure 14**). The lands designated in this area may also be used for a landscape-garden centre.

##### Site 30 – North of Main Street East/Old Beverly Road/Regional Road 97 Along the City of Cambridge Eastern Boundary

The site designated as low / medium density residential may also be used for business and professional offices.

This area is also identified in the City of Cambridge 1999 Official Plan as the Robinson Road Special District (refer to **Figure 15**). The lands designated in this area may also be used for business and professional offices.

##### Site 41 – North of Clyde Road/Regional Road 27 West of the City of Cambridge Eastern Boundary

The lands designated as industrial may be serviced by private sanitary services and may be used for a building materials yard for the storage of reclaimed and new building materials and general industrial uses that do not use water as part of the industrial process. Council may pass by-laws or otherwise facilitate or encourage the development of these lands for such additional uses without amending this Plan.

##### Site 46 – At the Easterly Termination of Savage Drive

The identified lands are a portion of the site of the former Regional landfill. Notwithstanding the permitted uses in this plan, these lands are permitted for use as a waste transfer station. Any future additional or alternative uses for this property will require an amendment to this plan.

##### Site 51 – South of Clyde Road/Regional Road 27 at the City of Cambridge Eastern Boundary

The lands designated as future urban reserve located at 975 Clyde Road/Regional Road 27 may also be used for those uses permitted in the recreation, cemetery and open space designation in accordance with Policy 8.8.4 of the Plan. Also the lands designated future urban reserve located 935 and 855 Clyde Road/Regional Road 27, may also be used for those uses permitted in the prime agriculture designation in accordance with Policy 8.9.1.2.

Figure 12: City of Cambridge 2012 Official Plan Trail Network

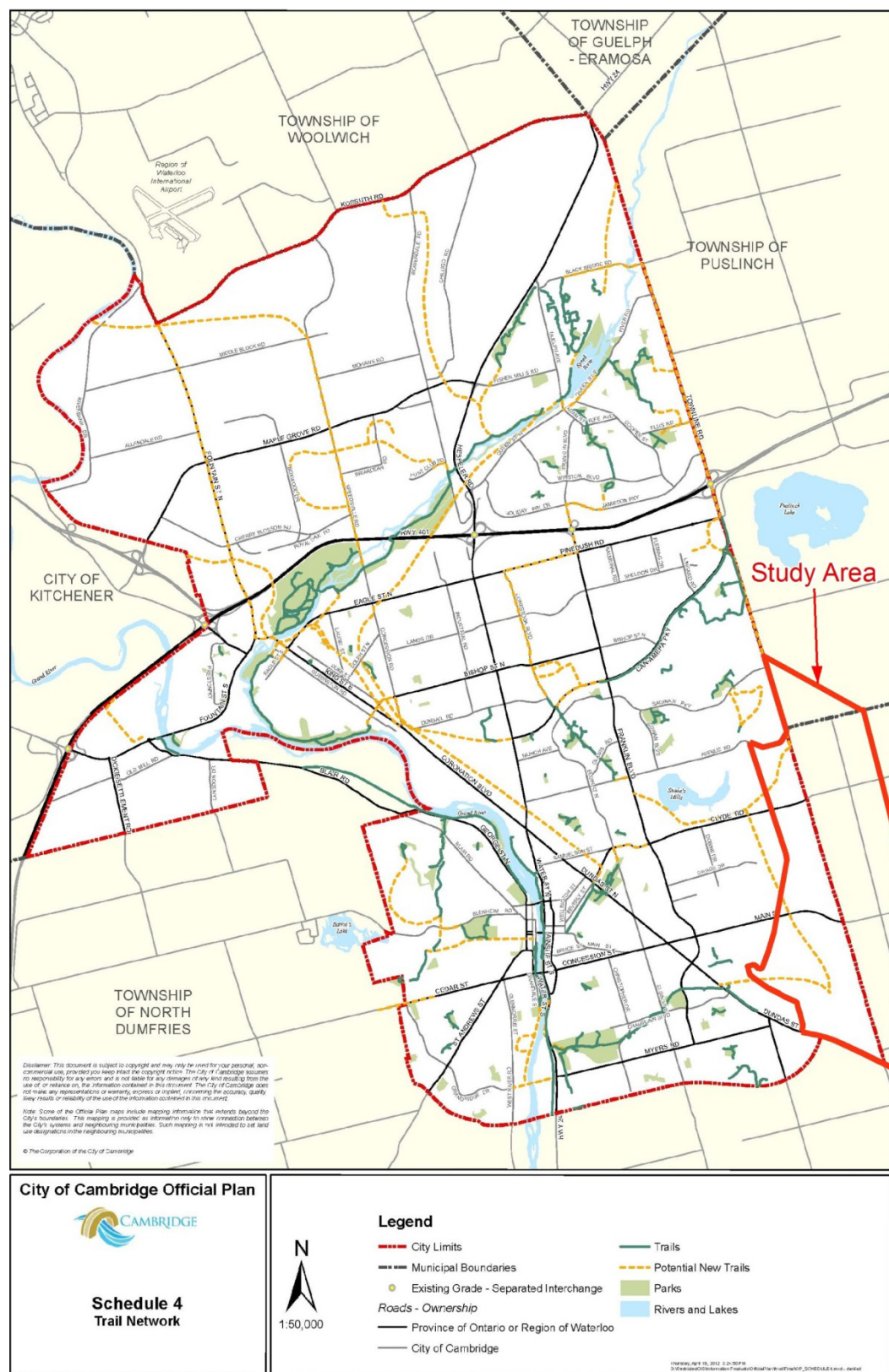
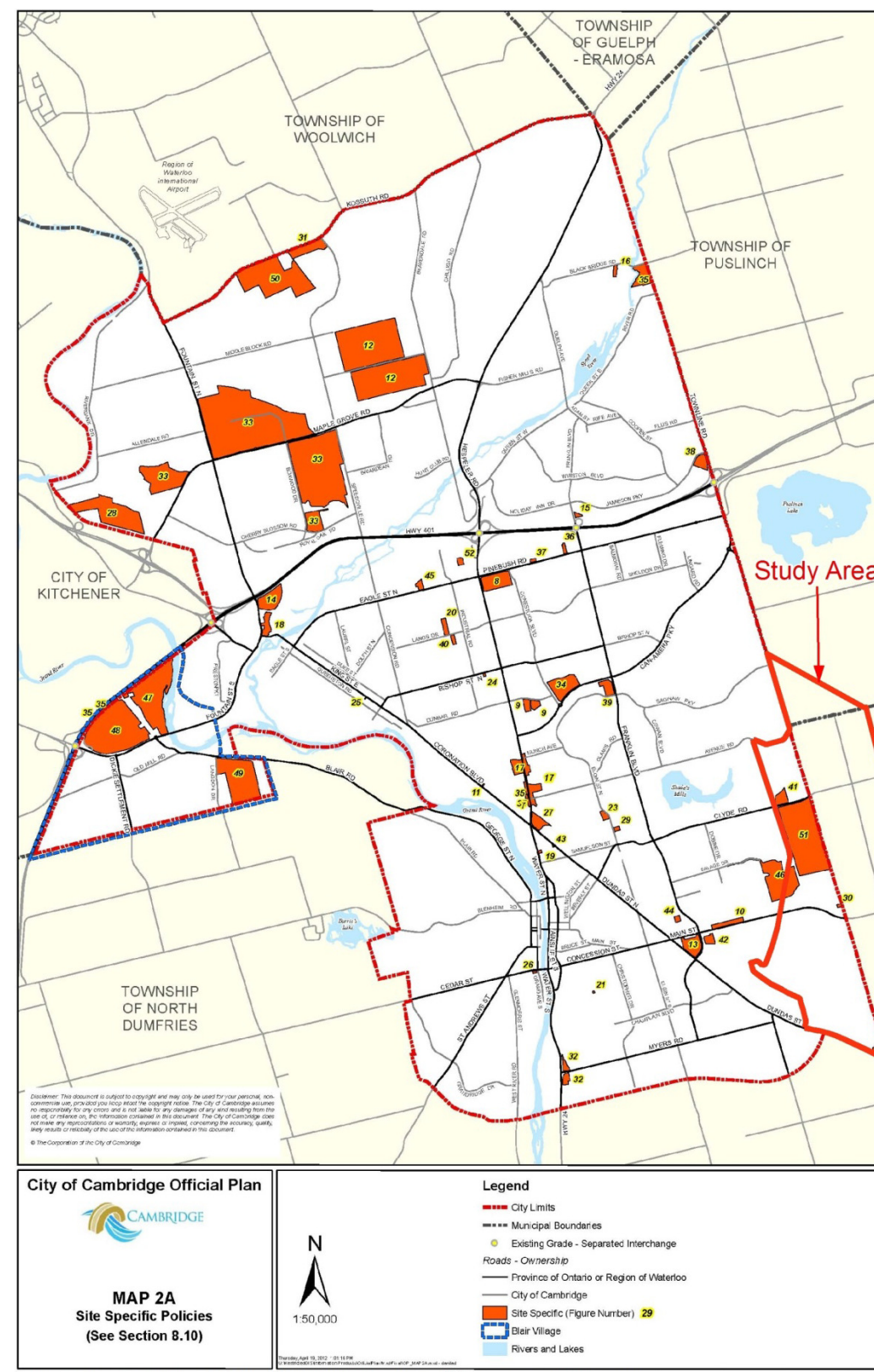
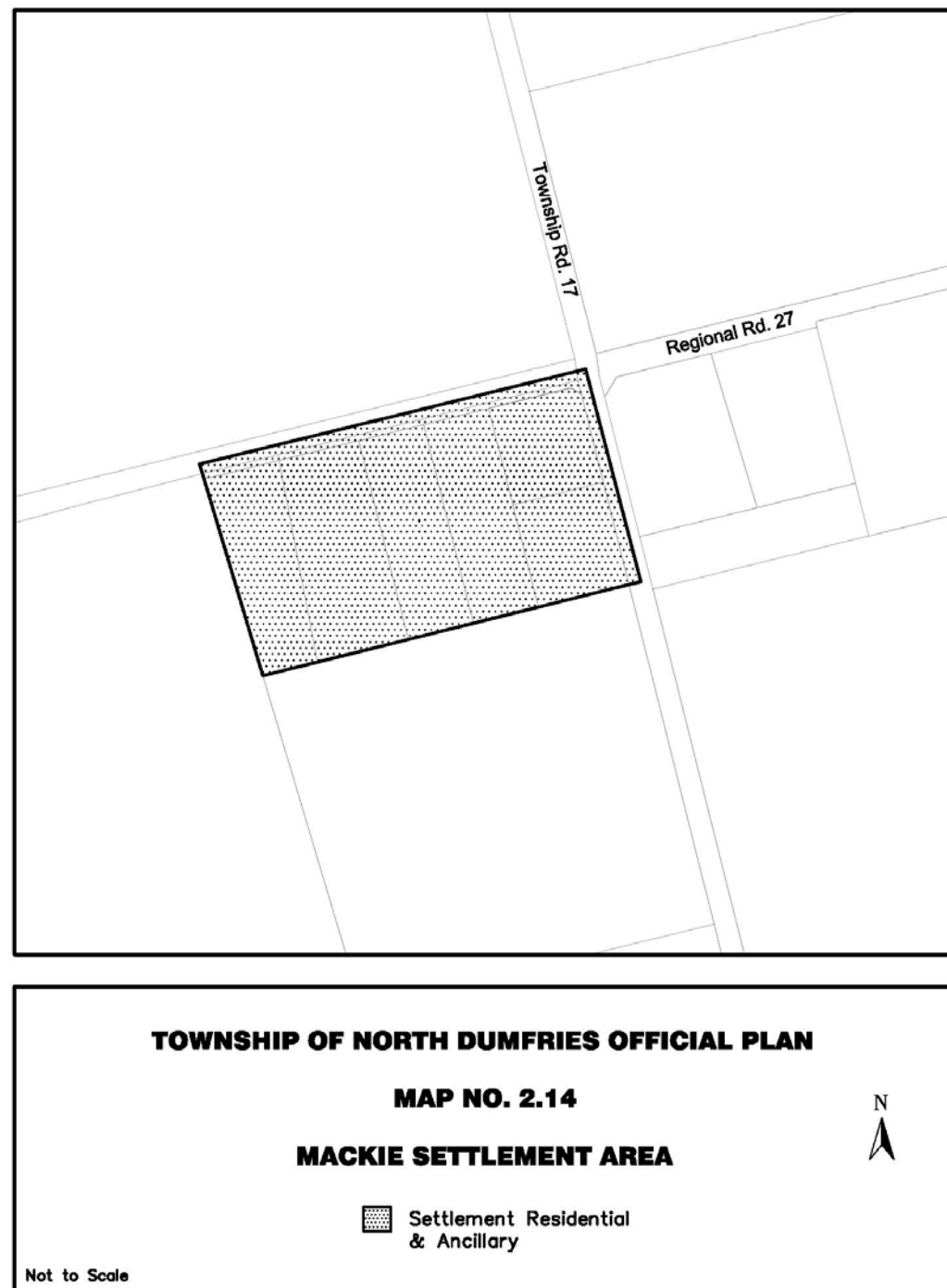


