

**APPENDIX B**

**Terrestrial Ecosystem Existing  
Conditions and Impact Assessment  
Report**

ONTARIO MINISTRY OF TRANSPORTATION, EASTERN REGION

# FINAL TERRESTRIAL ECOSYSTEM EXISTING CONDITIONS AND IMPACT ASSESSMENT REPORT GWP 4054-17-00

PRELIMINARY DESIGN AND CLASS ENVIRONMENTAL  
ASSESSMENT STUDY, HIGHWAY 401 PLANNING STUDY  
FROM COLBORNE TO BRIGHTON

SEPTEMBER 2023





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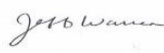
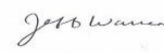
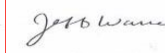
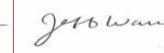



ONTARIO MINISTRY OF TRANSPORTATION,  
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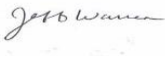
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# 1 INTRODUCTION

The Ontario Ministry of Transportation (MTO) has retained WSP Canada Inc. (WSP) to complete the Planning, Preliminary Design and Environmental Assessment Study for the replacement and rehabilitation of bridges and structural culverts, establishing the future Highway 401 footprint for an interim six lanes and ultimate eight lanes to address current and future transportation needs, and commuter parking lot improvements. The project limits extend from 0.8 km east of Percy Street to 0.4 km west of Christiani Road (Figure 1). The approximate length of the corridor is 16 km.

The study has been carried out as a Group 'B' project under the MTO *Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000)*. This Terrestrial Ecosystems Existing Conditions and Impact Assessment Report includes the results of secondary source background information and field data collections for vegetation, wildlife, wetlands and Species-at-Risk (SAR) and identifies potential sensitive features and habitats and considerations when developing a preferred design.

The scope of the proposed design study is presented in the following:

- The structures within the project limits are approaching end of their service life and need to be replaced. The new bridges are planned to have a service life of 75 years; therefore, the replacement bridges will be designed to accommodate any future Highway 401 widening.
- The existing Highway 401 platform cannot accommodate the traffic staging required to rehabilitate or replace the bridges and structural culverts. The new wider structures will provide sufficient room for the traffic staging for future rehabilitation projects.
- The Ministry also needs to designate Highway 401 Right-of-Way (ROW) so that informed decisions can be made related to the economic development of the corridor.
- Preliminary Design and EA for the replacement / rehabilitation of structures, along Highway 401 from 0.8 km east of Percy Street to 0.4 km west of Christiani Road.
- Preliminary Design and EA for the future widening of Highway 401 from 0.8 km east of Percy Street to 0.4 km west of Christiani Road.



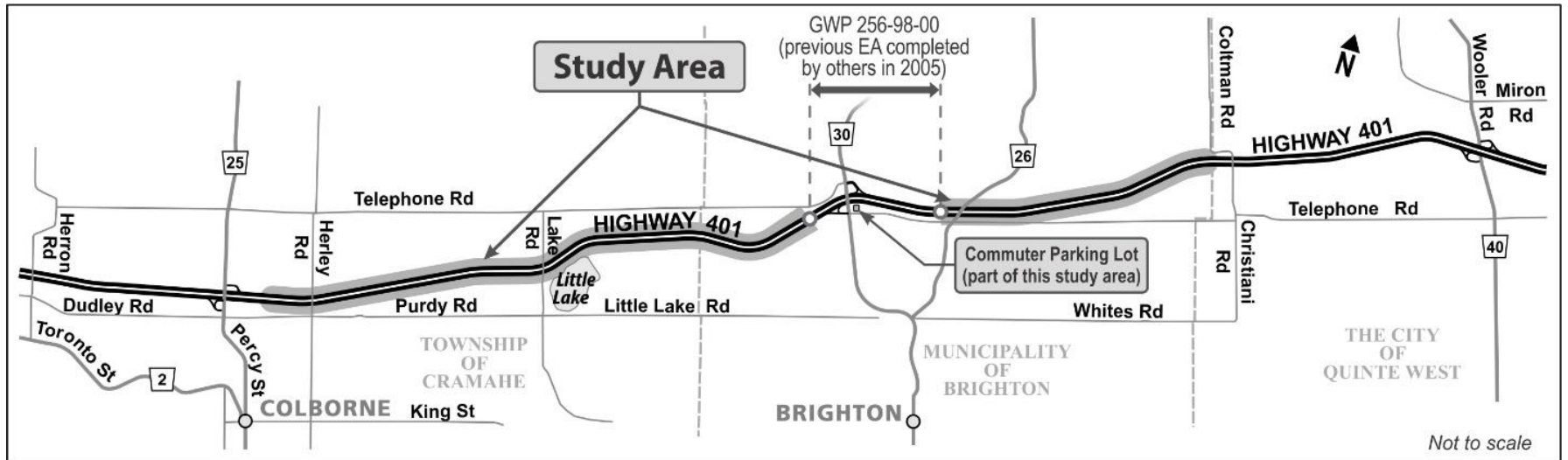


Figure 1: Key Map of Project Area

## 2 APPROACH

Descriptions of the terrestrial environment features of the study area were based on secondary source information compiled from agency correspondence and online database review and site investigations. WSP Terrestrial Ecologists conducted field investigations in 2021 to inventory and describe the terrestrial existing conditions for natural features, including vegetation, wildlife habitats and SAR within the project limits. The study area for the terrestrial ecosystem includes a 120 m distance from the MTO ROW throughout the length of the project limit in accordance with the Environmental Reference for Highway Design (ERHD, 2013). As shown in Figure 1, a section of Highway 401 in the vicinity of the Highway401/30 interchange is not included in this project, with the exception of a commuter parking lot.

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### 2.1 BACKGROUND INFORMATION REVIEW

A background review was undertaken using secondary source information. This review was intended to provide a preliminary assessment of the current ecological conditions and to provide an understanding of potential ecological constraints and field survey requirements for the study area. The following sources were consulted:

- Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF) (formerly Ministry of Natural Resources and Forestry (MNR)), Peterborough District Office;
- Ministry of the Environment, Conservation and Parks (MECP), Species at Risk Branch;
- Lower Trent Conservation Authority (LTCA);
- Aerial photography of the study area;
- Natural Heritage Information Centre (NHIC) Database Mapping;
- MNR Land Information Ontario (LIO) database;
- Ontario Nature's Reptile and Amphibian Atlas (ORAA);
- Ontario Breeding Bird Atlas (OBBA) (Bird Studies Canada, 2018); and
- Cornell Lab of Ornithology's eBird species' maps website.

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### 2.2 AGENCY CONSULTATION

WSP contacted the Ministry of Natural Resources and Forestry (MNR) in August 2020 and the Ministry of Environment, Conservation and Parks (MECP) and Lower Trent Conservation Authority (LTCA) in November 2020 requesting information on natural heritage information and species at risk occurring within the study area.

Catherine Warren (MNR – District Planner, Aug 20, 2020) identified critical turtle and bird nesting periods. Leah Stephens (LTCA – Environmental Planner / Regulations Officer, Nov 25, 2020) identified wetlands, regulated areas, significant natural areas and ANSI's within the study area. Monique Charette (MECP – Management Biologist, pers. Comm., June 9, 2021) identified two additional potential SAR (Monarch [*Danaus plexippus*] and Butternut [*Juglans cinerea*]) within the area.

All agency correspondence has been included in Appendix A.

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## 2.3 DESIGNATED NATURAL AREAS

For the purpose of this document, 'designated natural areas' include evaluated wetlands [both Locally Significant Wetlands (LSW) and Provincially Significant Wetlands (PSW)], Natural Heritage Features (NHF), Environmentally Sensitive Areas/Environmental Protection Areas, Area of Natural and Scientific Interest (ANSI), Provincial Parks and Conservation Reserves. The following is a description of 'designated natural areas' within the study area.

Further information of the 'designated natural areas' within the study area is provided below and the boundaries of areas and features identified in the following are shown in Appendix B.

### **Brighton Bluff ANSI**

A portion of the eastern study limit, east of County Road 26, is adjacent to the boundaries of Brighton Bluff provincially significant earth science area of natural and scientific interest (ANSI). The Brighton Bluff ANSI is 666.87 ha in size containing late glacial history of the area and a mature tunnel valley system. The south limit of the ANSI abuts the ROW limit on the north side of the highway for most of its length along the highway.

### **Mayhew Creek Significant Natural Area**

Significant Natural Areas are noted to be areas of significant indigenous vegetation and significant habitat of indigenous fauna. Natural Areas in this context is a designation by the Lower Trent Conservation Authority. A portion of the eastern study limit, south of Highway 401 is adjacent to the boundaries of Mayhew Creek Significant Natural Area. The Natural Area extends easterly beyond the east project limit. This area has a high diversity of habitats and plant species, many of which are provincially and regionally rare such as Nut Grass (*Cyperus schweinitzii*) and Red-shouldered Hawk (*Buteo lineatus*).

### **Spring Valley Significant Natural Area**

A small area of the eastern portion of the study area, west of County Road 26, is located within the boundaries of Spring Valley Significant Natural Area which is found south beyond the study limit. The north limit of this Natural Area briefly overlaps with forest cover on the southern extent of the highway.

### **Brighton Provincial Wildlife Area**

The Brighton Provincial Wildlife Area (BWA) is located along the north side of Highway 401. The area is within the Municipality of Brighton and the City of Quinte West. The Brighton Provincial Wildlife Area was identified as a provincially significant Earth Science Area of Natural and Scientific Interest (ANSI). Provincial Wildlife Areas (PWAs) are designated areas specifically managed for wildlife and to provide opportunities for outdoor recreation, particularly hunting and wildlife viewing. It contains areas of natural vegetation cover and wildlife habitat. Woodland cover of the BWA extends to the Highway 401 ROW on the north side.

### **Wetlands**

No Provincially Significant Wetlands (PSW) are found in, or immediately adjacent to, the study area. Biddy Creek Wetland is an evaluated wetland (non PSW) located in the vicinity of Brighton Cramahe Boundary Road. There are several wetlands, described according to Ecological Land Classification for Southern Ontario (ELC), located throughout the study area. They range in size and are not designated and; therefore, considered to be unevaluated. Based on review of Google Earth, the most common wetland types appear to be swamp and marsh.

In correspondence from the MNRF, they recommend that wetlands that have not been evaluated (unevaluated wetlands) be treated as Provincially Significant Wetland (for protection related to adjacent or encroaching development) or be evaluated by an Ontario Wetland Evaluation System (OWES) certified evaluator to conclude they are not Provincially Significant.

Additionally, portions of the study area are regulated by the LTCA under Ontario Regulation 150/06 of the *Conservation Authorities Act*. This is in relation to watercourses and wetlands and their adjacent areas.

### **Woodlands**

Natural Heritage mapping (NHIC, 2021) shows woodlands along the length of the study area. They include deciduous, coniferous and mixed forest types.

During field investigations these woodlands were found to be of significant size (greater than 2 ha) were in a rural to low-density residential setting and had a continuous canopy. These attributes are likely to designate the woodlands as significant based on criteria in the MNRF's Natural Heritage Reference Manual (MNRF, 2010) and Municipal and Northumberland County's Official Plans.

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### **2.3.1 SIGNIFICANT WILDLIFE HABITAT**

Wildlife habitat is defined as areas where plants, animals, and other organisms live and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual life cycle (e.g., breeding sites); and areas which are important to migratory or non-migratory species (OMMAH, 2014).

Wildlife habitat is referred to as significant if it is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System (OMMAH, 2014).

Significant Wildlife Habitat (SWH) is identified by the MNRF, or by a qualified person using MNRF evaluation procedures (OMMAH, 2014) (e.g., the MNRF's Significant Wildlife Habitat Technical Guide, 2000 and Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E, 2015).

In accordance with Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015), SWH is described under four main categories:

- Seasonal concentrations of animals;
- Rare vegetation communities or specialized habitats for wildlife;
- Wildlife movement corridors; and
- Habitats of species of conservation concern.

SWHs are generally associated with woodlands, wetlands and valley corridors, but could be associated with building structures, fallow fields, and the watercourse within the study area.

Further in-season wildlife surveys would be required to fully evaluate potential SWH within the study area; however, known SWH occurrences are detailed in Section 3.2.6.

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### 2.3.2 SIGNIFICANT HABITAT OF THREATENED OR ENDANGERED SPECIES

Habitat of a SAR is defined under subsection 2. (1) of the *Endangered Species Act, 2007* (ESA) as the area prescribed by a regulation made under clause 55 (1) (a) of the ESA for an Extirpated, Endangered or Threatened species; or, in the case of other species, as “an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding”.

Habitat of SAR designated Special Concern (SC) is not protected under the ESA but is instead identified as Significant Wildlife Habitat (Section 2.3.3).

The likelihood of SAR and their habitat that may be present within the study area is described in Section 2.4.

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## 2.4 SPECIES AT RISK

SAR species include those designated under the provincial ESA or under the federal *Species at Risk Act, 2002* (SARA) as either Extirpated (EX), Endangered (END), Threatened (THR) or Special Concern (SC), depending on level of risk.

Under Federal and/or Provincial legislation, species and their habitat are required to be protected if classified as END or THR. There is no legal protection for species ranked as SC, S-Rank or L-Ranks. However, their preservation, when found, is encouraged to assist with preserving Ontario’s biodiversity.

Online database (Section 2.1) tools and agency correspondence were reviewed to determine if there are records for known SCC occurrences for the area. Known SAR that could occur within the study area include:

- Birds (23 species):
  - Bank Swallow (*Riparia riparia*) (THR);
  - Barn Swallow (*Hirundo rustica*) (SC);
  - Black Tern (*Chlidonias niger*) (SC);
  - Bobolink (*Dolichonyx oryzivorus*) (THR);
  - Canada Warbler (*Cardellina canadensis*) (SC);
  - Cerulean Warbler (*Setophaga cerulea*) (THR);
  - Chimney Swift (*Chaetura pelagica*) (THR);
  - Common Nighthawk (*Chordeiles minor*) (SC);
  - Eastern Meadowlark (*Sturnella magna*) (THR);
  - Eastern Whip-poor-will (*Antrostomus vociferus*) (THR);
  - Eastern Wood-pewee (*Contopus virens*) (SC);
  - Evening Grosbeak (*Coccothraustes vespertinus*) (SC);

- Golden-winged Warbler (*Vermivora chrysoptera*) (SC);
  - Grasshopper Sparrow (*Ammodramus savannarum*) (SC);
  - King Rail (*Rallus elegans*) (END);
  - Least Bittern (*Ixobrychus exilis*) (THR);
  - Loggerhead Shrike (*Lanius ludovicianus*) (END);
  - Northern Bobwhite (*Colinus virginianus*) (END);
  - Olive-sided Flycatcher (*Contopus cooperi*) (SC);
  - Red-headed Woodpecker (*Melanerpes erythrocephalus*) (SC);
  - Short-eared Owl (*Asio flammeus*) (SC);
  - Wood Thrush (*Hylocichla mustelina*) (SC); and
  - Yellow-breasted Chat (*Icteria virens*) (END).
- Insects (1 species):
    - Monarch (SC).
  - Herpetiles (3 species):
    - Blanding’s Turtle (*Emydoidea blandingii*) (THR);
    - Northern Map Turtle (*Graptemys geographica*) (SC); and
    - Snapping Turtle (*Chelydra serpentina*) (SC).
  - Plants (1 species):
    - Butternut (END).

The likelihood of impacts to SAR and their habitat in the study area is presented in the SAR Screening Table (Appendix C). The assessment compares available habitat on and adjacent to the study area, to preferred habitat for individual species. Species were included in the assessment based on NHIC occurrence data listed above, species’ range maps and field observations. An impact assessment of confirmed habitat and SAR species observed is presented in section 4.4.

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## 2.5 FIELD SURVEYS

Terrestrial ecosystem field investigations were conducted by qualified ecologists on June 7 – 10, 2021. All terrestrial field investigations were completed from within the Highway 401 ROW, aided by using binoculars or traversing adjacent lands with landowner permission. Terrestrial ecosystem features that were examined during the field surveys included vegetation, wildlife and suitable habitat for SAR that are known or have potential to occur in the study area. The methods of investigation are described below.

### **Vegetation:**

Vegetation field investigations included identifying vegetation communities and delineating them on aerial photography. The vegetation communities were classified and described using the Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998). General vegetation characteristics including age, habitat features, drainage conditions and anthropogenic disturbance were recorded. Vegetation types are shown in the figure in Appendix D.

### **Wildlife:**

Wildlife field investigations included:

- Recording all incidental wildlife observations and wildlife signs (including vocalizations, browse, tracks / trails, scat, nests, carcasses and dens) and identifying potential wildlife usage and habitat functions associated with vegetation communities;
- A combination of stationary 5-minute point counts and wandering transects were completed throughout potential habitat areas; recorded abundance and breeding evidence levels per Ontario Breeding Bird Atlas (OBBA) protocols; and
- Assessing the potential of the habitats in the vicinity of the study area for SAR known to be present in the surrounding regional landscapes (especially for those where information suggested their presence in the local area);

Any observed SAR or Provincially / Regionally Rare species were recorded. A list of all recorded wildlife species is presented in Appendix E.

# 3 EXISTING CONDITIONS

The following is a description of existing conditions based on the results of the WSP terrestrial surveys and background review. It is noted that some descriptions mention specific properties where the vegetation type was found since access to all properties within the study area was not available at the time of the surveys. Vegetation types are also identified at varying levels of detail following the ELC system based on being able to access the site, viewing from the property boundary and aerial photo interpretation.

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## 3.1 VEGETATION

Natural vegetated areas within the study area include Coniferous Forest, Mixed Forest, Deciduous Forest, Coniferous Swamp, Mixed Swamp, Deciduous Swamp, Thicket Swamp, Shallow Marsh and Meadow Marsh. Cultural Woodland, Cultural Savannah, Cultural Thicket and Cultural Meadow vegetation types are primarily composed of introduced species or non-native weed species that are often associated with recently disturbed sites (e.g., residential areas, industrial sites, fallow agricultural lands, road ROWs). Areas with species that demonstrate anthropogenic influence are generally found within the highway ROW and in areas that are used recreationally for campgrounds, off-road vehicle usage and pedestrian trails.

Three (3) potential Butternuts (END) were identified during the field surveys. One (1) specimen was documented along Crandall Road, north of Highway 401. A second specimen was recorded within the Lake Road ROW adjacent to the Maple Mineral Deciduous Swamp type north of Crandall Road. The third individual was noted within the Brighton Provincial Wildlife Area and was observed at the edge of the Dry – Fresh Oak – Maple – Hickory Deciduous Forest type. Further information is provided in Section 3.3. The locations of the three Butternut specimens are shown in the ELC figures in Appendix D.

Based on Vegetation Community List (NHIC 2016), the vegetation community types observed are considered common in Southern Ontario.

A description of vegetation community findings is presented below with ELC mapping provided in Appendix D.

### **Dry – Fresh White Pine – Red Pine Coniferous Forest (FOC1-2)**

This coniferous forest type is dominated by Eastern White Pine (*Pinus strobus*) and is characterized by shallow soils with moderate drainage. This community was based on access to the property 248 Cochrane Road, adjacent to Bidy Creek. This vegetation community was infrequently observed within the study area and was only noted in one (1) other location farther east.

### **Dry – Fresh Red Cedar Coniferous Forest (FOC2-1)**

This forest type is associated with shallow soils with rapid drainage and represent secondary growth as a result of anthropogenic disturbance. This community description is based on access to property 248 Cochrane Road. The sub-canopy and shrub layer consisted predominantly of Eastern Red Cedar (*Juniperus virginiana*) up to approximately 10 m tall. Autumn Olive (*Elaeagnus umbellata*), Riverbank Grape (*Vitis riparia*) and European Buckthorn (*Rhamnus cathartica*) occasionally occurred within the shrub layer. The FOC1-2 community on 248 Cochrane Road was heavily disturbed due to recreational off-road vehicle trails. Where there were gaps in the canopy and there were no vehicular trails, the ground cover was



comprised of Dry-Moist Old Field Meadow Type species. This forest type was not frequently observed within the study area.

#### **Fresh – Moist White Cedar Coniferous Forest (FOC4)**

This community occurs on moist, yet well-drained sites and was documented in several locations adjacent to the highway ROW in wet depressions and was observed within the Brighton Provincial Wildlife Area. This community type consists predominantly of Eastern White Cedar (*Thuja occidentalis*), but the canopy height is lower (up to 10 m) and occasional taller coniferous and deciduous species such as Eastern White Pine, Trembling Aspen (*Populus tremuloides*), Paper Birch (*Betula papyrifera*), Green Ash (*Fraxinus pennsylvanica*) and American Basswood (*Tilia americana*) protrude above the cedars. The shrub and ground layers are sparse due to heavy shade, but in some areas where there were gaps in the canopy contained cattail species (*Typha* sp.) and rarely Reed Canary Grass (*Phalaris arundinacea*).

#### **Dry – Fresh White Cedar Mixed Forest (FOM4)**

This vegetation type was only observed in the vicinity of the property at 16298A Telephone Road south of Highway 401. The canopy contained a mix of coniferous and deciduous species. The canopy was composed of occasional Eastern White Pine, American Elm (*Ulmus americana*), Green Ash, Trembling Aspen and Sugar Maple (*Acer saccharum*). The sub-canopy was more dense than the canopy and contained occasional Eastern White Cedar, American Elm, Green Ash, Trembling Aspen, Red Oak (*Quercus rubra*) and rarely Paper Birch in the sub-canopy. Eastern White Cedar saplings comprised the shrub and groundcover layers.

#### **Dry – Fresh White Birch – Poplar – Conifer Mixed Forest (FOM5)**

This community is typically an early successional forest type and was documented in one (1) location, 856 Purdy Road, where access had been granted. Paper Birch and Eastern White Pine were frequent in this forest type with some Sugar Maple in the canopy and sub-canopy and rare occurrences of White Oak (*Quercus alba*). The shrub layer included Sugar Maple saplings and Honeysuckle species (*Lonicera* sp.).

#### **Deciduous Forest (FOD)**

Deciduous forest type communities were encountered frequently throughout the study limits. The description is based on access to this community at 263 Honey Road where access was granted. In this community, deciduous species such as Green Ash, American Basswood and Sugar Maple were abundant in the canopy and sub-canopy, with occasional Largetooth Aspen (*Populus grandidentata*), American Elm, Red Oak, Trembling Aspen, Scots Pine (*Pinus sylvestris*), Paper Birch, American Hop-hornbeam (*Ostrya virginiana*) and Black Cherry (*Prunus serotina*) in the sub-canopy. The understory layer contained Green Ash, American Basswood, Sugar Maple, Largetooth Aspen, American Elm, Red Oak, Trembling Aspen, Eastern White Cedar, American Hop-hornbeam and Black Cherry saplings and Prickly Gooseberry (*Ribes cynosbati*). The ground layer contained a mix of herbaceous species including: Jack-in-the-pulpit (*Arisaema triphyllum* ssp. *triphyllum*), Broad-leaved Enchanter's Nightshade (*Circaea canadensis*), Rosy Sedge (*Carex rosea*), False Solomon's-seal (*Maianthemum racemosum*), Zig-zag Goldenrod (*Solidago flexicaulis*), Broad-leaved Helleborine (*Epipactis helleborine*), Mayapple (*Podophyllum peltatum*), Common Dandelion (*Taraxacum officinale*), Pennsylvania Sedge (*Carex pennsylvanica*), Barren Strawberry (*Geum fragarioides*), Wild Geranium (*Geranium maculatum*), Common Speedwell (*Veronica officinalis*) and Sugar Maple seedlings with rare occurrences of Bloodroot (*Sanguinaria canadensis*), Graceful Sedge (*Carex gracillima*), Early Meadow Rue (*Thalictrum dioicum*) and Dewey's Sedge (*Carex deweyana*).

### **Dry – Fresh Red Oak Deciduous Forest (FOD1-1)**

This unit was uncommon within the project area limits and occurred between southeast of Telephone Road and County Road 26. The canopy was dominated by Red Oak with frequent amounts of Sugar Maple and Trembling Aspen, occasional Scots Pine, Eastern White Pine, Paper Birch and Green Ash. The sub-canopy had an abundance of Red Oak with frequent amounts of Sugar Maple and Trembling Aspen and occasional Paper Birch, White Oak and Green Ash. Extensive defoliation caused by the LDD moth (*Lymantria dispar dispar*) was noted in the deciduous canopy and sub-canopy. There was an understory with occasional amounts of Red Oak, Sugar Maple and Trembling Aspen. The ground layer contained an abundance of Goldenrod species (*Solidago* sp.) with frequent amounts of Poison-ivy (*Toxicodendron rydbergii*) and occasional Bracken Fern (*Pteridium aquilinum*) and False Solomon's-seal.

### **Dry – Fresh Oak – Maple – Hickory Deciduous Forest (FOD2)**

This vegetation unit type is characterized as being dominated by Oak species (*Quercus* sp.) and represents a transitional zone between wet and drier habitats. This community type was observed in one (1) location and was situated toward the east limit of the study area within the Brighton Provincial Wildlife Area. This unit contained Red Oak, which dominated the canopy and sub-canopy and a limited understory contained occasional American Hop Hornbeam and Green Ash. Canopy defoliation resulting from an infestation of LDD moth was observed. The ground layer contained an abundance of Graceful Sedge and frequent amount of False Solomon's-seal, White Trillium (*Trillium grandiflorum*) and Sugar Maple saplings. Northern Bush Honeysuckle (*Diervilla lonicera*) was occasionally observed as well as rare amounts of Showy Tick Trefoil (*Desmodium canadense*) adjacent to the gravel road, which runs parallel to the Highway 401.

One (1) mature potential Butternut tree was documented at the southeast edge of this community type.

### **Dry – Fresh Poplar Deciduous Forest Type (FOD3-1)**

This vegetation type represents growth arising from heavily managed or disturbed sites. This community occurred in several areas throughout the study area. The canopy of this forest community was dominated by Trembling Aspen in the canopy, sub-canopy and shrub layer with occasional Sugar Maple, Paper Birch, Eastern White Pine, and American Basswood in the sub-canopy. Occasionally there was Chokecherry (*Prunus virginiana*), Riverbank Grape, Staghorn Sumac (*Rhus typhina*), Balsam Poplar (*Populus balsamifera*), willows (*Salix* sp.), and Eastern White Cedar in the shrub layer. This Forest Type community located southeast of Telephone Road and Sriver Road contained a Willow Mineral Thicket Swamp comprised of mainly willow species and occasionally Paper Birch and Eastern White Cedar in the sub-canopy with Red-osier Dogwood (*Cornus sericea*) and Broadleaf Cattail (*Typha latifolia*) in the shrub layer and understory.

### **Dry – Fresh Sugar Maple Deciduous Forest (FOD5)**

This vegetation type occurred in one (1) location in the northwestern most limit of the study area, adjacent to the Colborne Emergency Services Base property. The canopy consisted of Sugar Maple and Eastern White Pine. The sub-canopy was abundant with Sugar Maple with a few occurrences of Paper Birch. The understory consisted of Sugar Maple saplings and European Buckthorn.

### **Dry – Fresh Sugar Maple Deciduous Forest (FOD5-1)**

This forest type occurred frequently throughout the study area. This community type was noted east of 856 Purdy Road, on 248 Cochrane Road and along Crandall Road north of Highway 401. The community type

is similar to the FOD5 vegetation description above; however, Sugar Maple dominated the canopy and sub-canopy and Sugar Maple saplings were abundant in the shrub layer and understorey. The following description is based on access to the property at 248 Cochrane Road. Red Oak and American Basswood were occasionally present in the canopy and sub-canopy along with Green Ash and rarely American Elm, American Hop-hornbeam and Eastern White Cedar in the sub-canopy. The shrub layer consisted of Green Ash saplings, Eastern White Cedar, Red Oak, American Hop-hornbeam, Chokecherry, Staghorn Sumac, Honeysuckle species, Paper Birch, European Buckthorn and Scots Pine. The understorey was comprised of Pennsylvania Sedge, Rosy Sedge, Sensitive Fern (*Onoclea sensibilis*), Broad-leaved Enchanter's Nightshade, Large-leaved Aster (*Eurybia macrophylla*) and Bracken Fern.

#### **Dry – Fresh Black Locust Deciduous Forest (FODM4-11)**

This community occurred at the westernmost limit of the study area, scattered within Low Density Residential areas. It is dominated by Black Locust (*Robinia pseudoacacia*) and includes Manitoba Maple (*Acer negundo*).

#### **Broad-leaved Sedge Mineral Meadow Marsh (MAM2-6)**

This vegetation type was recorded at one (1) location in the study area. It is associated with a seepage area along the southern slope adjacent to the Highway 401 ROW. The canopy of this Meadow Marsh is limited with occasional Green Ash and some dead Green Ash snags. Green Ash and Eastern White Cedar were occasional in the sub-canopy and shrub layer with rare occurrences of Peachleaf Willow (*Salix amygdaloides*). This vegetation type is dominated by wetland herbs such as Path Rush (*Juncus tenuis*), Watercress (*Nasturtium officinale*), Common Spike-rush (*Eleocharis palustris*), as well as frequent amounts of Sallow Sedge (*Carex lurida*) and Awl-fruited Sedge (*Carex stipata*) and occasionally American Bugleweed (*Lycopus americanus*), Boneset (*Eupatorium perfoliatum*), Limestone Meadow Sedge (*Carex granularis*), Purple Loosestrife (*Lythrum salicaria*), Fox Sedge (*Carex vulpinoidea*) and Golden Sedge (*Carex aurea*) with occasional pockets of Broadleaf Cattail in wet depressions.

#### **Common Reed Graminoid Mineral Meadow Marsh (MAMM1-12)**

This vegetation type is common within the study area mainly as small inclusions in disturbed habitats such as wet ditches along roadsides and within the ROW median. This type of meadow marsh is dominated by invasive Common Reed (*Phragmites australis*) with limited associate species. Some wetland herbs occur as well as occasional pockets of cattail species in wetter depressions. A minor component of shrub species such as willows, buckthorn and dogwood species may also occur.

#### **Cattail Mineral Shallow Marsh Type (MAS2-1)**

This vegetation type occurred frequently in ditches along the Highway 401 ROW and within the highway median and within the evaluated wetland associated with Bidy Creek. The dominant vegetation consisted of Broadleaf Cattail and Narrow-leaved Cattail (*Typha angustifolia*) and the occasional occurrence of standing snags, Heart-leaved Willow (*Salix eriocephala*), Common Reed and Reed Canary Grass.

#### **Coniferous Swamp (SWC)**

This swamp type was occasionally observed adjacent to the highway ROW in moist habitats and lands associated with permanent watercourses. The description here is based on property access at 14977 Telephone Road. This community was dominated by Eastern White Cedar in the sub-canopy with the occasional occurrence of Tamarack (*Larix laricina*) in the canopy and sub-canopy. The understorey contained an abundance of Eastern White Cedar and frequently willow species with occasional Red-osier

Dogwood and Green Ash saplings. The ground layer was comprised of cattail species, Reed Canary Grass and inclusions of the invasive Common Reed.

### **White Cedar Mineral Coniferous Swamp (SWC1-1)**

This vegetation type occurred in one (1) location north of Highway 401 and was associated with unevaluated wetland (NHIC 2021) surrounding the Bidy Creek watercourse. This community type is characterized by being dominated almost entirely by Eastern White Cedar. This unit contained middle-aged and young Eastern White Cedar in the canopy, sub-canopy, shrub layer and understorey and rare occurrences of Eastern White Pine in the canopy and American Elm and Tamarack in the sub-canopy. Speckled Alder (*Alnus incana*) and willow species were occasional in the shrub layer. The canopy of Eastern White Cedar was dense, which resulted in an open understorey with little to no ground cover present. Cattail species were present where there were openings in the canopy and adjacent to the highway ROW.

### **Mixed Swamp (SWM) / White Cedar Mineral Mixed Swamp (SWM1)**

This mixed vegetation type occurred in one (1) location north of Highway 401 on 14287 Telephone Road. This vegetation community is associated with a permanent watercourse that is connected to Little Lake. This area contained a mixture of upland and wetland deciduous and coniferous species. The sub-canopy was composed of Eastern White Cedar in wetter areas, and in drier areas the canopy contained occasional American Elm and rarely Sugar Maple. The sub-canopy also contained occasionally Green Ash, Paper Birch and Trembling Aspen. The understorey consisted of Green Ash and the ground layer was characterized by an abundance of cattail species.

### **Maple Mineral Deciduous Swamp (SWD3)**

This unit exists on the west and east sides of Lake Road, north of Crandall Road / Highway 401 intersection. The MNRF Natural Heritage Areas mapping shows the community is classified as unevaluated wetland (NHIC 2021). Open aquatic features were present within the community and could be observed from the Lake Road ROW. The canopy in this unit is dominated by Freeman's Maple (*Acer x freemanii*) with a few dead Ash snags. Freeman's Maple also dominated the sub-canopy and shrub layers. Frequent specimens of Heart-leaved Willow and occasional Riverbank Grape, Alternate-leaved Dogwood (*Cornus alternifolia*), Green Ash and Red-osier Dogwood were also noted in the shrub layer. The ground layer was abundant with Reed Canary Grass and commonly contained Broadleaf Cattail and occasionally Ostrich Fern (*Matteuccia struthiopteris*). A young potential Butternut tree was noted adjacent to Lake Road within the ROW.

### **White Birch – Poplar Mineral Deciduous Swamp (SWD4-3)**

One (1) SWD4-3 unit exists at the north side of the evaluated wetland associated with Bidy Creek, which is intersected by the Highway 401 east of Little Lake. The canopy in this unit contains frequent amounts of Paper Birch and Trembling Aspen with occasional Green Ash and several Green Ash standing snags. Frequent amounts of Paper Birch, Trembling Aspen and American Elm were noted with occasional Green Ash present in the sub-canopy. Occasional willow species and Eastern White Cedar were present in the shrub layer. The ground layer was comprised of frequent Eastern White Cedar saplings and occasional Narrow-leaved Cattail. This unit contained Cattail Mineral Shallow Marsh inclusions.

A second SWD4-3 community was also documented within the Brighton Provincial Wildlife Area north of Highway 401 and contained Open Aquatic habitat. This unit was dominated by Eastern Cottonwood

(*Populus deltoides*) in the canopy and sub-canopy with rare occurrences of Paper Birch in the sub-canopy. The understorey was dominated by Red-osier Dogwood with occasional Eastern Cottonwood, willow species and Riverbank Grape. The groundcover layer contained frequent amounts of Reed Canary Grass and rarely Purple Loosestrife.

#### **Alder Mineral Thicket Swamp (SWT2-1)**

This swamp vegetation type occurred within the evaluated wetland associated with Bidy Creek, which is intersected by the Highway 401 east of Little Lake. There were a number of standing snags and the sub-canopy consisted of Red Maple (*Acer rubra*) with Speckled Alder dominating the shrub layer. An abundance of Narrow-leaved Cattail comprised the understorey.

#### **Willow Mineral Thicket Swamp (SWT2-2)**

This community was found occasionally throughout the study area. The vegetation that comprised this unit was based on access to the Brighton Wildlife Area. The eastern limit of the Brighton Wildlife Area contained a mosaic of wetland communities that had been impacted by off-road vehicle use and anthropogenic disturbance such as dumping and pedestrian trail use. This swamp vegetation type occurred as a pocket of vegetation north of Highway 401 west of Coltman Road and was surrounded by Dry-fresh Poplar Deciduous Forest. The canopy consisted of rare occurrences of Trembling Aspen and Green Ash up to 10 m in height with frequent amounts of Meadow Willow (*Salix petiolaris*) in the sub-canopy. The shrub layer contained frequently Meadow Willow and Red-osier Dogwood with occasional Peachleaf Willow, Heart-leaved Willow, White Willow (*Salix alba*), White Meadowsweet (*Spiraea alba*) and Riverbank Grape. The groundcover layer contained an abundance of Common Spikerush (*Eleocharis palustris*), Rough Horsetail (*Equisetum hyemale*), Reed Canary Grass, and frequently bulrush species (*Scirpus* sp.) and occasionally Boneset, Swamp Milkweed (*Asclepias incarnata*), Heller's Rosette Grass (*Dichanthelium oligosanthes*) and Path Rush (*Juncus tenuis*).

#### **Dry – Moist Old Field Meadow (CUM1-1)**

This vegetation type occurred frequently within the limits of the Highway ROW, within the Highway median and as fallow field. The species listed below are based on access to the property at 856 Purdy Road. The CUM1-1 community on the property was once farmed for Tobacco (*Nicotiana tabacum*) (Landowner pers. comm., June 8, 2021). The dominant vegetation consisted of Kentucky Bluegrass (*Poa pratensis*), Tall Goldenrod (*Solidago altissima*), Hemp Dogbane (*Apocynum cannabinum*), Smooth Brome (*Bromus inermis*) and Sheep's Sorrel (*Rumex acetosella*). There was also occasionally Orchard Grass (*Dactylis glomerata*), Queen Anne's Lace (*Daucus carota*), Canada Goldenrod (*Solidago canadensis*), Black Medic (*Medicago lupulina*), Oxeye Daisy (*Leucanthemum vulgare*), Asters (*Symphotrichum* sp.), Common Dandelion, Bladder Campion (*Silene vulgaris*), Spotted Knapweed (*Centaurea stoebe*), Viper's Bugloss (*Echium vulgare*), Common Mullein (*Verbascum thapsus*) and occurrences of Common Milkweed (*Asclepias syriaca*).

Some woody vegetation observed included Poison-ivy, Riverbank Grape, Staghorn Sumac and Smooth Rose (*Rosa blanda*).

#### **Sumac Cultural Thicket (CUT1-1)**

This vegetation community was common adjacent to the highway ROW and was frequently associated with Mineral Cultural Woodland (CUW1). Staghorn Sumac frequently dominated the sub-canopy and shrub layers, with scarce amounts of Manitoba Maple in the canopy. Eastern Red Cedar was noted occasionally

in the sub-canopy and shrub layers. In general, the ground layer was comprised of old field meadow species and grasses such as Kentucky Bluegrass.

### **Cultural Savannah (CUS)**

One (1) young apple (*Malus* sp.) Cultural Savannah was identified on the south side of Highway 401 on 856 Purdy Road. Cultural savannahs are characterized by 25% to 35% tree cover. The open canopy of this ecosite reached 10 m and was composed of apple trees. The groundcover consisted of Dry-Moist Old Field Meadow Type species.

### **Mineral Cultural Woodland (CUW1)**

This vegetation type occurred throughout the study area adjacent to the highway ROW and the carpool lot at the Highway 401/30 interchange. Generally, the majority of trees within CUW1 communities were observed to be young (less than 25 cm diameter at breast height [DBH]) and are likely the result of successional growth following an excavation/disturbance of these areas. The CUW1 community adjacent to the carpool lot at Highway 401/30 interchange was accessible and was used to describe this unit. The canopy and sub-canopy consisted of Trembling Aspen with Manitoba Maple, Siberian Elm (*Ulmus pumila*) and rarely Black Locust in the sub-canopy. The shrub layer was comprised of Staghorn Sumac, Riverbank Grape and Austrian Pine (*Pinus nigra*). The ground layer consisted of a majority of CUM1-1 species including an abundance of Goldenrod species and Smooth Brome.

### **Red Pine Coniferous Plantation (CUP3-1)**

This plantation community was dominated by Red Pine (*Pinus resinosa*) and was less frequent within the study area compared to other coniferous plantation types. This community was noted adjacent to the road ROW and adjacent to other Coniferous Plantation communities. Other species within the shrub layer included Manitoba Maple, Black Locust, Green Ash and Poison-ivy was noted in the understorey.