Figure 13: City of Cambridge 2012 Official Plan Site Specific Policy Areas





**Figure 16: Township of North Dumfries Mackie Settlement Area**



### 3.5.2 Township of North Dumfries Site Specific Policies

The Township of North Dumfries has forecasted growth in the rural settlement areas to 2016. In order to meet this projected residential growth, additional lands must be designated to accommodate additional housing units in accordance with the policies contained in Section 2.6 of the Official Plan. However, within the study area, there are two settlement areas that have specific policies which do not permit expansion. The first is the Mackie Settlement Area (refer to **Figure 16**). The Mackie Settlement Area is located in the southwest quadrant of Shellard Side Road and Clyde Road/Regional Road 27.

The second is the Morrison Settlement Area (refer to **Figure 17**) located in the vicinity of Shellard Side Road and Morrison Road. In addition to the restrictive specific policy, any development on lands designated as dry industrial / commercial in the Morrison Settlement Area must be compatible with surrounding residential development, and must conform to the policies of the Official Plan.

The Township of North Dumfries also has general policies regarding development applications to expand industrial / commercial areas. However, the Township Road No. 17 Industrial/Commercial Area has an area specific policy which does not permit any expansions within the boundary (refer to **Figure 18**). This area is located on the west side of Shellard Side Road to the north of Main Street East/Old Beverly Road/Regional Road 97.

The Township of North Dumfries also has zoning by-laws for properties along Shellard Side Road. Refer to **Figure 19** for the properties referenced in the zoning by-law along Shellard Side Road. Details of the Township of North Dumfries Zoning by-law Section 20 for properties along Shellard Side Road are provided in **Appendix A**.

### 3.5.3 Township of Puslinch Site Specific Policies

The Township of Puslinch within the County of Wellington does not have any site specific policies within the study area based on the 2013 County of Wellington Official Plan.

Figure 17: Township of North Dumfries Morrison Settlement Area

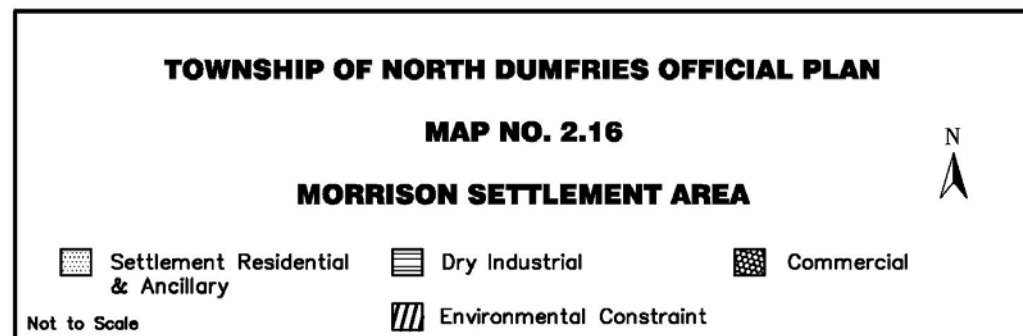
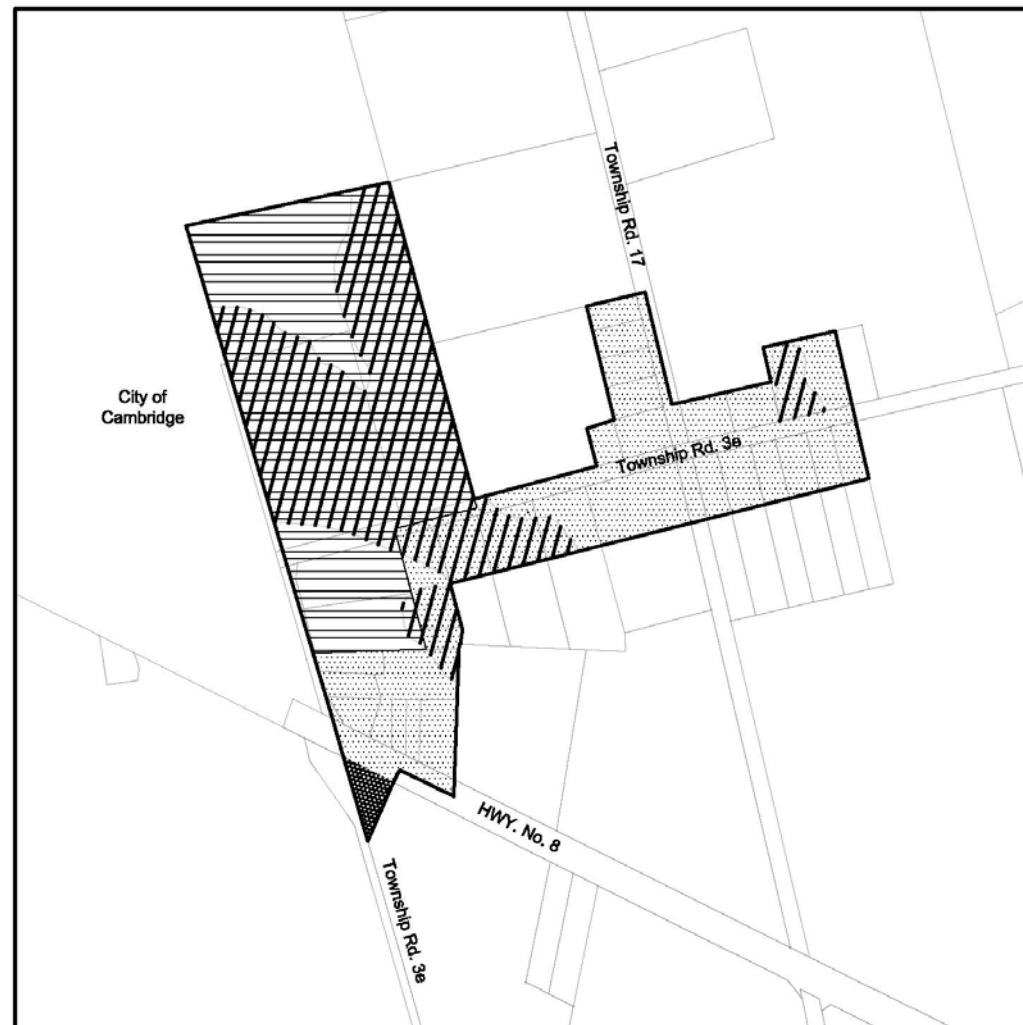
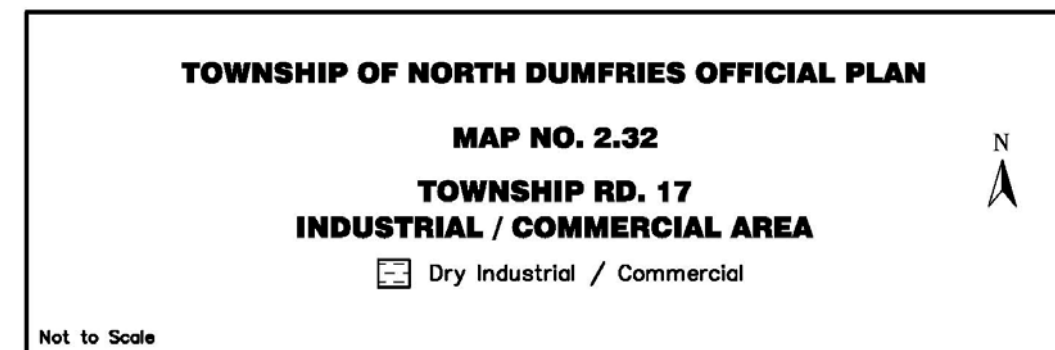


Figure 18: Township of North Dumfries Township Road No. 17 Industrial/Commercial Area





streets. Lots may be offered for sale after draft approval, but can be sold only after the plan of subdivision has been registered (see below for details about registered plans of subdivision).

Greengate Village Limited has a draft approved plan of subdivision (30T-03102) within the study area, located between Dundas Street South/Highway 8 and Main Street East/Old Beverly Road/Regional Road 97 (refer to **Figure 25**). The plan covers part of lots 4 and 5, Concession 10 within the City of Cambridge.

**Registered Plan of Subdivision**

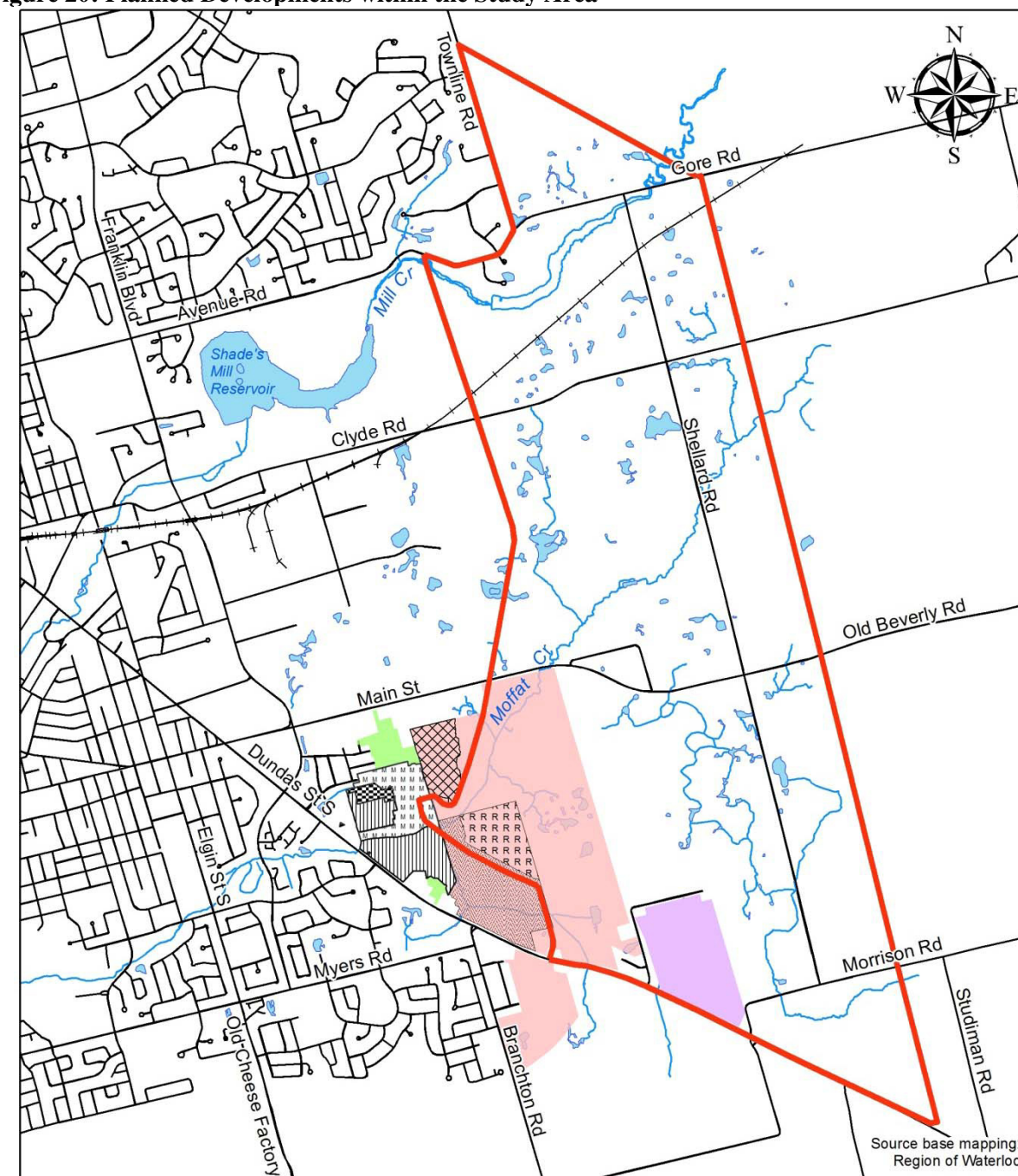
A Registered Plan of Subdivision, which is the result and final stage of a Plan of Subdivision application, creates legal lots of record that can be sold to another party.

Greengate Village Limited has registered three phases of their draft approved plan of subdivision 30T-03102 located within the study area between Dundas Street South/Highway 8 and Main Street East/Old Beverly Road/Regional Road 97. Phase 1a comprises of Registered Plan 58M-499 (refer to **Figure 26**). Phase 1b comprises of Registered Plan 58M-522 (refer to **Figure 27**). Phase 1c comprises of Registered Plan 58M-543 (refer to **Figure 28**).

**3.7 ENVIRONMENTAL FEATURES**

According to the Region of Waterloo Official Plan, a portion of the study area is located within the Beverly Environmentally Sensitive Landscape (refer to **Figure 29**). The Beverly Environmentally Sensitive Landscape and its neighbouring Dumfries Carolinian Environmentally Sensitive Landscape are made up of 11,918 ha of sensitive lands in North Dumfries Township and the City of Cambridge. These two areas contain the northern fringe of the Carolinian Forest Zone, Ontario's most threatened ecological area. Other core environmental features that may be found in these areas include Provincially Significant Wetlands (PSWs), regional forests, forests greater than 4 ha, and significant valley features. The Regional of Waterloo Official Plan has special policies for Environmentally Sensitive Landscapes to ensure that the land uses and activities in these areas are compatible with and preserve the unique rural features of these areas. Details can be found in Chapter 7 of the Region of Waterloo Official Plan.

**Figure 20: Planned Developments within the Study Area**



**Legend**

- Study Area
- Laurelview-Hammersley Draft Plan of Subdivision
- Greengate Village registered plan of subdivision Phase 1a
- Greengate Village registered plan of subdivision Phase 1b
- Greengate Village registered plan of subdivision Phase 1c
- Future Recreation Complex
- Greengate Village Draft Approved Plan of Subdivision
- Lakeview Homes Concept Plan
- Bosdale Farms Draft Plan of Subdivision
- Southeast Galt Community Plan