### **White Pine Coniferous Plantation (CUP3-2)**

This vegetation type occurred frequently throughout the study area. Documentation of this vegetation type is based on access to the property at 660 Purdy Road. The canopy was dominated by mature Eastern White Pine and frequently Scots Pine with occasional White Oak and Sugar Maple in the sub-canopy and Black Cherry, White Ash (*Fraxinus americana*), Black Raspberry (*Rubus occidentalis*), Thicket Creeper (*Parthenocissus vitacea*), Honeysuckle species and European Buckthorn in the understorey. The groundcover layer was limited in this community type, but some species consisted of Dog-strangling Vine (*Vincetoxicum rossicum*), Wild Sarsaparilla (*Aralia nudicaulis*), Barren Strawberry, Broad-leaved Enchanter's Nightshade and Spiked Sedge (*Carex spicata*).

### **Scotch Pine Coniferous Plantation (CUP3-3)**

This community was common within the study area limits and was most often encountered adjacent to the Highway 401 ROW and adjacent to other Coniferous Plantation communities. The canopy and sub-canopy were dominated by Scots Pine with frequent European Buckthorn and occasional Red Oak in the shrub layer. The limited understorey contained Dog-strangling Vine and Poison-ivy.

### **Hedgerows (HR)**

Hedgerows were documented throughout the length of the study area and were most commonly associated with Low Density Residential and Rural Properties. In general, hedgerow communities consisted of thick

growth of young to middle-aged coniferous and deciduous trees such as oak species, Black Locust, Colorado Blue Spruce (*Picea pungens*), Austrian Pine and Scots Pine.

Some hedgerows contained dense shrub cover comprised of species such as Common Lilac (*Syringa vulgaris*) and European Buckthorn. Non-native and invasive species were commonly noted in hedgerow communities.

#### **Open Agriculture (OAG) / Annual Row Crops (OAGM1)**

Agricultural lands were abundant within the study area and included active fields of corn, soybean and hay.

#### **Recreational (CGL\_4)**

One (1) campground was identified within the study area west of the commuter parking lot at Highway 401/30 interchange and was assigned the Recreational (CGL) code.

#### **Low Density Residential (CVR\_1) / Rural Property (CVR\_4)**

Surrounding the residential buildings throughout the study area, vegetation frequently consisted of mowed lawn with planted trees that are being maintained / cared for and native and introduced garden species.

#### **Light Industry (CVC\_2)**

Rural properties that were comprised of paved / compacted commercial land and parking for commercial vehicles were classified as Light Industry.

#### **Extraction (CVC\_4)**

Lands identified from aerial imagery (Google Earth 2021) as active quarries and gravel pits were assigned the Extraction (CVC) code. One (1) quarry was identified east of 856 Purdy Road and an additional quarry was documented north of Telephone Road, south of the Brighton Wildlife Area.

#### **Open Aquatic (OAO)**

Open water features were identified throughout the length of the study area, the largest of which is Little Lake, situated south of Highway 401 and east of Lake Road.

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## **3.2 WILDLIFE**

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### **3.2.1 WILDLIFE HABITAT OVERVIEW**

Habitats in the study area including forests, meadows and wetlands have the potential to support a variety of wildlife that are tolerant of human landscapes. Areas beyond the ROW or adjacent to the study area generally provide greater opportunities for more sensitive wildlife including forest interior bird species. A list of wildlife species recorded for the project is found in Appendix E.

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### **3.2.2 AVIFAUNA**

In total, 56 bird species were recorded during the June 7 – 10, 2021 terrestrial field investigations. Since the majority of making observations and listening for bird calls, was conducted from the ROW, noise from

road traffic on the highway was a barrier to the full complement of bird species that may have been present. The majority of these bird species are common in Ontario and expected within the broader landscape surrounding the study area. Seven (7) avifauna SCC including three SAR were recorded during the breeding bird period.

- **Species at Risk.** Three (3) SAR were recorded:
  - Barn Swallow (Special Concern) – four (4) individuals were observed foraging over horse pastures with adjacent barns in the area of Honey/Crandall Road intersection (Appendix F);
  - Eastern Meadowlark (Threatened) – two (2) singing males in potential breeding habitat (Appendix F); and
  - Eastern Wood-pewee (Special Concern) – two (2) individuals recorded; one male singing within the forest on Lake Road and one male singing in Brighton Wildlife Area (Appendix F).
- **Area Sensitive Species (Ecoregion 6E (MNRF 2015)):**
  - Black-throated Green Warbler (*Setophaga virens*)– one (1) individual recorded in the vicinity of Cochrane Road adjacent to the ROW (Appendix F);
  - Ovenbird (*Seiurus aurocapilla*) – one (1) individual recorded in the CUP3-2 unit at 660 Purdy Road (Appendix F);
  - Red-breasted Nuthatch (*Sitta canadensis*) – one (1) individual recorded in the small White Cedar Forest (FOC4) at Purdy Road, just west of Durham Street North (Appendix F); and
  - Veery (*Catharus fuscescens*) – one (1) individual recorded in the SWT2-1 unit (thicket swamp) in the vicinity of the Bidy Creek culvert crossing (Appendix F).

In their correspondence, the MNRF identified that the breeding bird season for the area of the project is April 15 – July 31.

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### 3.2.3 MAMMALS

During the 2021 WSP field surveys eight (8) mammal species were recorded: Eastern Chipmunk (*Tamias striatus*), Eastern Cottontail (*Sylvilagus floridanus*), Grey Squirrel (*Sciurus carolinensis*), Red Squirrel (*Tamiasciurus hudsonicus*) were observed in the forested areas. Feeding evidence of Beaver (*Castor canadensis*) was observed near creek crossings. Raccoon (*Procyon lotor*) tracks were identified along the highway ditches and culverts. Coyote (*Canis latrans*) and White-tailed Deer (*Odocoileus virginianus*) scat and tracks were identified along trails and forested areas. All are common to the area and not SCC.

Although not confirmed during the field surveys, several other common mammal species are likely to occur within the study area based on presence of suitable habitat features, including: Muskrat (*Ondatra zibethicus*), Striped Skunk (*Mephitis mephitis*) and Virginia Opossum (*Didelphis virginiana*). Also, a number of small mammals often go undetected (e.g., bats, mice, moles etc.).

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### 3.2.4 REPTILES AND AMPHIBIANS

No targeted surveys were completed for herpetofauna. However, during the 2020-2021 WSP field surveys, two (2) roadkill reptile species were confirmed in the study area:



- Snapping Turtle (*Chelydra serpentina*). One deceased Snapping Turtle was observed dead on the north shoulder of the highway at C3 – Little Lake Tributary 2 (Appendix F).
- Midland Painted Turtle (*Chrysemys picta marginata*). Three individuals were observed deceased and one alive. One individual was observed dead on the road shoulder at the SWT2-1 unit at the Biddy Creek crossing. Two hatchlings were observed dead on a trail at Brighton Wildlife Area and one live turtle was observed in the vicinity of Crandall Road / Dunk Road intersection and may use the pond habitat between Crandall Road and Highway 401 (Appendix F).

Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) and Grey Treefrog (*Hyla versicolor*) were also observed. Based on the background information review and habitat assessment, the following additional herpetofauna species are likely to occur in suitable wetland or forest edge / meadow habitats within the study area: American Toad (*Anaxyrus americanus*), Northern Leopard Frog (*Lithobates pipiens*), Spring Peeper (*Pseudacris crucifer*) and Wood Frog (*Lithobates sylvaticus*).

Wet ditches, meadows and forest habitats adjacent to the highway ROW may provide potential habitat for herpetiles. The creeks, waterbodies and wetlands provide suitable habitat for amphibians and turtles. Furthermore, turtle may attempt to nest along the gravel zones between the paved shoulder and vegetated ditches, or in agricultural fields or other open disturbed sites within proximity to aquatic features. However, no evidence of turtle nesting was observed.

In their correspondence, the MNRF identified general critical periods for the protection of turtles. These are:

- Active Season: April 15 – October 15;
- Hibernation: October 15 – April 15;
- Mating: April, September and October, but may occur at any time of year, including during hibernation;
- Nesting: May 15 – June 30; lasts about 3 weeks each year;
- Hatching: August 15 – September 30; and
- Dispersal / Migration: April 15 – May 15; September 1 – September 30.

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### 3.2.5 OTHER WILDLIFE

Six (6) insect species were observed during the field surveys: including one SAR, Monarch (*Danaus plexippus*; Special Concern in Ontario). Two Monarchs were observed foraging at the Brighton Wildlife Area, one individual at 248 Cochrane Road and one individual in the CUM1-1 unit near the west project limit. All of these insect species are common in Ontario and expected within the broader landscape surrounding the study area.

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### 3.2.6 SIGNIFICANT WILDLIFE HABITAT

WSP has undertaken an assessment of *Significant Wildlife Habitat* (SWH) using the Significant Wildlife Habitat Ecoregion Criteria Schedules, Ecoregion 6E (MNRF 2015). Based on field survey results, SWH was confirmed for two (2) criteria:

- **Special Concern and Rare Wildlife Species.**
  - Eastern Wood-pewee, Monarch and Snapping Turtle were recorded within the study

area.

- **Woodland Area-Sensitive Bird Breeding Habitat**
  - Black-throated Green Warbler, Ovenbird, Red-breasted Nuthatch and Veery were recorded as probable breeders within the study area as males were observed singing.

In addition, candidate (unconfirmed) SWH was identified for seven (7) criteria:

- **Bat Maternity Colonies** – Observations of potential cavity trees or characteristics such as peeling bark were recorded in the deciduous forested areas. Candidate SWH is present where mature Sugar Maple and other deciduous tree species with a DBH greater than 25 cm are present. No targeted snag surveys were conducted.
- **Marsh Breeding Bird Habitat** – Wetland habitats with varying water depths and emergent aquatic vegetation is present within the existing ROW and study area limit. No targeted marsh bird surveys were conducted.
- **Reptile Hibernaculum** – Rock piles and old stone fences were observed in the FOD5 unit at the west project limit and near Mayhew Creek Tributary that may go below the frost line. No targeted snake surveys were conducted.
- **Bald Eagle and Osprey Nesting, Foraging and Perching Habitat** – Super canopy trees were observed near Little Lake Tributary 2.
- **Amphibian Breeding Habitat (Woodland)** – Pools were observed within woodlands. No targeted amphibian breeding surveys were conducted.
- **Turtle Nesting Areas** – Candidate habitat is present adjacent to the marsh wetlands. SWH criteria are not definitive regarding exclusion of agricultural fields, but other man-made habitats are excluded (road embankments / shoulders). Active agricultural fields are less likely to provide successful nesting opportunities given frequent disturbance (e.g., ploughing, seeding, harvesting, soil compaction). No targeted surveys were conducted.
- **Deer Yarding or Wintering Area** – Through consultation with MNRF it was identified that there are no deer wintering areas within the study area. Due to the landscape mosaic of habitat types, it is likely that deer wintering may occur in local woodlands.

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### 3.3 SPECIES AT RISK

The background information review generated a ‘long list’ of 33 potential SAR. Those species that were considered to have at least some potential to occur in the vicinity of the study area were assessed for suitable habitat conditions.

Of the potential SAR, six (6) species were confirmed within the ROW or on properties where access was granted:

- Barn Swallow (Special Concern) – Four (4) birds were observed foraging. There are barns, bridges, culverts and other structures within the ROW for potential nesting.

- Butternut (Endangered) – Three (3) Butternut specimens were recorded. There is the possibility that they may be a hybrid species in which case the specimens would not be subject to the requirements of the ESA. At the present time until hybridity can be determined they are identified as ‘potential’ Butternuts.
- Eastern Meadowlark (Threatened) – Two (2) adult males were heard singing adjacent to the study area. Throughout the study area there are meadows and agricultural lands that could be used for nesting and foraging.
- Eastern Wood-pewee (Special Concern) – Two (2) adult males were heard singing. There are patches of deciduous forest habitat beyond the ROW that would be suitable for nesting.
- Monarch (Special Concern) – Four (4) Monarch butterflies were observed. There is cultural meadow habitat with scattered patches of Milkweed throughout the study area and within the ROW for potential breeding.
- Snapping Turtle (Special Concern) – One (1) adult turtle was observed dead on the highway shoulder. There are scattered creeks, wetlands and ponds for potential basking and breeding habitat. Movement beneath the highway may occur in some of the larger watercourse culverts with greater potential at locations where there are marshes for foraging and possible overwintering outside of the ROW.

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## 3.4 WILDLIFE MOVEMENT ASSESSMENT AND OPPORTUNITY

An assessment of wildlife movement within the study area was carried out to identify if there was evidence of locations where wildlife were crossing the highway and where suitable conditions may occur that would support and provide opportunity for wildlife to move across the highway including a provision for a new structure for wildlife passage beneath the highway. A technical memo that presents the results of the assessment can be found in Appendix G. Below is a summary of the memo.

The landscape adjacent to Highway 401 within the project limits is a mosaic of agricultural, rural residential and natural habitats including forests, wetlands and cultural meadow. The landscape is generally flat to slightly rolling with limited deep valleylands. Field investigations carried out in 2020 and 2021 did not identify any evidence of concentrated wildlife activity / presence (foraging, staging, trails and scat) at the highway ROW and in adjacent habitat where access has been granted. Some wildlife mortality was observed (raccoon, turtles, small birds) during the investigations but there was no strong evidence of locations where wildlife were attempting to cross the highway. A review of locations of vehicle / wildlife collisions (assumes wildlife is white-tailed deer, coyote, red fox) indicated some concentration in the vicinity of the Brighton Provincial Wildlife Area at the east end of the project area as well as an area in the vicinity of Lake Road. A total of 34 vehicle / wildlife collision locations were identified for the assessment.

There are four (4) structural culverts that cross beneath the highway. All are associated with watercourses. Based on their size and openness ratio and that their passage function is largely aquatic in nature it was identified that 3 of the 4 culverts could support turtle passage with some opportunity for medium sized mammals to use during the period of lowest water level. There are 35 non-structural drainage culverts that do not support wildlife movement opportunity due to their small opening and great length.

Opportunities to provide wildlife passage using white-tailed deer as the target wildlife group were examined. The larger sized culvert required for deer passage (3 m tall by 3 m wide) would likely support passage for smaller mammals. Factors that were considered for possible passage locations included evident patterns of wildlife mortality in attempting to cross the highway, physiographic conditions such as valleylands that would provide physical space to locate a culvert and supporting habitat on either side of the highway. Based on this, there were no locations that were suitable to locate a dedicated wildlife culvert and the low frequency of vehicle / wildlife collisions that ranged from 1-2 per year would not warrant the need for a wildlife culvert.

## 4 IMPACT ASSESSMENT

This section reviews potential impacts or condition changes to the terrestrial environment within or adjacent to the study area, based on construction activities (e.g., vegetation clearing and grading). Direct and indirect impacts to designated natural heritage features, vegetation, wildlife, SAR and wetlands are reviewed in terms of immediate impacts and residual effects. For recommended mitigation measures, refer to **Section 5.0**.

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### 4.1 VEGETATION

#### Direct Impacts

The proposed rehabilitation and replacement of structures and proposed highway widening will result in direct and indirect impacts to vegetation within the ROW. SAR vegetation is discussed in **Section 4.4**.

Encroachment of the new ROW limits on both sides of Highway 401 will directly impact areas of cultural vegetation of relatively minor ecological value and small isolated groupings of trees. Notably, removals will directly impact the edge of woodlands and habitat of Butternut (Tree B03), adjacent wetlands and vegetation within the Brighton Provincial Wildlife Area ANSI.

The proposed work will require the removal or disturbance of cultural roadside vegetation. Impacted vegetation communities include cultural meadow (CUM1-1), cultural savannah (CUS), cultural thicket (CUT) cultural woodland (CUW) and cultural plantation (CUP), which are primarily composed of introduced species or non-native species. They are associated with disturbance and are considered lower quality ecosystem types. These vegetation types can quickly re-establish post-disturbance with general stabilization and revegetation (refer to **Section 5.2**) without further mitigation required. The descriptions provided below follow the highway from west to east.

Vegetation removal is also planned to occur within some treed habitat. In the southwest quadrant of the Herley Road underpass, an approximately 50 m edge of a Dry - Fresh Black Locust Deciduous Forest (FODM4-11) is to be removed (Appendix D: Plate 2) and in the southeast quadrant of the underpass, approximately 100 m of the edge of Dry - Fresh Poplar Deciduous Forest (FOD3-1) is proposed for removal. North and south of Highway 401 east of Herley Road the edges of Deciduous Forest (FOD; approximately 500 m) and Mixed Forest (FOM; approximately 300 m) are identified for removal. Approximately 90 m of the edge of Dry - Fresh White Birch - Poplar - Conifer Mixed Forest (FOM5) is proposed for removal south of Highway 401 adjacent to the property at 856 Purdy Road (Plate 3).

Between Highway 401 and Crandall Road, approximately 160 m of Coniferous Forest (FOC) edge and an approximate 100 m length of edge of a Dry - Fresh Sugar Maple Deciduous Forest (FOD5-1) will be impacted. In the same area but on the south side of Highway 401 approximately 400 m of FOD5-1 edge will be impacted.

A 180 m long edge of Scotch Pine Coniferous Plantation (CUP3-3) north and south of Highway 401 west of Lake Road will also be removed. A length of approximately 530 m of FOD habitat north of Highway 401 (east of Dean Road and south of Crandall Road continuing north of Crandall Road) is proposed to be impacted by the proposed highway widening in addition to a proposed road connecting Crandall Road to Lake Road. East of Lake Road and north of Highway 401, a 140 m long portion of FOD is proposed for removal. The edges of a FOD and a Dry - Fresh Red Cedar Coniferous Forest (FOC2-1) approximately 200 m in length east of Cochrane Road and south of Highway 401 are proposed to be impacted. The area of removal within the edge of the FOC2-1 habitat includes the regionally rare Eastern Red Cedar.

The edges of Cattail Mineral Shallow Marsh drainage ditches (MAS2-1) and Common Reed Graminoid Mineral Meadow Marsh (MAMM1-12) and adjacent moist coniferous forest and coniferous swamp habitat east of Little Lake north and south of Highway 401 will also be disturbed by culvert lengthening along Bidy Creek and associated tributaries. The vegetation along the edges of the MAS2-1 habitat and Alder Mineral Thicket Swamp (SWT2-1) within the non-provincially significant wetland and unevaluated wetland surrounding Bidy Creek east of Cochrane Road may be impacted as a result of highway widening and grading into wetland habitat. However, disturbance is expected to be isolated to the edges and the hydrology of the creek should be maintained.

Two sections of retaining wall on the north side of the highway at approximate stations (10+690 to 11+050; 11+340 to 11+680) will impact plantation (CUP3-3). This habitat type is common within the study area and there were no significant species present. Across from this area on the south side of the highway, the edge of SWC (Coniferous Swamp) and SWM4-1 (White Cedar-Hardwood Mixed Organic Swamp) over a distance of approximately 700 m will be impacted.

Impacts to vegetation communities along Telephone Road east of County Road 26 and south of the highway include widening into CUP, CUT, CUW and FOD communities as well as within an approximate length of 100 m of the northwest corner of Dry - Fresh Red Oak Deciduous Forest (FOD1-1) habitat (Plates 10 and 11). Further, encroachment within and along approximately 340 m of edge habitat of CUP3-3 north of Highway 401 may occur (Plate 11).

Approximately 400 m of the edge of FOD may be impacted by construction of a retaining wall on the north side of the highway in the area of the Brighton Provincial Wildlife Area.

Approximately 740 m of the edge of mature FOD5-1 habitat south of the Brighton Provincial Wildlife Area south of Highway 401 may be impacted by the proposed widening and grading works (Plates 13 and 14).

These removals will create new woodland edge, which may result in negative impacts on retained woodlands. Negative impacts may include:

- Greater light and wind penetration resulting in changes to microclimate (e.g., warmer temperatures, decreased soil moisture), potentially leading to plant desiccation;
- Increased susceptibility to windthrow and sunscald;
- Loss of plant and wildlife habitat at the edge;
- Tree crown and root damage and/or stress from construction equipment and / or grading;
- Susceptibility to invasion by non-native species; and
- Loss of native seed bank.

A majority of the areas proposed for encroachment are of low ecological significance as they are culturally influenced and/or contain a high abundance of invasive and non-native species. No other further direct impacts to rare or sensitive flora species are expected. No rare vegetation community types are present within or adjacent to the ROW. The majority of the vegetation proposed for removal will occur directly at the edge and thus creates a minimal impact.

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### 4.1.1 INVASIVE SPECIES

Invasive Common Reed was found within marsh drainage ditches (MAMM1-12). Disturbance to this community type is expected with grading activities adjacent to culverts.

There is a high risk of spreading this invasive species to other wetland communities if machinery or workers are allowed to enter these areas.

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## 4.2 DESIGNATED NATURAL AREAS

The removal of the vegetation between the highway and the service road 1<sup>st</sup> Avenue within the Brighton Provincial Wildlife Area may involve the creation of a new edge. Additionally, the Brighton Provincial Wildlife Area contains one (1) potential pure SAR Butternut tree within approximately 20 m of the proposed area of impact, which is further discussed in **Section 4.4**. If the Butternut tree is determined to be a hybrid, it is not protected under the ESA and; therefore, there is no impact associated with the vegetation surrounding the tree. The tree itself, is located approximately 20 m from the grading limit and will not be harmed. The proposed impacts are anticipated to be limited to the area adjacent to Highway 401 and south of 1<sup>st</sup> Avenue; therefore, impacts to the function of the Brighton Provincial Wildlife Area are not expected.

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## 4.3 WILDLIFE

Potential impacts on wildlife habitat are similar to those discussed for vegetation (i.e., direct / indirect impacts to habitat – removals, fragmentation, etc.).

### Direct Impacts

The largest areas of vegetation removal include cultural meadow (CUM1-1), cultural thicket (CUT), cultural woodland (CUW) and cultural plantation (CUP) communities which are primarily composed of introduced species or non-native weed species.

- **Mortality.** Moderate – wildlife mortality may occur during construction, particularly during vegetation removal and grubbing.
- **Movement opportunities.** Minimal – loss of small areas of cultural / disturbed vegetation in the meadow and plantations. Potential movement area for urban tolerant species, but no defined wildlife movement areas recorded. Movement areas in the woodland, tributary corridors will be retained. Generally, mobile wildlife will move away from construction activity and based on the project setting, can retreat away from the corridor into the adjacent habitat and landscape.
- **Habitat for SAR wildlife.** Low – the majority of works will occur within the ROW and minimal removal loss will occur on the edge of the vegetation communities (approximately 10-20 m). A small amount of meadow habitat within the ROW for Monarch will be impacted. Given the level of disturbance, non-native species and fragmentation, meadows within the ROW are generally of poor-quality habitat. There is a diversity of deciduous, mixed and coniferous forest habitat present, which may provide suitable SAR bat maternity habitat or breeding habitat for Eastern Wood-pewee. Edges of these forest communities will be removed in some areas; however, forest communities are very common and widespread in the greater landscape. Edges of pastures and meadows may be removed, temporarily displacing Eastern Meadowlark.
- **Habitat for area-sensitive Birds.** Low – some species require large areas of suitable habitat for long term population survival and are sensitive to habitat fragmentation. Four area-sensitive birds, Black-throated Green Warbler, Ovenbird, Red-breasted Nuthatch and Veery were recorded during the 2021 field surveys. These species nest in the interior of mature forest and require at least 10-70 hectares of forest.

- Pileated Woodpecker Nest Cavity Trees. Low- cavity nest trees used by the Pileated Woodpecker are now protected as a Schedule 1 bird species under the recent modernization regulations to the Migratory Birds Convention Act (MBCA). Removals at the edge of a few treed habitats could include potential nest cavity trees. A survey of potential trees is required to be carried out to identify if any are proposed to be impacted and to determine if a permit is required under the MBCA.

**Indirect Impacts.** There is potential for indirect impacts to wildlife habitat as a result of construction and changes to hydrology.

- Construction-related impacts. These are generally limited to temporary disturbances to edge habitats during construction such as noise-related effects to wildlife inhabiting adjacent lands. Potential for sedimentation and contamination are addressed by ESC measures.
- Hydrology. Potential impacts to retained wetland habitats as the result of culvert replacement should have no significant hydrological changes that may impact wildlife habitat (e.g., amphibian breeding in wetlands).

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## 4.4 SPECIES AT RISK

**Butternut (Endangered):** Three (3) potential trees (Trees B01 to B03) were identified. Tree B01 was noted on private property along the edge of mixed forest (FOM) north of Crandall Road. B01 was approximately 10 cm DBH and was situated approximately 160 m northwest of the edge of proposed impacts. Tree B02 was observed west of Lake Road within the ROW at the edge of the Maple Mineral Deciduous Swamp (SWD3). B02 was comprised of three (3) stems measuring 8, 7, and 2 cm in DBH. Tree B02 was approximately 100 m northwest of the edge of proposed impacts. Therefore, impacts to the critical root zones and the immediate adjacent areas (25 m radius centered on the trunk) of Trees B01 and B02 are not anticipated. Tree B03 was located within deciduous forest (FOD) within the Brighton Provincial Wildlife Area and was located just north of 1<sup>st</sup> Avenue. B03 was approximately 20 cm in DBH and was situated approximately 20 m from the edge of proposed impacts. Therefore, proposed impacts along Highway 401 may encroach within the 25 m radius critical root zone and immediately adjacent area surrounding B03. Butternut Health Assessments were not completed for these trees. No other SAR flora were observed within the study area.

**Barn Swallow (Special Concern):** Four (4) Barn Swallows were observed flying overhead at a horse farm on Crandall Road. The property contains at least one structure with suitable nesting habitat located approximately 200 m north of the proposed impacts. There will be no direct impacts to residential buildings and structures from the proposed works. This species may also nest beneath bridges or culverts in the study area. There is potential for the proposed works to impact nesting habitat for Barn Swallow if nests are built within the structural culverts proposed for rehabilitation during the year of construction.

**Eastern Meadowlark (Threatened):** Evidence of 'possible' breeding as two (2) males were observed singing in suitable habitat on adjacent properties, outside the study area. There are five (5) properties with potentially suitable grassland habitat where the construction footprint and/or the ultimate MTO ROW encroaches into the habitat. The habitat areas are shown in Appendix F. Beginning from the west side: 1) Annual row crop north of Highway 401 and west of Herley Road. Although the habitat within the study area is small it is connected to open agricultural lands which may support use of this smaller area. Replacement of the Herley Road structure may encroach into the edge of the habitat; 2) Annual row crop immediately east of Lake Road, that extends southerly to the highway and separated from the highway by a narrow length of tree cover. In this area widening will intrude into the edge of the habitat and the ultimate MTO ROW will extend well into habitat. Depending on how the MTO ROW is maintained, it may either support or remove this habitat type; 3) Dry-moist old field meadow north of Highway 401 and west of Biddy Creek

crossing 1, none or minimal works on the edge of potential nesting habitat; 4) north of Highway 401 and east of Bidy Creek crossing 1, none or minimal works on the edge of potential nesting habitat but the ultimate MTO ROW will extend a short distance into this area; and, 5) Dry-moist old field meadow north of Highway 401 and west of County Road 26; the potential impact relates to maintenance measures of the ultimate MTO ROW. Eastern Meadowlark were recorded within the study area; however, no target surveys were conducted.

**Eastern Wood-pewee (Special Concern):** Evidence of ‘possible’ breeding as two (2) males were observed singing in suitable habitat, one north of Highway 401 within the Coniferous Plantation in Brighton Provincial Wildlife Area and the other north of Highway 401 west of Lake Road in the Maple Mineral Deciduous Swamp. The majority of suitable woodlands such as Brighton Provincial Wildlife Area will be retained with only minor edge removals. No impacts are anticipated to this species with the implementation of timing windows for tree removals (i.e., no removals during the breeding bird season April 1 to August 31). The forested habitat surrounding the highway is not unique or limited in the local or broader landscape.

**Monarch (Special Concern):** Four (4) individuals were recorded foraging throughout the study area. This species would be expected to occur as a visitant throughout the site, with life-cycle processes occurring wherever the larval food plant, milkweed, is found. Suitable Monarch habitat will be removed within the ROW; however, other suitable habitat will remain as well as other surrounding habitats where milkweed occurs. Availability of suitable habitat within the local landscape is not a limiting factor for this species.

**Snapping Turtle (Special Concern) –** One (1) adult turtle was observed dead on the westbound highway shoulder north of Little Lake. There is potential habitat present along the adjacent tributaries and wetlands. These aquatic habitats will be retained. There is potential for Snapping Turtle encounters during construction in terrestrial areas adjacent to wetlands and watercourses, especially during the nesting season. Furthermore, in-water works have the potential to impact hibernating turtles, depending on timing of works.

#### **Potential SAR Fauna and SAR Fauna Habitat**

There is moderate to high potential for an additional 10 SAR fauna to occur within the study area and be impacted by the proposed works, including: Bobolink, Olive-sided Flycatcher, Red-headed Woodpecker, Wood Thrush, Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, Tri-coloured Bat, Blanding’s Turtle and Northern Map Turtle. *Potential* habitat is not protected by the ESA or SARA; rather, the species must be recorded in a given area in order for the associated habitat to be protected. Follow-up would only be required if one of these species is observed during detail design or new records are provided by the MECP / Environment and Climate Change Canada (ECCC) at that time.

There will be tree removals and encroachment within four (4) forested habitats: Dry - Fresh Black Locust Deciduous Forest (FODM4-11), Dry - Fresh Sugar Maple Deciduous Forest (FOD5-1), Deciduous Forest (FOD) and Dry - Fresh Red Oak Deciduous Forest (FOD1-1). These areas have potential bat habitat, which may result in the loss of bat maternity habitat and result in harm or mortality to adult bats and their young. Removal of trees may also impact SAR bird nests and young. Impacts to bats and birds can be mitigated through timing windows for tree removals.

## **5 MITIGATION**

The following mitigation measures are recommended.



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## 5.1 GENERAL

- All activities shall be controlled to prevent the entry of petroleum products or other deleterious substances, such as debris, waste, rubble, or concrete material, into the natural environment.
- Erosion and sedimentation shall be controlled to prevent the entry of sediment into environmentally sensitive areas including wetlands and watercourses.
- Vehicle maintenance, staging, equipment storage and refuelling shall be confined to designated areas a minimum of 30 m away from watercourses and wetlands.
- Environmental inspections shall be conducted during construction to ensure that protection measures are implemented, maintained and repaired and that remedial measures are initiated where warranted.

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## 5.2 VEGETATION

Recommended measures for mitigating effects to the local vegetation communities and their associated habitat functions include the following:

- Minimize the extent of vegetation removal and damage within construction access, work and staging areas, particularly adjacent to woodland or wetland habitat. These areas will be clearly identified in the Contract documents, and then delineated in the field using erosion and sediment control fencing. Erosion and sediment control fencing will be maintained throughout the construction period.
- Re-stabilize and re-vegetate exposed soil surfaces as soon as possible, using native seed mixes where possible.
- Ensure that machinery arrives on site in a clean condition and is maintained free of invasive species and noxious weeds.
- Conduct vehicle maintenance and fueling at the designated and properly contained maintenance areas in the works yards or at commercial garages located well away from retained vegetation areas.

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## 5.3 WILDLIFE

The mitigation measures outlined above are designed to minimize effects to vegetation and protect adjacent vegetation areas, which in turn protect the associated wildlife habitat functions. However, it is also necessary to ensure the protection of breeding birds according to the MBCA, as well as other wildlife that may nest or otherwise use areas where construction is proposed. Wildlife-specific mitigation measures are outlined below:

### **Migratory Birds**

As noted, nesting migratory birds are protected under the MBCA. In order to protect nesting migratory birds, in accordance with the MBCA, the following mitigation measures should be implemented:

- Ensure that timing constraints are applied to avoid vegetation clearing (including grubbing and removal of trees, shrubs, plants, grasses and brush piles) and construction during the breeding bird season (April 1 to August 31). It should be noted that occasionally bird species will precede (e.g., mid-March) or exceed (e.g., September) the approximate breeding bird season window.
- The Contractor shall not destroy active nests (nests with eggs or young birds) of protected migratory birds. If active bird nests are encountered, the Contract Administrator must be contacted.
- If a nesting migratory bird is identified within or adjacent to the construction site and the construction activities are such that continuing construction in that area would result in a contravention of the MBCA,

all activities will stop and the Contract Administrator will contact the MTO Environmental Planner to discuss mitigation options.

- No removal of a Schedule 1 (MBCA) bird nest and associated vegetation / structure that it is found in is permitted.

### **Other Wildlife**

The following measures are recommended for the protection of wildlife:

- Wildlife incidentally encountered during construction shall not knowingly be harmed and shall be allowed to move away from the construction area on its own.
- In the event that an animal encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified.
- In the event that an injured animal is encountered in the construction zone, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. The Contract Administrator will immediately contact a Wildlife Custodian (authorized under the Fish and Wildlife Conservation Act) to provide care for the animal. A list of authorized Wildlife Custodians, their locations and their specialties is available at <https://www.ontario.ca/page/find-wildlife-rehabilitator>.

### **Wildlife Passage and Wildlife Enhancement Opportunities**

Although the current study involves widening an existing highway, new construction always presents the opportunity to improve the permeability of roadways to local wildlife and thereby reduce wildlife-vehicle collisions and the isolation of wildlife habitat. It is recommended that opportunities for improving wildlife passage through enhanced wildlife crossing structures be considered during detail design.

Potential wildlife enhancement considerations include:

- Installing rock piles, logs and stumps to provide cover, nesting and basking habitat for snakes and small mammals.
- Supplemental planting / seeding of native vegetation, specifically vegetation that attracts wildlife (e.g., milkweed for Monarch and berry-producing shrubs for forage [e.g., serviceberries, elderberry, nannyberry, sumac, dogwood, etc.]).
- Construction of turtle nesting habitat away from the highway at suitable locations to reduce the use of the highway shoulder as a nesting habitat.

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## **5.4 SPECIES AT RISK**

Based on the site-specific conditions, 10 SAR have reasonable potential to occur within the work area and; therefore, there is some risk of harm to these species. Only Endangered and Threatened species have legal protection under the provincial ESA and the federal SARA. To protect these species and any other SAR generally, the following mitigation measures will be implemented and specified within the Contract documents.

### **SAR Generally:**

- Awareness and Encounter protocols will be implemented within the Contract documents and specifications to identify the potential for SAR to be encountered during construction and the procedures to be followed in the event of an encounter. All on-site personnel must be made aware of the potential

presence of SAR and the protection afforded under the ESA and SARA, prior to conducting any work on the site.

- In the event that a SAR or possible SAR encountered during construction does not move from the construction zone and construction activities are such that continuing construction in the area would result in harm to the animal, all activities that could potentially harm the animal will cease immediately and the Contract Administrator will be notified. The Contract Administrator or Environmental Inspector will then contact the MTO Environmental Planner for direction, as these animals are protected under the ESA and SARA.
- All disturbed areas will be restored to pre-construction conditions.

#### **SAR Vegetation:**

- In accordance with the regulations of Ontario's ESA, O.Reg 230/08A, any potential Butternuts observed must be assessed to determine whether the trees are hybrids or pure Butternuts.
- A Butternut Health Assessment (BHA) is to be conducted for the one tree in the Brighton Provincial Wildlife Area may be impacted by the proposed works. The Butternut Health Expert (BHE) report must be submitted to the MECP for approval.

#### **SAR Insects:**

- Restore disturbed meadow areas using Native Grass and Forb Mix – Well Drained. This seed mix contains Common Milkweed which supports Monarch breeding.

#### **SAR Birds:**

- Adhere to mitigation measures for MBCA compliance to avoid impacts to SAR bird species potentially nesting in the work area or vicinity (i.e., Barn Swallow, Eastern Meadowlark, Eastern Wood-pewee, Red-headed Woodpecker, Wood Thrush).
- If a Barn Swallow nest is encountered in a structure which occurs within proximity to the work zone, a 10 m buffer will be implemented around the structure to avoid harassment to Barn Swallows until the young have fully fledged or the nest is no longer active (to be determined by a qualified avian biologist).

#### **SAR Bats:**

- No tree removals shall be completed during the bat breeding season (i.e., April 1 to September 30).

#### **SAR Turtles:**

- In order to prevent SAR turtles from entering the construction zone, temporary exclusion fencing should be installed to isolate the work areas adjacent to wetlands and watercourses prior to the start of construction. Locations include: C3 Little Lake Tributary and the large Cattail Mineral Shallow Marsh east of Cochrane Road. Fencing should be paige-wire backed and follow the OMNR Best Practices Technical Guide for Reptile and Amphibian Exclusion Fencing (<https://www.ontario.ca/page/reptile-and-amphibian-exclusion-fencing>). Temporary exclusion fencing can be combined with erosion and sediment control fencing, following the OMNR Best Practices Technical Guide.
- In the event that a SAR turtle is encountered while nesting, all activities within 30 m shall cease until the turtle has finished nesting and left the area on its own accord (this may take several hours). Any SAR turtle nests laid within the construction zone shall be protected with a 10 m buffer and an MNRF authorized local wildlife rehabilitator shall be contacted immediately (<https://www.ontario.ca/page/find-wildlife-rehabilitator>) to relocate the nest to a suitable location outside the construction zone or collect the nest for ex situ incubation under an approved permit.

A review of updated SAR lists (under SARA and SARO), SAR guidelines and policies, and additional agency consultation will be required at detail design to confirm SAR approvals and mitigation requirements.

## 6 RECOMMENDATIONS

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### 6.1 VEGETATION

- At detail design, a complete vegetation survey of properties that were not accessible for this preliminary design study should be undertaken.
  - Surveys to include ELC and species composition and to identify any SAR plant species.
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### 6.2 WILDLIFE

- Conduct survey of woodland habitat in areas that are identified for tree removal to identify the presence of Pileated Woodpecker nest cavity trees and other locations where the project may impact the nesting habitat of other Schedule 1 species.
  - Conduct breeding bird surveys in locations where access to property was not granted at the time of this preliminary design study.
  - Review opportunities for improving wildlife passage through replaced structural culverts. This would relate to turtles and medium size mammals. Also examine opportunities for installing directional fencing in the local area of new structural culverts.
- 

### 6.3 SPECIES AT RISK

- Conduct species specific surveys for Eastern Meadowlark / Bobolink in areas identified as potential habitat and where highway widening will result in the removal of habitat.
- Conduct survey of woodland habitat in areas that are identified for tree removal to identify the presence of snag trees that could be used as maternity roost habitat for SAR bats and any potential areas that could be used by Eastern Small-footed Bat. MTO to identify the requirement for acoustic surveys of any locations where a density of snag trees are found that would warrant further survey.
- Conduct survey of suitable woodland habitat for the presence of Butternut in areas that were not accessible during the preliminary design study. The extent of the survey should be based on identification of the 25 m critical root zone of a tree.
- Conduct a Butternut Health Assessment for the tree found in the area of the Brighton Provincial Wildlife Area and for any additional trees found during the detail design study.

## 7 REFERENCES

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# APPENDIX

## A AGENCY CORRESPONDENCE

## Enoae, Jenny

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**From:** Warren, Catherine (MNRF) <Catherine.Warren@ontario.ca>  
**Sent:** August 20, 2020 10:36 AM  
**To:** Enoae, Jenny  
**Cc:** Ritchie, Shannon; Mohr, Pat; Mitchell, Kim; Vazz, Christine; Formsma, Julie (MNRF)  
**Subject:** RE: Highway 401 Planning Study from Colborne to Brighton - Preliminary Design and Class Environmental Assessment Study MNRF File No: 20-CRAM-NOR-EAE-3124  
**Attachments:** MNRF Information Request\_Request to Confirm WSP 20200806\_CHcomments.docx; ANSI\_P-ES- BrightonBluff-CS-I\_from\_PAPIR.pdf; Approved Boundary Map.2012.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hello Jenny,

The MNRF Peterborough District has received your e-mail dated August 10, 2020 regarding the Class EA for rehabilitation and replacement of six structures in preparation for the widening Highway 401 Colborne to Brighton. We provide the following general information and technical advice for your consideration.

### **General: MNRF Data and Information**

The MNRF's natural heritage and natural resources GIS data layers can be obtained through the Ministry's [Land Information Ontario \(LIO\) website](#). You may also view natural heritage information online (e.g., Provincially Significant Wetlands, ANSIs, woodlands, etc.) using the [Natural Heritage Make a Map](#) tool.