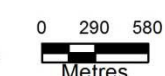


Figure 21: Southeast Galt Community Plan Concept Plan

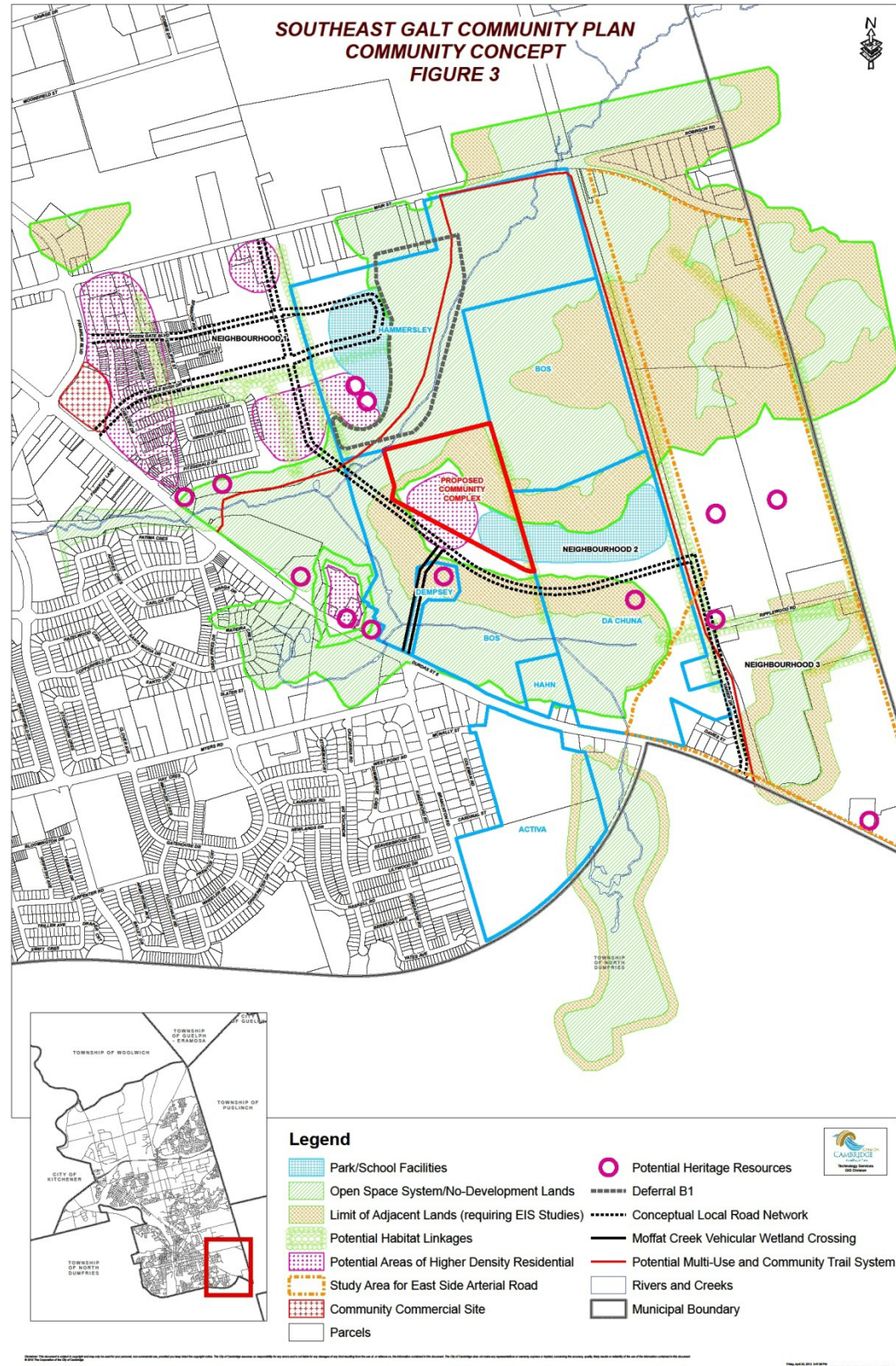


Figure 22: Laurelvew-Hammersley Draft Plan of Subdivision

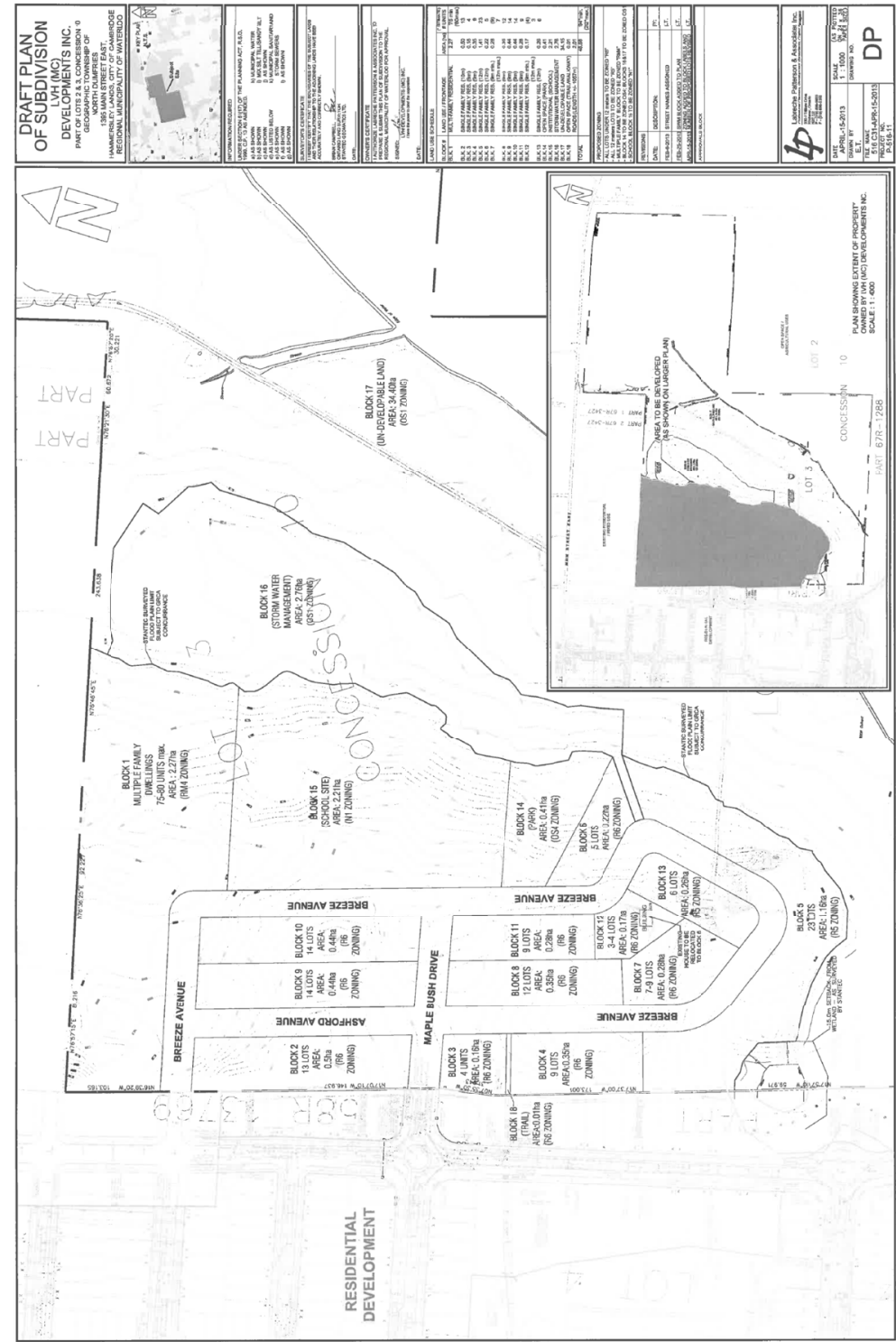


Figure 23: Lakeview Homes (Formerly Collishaw) Concept Plan

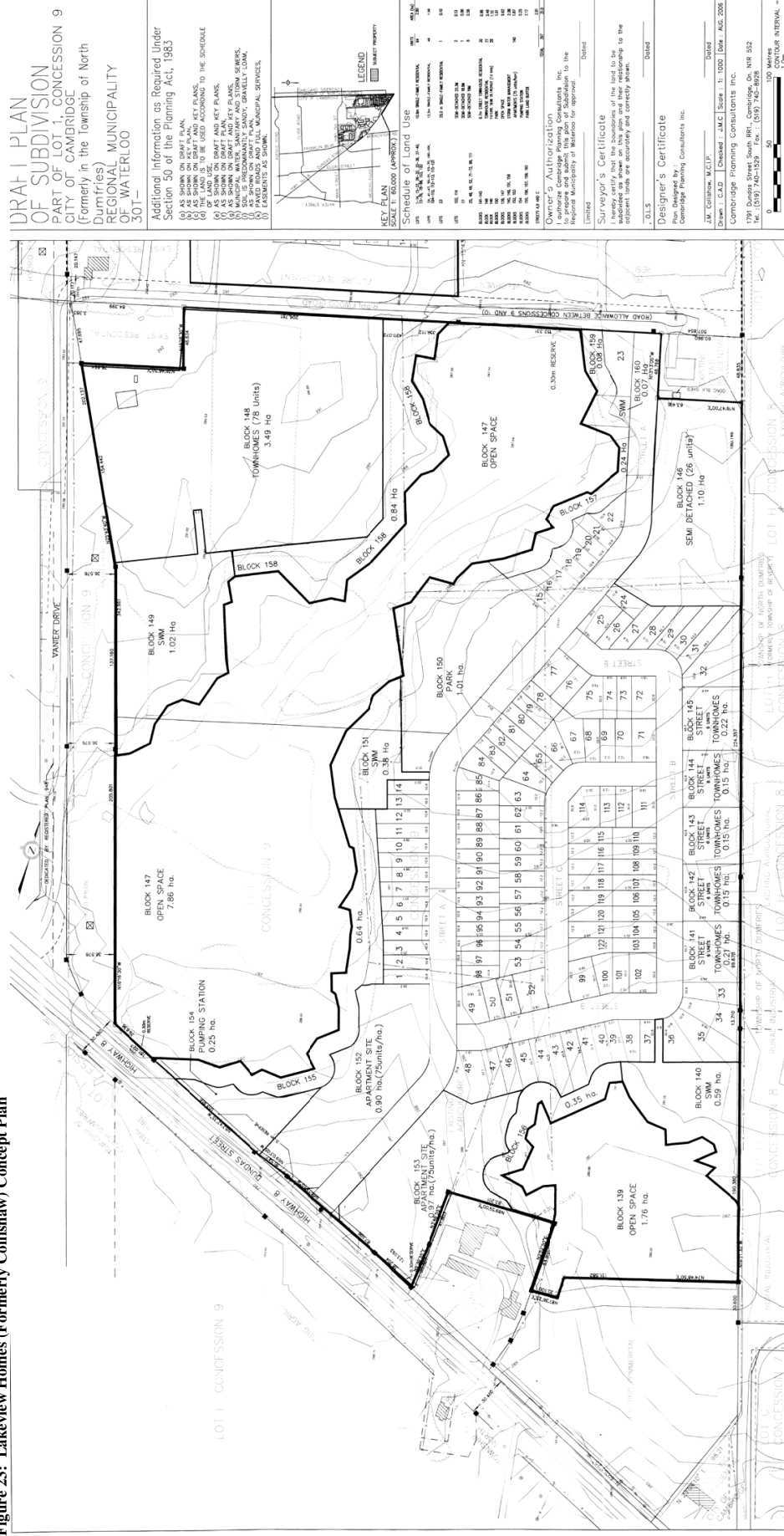


Figure 24: Bos Draft Plan of Subdivision Including the Future Recreational Complex



Figure 25: Greengate Village Draft Approved Plan of Subdivision

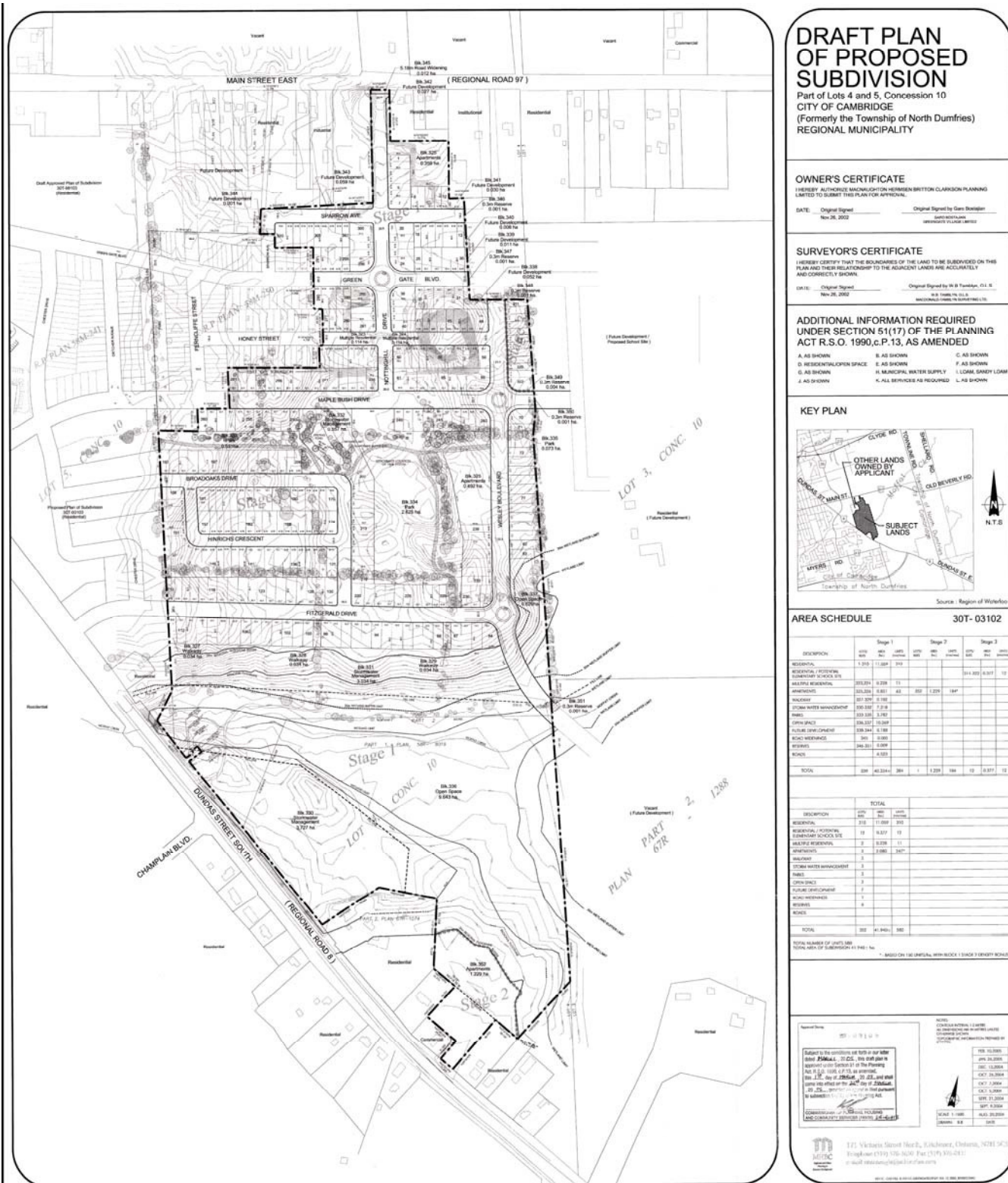


Figure 26: Greengate Village Registered Plan of Subdivision Phase 1a

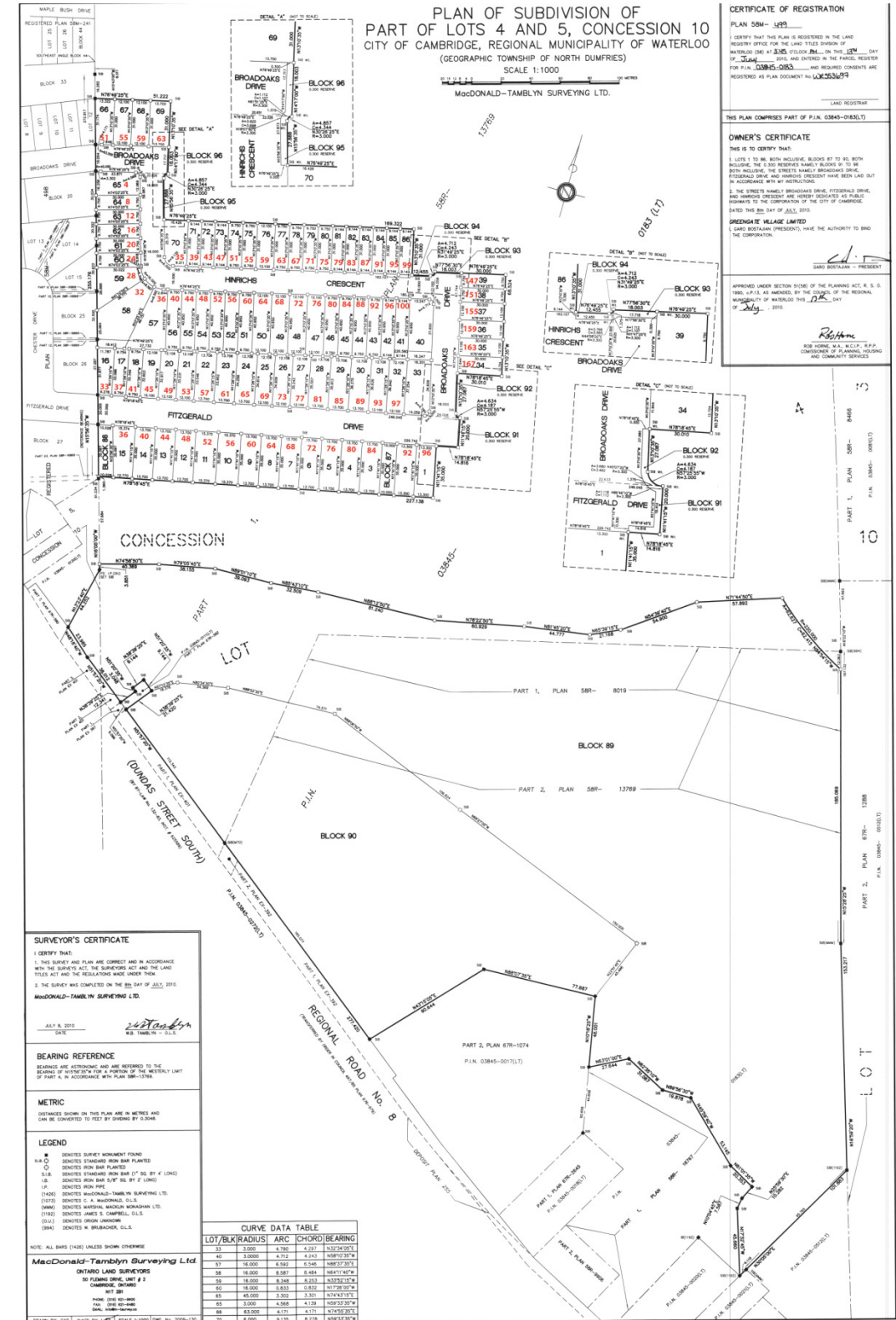
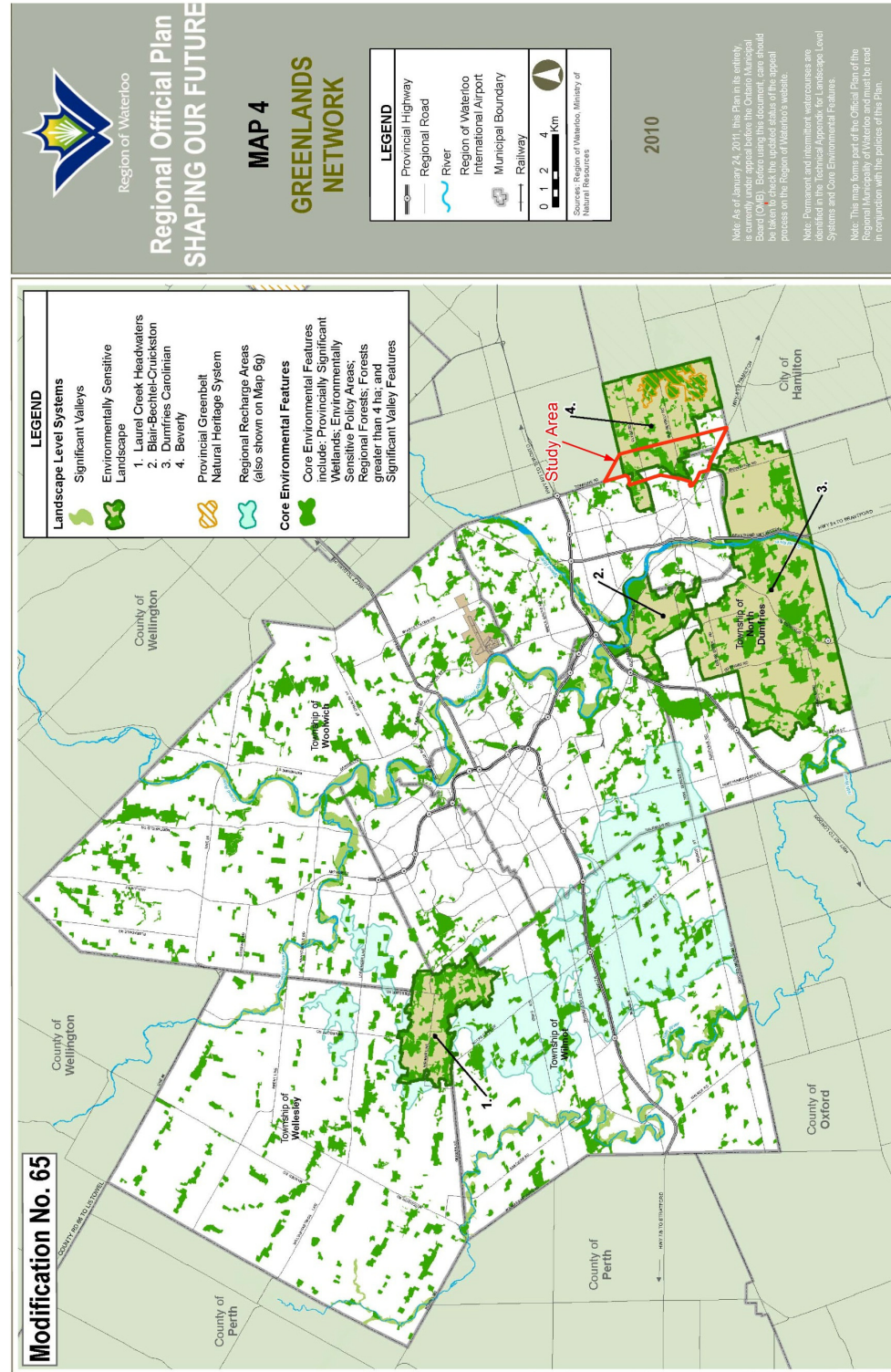




Figure 29: Region of Waterloo 2010 Official Plan Greenland Network Map



Source: <http://www.regionofwaterloo.ca/en/regionalGovernment/PreviousROP.asp>

To ensure that the municipal drinking-water supply system continues to provide a sufficient quantity and quality of drinking-water, the Region of Waterloo has developed policies to manage land use activities within designated Source Water Protection Areas. These protection areas contribute water, or are in close proximity, to municipal drinking-water supply wells and surface water intakes that are vulnerable to contamination and or depletion from incompatible land uses. As shown in **Figure 30**, the study area has two municipal wellheads with their surrounding wellhead protection areas. Development must comply with the policies set out in Chapter 8 of the Region of Waterloo Official Plan – Source Water Protection.

A number of revisions were made to Wellington County’s Greenlands System mapping that identifies new woodlands, wetlands, and hazardous lands to be designated Core Greenlands. More specifically, identification of wetlands and significant woodlands to be designated Core Greenlands are within the study area in the Township of Puslinch (refer to **Figure 31 and 32**).

### 3.8 MINERAL AGGREGATE RESOURCES

There are no mineral aggregate resource areas within the study area.

### 3.9 TRANSIT AND TRANSPORTATION

The Region of Waterloo has identified a planned transit corridor west of the study area along Franklin Boulevard/Regional Road 36 (refer to **Figure 33**). According to the Official Plan, the transit corridor will be a regional or area municipal road or dedicated right-of-way outside of mixed traffic that will accommodate existing or planned high frequency transit service. However, there is no planned transit corridor within the study area.

The only proposed road or corridor within the study area is this East Boundary Road Corridor, which is being determined through a Schedule C project under the Municipal Class Environmental Assessment process. The East Boundary Road Corridor was highlighted in the Region of Waterloo 2010 Official Plan (refer to **Figure 34**).

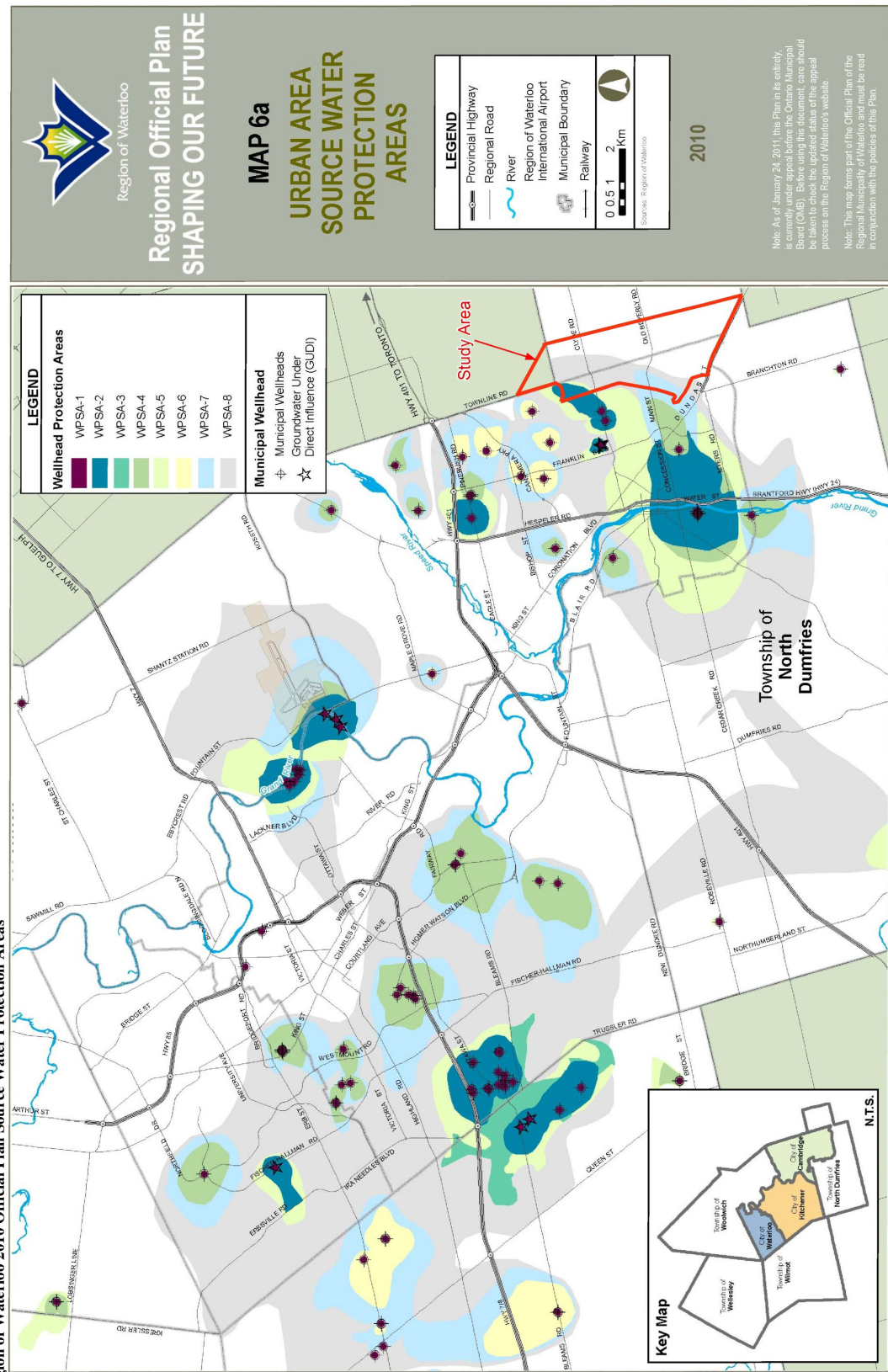
The County of Wellington has not identified transit within the study area for the Township of Puslinch. As identified within Section 12.4 of the County’s recently adopted Official Plan, the County has not reached a point that public transit is a viable option.