We recommend that you use the above-noted sources of information during the review of your project proposal.

The MNRF may provide additional information and technical advice if additional details of the proposed works are circulated to our office.

### **Wetlands**

The subject area is adjacent to unevaluated wetlands as well as a wetland, Biddy Creek (which is evaluated as "other significance"), located where the 401 crosses Brighton Cramahe Boundary Road). The MNRF recommends that the unevaluated wetlands be treated as Provincially Significant Wetland or evaluated by an Ontario Wetland Evaluation System (OWES) certified evaluator.

**Any new evaluations or proposed changes made to an evaluated wetland boundary must be submitted to our office for approval as per the Ontario Wetland Evaluation System (OWES).**

If a new OWES evaluation will be undertaken, please contact our office early in the process for advice on scoping the evaluation/field studies.

We recommend contacting your local Conservation Authority for more information on approvals that they may require.

As the study area contains unevaluated wetlands and a wetland evaluated as “other significance” please note that all wetlands (regardless of significance) within the Growth Plan area (except settlement areas) are both key hydrologic features and key natural heritage features and should be assessed for any negative impacts from the proposed works. Unevaluated wetlands generally require field verification to confirm boundaries since they are based on remotely-sensed data. MNRF recommends that any potential wetlands in the study area be mapped and confirmed in the field.

The Infrastructure policies of the Growth Plan state that an environmental assessment should demonstrate “that any impacts on key natural heritage features in the Natural Heritage System for the Growth Plan, key hydrologic features and key hydrologic areas have been avoided, or if avoidance is not possible, minimized and to the extent feasible mitigated.” (S. 3.2.5). Please see the Growth Plan definitions for a list of key natural heritage features and key hydrologic features. Please note that not all key natural heritage features or key hydrologic features have been mapped in advance and field verifications may be required to map some of these features.

MNRF recommends that new footprint or disturbance (including temporary disturbance e.g. laydown areas) be avoided within or adjacent to wetlands. Work should avoid negative impacts to these features by following best practices for construction e.g. avoiding sedimentation into wetlands. The use of equipment cleaning protocols is strongly recommended to prevent the introduction or spread of invasive species (e.g. European common reed, *Phragmites australis*) into natural heritage features. An example protocol can be found here: [http://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol\\_June2016\\_D3\\_WEB-1.pdf](http://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf)

General turtle critical periods include;

Active season: April 15<sup>th</sup> – October 15<sup>th</sup>

Hibernation: October 15<sup>th</sup> – April 15<sup>th</sup>

Mating: April, September and October but may occur at any time of year, including during hibernation

Nesting: May 15<sup>th</sup> – June 30<sup>th</sup>; lasts about 3 weeks each year

Hatching: August 15<sup>th</sup> – September 30<sup>st</sup>

Dispersal/migration: April 15<sup>th</sup> – May 15<sup>th</sup>; September 1<sup>st</sup> – September 30<sup>th</sup>

If works are planned between May 15 and September 30 and work locations are adjacent to wetlands, ponds, or lakes, they should have turtle exclusion fencing erected prior to May 15 and maintained until June 30 to prevent turtles from nesting in the work area. BMP for fencing can be found at [https://files.ontario.ca/bmp\\_herp\\_2016\\_final\\_final\\_resized.pdf](https://files.ontario.ca/bmp_herp_2016_final_final_resized.pdf)

### **Areas of Natural and Scientific Interest (ANSIs)**

The Brighton Bluff Earth Science ANSI is in the subject area, east of County Road 26 to near the Brighton-Quinte West boundary. Information about this ANSI is attached to this email.

### **Fish and Fish Habitat**

Please see attached fisheries table for information on the watercourse thermal regime and fish species.

The MNRF recommends minimum 30 m naturally vegetated buffers to protect fish habitat.

Please contact Fisheries and Oceans Canada and the local Conservation Authority for any other approvals that may be required.

### **Species at Risk**



The Ministry of Environment, Conservation and Parks (MECP) has now assumed responsibility for the Endangered Species Act (ESA), including species at risk (SAR) in Ontario. Please contact [SAROntario@ontario.ca](mailto:SAROntario@ontario.ca) to reach the MECP for advice about species at risk and the ESA.

**Breeding Bird Season:**

Workers must be vigilant and check work areas for the presence of breeding birds and nests containing eggs and/or young. If breeding birds and/or nests are encountered, works should not continue in the location of the nest until after August 1 (or as soon as it has been determined that the young have left the nest). Please note that the breeding bird season in the subject area extends from April 15 to July 31.

For further information of bird timing windows, see: <https://www.ontario.ca/page/remove-bird-nests-or-eggs>.

**Fish and Wildlife Conservation Act**

Please note that you may require a Licence to Collect Fish for Scientific Purposes or Wildlife Scientific Collector's Authorization from our office if you will be doing any fish or wildlife sampling, collection, salvage, or relocation. For more information, please contact Julie Formsma, Fish and Wildlife Technical Specialist, at 705-755-3296.

MNRF has received your FCL for this project and are working on processing it.

**Other Approvals**

It is the responsibility of the proponent to acquire all other information and necessary approvals from any other municipal, Conservation Authority, provincial, or federal authority under other legislation.

If you have any questions regarding the above comments, don't hesitate to contact me. Please reference file number: 20-CRAM-NOR-EAE-3124 for any future correspondence.

Sincerely,  
Catherine

---

**From:** Enoae, Jenny <Jenny.Enoae@wsp.com>  
**Sent:** August 10, 2020 3:46 PM  
**To:** Warren, Catherine (MNRF) <Catherine.Warren@ontario.ca>  
**Cc:** Ritchie, Shannon <shannon.ritchie@wsp.com>; Mohr, Pat <Pat.Mohr@wsp.com>; Mitchell, Kim <Kim.Mitchell@wsp.com>; Vazz, Christine <Christine.Vazz@wsp.com>  
**Subject:** RE: Highway 401 Planning Study from Colborne to Brighton - Preliminary Design and Class Environmental Assessment Study

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hello Catherine,

Please find attached WSP's request for natural heritage information with regards to the MTO Highway 401 Colborne to Brighton EA/PD project in which you recently received a Project Commencement Notification for.

In addition to the request for information, we are also seeking a FCL for the watercourses identified – forms are attached.

If you have any questions, please feel free to contact me at any time.

Regards,

Jenny Enoae, M.Sc.

Project Ecologist

Ecology and Environmental Impact Assessment (EIA)



T+ 1 289-982-4848

M+ 1 416-885-0721

100 Commerce Valley Drive West

Thornhill, Ontario

L3T 0A1 Canada

[wsp.com](http://wsp.com)

**From:** Warren, Catherine (MNRF) [<mailto:Catherine.Warren@ontario.ca>]

**Sent:** August-05-20 11:13 AM

**To:** Highway 401 Colborne to Brighton Project Team <[project-team@highway401colbornebrighton.ca](mailto:project-team@highway401colbornebrighton.ca)>

**Subject:** RE: Highway 401 Planning Study from Colborne to Brighton - Preliminary Design and Class Environmental Assessment Study

Hello,

Thank you very much for sending this notice to MNRF. If it would be helpful MNRF can provide information about natural heritage features (e.g., wetlands and ANSIs) for this area. It would be useful for us to have a more detailed map of the study area to confirm that we are looking at the correct features. We can also look into the thermal regimes of waterways that may be affected by this project. To do this it would be necessary for us to have a list of the coordinates of the water crossings in the study area. Are you looking for that sort of information at this time?

All the best,  
Catherine

---

**From:** Highway 401 Colborne to Brighton Project Team <[project-team@highway401colbornebrighton.ca](mailto:project-team@highway401colbornebrighton.ca)>

**Sent:** July 27, 2020 5:12 PM

**Cc:** Waseem, Muhammad (MTO) <[Muhhammad.Waseem@ontario.ca](mailto:Muhhammad.Waseem@ontario.ca)>; Pipe, Erin (MTO) <[Erin.Pipe@ontario.ca](mailto:Erin.Pipe@ontario.ca)>; Gotts, Brent <[Brent.Gotts@wsp.com](mailto:Brent.Gotts@wsp.com)>; Nairn, Sandy <[Sandy.Nairn@wsp.com](mailto:Sandy.Nairn@wsp.com)>

**Subject:** Highway 401 Planning Study from Colborne to Brighton - Preliminary Design and Class Environmental Assessment Study

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi,

Please see the attached Notice of Study Commencement letter regarding the above mentioned project.

Thank you,

The Highway 401 Colborne to Brighton Project Team

---

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-LAEmHhHzdJzBITWfa4Hgs7pbKl

**From:** Warren, Jeff  
**Sent:** December 5, 2021 11:31 AM  
**To:** Warren, Jeff  
**Subject:** FW: MECP Data Request

---

**From:** Species at Risk (MECP) <[SAROntario@ontario.ca](mailto:SAROntario@ontario.ca)>  
**Sent:** Wednesday, June 09, 2021 8:34 PM  
**To:** Van Daele, Carly <[Carly.VanDaele@wsp.com](mailto:Carly.VanDaele@wsp.com)>  
**Cc:** Warren, Jeff <[Jeff.Warren@wsp.com](mailto:Jeff.Warren@wsp.com)>  
**Subject:** RE: MECP Data Request

Good evening Ms. Van Daele,

I'm sorry I was unable to respond sooner. A review of our best available information includes the same species you have listed. We also have the following additional species observations to add to your list.

- Butternut (Endangered)
- Monarch (Special Concern)

This list should not be considered complete. Site surveys may be required to confirm the presence of species at risk and/or their habitat and to also determine if there will be potential impacts associated with the project.

Please let me know if you have any questions.

***Monique Charette***  
Management Biologist  
Ministry of the Environment, Conservation and Parks  
Permissions and Compliance Section  
Species At Risk Branch  
(613) 583-3162  
[Monique.charette@ontario.ca](mailto:Monique.charette@ontario.ca)

---

**From:** Van Daele, Carly <[Carly.VanDaele@wsp.com](mailto:Carly.VanDaele@wsp.com)>  
**Sent:** November 17, 2020 9:38 AM  
**To:** Species at Risk (MECP) <[SAROntario@ontario.ca](mailto:SAROntario@ontario.ca)>  
**Cc:** Warren, Jeff <[Jeff.Warren@wsp.com](mailto:Jeff.Warren@wsp.com)>  
**Subject:** RE: MECP Data Request

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To whom it may concern,

WSP Canada Inc. (WSP) has been retained by Ministry of Transportation Ontario (MTO) to complete Planning, Preliminary Design and Class Environmental Assessment Study (Class EA) on Highway 401 between Colborne and Brighton. The location of the study area is shown on the attached map.

As such, we are formally contacting you to request any available natural heritage information pertinent to the study area. We have also contacted Lower Trent Conservation.

We are currently aware of the following natural heritage information for the study area:

- A review of Natural Heritage Information Centre (NHIC) revealed records for:
  - o Blanding's Turtle (*Emydoidea blandingii*) – END
  - o Eastern Wood-pewee (*Contopus virens*) – SC
  - o Snapping Turtle (*Chelydra serpentina*) – SC
  - o Wood Thrush (*Hylocichla mustelina*) – SC
  
- The following watercourses and waterbodies are within the study area vicinity:
  - o Colborne Creek Tributary
  - o Little Lake Tributary 1 and 2
  - o Unknown Watercourse (44° 3'39.39"N, 77°47'21.03"W)
  - o Bidy Creek Crossing 1, 2 and 3
  - o Proctor's Creek
  - o Proctor's Creek Tributary
  - o Smithfield Creek Tributary
  - o Mayhew Creek Tributary 1 and 2
  - o Little Lake
  
- A review of the Ontario Breeding Bird Atlas (OBBA) for square #18TTP78 and 18TTP67 revealed additional records for the following SAR and provincially rare species within the study area vicinity:
  - o Bank Swallow
  - o Barn Swallow
  - o Black Tern
  - o Bobolink
  - o Canada Warbler
  - o Cerulean Warbler
  - o Chimney Swift
  - o Common Nighthawk
  - o Eastern Meadowlark
  - o Eastern Whip-poor-will
  - o Evening Grosbeak
  - o Golden-winged Warbler
  - o Grasshopper Sparrow
  - o King Rail
  - o Least Bittern
  - o Loggerhead Shrike
  - o Northern Bobwhite
  - o Olive-sided Flycatcher

- Red-headed Woodpecker
  - Red-shouldered Hawk
  - Short-eared Owl
  - Yellow-breasted Chat
- A review of the Ontario Reptile and Amphibian Atlas (ORAA) for square #18TP67, 18TP88 revealed additional records for the following SAR and provincially rare species within the study area vicinity:
- Milksnake
  - Northern Map Turtle

Additional information we are seeking includes any of the following information that is not publicly available through the above sources:

- Species at Risk (SAR):
  - List of SAR to be considered for the study area
  - Locations, observation dates and any other relevant information about SAR – if possible, please provide the UTM/accuracy codes
  - Locally rare species lists or records and/or rare vegetation communities known from the study area

If further information is required, please feel free to contact the undersigned. Thank you for your assistance, it is greatly appreciated.

Thank you,  
Carly

**Carly Van Daele**, B.E.S.  
T +1 519-904-1778



**From:** Leah Stephens <leah.stephens@ltc.on.ca>  
**Sent:** November 25, 2020 3:01 PM  
**To:** Van Daele, Carly  
**Cc:** eff.Warren@wsp.com  
**Subject:** Re: Data Request (LTC e-mail reply 1 of 4)  
**Attachments:** [PL-20-150 \(map 1 of 3\).pdf](#)

Good afternoon Carly,

Thank you for reaching out to LTC to obtain natural heritage information for the study area. I have created three maps of the area in question, progressing from west to east along the Highway 401 corridor, showing the natural heritage, wetland, and water features we have mapping available for. In the study area the following features are showing up on our mapping:

- a Ministry of Natural Resources and Forestry (MNRF) evaluated non-provincially significant wetland (i.e., the Cankerville Swamp);
- the Brighton Bluff provincially significant earth science area of natural and scientific interest (ANSI);
- Mayhew Creek significant natural area;
- watercourses (Biddy Creek, Proctors Creek, and other unnamed tributaries);
- Little Lake; and,
- MNRF unevaluated wetlands.

My three maps will have to be sent via separate e-mails due to their size. I have also scanned the 1996 report information and mapping for the Mayhew Creek significant natural area for your use. This will follow after the maps make it through.

Information regarding the Cankerville Swamp and the Brighton Bluff ANSI should be obtained directly through MNRF as they are responsible for the designation of these features.

Please let me know if you have any questions about the information/materials provided.

Leah Stephens  
Environmental Planner / Regulations Officer  
Lower Trent Conservation  
613.394.3915 x220  
[leah.stephens@ltc.on.ca](mailto:leah.stephens@ltc.on.ca)

**\*\* COVID-19 Notice:** In order to protect the health of our working environments, our office is closed to the public until further notice. However, we remain available to provide our services. We will advise when our office reopens.

---

**From:** Information <[information@ltc.on.ca](mailto:information@ltc.on.ca)>  
**Sent:** 11 November 2020 14:28

**To:** Janet Noyes <[janet.noyes@ltc.on.ca](mailto:janet.noyes@ltc.on.ca)>; Leah Stephens <[leah.stephens@ltc.on.ca](mailto:leah.stephens@ltc.on.ca)>  
**Subject:** Fw: Data Request

Please see below/attached.

Lower Trent Conservation  
714 Murray Street, RR 1, Trenton, ON K8V 5P4  
Telephone: 613-394-4829 Fax: 613-394-5226  
[information@ltc.on.ca](mailto:information@ltc.on.ca)  
[www.ltc.on.ca](http://www.ltc.on.ca)

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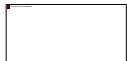
Buying or building near wetlands or waterways? Check out these [online services](#) – **Property Inquiry Service** and **Map Viewer** will help you get information about environmental features & required permits.

---

**From:** Van Daele, Carly <[Carly.VanDaele@wsp.com](mailto:Carly.VanDaele@wsp.com)>  
**Sent:** November 11, 2020 2:09 PM  
**To:** Information <[information@ltc.on.ca](mailto:information@ltc.on.ca)>  
**Cc:** Warren, Jeff <[Jeff.Warren@wsp.com](mailto:Jeff.Warren@wsp.com)>  
**Subject:** Data Request

Good afternoon,  
Please review the attached document regarding upcoming Highway 401 works. If you have any comments or questions please let me know.  
Thanks,

**Carly Van Daele**, B.E.S.  
Terrestrial Ecologist – ISA Certified Arborist  
Ecology & Environment Impact Assessment (EIA)



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M+ 1 519-358-2837

582 Lancaster Street West  
Kitchener, Ontario  
N2K 1M3 Canada

[wsp.com](http://wsp.com)

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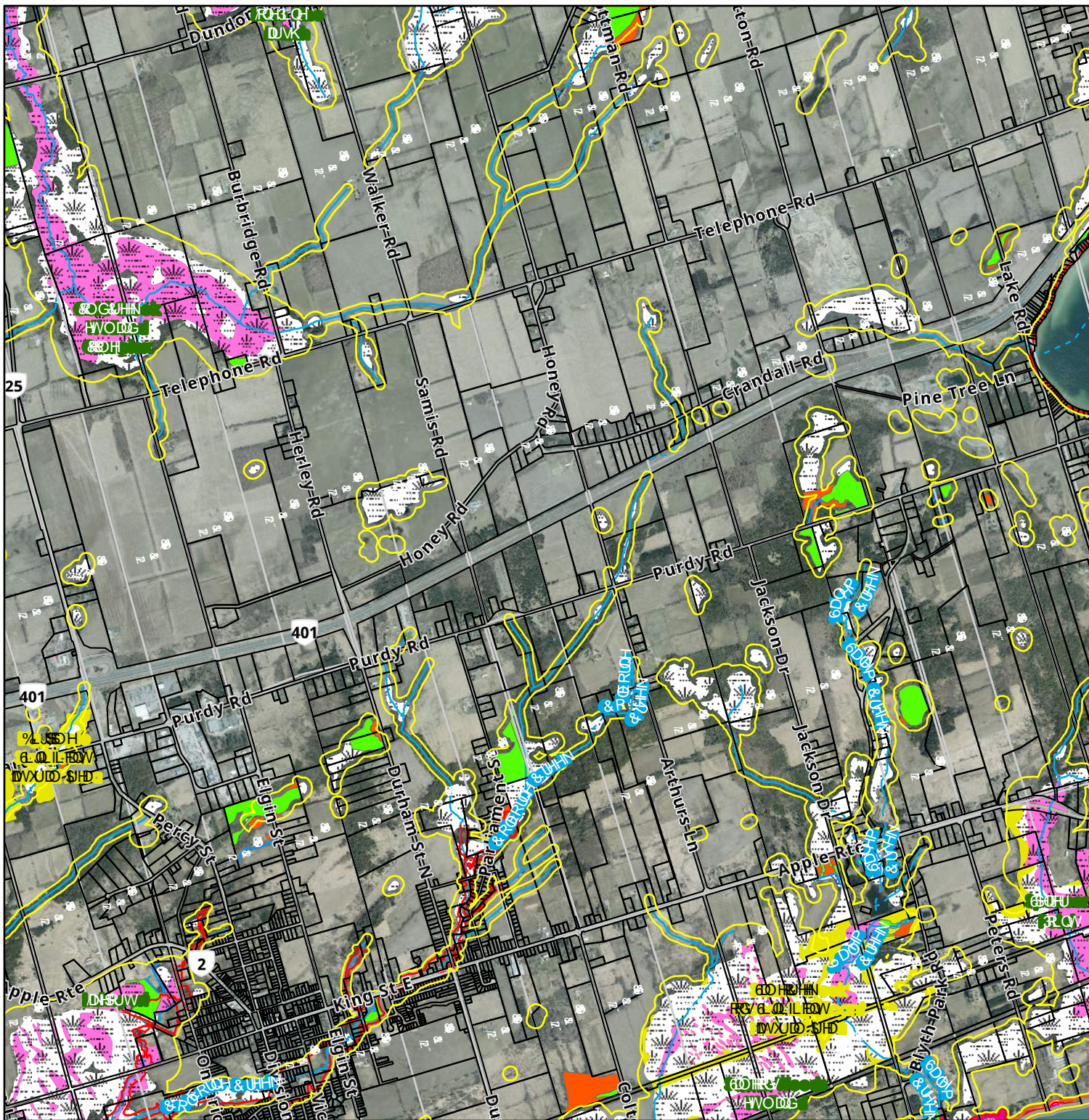