Additionally, as noted in Section 12.5.3 of the County’s recent Official Plan for Puslinch, all major roadways are shown on Schedule A7 (refer to **Figure 6**); the only proposed road or corridor within the study area is the subject East Boundary Road Corridor.

### 3.10 AESTHETICS

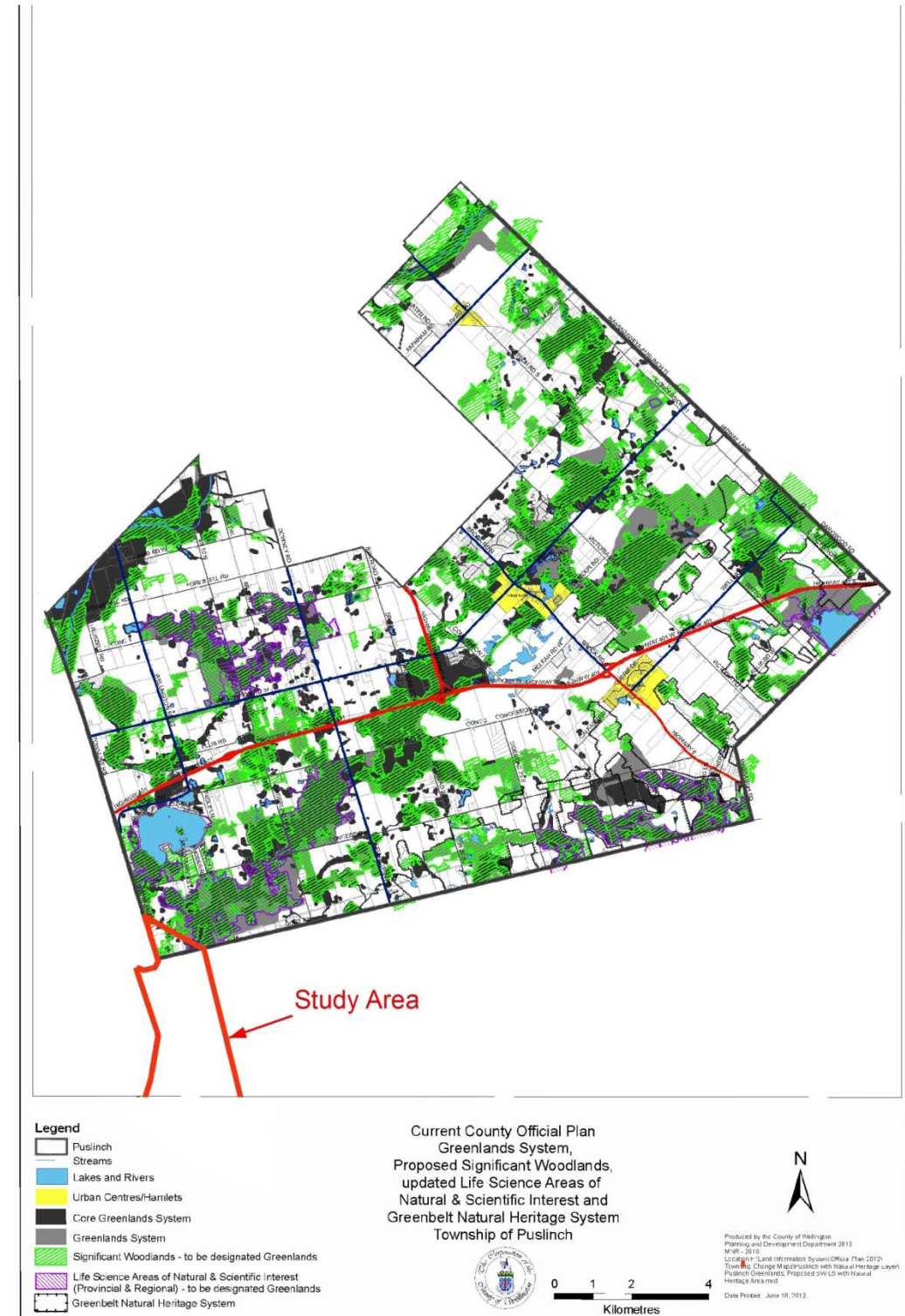
The study area presents a rural community setting, with low to medium density residential, agricultural land use and natural open space, in addition to a pocket of centrally located industrial lands. The gently rolling agricultural fields provide key views and vistas along with the natural open space in the vicinity of Shade’s Mill Conservation Area, the lands abutting the major watercourses such as Mill Creek, and the Beverly Environmentally Sensitive Landscape. The main roadways through the study area also provide notable views, such as Avenue Road/Gore Road, Clyde Road/Regional Road 27, Main Street East/Old Beverly Road/Regional Road 97, Townline Road/Regional Road 33, Dundas Street South/Highway 8, and Shellard Side Road, as these roads have helped to shape the surrounding land use and its functions.

Figure 30: Region of Waterloo 2010 Official Plan Source Water Protection Areas



Source: <http://www.regionofwaterloo.ca/en/regionalGovernment/PreviousROP.asp>

Figure 31: County of Wellington 2013 Official Plan Proposed Significant Woodlands



Source: <http://www.wellington.ca/en/business/resources/PuslinchGreenlandsProposedSWLSwithNaturalHeritageArea.pdf>

Figure 32: County of Wellington 2013 Official Plan Hazardous Lands, Wetlands and Greenbelt Natural Heritage System

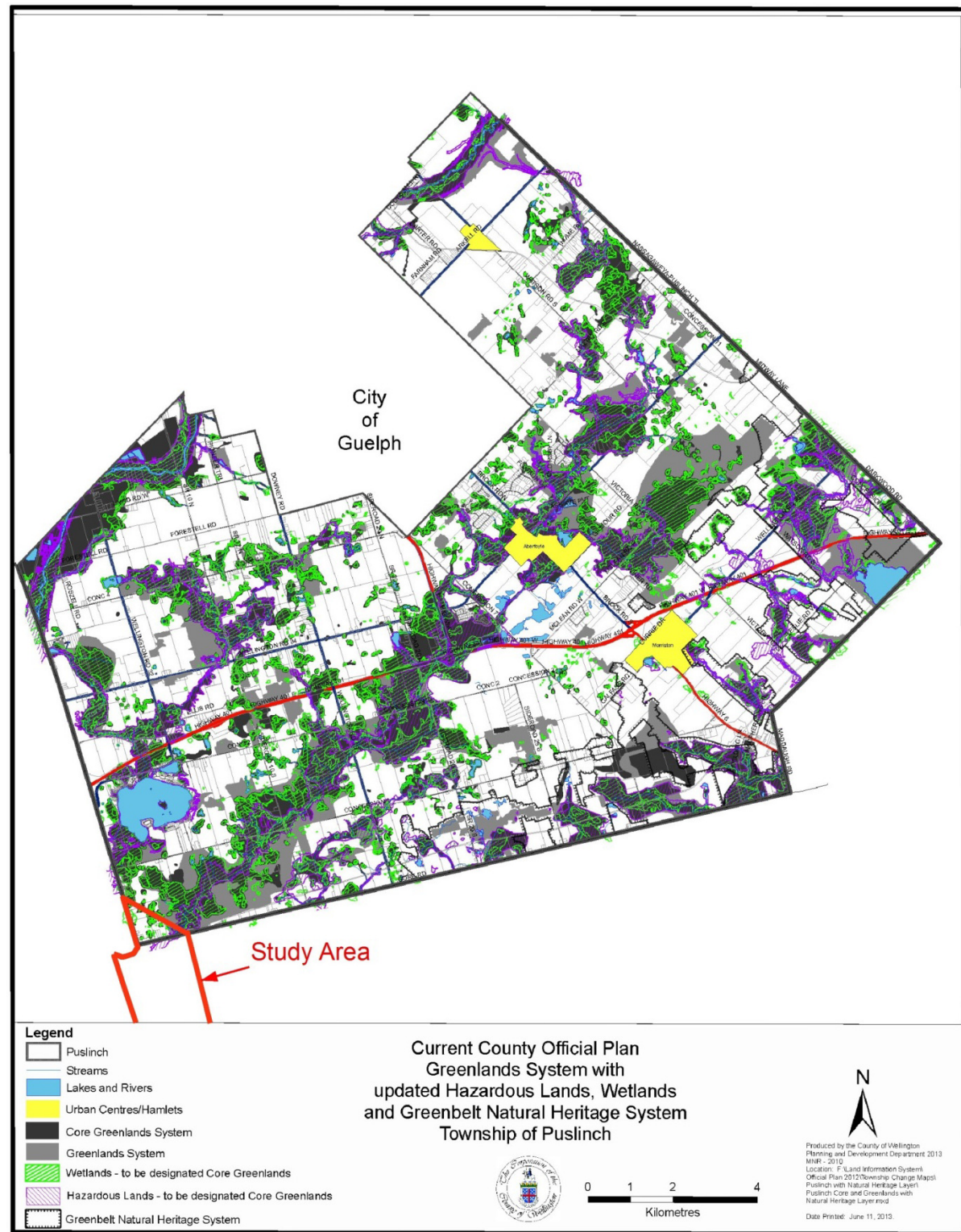


Figure 33: Region of Waterloo 2010 Official Plan Regional Transit Network

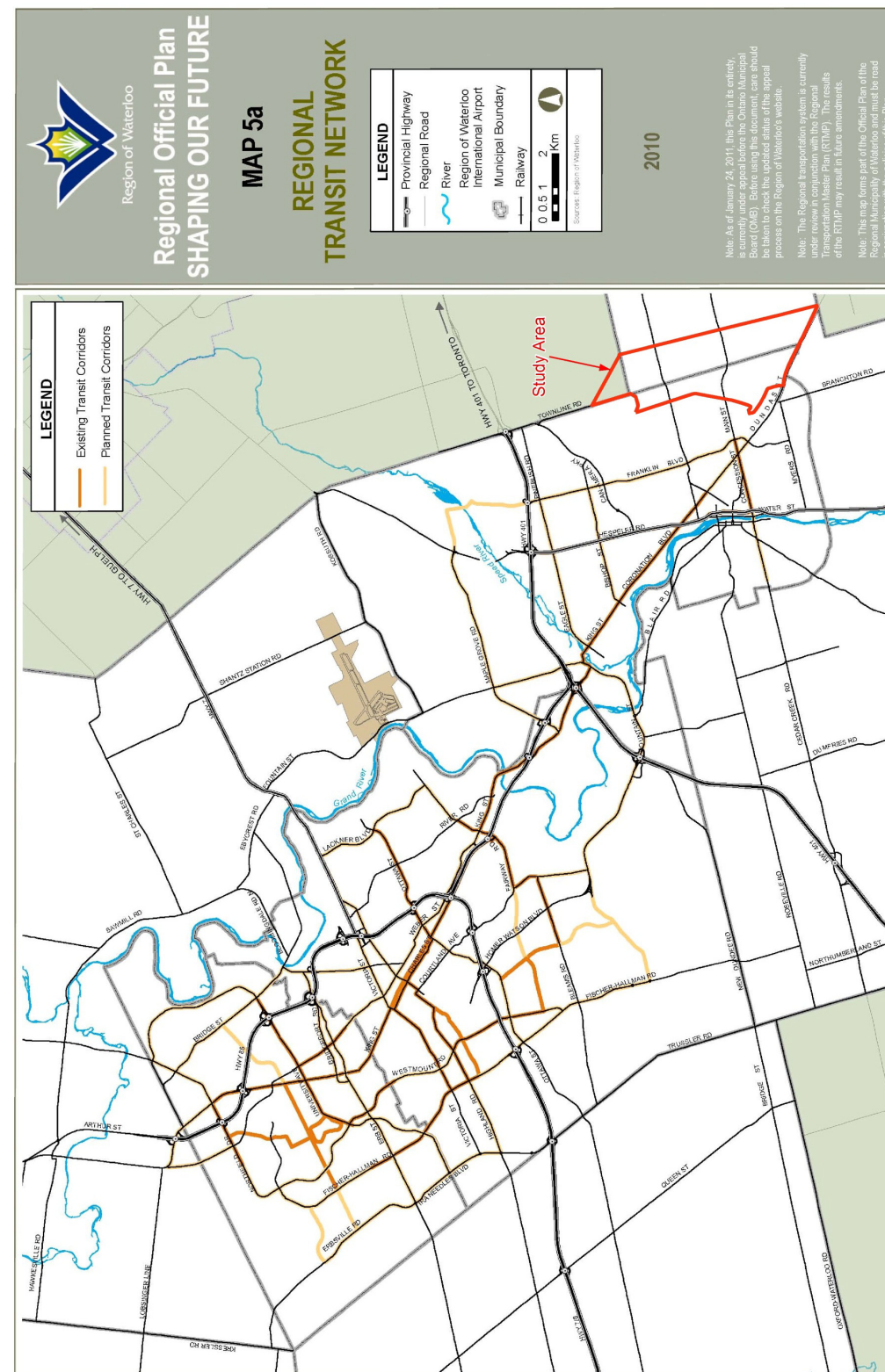
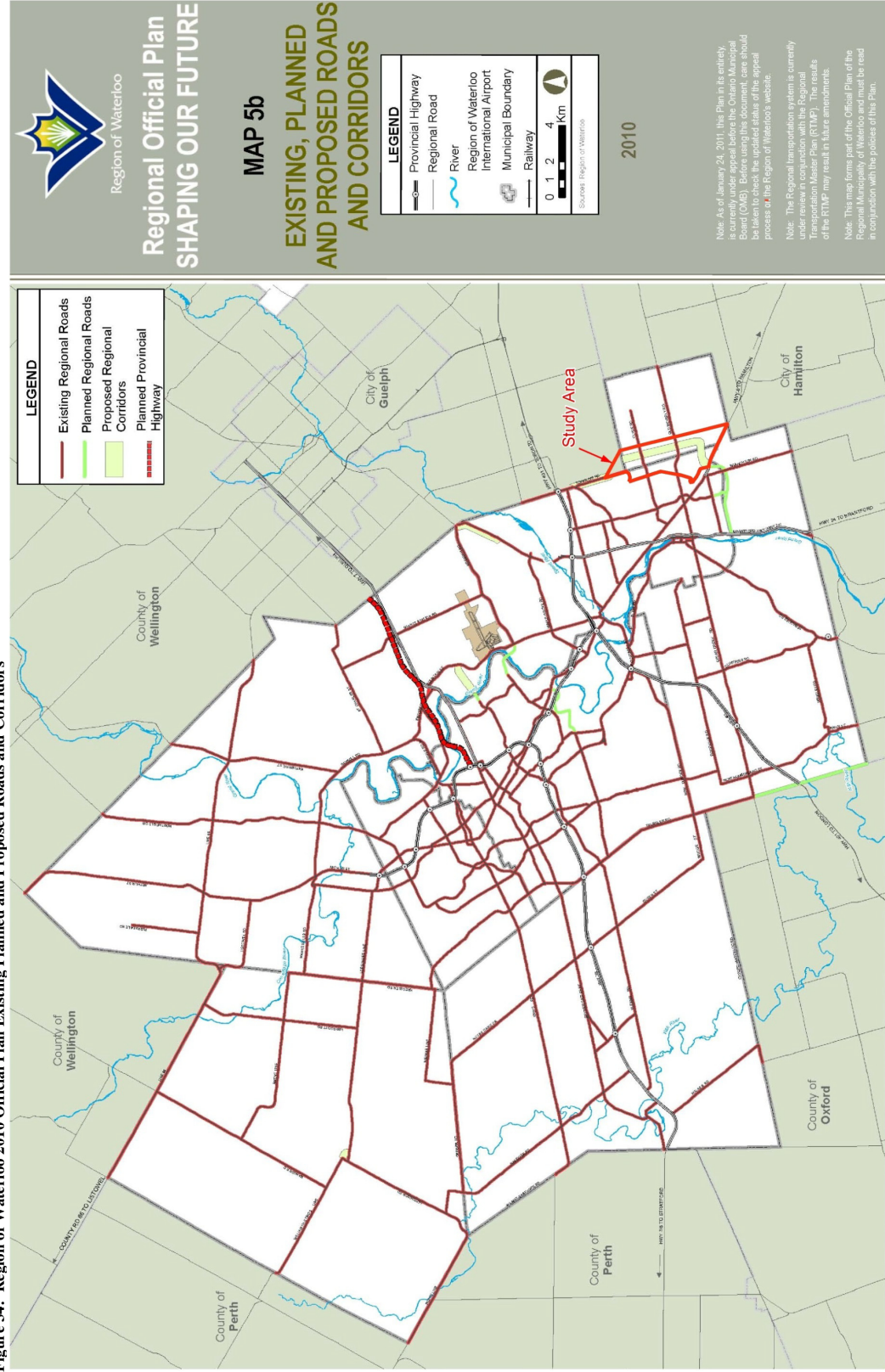


Figure 34: Region of Waterloo 2010 Official Plan Existing Planned and Proposed Roads and Corridors



Source: <http://www.regionofwaterloo.ca/en/regionalGovernment/PreviousROP.asp>

# APPENDIX A

## Township of North Dumfries Zoning By-law Section 20 Text Compilation For Properties Along Shellard Side Road

**North Dumfries Zoning By-law Section 20 Text Compilation  
For Properties Along Shellard Road**

20.1.9 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.9 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:

- a) the storage of construction forms, building materials and motor vehicles related to the construction of silos

subject to the following:

- b) all uses permitted by this By-law as additional permitted uses shall be conducted entirely within the buildings existing on the lands as shown on the map forming Schedule 'A', Section 20.1.9 of this By-law, together with approved area for parking and access thereto and no additions, extension or enlargements of the said existing buildings shall be permitted nor shall additional buildings be constructed in connection with such additional permitted uses.

20.1.23 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.23 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:

- a) private sports and recreational club and uses, buildings or structures accessory thereto.

20.1.32 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.32 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:

- a) a kennel

subject to the following:

- b) all uses permitted by this By-law as additional permitted uses shall be conducted entirely within the buildings existing on the lands as shown on the map forming Schedule 'A', Section 20.1.32 of this By-law, together with approved area for parking and access thereto and no additions, extension or enlargements of the said existing buildings shall be permitted nor shall additional buildings be constructed in connection with such additional permitted uses.

20.1.34 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.34 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:

- a) a school bus garage and uses accessory thereto which shall include the storage, repair and maintenance of school buses;

subject to the following:

- b) all uses permitted by this By-law as additional permitted uses shall be conducted entirely within the buildings existing on the lands as shown on the map forming Schedule 'A', Section 20.1.34 of this By-law, together with approved area for parking

and access thereto and no additions, extension or enlargements of the said existing buildings shall be permitted nor shall additional buildings be constructed in connection with such additional permitted uses.

20.1.50 Notwithstanding any other provisions of this By-law, the lands shown as Parcel 'A' on the map forming Schedule 'A', Section 20.1.50 of this By-law may continue to be used for a Residential Building - One Unit until such time as the dwelling unit is removed and the lands shown as Parcel 'A' are development for industrial purposes in accordance with the provisions of Section 16 - Zone 10 (Z.10) of this By-law.

20.1.71 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.71 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:

- a) a commercial nursery and greenhouse including the sale of plants and shrubs

subject to the following:

- b) all uses permitted by this By-law as additional permitted uses shall be conducted entirely within the buildings existing on the lands as shown on the map forming Schedule 'A', Section 20.1.71 of this By-law, together with approved area for parking and access thereto.

20.1.64 Notwithstanding any other provisions of this By-law:

- a) The land identified as 'Part 1' to 'Schedule A' shall have a minimum frontage of 65 m, and a minimum area of 2.4 hectares;
- b) The land identified as 'Part 2' to 'Schedule A' shall have a minimum area of 8.0 hectares; and,
- c) The land identified as 'Part 2' to 'Schedule A' shall be subject to a Holding Provision (H) until such time as the Council of the Township of North Dumfries is satisfied that an Archaeological Assessment has been completed to the satisfaction of the Region of Waterloo – Planning, Housing and Community Services Department. Satisfaction of this requirement will be outlined in a letter from the Region of Waterloo to the Township of North Dumfries identifying that an appropriate Archaeological Assessment has been completed to their satisfaction and that development can occur on the subject land in accordance with the findings of the Archaeological Assessment.