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LEAD  
SOURCES  
DSR



HYDRO

- 25' BUFFER
- WATER
- DMU
- WATER
- UNSATURATED ZONE

WATER

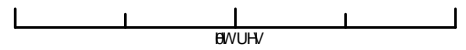
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LEAD

- LEAD
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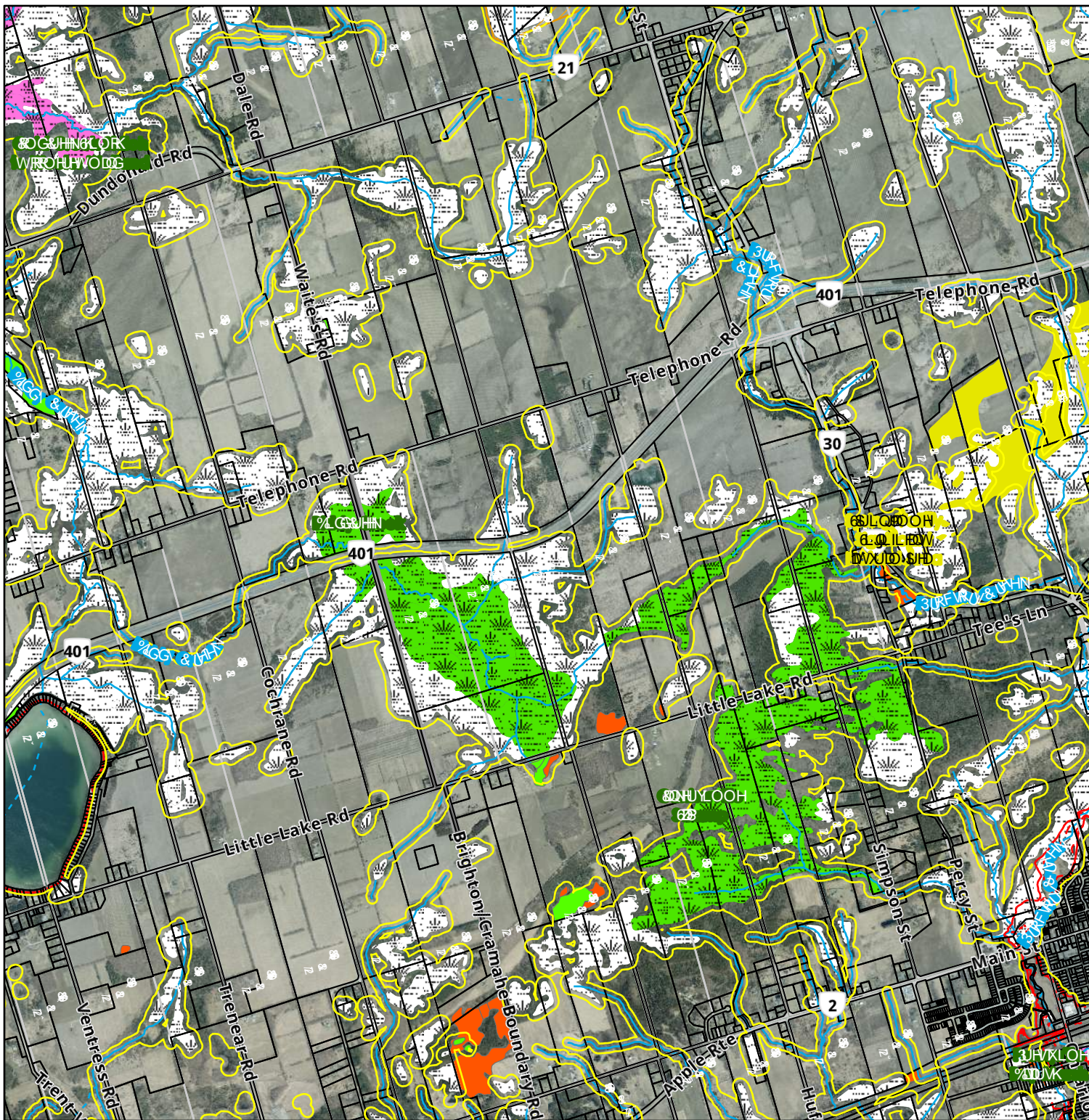
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WATER QUALITY MONITORING PLAN



LEGEND

- Yellow outline: 20' BUFFER ZONE
- Black outline: PROPERTY
- DMU: DISTRICT MUNICIPALITY
- Blue line: WATERWAY
- Blue dashed line: UNIMPROVED WATERWAY

WATER QUALITY

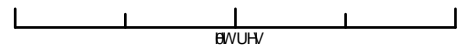
- Green stippled: GOOD WATER QUALITY
- Pink stippled: MODERATE WATER QUALITY
- Green solid: POOR WATER QUALITY

WATER QUALITY MONITORING POINTS

- Green square: ACTIVE MONITORING POINT
- Orange square: PROPOSED MONITORING POINT

PROPOSED WATERWAY

- Red line: PROPOSED WATERWAY







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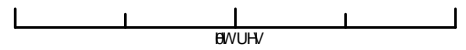
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-  3UHOV
- DMHU
-  6WUHP
-  9LUWXDQ. DRZROQHWRU

HWODQG 6

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-  MDDXMGZWO DQG 36
-  MDDXMGZWO DQG 6RQ3

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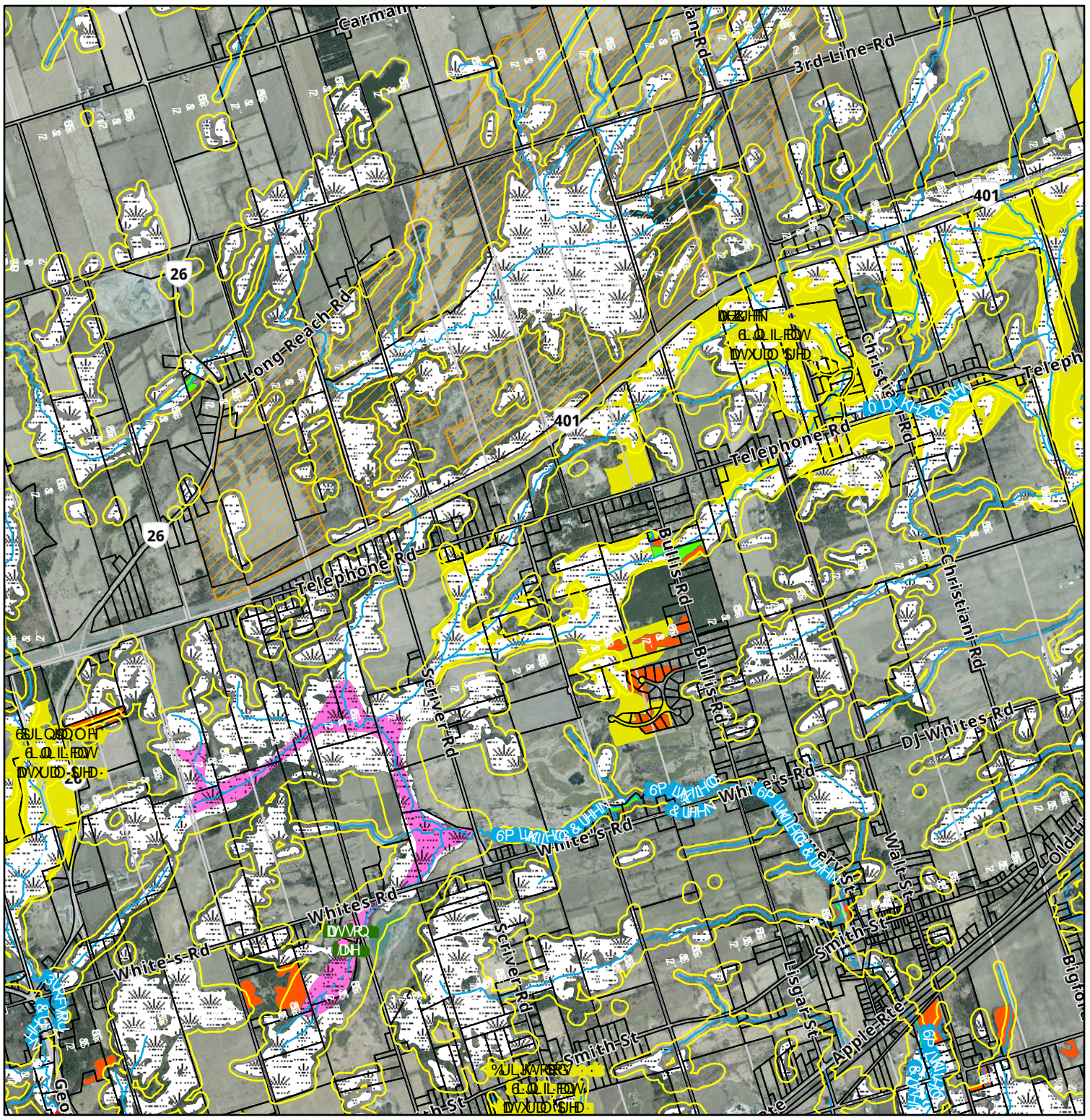
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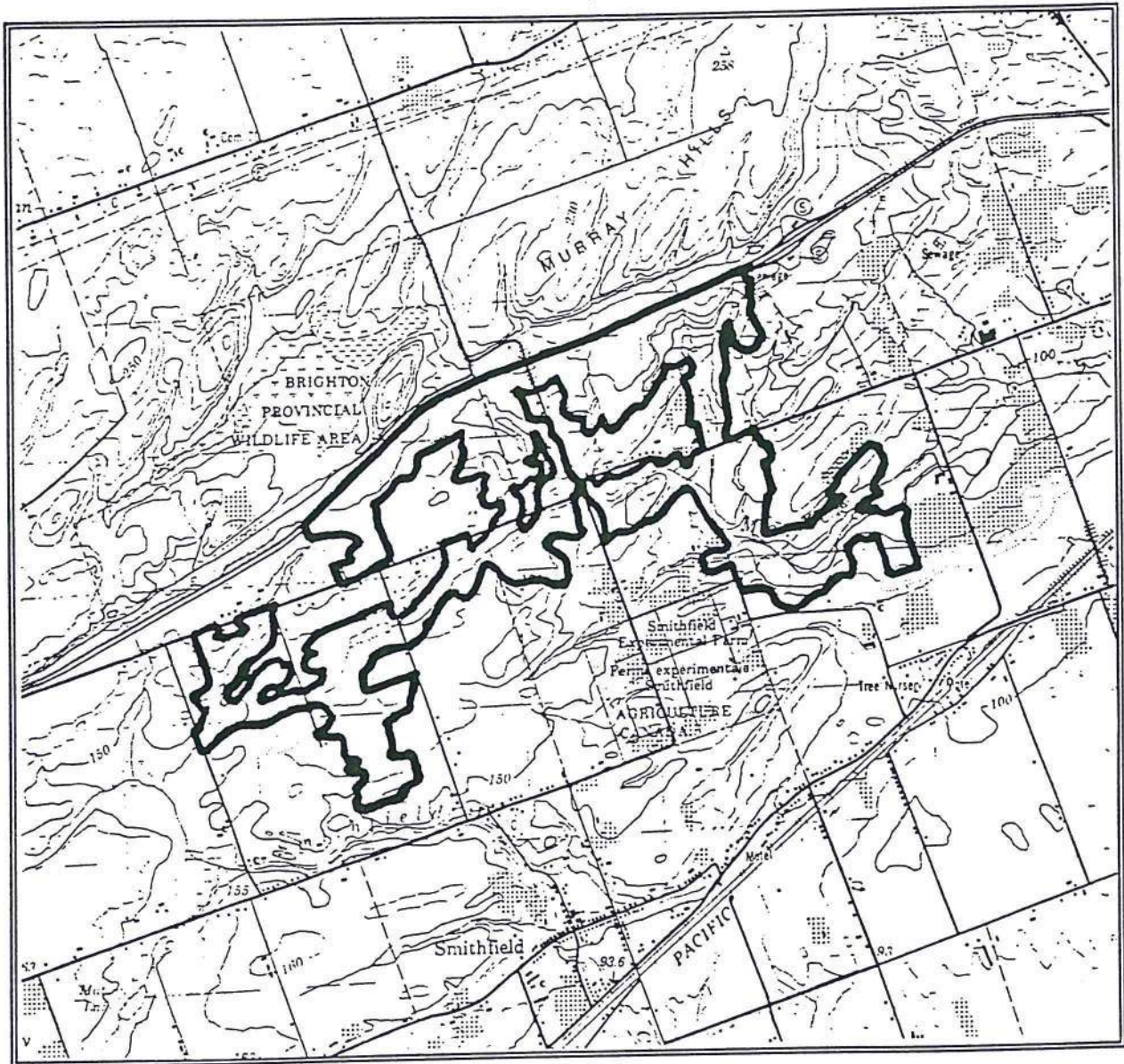


LOWER TRENT  
CONSERVATION



### 34. MAYHEW CREEK HEADWATER

Scale: 1:50,000  
2 cm = 1 km



#### Location References

NTS MAP SHEET: Trenton 31C/4

UTM: 18 TD 850858

OBM MAP: 10 18 2800 4880, 48850; 2850 48800, 48850.

1993 AIR PHOTOS: ASC 93039; 7-165-171; 8-103-108

LOTS & CONCESSIONS: Murray Twp. Lots 16-28, Conc. 1; Lots 17-26, Conc. 2.

## 34. Mayhew Creek Headwater

COUNTY: Northumberland  
TOWNSHIP: Murray  
SIZE: 432.2 ha  
SUB-WATERSHEDS: Mayhew  
LANDSCAPE UNIT: 3 - Lake Iroquois  
Shoreline (Reid & Grand, 1994)  
OMNR: Southern Region, Tweed District  
OWNERSHIP: Approximately 31 private  
landowners and one parcel owned by the  
township of Murray.

### GENERAL SUMMARY

Mayhew Creek Headwater study area is located approximately 3 km west of Trenton, just south of Highway 401. This shorecliff, boulder pavement and sand plain left by Lake Iroquois supports a high diversity of habitats and plant species, many of which are provincially and regionally rare. Two plant species found there, Nut Grass (*Cyperus schweinitzii*) and Sedge (*Carex laevivaginata*), have not been previously documented in Eastern Ontario. Provincially rare communities include black oak woodland, black oak-white oak-white pine woodland, spicebush ravine and old growth hemlock ravine. The black oak and oak-pine woodland communities are some of the best known examples in eastern Ontario. The 10.7 ha hemlock forest is estimated to be about 120-150 years old with about 3% of the trees reaching about 250 years and may be one of the oldest, extensive examples in southern Ontario. Generally the area supports relatively high quality upland forest and is highly representative of the Lake Iroquois sand plain landform. Mayhew Creek contains 3 plant species considered rare in Ontario based on Oldham (1996), 11 plants that are rare in Eastern Ontario and 7 plants that are rare in the Lake Ontario Lowlands physiographic region (status based on Cuddy, 1991). Red-shouldered Hawk, a provincially significant bird species, was recorded as a possible breeder in 1995. The site is important hydrologically as a major recharge area and strong coldwater spring source for Mayhew Creek. It is adjacent to the Murray Hills Significant Natural Area, and Brighton Provincial Wildlife Area and earth science ANSI. Buffering

capability is quite low due to its highly irregular shape and nearby housing developments. Mayhew Creek Headwater is considered a Significant Natural Area because it meets 8 of the 10 natural areas selection criteria. The site warrants consideration by OMNR as a regionally significant life science ANSI or sections could possibly be incorporated with Murray Hills Significant Natural Area as a provincially significant life science ANSI.

### A. Physical Features

Bedrock: Paleozoic, Middle Ordovician, Trenton, Black River limestone.

Landform Types: Lake Iroquois shorecliff, sand plain with boulder pavement and esker (all major representation) (Chapman and Putnam, 1984).

Topography: Relatively gently sloping southward except for several deeply cut creek and ravine systems. Elevations range from 100m at the southeast end to 170 m at the top of a centrally located drumlin.

Surficial Geology: Deep glaciolacustrine, wave planned shoreline deposits of sand at the northwest end near the 401 and glaciolacustrine shallow water deposits on the south and east side. A small esker is located at the southwest end (Leyland and Mihychuk 1984).

Soil Type: Brighton, Bondhead and Dundonald sandy loams, Pontypool sand (major representation), muck, Granby and Colborne sandy loam (minor) (Hoffman and Acton, 1974).

Soil pH: Bondhead is mildly to moderately alkaline and Pontypool is neutral to strongly acidic providing a diverse range of pH.

Moisture Regimes: Dry - wet.

Microclimate: Colder than normal, normal and warmer than normal.

### Evaluation of Landform Representation and Rarity:

This is an excellent example of drumlinized sand plain and Lake Iroquois shoreline and is probably only surpassed within the lower Trent region by Murray Hills Significant Natural Area. None of the soil types are rare.

## B. Hydrological Function

Mayhew Creek Headwater is the source of intermediate-tributaries of Mayhew Creek and may contribute up to half of the water that eventually flows into the City of Trenton. It contains several major springs and one major seepage area. The site is underlain by deep deposits of sand and gravelly till which constitutes an important regional groundwater recharge zone. The area does not contribute significantly to water detention since it only has a small amount of wetland.

### Evaluation of Hydrological Function:

Mayhew Creek Headwater constitutes an important regional groundwater recharge zone and contains several major springs and seeps which feed Mayhew Creek.

## C. Vegetation Community Representation and Diversity (see Map 34 on file at the LTRCA, scale 1:10,000):

Community condition rankings are provided as follows: poor, fair, good and excellent. Definitions of the condition rankings and other terminology and an explanation of the vegetation classifications are given in the section on field methodology.