20.1.65 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.65 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:

- a) a commercial nursery including the sale of plants and shrubs

subject to the following:

- b) all uses permitted by this By-law as additional permitted uses shall be conducted entirely within the buildings existing on the lands as shown on the map forming Schedule 'A', Section 20.1.65 of this By-law, together with approved area for parking and access thereto.

- 20.1.84 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.84 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:
- a) a building contractor
- subject to the following:
- b) all uses permitted by this By-law as additional permitted uses shall be conducted entirely within the buildings existing on the lands as shown on the map forming Schedule 'A', Section 20.1.84 of this By-law, together with approved area for parking and access thereto.
- 20.1.88 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.88 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:
- a) a sandblasting contractor
- subject to the following:
- b) all uses permitted by this By-law as additional permitted uses shall be conducted entirely within the buildings existing on the lands as shown on the map forming Schedule 'A', Section 20.1.88 of this By-law, together with approved area for parking and access thereto.
- 20.1.93 Notwithstanding any other provisions of this By-law, the lands illustrated on the map forming Schedule 'A', Section 20.1.93 of this By-law may be used for the following specific uses in addition to those uses permitted in the zone within which the parcel lies:
- a) a transmission and communication tower
- subject to the following:
- b) all uses permitted by this By-law as additional permitted uses shall be conducted entirely within the buildings existing on the lands as shown on the map forming Schedule 'A', Section 20.1.93 of this By-law, together with approved area for parking and access thereto.
- 20.1.155 Notwithstanding and other provisions of this By-law, the lands illustrated as Part 1 on the map forming Schedule 'A' - Section 20.1.155 of this By-law may have a minimum lot area of .973 hectares and a minimum lot frontage of 19.087 metres and the lands illustrated as Part 2 on the map forming Schedule 'A' - Section 20.1.155 of this By-law may have a minimum lot area of 6.0 hectares and a minimum lot frontage of 208 metres.
- 20.1.174 Notwithstanding any other provision of this By-law, the lands illustrated as Part 1 on the map forming Schedule 'A' – Section 20.1.174 of this By-law may have a minimum lot area of 1.45 hectares and a minimum lot frontage of 98.3 metres.
- The lands illustrated Part 2 on the map forming Schedule 'A' – Section 20.1.174 of this By-law may have a minimum lot areas of 1.50 hectares and a minimum lot frontage of 104.6 metres.
- The lands illustrated as Part 3 on the map forming Schedule 'A' – Section 20.1.174 of this

- By-law may have a minimum lot area of 1.0 hectares and a minimum lot frontage of 44.2 metres.
- 20.1.178 Notwithstanding any other provisions of this By-law, the lands illustrated as Part 1 on the map forming Schedule 'A' - Section 20.1.178 of this By-law may have a minimum lot area of 1.00 hectares and a minimum lot frontage of 30.00 metres.
- The lands illustrated as Part 2 forming Schedule 'A' -Section - 20.1.178 of this By-law may have a minimum lot area 1.00 hectares and a minimum lot frontage of 30.00 metres.
- The lands illustrated as Part 3 forming Schedule 'A'-Section - 20.1.178 of this By-law may have a minimum lot area 1.00 hectares and a minimum lot frontage of 30.00 metres.
- The lands illustrated as Part 4 forming Schedule 'A' -Section - 20.1.178 of this By-law may have a minimum lot area 37.09 hectares and a minimum lot frontage of 390.00 metres.
- 20.1.186 Notwithstanding any other provisions of this By-law, the lands illustrated as Part 1 on the map forming Schedule 'A' - Section 20.1.186 of this By-law may have a minimum lot area of 0.41 hectares and a minimum lot frontage of 50.0 metres.
- The lands illustrated as Part 2 on the map forming Schedule 'A' - Section 20.1.186of this By-law may have a minimum lot area of 0.40 hectares and a minimum lot frontage of 42.0 metres.
- The lands illustrated as Part 3 on the map forming Schedule 'A' - Section 20.1.186of this By-law may have a minimum lot area of 0.4 hectares and a minimum lot frontage of 37.0 metres.
- The lands illustrated as Part 4 on the map forming Schedule 'A' - Section 20.1.186of this By-law may have a minimum lot area of 8.77 hectares.
- 20.1.188 Notwithstanding any other provisions of this By-law, the lands illustrated as Part 1 on the map forming Schedule 'A' - Section 20.1.188 of this By-law may have a minimum lot area of 0.6 hectares and a minimum lot frontage of 59 metres.
- The lands illustrated as Parts 2 and 3 on the map forming Schedule 'A' - Section 20.1.188 of this By-law may have a minimum lot area of 4.8 hectares and a minimum lot frontage of 139.0 metres.
- The lands illustrated as Parts 2 and 3 on the map forming Schedule 'A' - Section 20.1.188 of this By-law shall be zoned as Zone 12 - Z.12 (Open Space) and shall be subject to all applicable regulations of Section 18 of By-law Number 689-83 as amended.
- Notwithstanding any other provisions of this By-law, the lands illustrated as Part 3 on the map forming Schedule 'A' - Section 20.1.188 of this By-law shall be the limits of the “Building Envelope”.
- 20.1.191 Notwithstanding any other provisions of this By-law, the lands illustrated as Part 1,2 and 3 on the map forming Schedule 'A' - Section 20.1.191 of this By-law may have a minimum lot area of 1 hectare and a minimum lot frontage of 50 metres.

20.1.194 Notwithstanding any other provisions of this By-law, the lands illustrated as Part 1 on the map forming Schedule 'A' - Section 20.1.194 of this By-law may have a minimum lot area of 1.0 hectares and a minimum lot frontage of 55.0 metres.

The lands illustrated as Part 2 on the map forming Schedule 'A' – Section 20.1.194 of this By-law may have a minimum lot area of 1.0 hectares and a minimum lot frontage of 55.0 metres.

The lands illustrated as Part 3 on the map forming Schedule 'A' – Section 20.1.194 of this By-law may have a minimum lot area of 1.0 hectares, a minimum lot frontage of 55.0 metres.

The lands illustrated as Part 4 on the map forming Schedule 'A' – Section 20.1.194 of this By-law may have a minimum lot area of 33.0 hectares.

20.1.195 Notwithstanding any other provisions of this By-law, the lands illustrated as Part 1 on the map forming Schedule 'A' - Section 20.1.195 of this By-law may have a minimum lot area of 1.1 hectares and a minimum lot frontage of 56.0 metres.

The lands illustrated as Part 2 on the map forming Schedule 'A' – Section 20.1.195 of this By-law may have a minimum lot area of 1.0 hectare and a minimum lot frontage of 51.0 metres.

The lands illustrated as Part 3 on the map forming Schedule 'A' – Section 20.1.195 of this By-law may have a minimum lot area of 3.0 hectares.

20.1.211 Notwithstanding any other provisions of this By-law, the lands illustrated as Part 1 on the map forming Schedule 'A' - Section 20.1.211 of this By-law shall have a minimum lot area of 2.2 hectares, a minimum lot frontage of 100.0 metres, and a minimum building setback of 24 metres. The northern side yard setback shall be 45.0 metres as illustrated on Schedule 'A'.

The lands illustrated as Part 2 on the map forming Schedule 'A' – Section 20.1.211 of this By-law shall have a minimum lot area of 1.6 hectares, a minimum lot frontage of 75.0 metres, and a minimum building setback of 24 metres.

The lands illustrated as Part 3 on the map forming Schedule 'A' – Section 20.1.211 of this By-law shall have a minimum lot area of 6.0 hectares.

The hatched area, representing a pond and buffer zone, shall be identified as Zone 12 as illustrated on Schedule 'A'.

20.1.232 Notwithstanding any other provisions of this By-law, the lands illustrated as Part 1 on Schedule 'A' – Section 20.1.232 of this By-law may have a minimum lot area of 0.91 hectares and a minimum lot frontage of 53 metres.

The lands illustrated as Part 2 on Schedule 'A' – Section 20.1.232 of this By-law may have a minimum lot area of 0.68 hectares and a minimum lot frontage of 38 metres.

20.1.255 Notwithstanding any other provisions of this By-law:

a) the lands illustrated as Part 1 on Schedule 'A' – Section 20.1.255 of this By-law may have a minimum lot area of 1.2 hectares and a minimum lot frontage of 65.0 metres

b) The lands illustrated as Part 2 on Schedule 'A' – Section 20.1.255 of this By-law may have a minimum lot area of 7.37 hectares

c) The lands illustrated as Part 3 on Schedule 'A' – Section 20.1.255 of this By-law shall be rezoned to Zone 12A – Z.12A; and

d) The lands illustrated as Part 4 on Schedule 'A' – Section 20.1.255 of this By-law shall be rezoned to Zone 12C – Z.12C.

20.1.274 Notwithstanding any other provisions of the By-law:

a) the lands illustrated as Part 1 on Schedule 'A' – Section 20.1.274 of this By-law may have a minimum lot area of 1.1 hectares and minimum lot frontage of 35 meters; and

b) The lands illustrated as Part 2 on Schedule 'A' – Section 20.1.274 of this By-law may have a minimum lot area of 1.2 hectares and a minimum lot frontage of 105 meters.

20.1.275 Notwithstanding any other provisions of the By-law:

a) the lands illustrated as Part 1 on Schedule 'A' – Section 20.1.275 of this By-law may have a minimum lot area of 1.0 hectares and a minimum lot frontage of 130.0 metres;

b) The lands illustrated as Part 2 on Schedule 'A' – Section 20.1.275 of this By-law may have a minimum lot area of 1.0 hectares and a minimum lot frontage of 38.0 metres;

c) the lands illustrated as Part 3 on Schedule 'A' – Section 20.1.275 of this By-law may have a minimum lot area of 1.0 hectares and a minimum lot frontage of 90.0 metres; and

d) the lands illustrated as Part 4 on Schedule 'A' – Section 20.1.275 of this By-law may have a minimum lot area of 39.0 hectares and a minimum lot frontage of 350.0 metres.

20.1.284\*\* Notwithstanding any other provisions of this By-law:

d) the lands illustrated as Part 1 on Schedule 'A' – Section 20.1.284 of this By-law may have a minimum lot area of 1.69 hectares and a minimum lot frontage of 101 metres;

e) The lands illustrated as Part 2 on Schedule 'A' – Section 20.1.284 of this By-law may have a minimum lot area of 1.0 hectares and a minimum lot frontage of 72 metres;

f) the lands illustrated as Part 3 on Schedule 'A' – Section 20.1.284 of this By-law may have a minimum lot area of 1.18 hectares and a minimum lot frontage of 120 metres; and

g) the lands illustrated as Part 4 on Schedule 'A' – Section 20.1.284 of this By-law may have a minimum lot area of 25.79 hectares and a minimum lot frontage of 361 metres

\*\* Note: Section 20.1.284 has not been passed by the Township, Public Meeting was held on July 3, 2012