### A. WETLAND VEGETATION

#### WETLAND ON SAND PLAIN

#### RIVERINE AQUATIC

##### 1. OPEN SHALLOW WATER

- a. sparsely to none vegetated
- b. *Potamogeton natans* - *P. pusillus* - *Typha latifolia*

#### MARSH

##### 2. EMERGENT MARSH

- a. *Typha latifolia*
- b. *Phalaris arundinacea* - *Leersia oryzoides* - *Typha latifolia*

#### SWAMP

3. SHRUB SWAMP: *Salix bebbiana* - *S. discolor* - *Cornus stolonifera* - *Sambucus canadensis* - *Viburnum lentago* (30% shrub cover) - white cedar - balsam poplar - trembling aspen - American elm -

white birch (20% tree cover) (fair)

##### 4. DECIDUOUS FOREST-SWAMP

- a. white ash<sup>3</sup> - trembling aspen<sup>2</sup> - sugar maple<sup>1</sup> - red maple<sup>1</sup> - white birch<sup>1</sup> - balsam poplar<sup>1</sup> - (white pine - basswood - yellow birch - black ash - butternut)<sup>1</sup> (fair)
- b. white birch<sup>3</sup> - American elm<sup>2</sup> - red ash<sup>1</sup> - white pine<sup>1</sup> - basswood<sup>1</sup> - (trembling aspen - balsam poplar)<sup>1</sup> - (white cedar - hemlock)<sup>1</sup> (poor-fair)
- c. white cedar<sup>2</sup> - American elm<sup>2</sup> - red ash<sup>2</sup> - trembling aspen<sup>1</sup> - balsam poplar<sup>1</sup> - white ash<sup>1</sup> - (white birch - sugar maple - black ash - basswood)<sup>1</sup> (fair)

##### 5. MIXED FOREST SWAMP

- a. hemlock<sup>3</sup> - yellow birch<sup>2</sup> - sugar maple<sup>2</sup> - white cedar<sup>1</sup> - beech<sup>1</sup> - (white ash - basswood - red oak - white birch - red maple - striped maple - black ash)<sup>1</sup> (good-excellent)
- b. hemlock<sup>2</sup> - yellow birch<sup>1</sup> - sugar maple<sup>2</sup> - white cedar<sup>1</sup> - white birch<sup>1</sup> - white ash<sup>1</sup> - large-toothed aspen<sup>1</sup> - (red maple - white pine - basswood - red oak)<sup>1</sup> (fair-good)
- c. yellow birch<sup>3</sup> - white cedar<sup>2</sup> - hemlock<sup>2</sup> - red maple<sup>2</sup> - red ash<sup>1</sup> - (white birch - beech - white pine) (good)
- d. white cedar<sup>3</sup> - hemlock<sup>2</sup> - yellow birch<sup>2</sup> - sugar maple<sup>2</sup> - (white birch - black ash - balsam poplar - basswood - American elm)<sup>1</sup> (fair)
- e. white cedar<sup>3</sup> - hemlock<sup>2</sup> - yellow birch<sup>2</sup> - white birch<sup>1</sup> - red maple<sup>1</sup> - (white pine - basswood - white ash - American elm - sugar maple)<sup>1</sup> (fair-good)
- f. white cedar<sup>3</sup> - hemlock<sup>3</sup> - yellow birch<sup>1</sup> - white birch<sup>1</sup> - trembling aspen<sup>1</sup> - (black ash - red maple)<sup>1</sup> (good)
- g. white cedar<sup>2</sup> - red ash<sup>2</sup> - hemlock<sup>1</sup> - basswood<sup>1</sup> - American elm<sup>1</sup> - balsam poplar<sup>1</sup> - sugar maple<sup>1</sup> - white birch<sup>1</sup> - (red maple - white pine - trembling aspen) (fair)
- h. white cedar<sup>2</sup> - white birch<sup>2</sup> - red maple<sup>1</sup> - trembling aspen<sup>1</sup> - hemlock<sup>1</sup> - American elm<sup>1</sup> - yellow birch<sup>1</sup> - (black ash - red ash)<sup>1</sup> (fair)
- i. white cedar<sup>4</sup> - trembling aspen<sup>2</sup> - balsam poplar<sup>2</sup> - white birch<sup>2</sup> (fair)
- j. white cedar<sup>3</sup> - trembling aspen<sup>3</sup> - American elm<sup>1</sup> - white birch<sup>1</sup> - white pine<sup>1</sup> - (Norway spruce - white ash - balsam poplar)<sup>1</sup> (poor)

## 6. CONIFEROUS FOREST SWAMP

- a. white cedar<sup>9</sup> - (white pine - white birch - trembling aspen - American elm)<sup>1</sup> (fair)
- b. white cedar<sup>7</sup> - white pine<sup>2</sup> - (hemlock - white birch - yellow birch - American elm)<sup>1</sup> (fair)
- c. white cedar<sup>7</sup> - hemlock<sup>1</sup> - yellow birch<sup>1</sup> - (white birch - white pine - basswood - American elm)<sup>1</sup> (good)

## B. UPLAND VEGETATION

### UPLAND ON SAND PLAIN

#### OPEN UPLAND

##### 7. THICKET

- a. *Juniperus communis* - *Rhus typhina* - *Juniperus virginiana* (35% shrub cover) - (white pine<sup>2</sup> - trembling aspen<sup>2</sup> - apple<sup>2</sup> - black oak<sup>2</sup> - (red oak - white oak)<sup>1</sup> - (bitternut hickory - American elm - white ash)<sup>1</sup> (30% tree cover) (poor)
- b. *Rhus typhina* - *Rubus allegheniensis* - *Prunus virginiana* (25% shrub cover, 20% tree cover) - *Carex foenea* - *Rhus radicans* - *Poa compressa* (fair)
- c. *Rhus typhina* - *Juniperus communis* - *Ceanothus americanus* (30% shrub cover) - *Poa compressa* - *Danthonia spicata* (fair)

### WOODLAND (OPEN FOREST)

#### 8. DRY MESIC TO DRY WOODLAND

- a. white pine<sup>5</sup> - (white ash - white oak - apple - large-toothed aspen)<sup>2</sup> - white cedar<sup>1</sup> - red oak<sup>1</sup> - black oak<sup>1</sup> (fair-good)
- b. black oak<sup>10</sup> (40% tree cover, 30% lichen cover, 30% herb cover - *Poa compressa* - *Carex pensylvanica*) (fair)
- c. black oak<sup>4</sup> - white pine<sup>3</sup> - red pine<sup>1</sup> - white oak<sup>1</sup> - (red oak - hemlock - sugar maple - white ash)<sup>1</sup> (excellent)
- d. red cedar<sup>6</sup> - white ash<sup>3</sup> - (sugar maple - trembling aspen - white pine - white oak)<sup>1</sup> (poor)

### FORESTED UPLAND

#### 9. MESIC TO WET MESIC, DECIDUOUS FOREST

- a. sugar maple<sup>4</sup> - bitternut hickory<sup>2</sup> - basswood<sup>2</sup> - beech<sup>1</sup> - (red oak - white ash)<sup>1</sup> (fair)
- b. sugar maple<sup>3</sup> - bitternut hickory<sup>2</sup> - white ash<sup>2</sup> - red oak<sup>1</sup> - large-toothed aspen<sup>1</sup> - (white birch -

- basswood - ironwood - black cherry - butternut)<sup>1</sup> (fair-good)
- c. sugar maple<sup>3</sup> - white ash<sup>1</sup> - ironwood<sup>1</sup> - red oak<sup>1</sup> - white birch<sup>1</sup> - trembling aspen<sup>1</sup> - beech<sup>1</sup> - (bitternut hickory - basswood - black cherry)<sup>1</sup> (fair)
- d. sugar maple<sup>3</sup> - red oak<sup>2</sup> - large-toothed aspen<sup>1</sup> - white pine<sup>1</sup> - white birch<sup>1</sup> - white ash<sup>1</sup> - (red maple - bitternut hickory - hemlock - trembling aspen - white oak - basswood - beech)<sup>1</sup> (fair-good)
- e. sugar maple<sup>3</sup> - beech<sup>2</sup> - white birch<sup>1</sup> - red maple<sup>1</sup> - white ash<sup>1</sup> - yellow birch<sup>1</sup> - (basswood - american elm - red oak)<sup>1</sup> (good)
- f. white ash<sup>5</sup> - bitternut hickory<sup>3</sup> - sugar maple<sup>1</sup> - (basswood - American elm)<sup>1</sup> (fair)
- g. white ash<sup>4</sup> - basswood<sup>2</sup> - sugar maple<sup>2</sup> - trembling aspen<sup>1</sup> - (white birch - balsam poplar - American elm - white cedar)<sup>1</sup> (poor)
- h. white ash<sup>3</sup> - white pine<sup>2</sup> - white birch<sup>2</sup> - sugar maple<sup>2</sup> - (black cherry - trembling aspen - basswood)<sup>1</sup> (fair)
- i. white ash<sup>3</sup> - bitternut hickory<sup>2</sup> - sugar maple<sup>1</sup> - white birch<sup>1</sup> - balsam poplar<sup>1</sup> - (American elm - basswood - trembling aspen - white cedar - Manitoba maple)<sup>1</sup> (poor-fair)
- j. white ash<sup>2</sup> - trembling aspen<sup>2</sup> - white birch<sup>2</sup> - red cedar<sup>1</sup> - ironwood<sup>1</sup> - white pine<sup>1</sup> - (American elm - white pine - bitternut hickory - sugar maple - black oak)<sup>1</sup> (poor-fair)
- k. trembling aspen<sup>4</sup> - white birch<sup>2</sup> - cottonwood<sup>1</sup> - red maple<sup>1</sup> - sugar maple<sup>1</sup> - (white pine - American elm - basswood)<sup>1</sup> (fair)
- l. trembling aspen<sup>3</sup> - white birch<sup>3</sup> - white pine<sup>1</sup> - white cedar<sup>1</sup> - American elm<sup>1</sup> - (black cherry - white ash)<sup>1</sup> (fair)
- m. trembling aspen<sup>3</sup> - balsam poplar<sup>2</sup> - white ash<sup>2</sup> - white birch<sup>2</sup> - (American elm - black cherry - ironwood)<sup>1</sup> (poor-fair)
- n. trembling aspen<sup>2</sup> - sugar maple<sup>2</sup> - red oak<sup>2</sup> - bitternut hickory<sup>1</sup> - white cedar<sup>1</sup> - butternut<sup>1</sup> - (American elm - white pine - white birch - cottonwood)<sup>1</sup> (poor-fair)
- o. red maple<sup>3</sup> - sugar maple<sup>2</sup> - white ash<sup>2</sup> - black maple<sup>1</sup> - red oak<sup>1</sup> - (black cherry - white birch) (fair)

10. MESIC TO DRY MESIC DECIDUOUS FOREST  
red oak<sup>2</sup> - large-toothed aspen<sup>2</sup> - white pine<sup>1</sup> - white birch<sup>1</sup> - white oak<sup>1</sup> - red maple<sup>1</sup> - sugar maple<sup>1</sup> -



(ironwood - white ash - black oak - beech)<sup>1</sup> (fair)

11. MESIC TO WET MESIC MIXED FOREST

- a. hemlock<sup>4</sup> - sugar maple<sup>3</sup> - beech<sup>1</sup> - white pine<sup>1</sup> - (ironwood - white ash - black cherry - basswood)<sup>1</sup> (good)
- b. hemlock<sup>4</sup> - sugar maple<sup>4</sup> - beech<sup>1</sup> - (white birch - trembling aspen - white pine - white cedar - white ash)<sup>1</sup> (fair)
- c. hemlock<sup>2</sup> - sugar maple<sup>2</sup> - white cedar<sup>1</sup> - red maple<sup>1</sup> - large-toothed aspen<sup>1</sup> - red oak<sup>1</sup> - white pine<sup>1</sup> - (white birch - yellow birch - beech - black ash - white ash)<sup>1</sup> (fair-good)

12. MESIC TO DRY MESIC MIXED FOREST:

white pine<sup>5</sup> - trembling aspen<sup>2</sup> - red maple<sup>1</sup> - white birch<sup>1</sup> - (white oak - red oak)<sup>1</sup> (fair)

13. MESIC TO WET MESIC CONIFEROUS FOREST

hemlock<sup>5</sup> - white cedar<sup>2</sup> - yellow birch<sup>1</sup> - white pine<sup>1</sup> - (sugar maple - basswood - red oak - beech)<sup>1</sup> (excellent) ph. white cedar<sup>8</sup> - white pine<sup>1</sup> - (trembling aspen - white ash - American elm - white birch)<sup>1</sup> (fair)

UPLAND ON DRUMLIN  
FORESTED UPLAND

14. MESIC DECIDUOUS FOREST

- a. sugar maple<sup>6</sup> - basswood<sup>2</sup> - beech<sup>1</sup> - (white ash - white birch - trembling aspen - white pine - white cedar)<sup>1</sup> (fair-poor)
- b. sugar maple<sup>3</sup> - bittenuit hickory<sup>2</sup> - white ash<sup>2</sup> - white cedar<sup>1</sup> - ironwood<sup>1</sup> - (red oak - hemlock - white birch - basswood - beech)<sup>1</sup> (fair)

15. MESIC MIXED FOREST: hemlock<sup>4</sup> - sugar maple<sup>4</sup> - white ash<sup>1</sup> - (white birch - ironwood - bittenuit hickory - beech)<sup>1</sup> (good)

16. MESIC CONIFEROUS FOREST

- a. hemlock<sup>5</sup> - white cedar<sup>4</sup> - (white birch - white pine - ironwood - white ash)<sup>1</sup> (good)
- b. white pine<sup>4</sup> - white cedar<sup>4</sup> - trembling aspen<sup>1</sup> - (white birch - white ash - apple - pear)<sup>1</sup> (poor)

UPLAND ON KAME MORaine  
FORESTED UPLAND

17. MESIC DECIDUOUS FOREST

- a. sugar maple<sup>3</sup> - red oak<sup>2</sup> - beech<sup>2</sup> - white ash<sup>1</sup> - white oak<sup>1</sup> - (hemlock - white pine)<sup>1</sup> (good)

- b. large-toothed aspen<sup>3</sup> - sugar maple<sup>2</sup> - red oak<sup>2</sup> - white ash<sup>1</sup> - beech<sup>1</sup> - (white birch - ironwood - butternut)<sup>1</sup> (fair)

18. DRY MESIC MIXED FOREST

- a. red oak<sup>3</sup> - white oak<sup>3</sup> - sugar maple<sup>1</sup> - large-toothed aspen<sup>1</sup> - white pine<sup>1</sup> - hemlock<sup>1</sup> - (beech - ironwood) (excellent)
- b. large-toothed aspen<sup>3</sup> - red oak<sup>2</sup> - white oak<sup>2</sup> - white pine<sup>2</sup> - Scots pine (naturally seeded)<sup>1</sup> (poor-fair)

C. ANTHROPOGENIC VEGETATION

19. OLD FIELD

- a. *Poa pratensis* - *Poa compressa* - *Vitis riparia* - white pine - trembling aspen - red cedar - white birch - white ash - black oak (10% tree cover) (poor)
- b. *Poa pratensis* - *Vicia cracca* - *Euphorbia cyparissias* - white cedar - American elm - (white spruce - black locust, planted) (10% tree cover) (poor)

20. SAND BARREN (FORMER SAND PIT)

*Poa compressa* - *Danthonia spicata* - *Sporobolus vaginiflorus* - *Juniperus communis* - *J. virginiana* - *Salix* spp. (10% shrub cover) (poor-fair)

21. CONIFER PLANTATION

- a. white pine<sup>10</sup> (intermediate-mature)
- b. red pine<sup>10</sup> (young)
- b. scots pine (young-intermediate)

22. PAVED TWO LANE ROAD

Evaluation of Vegetation Community Representation and Diversity:

The site contains 18 natural vegetation subclasses and 59 natural vegetation community associations which is above average for the region. Representation is considered to be very good.

D. Vegetation Community Rarity

Provincially Rare Communities

1. Community 8b. Dry black oak woodland is

considered extremely rare in Ontario (probably S1 although not ranked by Bakowsky 1995). The black oak woodland at Mayhew Creek contains nearly 100% black oak and is about 40-50 years old. This is the highest percentage of black oak in a community recorded in the lower Trent region. The site is quite unusual with *Poa compressa*, lichens and *Polytrichum* mosses dominating the ground cover. Tree cover is about 40-50% (slightly higher than savanna). The average dbh is about 17 cm and maximum dbh is 50 cm.

The site was probably clear cut or burnt about 50 years ago when an adjacent sand and gravel pit was in operation. The community occurs on land owned by the Township of Murray. There is localized impact on the fine sand from trail bike use. This community actually extends south of the road, however that area has been excluded because of recent housing development.

2. Community 8c. Black oak-white oak-white pine-red pine savanna is considered extremely rare in Ontario (S1 rank) (Bakowsky 1995). This is the best example of this type of community seen by the authors in eastern Ontario. Black oak-pine savanna occurs in southwestern Ontario primarily at Pinery and Turkey Point, however it may differ in herbaceous and shrub dominants. The savanna is about 60 years old with about 30-40% tree cover. *Juniperus communis* and *Amelanchier* species dominating the shrub layer. *Carex pennsylvanica* and *Pteridium aquilinum* are the main herbaceous ground cover. There is evidence of past tree cutting (about 60 years ago). Recent housing development occurs at the south end of this community.

3. Community 5a. This hemlock-yellow birch-beech-sugar maple swamp and slope forest is about 75 years old. This community occurs in a steep ravine system cut through acidic sand deposits. Major springs arise from the slopes. Striped Maple, Witch Hazel and Spicebush are common shrubs. Spicebush thicket is considered rare to uncommon (S3 rank) in Ontario (Bakowsky 1995). Spicebush (*Lindera benzoin*) is a Carolinian species reaching the northeastern limit of its distribution at Belleville. Eleven populations are currently known in the lower Trent region. Murray Hills supports the largest of these, with the second largest occurring at Mayhew. Selective cutting occurred about 50 years ago. Recent housing development occurs at the south end of this community.

4. Community 15a. This 10.7 ha old growth hemlock swamp and slope forest follows a ravine along a coldwater stream (Mayhew Creek). Hemlock swamp is considered to be rare or uncommon in Ontario (S3 rank)

(Bakowsky 1995), however this example is even more significant because of its age and relatively large size. Hemlock trees range in dbh from 40 to 100 cm and white pines occur that are up to 90 cm dbh. About 3% of the trees are 80-100cm dbh. Based on ring counts of hemlocks that have been cut in the area, the forest is about 120-150 years old with some trees reaching about 250 years. A large, mature white pine plantation flanks its eastern and southern boundaries. In 1994 a trail was cut through part of this community along the property line.

#### Rare or Uncommon Communities in the Lower Trent Region

5. Community 11a-c. Hemlock-sugar maple-beech mixed forest in fair-good condition.

6. Community 18a. A mature, dry mesic, red oak-white oak forest with about 75% tree cover occurs on a small esker near the southwest corner of Mayhew Creek Headwater. Its age is estimated at 90-100 years with the average dbh about 37 cm and maximum dbh 55 cm.

#### Evaluation of Vegetation Community Rarity:

Four communities within Mayhew Creek are considered provincially rare based on Bakowsky (1995) and personal observations and several others are considered rare or uncommon within the lower Trent region.

### E. Condition/Quality of Habitats and Communities

The study area was nearly doubled in size (from 240 ha proposed by Reid and Grand 1994 to about 440 ha). Originally it was confined to the woods flanking Highway 401. It has been extended south one concession nearly to Whites Road and westward to connect to the Matson Lake Wetland in order to include high quality remnant woodlots.

Although little is known about the historical land-use of the site, most of the area was probably cut about 50 years ago. An extensive old growth forest exists in the southeast section along Mayhew Creek where some hemlock and white pine reach 100 cm dbh. Some of the area was cleared about 40-50 years ago for apple orchards and other agricultural uses, but these have been abandoned. A sand and gravel pit owned by Murray Township is no longer in use. Recent disturbances in the vicinity include fairly extensive

housing development and ATV trails.

Each community was assessed utilizing the criteria outlined in chapter 1, section "A" on condition/quality of habitats and communities. The condition of each community is indicated in the vegetation classification for the site as poor, fair, good or excellent. Condition percentages for the site are as follows: poor 14%, fair 50%, good 25%, and excellent 11%

#### Evaluation of Condition/Quality of Habitats and Communities:

Mayhew Creek meets the criteria since 36% of the site is in good to excellent condition and only 14% is in poor condition.

#### F. Species Diversity

Total Number of Vascular Plant Taxa: 448

Native Vascular Plant Taxa: 356

Breeding Bird Species: 67

Total Number of Bird Species: 90

Mammal Species: 6

Reptile and Amphibian Species: 0 + 3 = 3

#### Evaluation of Species Diversity:

This site supports a relatively high number of native vascular plant taxa in relation to site size (well above the regression line in Figure 2). Breeding bird diversity is average (on the regression line in Figure 3).

#### G. Significant Species

Abundance ratings are given for significant plant species after the common name. Species without an abundance rating below their name were rated as rare in the study area. Definitions of abundance are provided in the section on field methodology. Collections deposited at Agriculture Canada herbarium in Ottawa (DAO) are indicated with an asterisk.

Significant bird species which were not noted as probable or confirmed breeders are included below for use in future studies, but are not considered to have fulfilled the criteria. Refer to Appendix C for breeding status codes.

#### Provincially Rare Plants

*Carex formosa*\* Sedge S3

*Cyperus schweinitzii*\* Nut Grass S3  
-first record for Eastern Ontario.

*Lactuca hirsuta*\* Hairy Lettuce S3?

#### Eastern Ontario Rare Plants

*Potamogeton pusillus* Small Pondweed  
var. *pusillus*

*Cinna arundinacea* Stout Wood Grass

*Sporobolus cryptandrus* Sand Dropseed F

*Carex laevivaginata*\* Sedge U

-new record for Eastern Ontario

*Carex prasina*\* Sedge

*Quercus velutina* Black Oak C

*Desmodium paniculatum*\* Tick-trefoil U

*Lespedeza capitata* Bush Clover

*Angelica atropurpurea*\* Angelica U

*Asclepias exaltata* Poke Milkweed

*Hieracium scabrum* Rough Hawkweed

#### Lake Ontario Lowlands Rare Plants

*Oryzopsis pungens*\* Mountain-rice

*Salix eriocephala*\* Heart-leaved Willow

*Ribes hirtellum*\* Canada Gooseberry

*Monotropa hypopithys* Pinesap

*Agalinis tenuifolia*\* Narrow-leaved

Agalinis

*Melampyrum lineare*\* Cow-wheat U

*Veronica americana* American Brooklime U

#### Carolinian affiliates and notable species

*Lindera benzoin* Spicebush

- abundant in bottomland in w. portion of area

*Hamamelis virginiana* Witch Hazel

- rare in central portion

#### Provincially Significant Breeding Birds

Listed as provincially significant in OMNR (1993).

*Buteo lineatus* Red-shouldered Hawk PO (SH)

Listed as vulnerable by COSEWIC, and given an S3B rank by Sutherland (1994a).

#### Lake Ontario Region Rare Breeding Birds

Status according to Norris (1991).

*Dendroica fusca* Blackburnian Warbler PO (SM)

The species is also considered rare in the LTR.

#### Evaluation of Significant Species:

Mayhew Creek contains 3 plant species considered rare in Ontario based on Oldham (1996), 11 plants that are rare in Eastern Ontario and 7 plants that are rare in the

Lake Ontario Lowlands physiographic region (status based on Cuddy, 1991). Two of the plant taxa were previously undocumented as occurring in Eastern Ontario. Red-shouldered Hawk, a provincially significant bird species, was recorded as a possible breeder in 1995.

### H. Habitat for Seasonal Concentrations of Wildlife

The site may be important for migratory non-game bird species since very little upland forest remains near to Lake Ontario, however this is not documented.

#### Evaluation of Habitat for Seasonal Concentrations of Wildlife:

No documented significance.

### I. Area Size, Shape and Buffering Capability

Mayhew Creek is relatively large (432.2 ha), however its edges are extremely irregular. The area has a poor buffer capability since it is flanked by Highway 401, bisected by a 2 lane paved road and separated by several gravel roads. Residential development is increasing in the area.

#### Evaluation of Area Size, Shape and Buffering Capability:

Although the area is fairly large, the irregular shape and poor buffering capability reduce its significance.

### J. Linkage and Clustering

Mayhew Creek is immediately south of the Brighton Provincial Wildlife Area which is a provincially significant earth science ANSI and a large publicly-owned parcel of land. It is about 0.5 km southwest of the Murray Hills Significant Natural Area.

#### Evaluation of Linkage and Clustering:

Mayhew Creek contributes to a fairly large node of natural area just to the west of Trenton which includes the Murray Hills Significant Natural Area and Brighton Provincial Wildlife Area.

## SITE EVALUATION SUMMARY

- Landform Representation & Rarity
- Hydrological Function
- Community Representation & Diversity
- Vegetation Community Rarity
- Quality of Habitats & Communities
- Species Diversity
- Significant Species
- Seasonal Wildlife Concentrations
- Size & Shape
- Linkage & Clustering

## RECOMMENDATIONS

1. Mayhew Creek be acknowledged as meeting 8 of the 10 evaluation criteria for natural areas presented in this report and therefore be designated as a Significant Natural Area.
2. The Mayhew Creek Headwater warrants consideration by OMNR as a regionally significant life science ANSI or sections could possibly be incorporated with Murray Hills Significant Natural Area and Brighton Provincial Wildlife Area earth science ANSI as a provincially significant life science ANSI.
3. OMNR, Tweed District, should be asked to investigate community 15a as a potentially important example of old growth hemlock forest.
4. Management of ATV use in the area is suggested primarily to avoid impacts on rare plant species and rare communities.
5. The LTRCA should contact landowners of the provincially significant communities and inform them of the very significant natural features found on their properties.
6. Reforestation, especially with non-native pines, should be discouraged in open sandy areas.

# AP 34: MAYHEW CREEK SIGNIFICANT NATURAL AREA

## VEGETATION COMMUNITIES

### A. WETLAND VEGETATION

#### WETLAND ON SAND PLAIN RIVERINE AQUATIC

##### 1. OPEN SHALLOW WATER

- a. sparsely to non-vegetated
- b. *Potamogeton natans* - *P. pusillus* - *Typha latifolia*

#### MARSH

##### 2. EMERGENT MARSH

- a. *Typha latifolia*
- b. *Phalaris arundinacea* - *Leersia oryzoides* - *Typha latifolia*

#### SWAMP

3. SHRUB SWAMP: *Salix hebbiana* - *S. discolor* - *Cornus stolonifera* - *Sambucus canadensis* - *Viburnum lentago* (30% shrub cover) - white cedar - balsam poplar - trembling aspen - American elm - white birch (20% tree cover)

##### 4. DECIDUOUS FOREST SWAMP

- a. white ash<sup>3</sup> - trembling aspen<sup>2</sup> - sugar maple<sup>1</sup> - red maple<sup>1</sup> - white birch<sup>1</sup> - balsam poplar<sup>1</sup> - (white pine - basswood - yellow birch - black ash - butternut)<sup>1</sup> (fair)
- b. white birch<sup>3</sup> - American elm<sup>2</sup> - red ash<sup>1</sup> - white pine<sup>1</sup> - basswood<sup>1</sup> - (trembling aspen - balsam poplar<sup>1</sup>) - (white cedar - hemlock)<sup>1</sup> (poor-fair)
- c. white cedar<sup>2</sup> - American elm<sup>2</sup> - red ash<sup>2</sup> - trembling aspen<sup>1</sup> - balsam poplar<sup>1</sup> - white ash<sup>1</sup> - (white birch - sugar maple - black ash - basswood)<sup>1</sup> (fair)

##### 5. MIXED FOREST SWAMP

- a. hemlock<sup>3</sup> - yellow birch<sup>2</sup> - sugar maple<sup>2</sup> - white cedar<sup>1</sup> - beech<sup>1</sup> - (white ash - basswood - red oak - white birch - red maple - striped maple - black ash)<sup>1</sup> (good-excellent)
- b. hemlock<sup>2</sup> - yellow birch<sup>1</sup> - sugar maple<sup>2</sup> - white cedar<sup>1</sup> - white birch<sup>1</sup> - white ash<sup>1</sup> - largetooth aspen<sup>1</sup> - (red maple - white pine - basswood - red oak)<sup>1</sup> (fair-good)
- c. yellow birch<sup>3</sup> - white cedar<sup>2</sup> - hemlock<sup>2</sup> - red maple<sup>2</sup> - red ash<sup>1</sup> - (white birch - beech - white pine) (good)
- d. white cedar<sup>3</sup> - hemlock<sup>2</sup> - yellow birch<sup>2</sup> - sugar maple<sup>2</sup> - (white birch - black ash - balsam poplar - basswood - American elm)<sup>1</sup> (fair)
- e. white cedar<sup>3</sup> - hemlock<sup>2</sup> - yellow birch<sup>2</sup> - white birch<sup>1</sup> - red maple<sup>1</sup> - (white pine - basswood - white ash - American elm - sugar maple)<sup>1</sup> (fair-good)
- f. white cedar<sup>2</sup> - hemlock<sup>3</sup> - yellow birch<sup>1</sup> - white birch<sup>1</sup> - trembling aspen<sup>1</sup> - (black ash - red maple)<sup>1</sup> (good)
- g. white cedar<sup>2</sup> - red ash<sup>2</sup> - hemlock<sup>1</sup> - basswood<sup>1</sup> - American elm<sup>1</sup> - balsam poplar<sup>1</sup> - sugar maple<sup>1</sup> - white birch<sup>1</sup> - (red maple - white pine - trembling aspen) (fair)
- h. white cedar<sup>2</sup> - white birch<sup>2</sup> - red maple<sup>1</sup> - trembling aspen<sup>1</sup> - hemlock<sup>1</sup> - American elm<sup>1</sup> - yellow birch<sup>1</sup> - (black ash - red ash)<sup>1</sup> (fair)
- i. white cedar<sup>4</sup> - trembling aspen<sup>2</sup> - balsam poplar<sup>2</sup> - white birch<sup>2</sup> - white birch<sup>2</sup> (fair)
- j. white cedar<sup>3</sup> - trembling aspen<sup>3</sup> - American elm<sup>1</sup> - white birch<sup>1</sup> - white pine<sup>1</sup> - (Norway spruce - white ash - balsam poplar)<sup>1</sup> (poor)

##### 6. CONIFEROUS FOREST SWAMP

- a. white cedar<sup>9</sup> - (white pine - white birch - trembling aspen - American elm)<sup>1</sup> (fair)
- b. white cedar<sup>7</sup> - white pine<sup>2</sup> - (hemlock - white birch - yellow birch - American elm)<sup>1</sup> (fair)
- c. white cedar<sup>7</sup> - hemlock<sup>1</sup> - yellow birch<sup>1</sup> - (white birch - white pine - basswood - American elm)<sup>1</sup> (good)

### B. UPLAND VEGETATION

#### UPLAND ON SAND PLAIN OPEN UPLAND

##### 7. THICKET

- a. *Juniperus communis* - *Rhus typhina* - *Juniperus virginiana* (35% shrub cover) - (white pine<sup>2</sup> - trembling aspen<sup>2</sup> - apple<sup>2</sup> - black oak<sup>2</sup> - (red oak - white oak)<sup>1</sup> - (bitternut hickory - American elm - white ash)<sup>1</sup> (30% tree cover) (poor)
- b. *Rhus typhina* - *Rubus allegheniensis* - *Prunus virginiana* (25% shrub cover, 20% tree cover) - *Carex foenea* - *Rhus radicans* - *Poa compressa* (fair)
- c. *Rhus typhina* - *Juniperus communis* - *Ceanothus americanus* (30% shrub cover) - *Poa compressa* - *Danthonia spicata* (fair)

#### WOODLAND (OPEN FOREST)

##### 8. DRY TO DRY MESIC, MIXED WOODLAND

- a. white pine<sup>5</sup> - (white ash - white oak - apple - largetooth aspen)<sup>2</sup> - white cedar<sup>1</sup> - red oak<sup>1</sup> - black oak<sup>1</sup> (fair-good)
- b. black oak<sup>10</sup> (40% tree cover, 30% lichen cover, 30% herb cover - *Poa compressa* - *Carex pensylvanica*) (fair)
- c. black oak<sup>4</sup> - white pine<sup>3</sup> - red pine<sup>1</sup> - white oak<sup>1</sup> - (red oak - hemlock - sugar maple - white ash)<sup>1</sup> (excellent)
- d. red cedar<sup>6</sup> - white ash<sup>3</sup> - (sugar maple - trembling aspen - white pine - white oak)<sup>1</sup> (poor)

#### FORESTED UPLAND

##### 9. MESIC TO WET MESIC, DECIDUOUS FOREST

- a. sugar maple<sup>4</sup> - bitternut hickory<sup>2</sup> - basswood<sup>2</sup> - beech<sup>1</sup> - (red oak - white ash)<sup>1</sup> (fair)
- b. sugar maple<sup>3</sup> - bitternut hickory<sup>2</sup> - white ash<sup>2</sup> - red oak<sup>1</sup> - largetooth aspen<sup>1</sup> - (white birch - basswood - ironwood - black cherry - butternut)<sup>1</sup> (fair-good)
- c. sugar maple<sup>3</sup> - white ash<sup>1</sup> - ironwood<sup>1</sup> - red oak<sup>1</sup> - white birch<sup>1</sup> - trembling aspen<sup>1</sup> - beech<sup>1</sup> - (bitternut hickory - basswood - black cherry)<sup>1</sup> (fair)
- d. sugar maple<sup>3</sup> - red oak<sup>2</sup> - largetooth aspen<sup>1</sup> - white pine<sup>1</sup> - white birch<sup>1</sup> - white ash<sup>1</sup> - (red maple - bitternut hickory - hemlock - trembling aspen - white oak - basswood - beech)<sup>1</sup> (fair-good)
- e. sugar maple<sup>3</sup> - beech<sup>2</sup> - white birch<sup>1</sup> - red maple<sup>1</sup> - white ash<sup>1</sup> - yellow birch<sup>1</sup> - (basswood - American elm - red oak)<sup>1</sup> (good)
- f. white ash<sup>3</sup> - bitternut hickory<sup>3</sup> - sugar maple<sup>1</sup> - (basswood - American elm)<sup>1</sup> (fair)
- g. white ash<sup>4</sup> - basswood<sup>2</sup> - sugar maple<sup>2</sup> - trembling aspen<sup>1</sup> - (white birch - balsam poplar - American elm - white cedar)<sup>1</sup> (poor)
- h. white ash<sup>3</sup> - white pine<sup>2</sup> - white birch<sup>2</sup> - sugar maple<sup>2</sup> - (black cherry - trembling aspen - basswood)<sup>1</sup> (fair)
- i. white ash<sup>3</sup> - bitternut hickory<sup>2</sup> - sugar maple<sup>1</sup> - white birch<sup>1</sup> - balsam poplar<sup>1</sup> - (American elm - basswood - trembling aspen - white cedar - Manitoba maple)<sup>1</sup> (poor-fair)
- j. white ash<sup>2</sup> - trembling aspen<sup>2</sup> - white birch<sup>2</sup> - red cedar<sup>1</sup> - ironwood<sup>1</sup> - white pine<sup>1</sup> - (American elm - white pine - bitternut hickory - sugar maple - black oak)<sup>1</sup> (poor-fair)

- c. sugar maple<sup>7</sup> - white ash<sup>1</sup> - ironwood<sup>1</sup> - red oak<sup>1</sup> - white birch<sup>1</sup> - trembling aspen<sup>1</sup> - beech<sup>1</sup> - (bitternut hickory - basswood - black cherry)<sup>1</sup> (fair)
- d. sugar maple<sup>3</sup> - red oak<sup>2</sup> - largetooth aspen<sup>1</sup> - white pine<sup>1</sup> - white birch<sup>1</sup> - white ash<sup>1</sup> - (red maple - bitternut hickory - hemlock - trembling aspen - white oak - basswood - beech)<sup>1</sup> (fair-good)
- e. sugar maple<sup>3</sup> - beech<sup>2</sup> - white birch<sup>1</sup> - red maple<sup>1</sup> - white ash<sup>1</sup> - yellow birch<sup>1</sup> - (basswood - american elm - red oak)<sup>1</sup> (good)
- f. white ash<sup>5</sup> - bitternut hickory<sup>2</sup> - sugar maple<sup>1</sup> - (basswood - American elm)<sup>1</sup> (fair)
- g. white ash<sup>4</sup> - basswood<sup>2</sup> - sugar maple<sup>2</sup> - trembling aspen<sup>1</sup> - (white birch - balsam poplar - American elm - white cedar)<sup>1</sup> (poor)
- h. white ash<sup>3</sup> - white pine<sup>2</sup> - white birch<sup>2</sup> - sugar maple<sup>2</sup> - (black cherry - trembling aspen - basswood)<sup>1</sup> (fair)
- i. white ash<sup>3</sup> - bitternut hickory<sup>2</sup> - sugar maple<sup>1</sup> - white birch<sup>1</sup> - balsam poplar<sup>1</sup> - (American elm - basswood - trembling aspen - white cedar - Manioba maple)<sup>1</sup> (poor-fair)
- j. white ash<sup>2</sup> - trembling aspen<sup>2</sup> - white birch<sup>2</sup> - red cedar<sup>1</sup> - ironwood<sup>1</sup> - white pine<sup>1</sup> - (American elm - white pine - bitternut hickory - sugar maple - black oak)<sup>1</sup> (poor-fair)
- k. trembling aspen<sup>4</sup> - white birch<sup>3</sup> - cottonwood<sup>1</sup> - red maple<sup>1</sup> - sugar maple<sup>1</sup> - (white pine - American elm - basswood)<sup>1</sup> (fair)
- l. trembling aspen<sup>3</sup> - white birch<sup>3</sup> - white pine<sup>1</sup> - white cedar<sup>1</sup> - American elm<sup>1</sup> - (black cherry - white ash)<sup>1</sup> (fair)
- m. trembling aspen<sup>3</sup> - balsam poplar<sup>2</sup> - white ash<sup>2</sup> - white birch<sup>2</sup> - (American elm - black cherry - ironwood)<sup>1</sup> (poor-fair)
- n. trembling aspen<sup>2</sup> - sugar maple<sup>2</sup> - red oak<sup>2</sup> - bitternut hickory<sup>1</sup> - white cedar<sup>1</sup> - butternut<sup>1</sup> - (American elm - white pine - white birch - cottonwood)<sup>1</sup> (poor-fair)
- o. red maple<sup>3</sup> - sugar maple<sup>2</sup> - white ash<sup>2</sup> - black maple<sup>1</sup> - red oak<sup>1</sup> - (black cherry - white birch) (fair)

10. MESIC TO DRY MESIC DECIDUOUS FOREST: red oak<sup>2</sup> - largetooth aspen<sup>2</sup> - white pine<sup>1</sup> - white birch<sup>1</sup> - white oak<sup>1</sup> - red maple<sup>1</sup> - sugar maple<sup>1</sup> - (ironwood - white ash - black oak - beech)<sup>1</sup> (fair)

#### 11. MESIC MIXED FOREST

- a. hemlock<sup>4</sup> - sugar maple<sup>3</sup> - beech<sup>1</sup> - white pine<sup>1</sup> - (ironwood - white ash - black cherry - basswood)<sup>1</sup> (good)
- b. hemlock<sup>4</sup> - sugar maple<sup>4</sup> - beech<sup>1</sup> - (white birch - trembling aspen - white pine - white cedar - white ash)<sup>1</sup> (fair)
- c. hemlock<sup>2</sup> - sugar maple<sup>2</sup> - white cedar<sup>1</sup> - red maple<sup>1</sup> - largetooth aspen<sup>1</sup> - red oak<sup>1</sup> - white pine<sup>1</sup> - (white birch - yellow birch - beech - black ash - white ash)<sup>1</sup> (fair-good)

12. MESIC TO DRY MESIC MIXED FOREST: white pine<sup>5</sup> - trembling aspen<sup>2</sup> - red maple<sup>1</sup> - white birch<sup>1</sup> - (white oak - red oak)<sup>1</sup> (fair)

#### 13. MESIC TO WET MESIC CONIFEROUS FOREST

- a. hemlock<sup>5</sup> - white cedar<sup>2</sup> - yellow birch<sup>1</sup> - white pine<sup>1</sup> - (sugar maple - basswood - red oak - beech)<sup>1</sup> (excellent)
- b. white cedar<sup>8</sup> - white pine<sup>1</sup> - (trembling aspen - white ash - American elm - white birch)<sup>1</sup> (fair)

#### UPLAND ON DRUMLIN FORESTED UPLAND

#### 14. MESIC DECIDUOUS FOREST

- a. sugar maple<sup>6</sup> - basswood<sup>2</sup> - beech<sup>1</sup> - (white ash - white birch - trembling aspen - white pine - white cedar)<sup>1</sup> (fair-poor)
- b. sugar maple<sup>3</sup> - bitternut hickory<sup>2</sup> - white ash<sup>2</sup> - white cedar<sup>1</sup> - ironwood<sup>1</sup> - (red oak - hemlock - white birch - basswood - beech)<sup>1</sup> (fair)

15. MESIC MIXED FOREST: hemlock<sup>4</sup> - sugar maple<sup>4</sup> - white ash<sup>1</sup> - (white birch - ironwood - bitternut hickory - beech)<sup>1</sup> (good)

#### 16. MESIC CONIFEROUS FOREST

- a. hemlock<sup>2</sup> - white cedar<sup>4</sup> - (white birch - white pine - ironwood - white ash)<sup>1</sup> (good)
- b. white pine<sup>4</sup> - white cedar<sup>4</sup> - trembling aspen<sup>1</sup> - (white birch - white ash - apple - pear)<sup>1</sup> (poor)

#### UPLAND ON KAME MORAIN FORESTED UPLAND

#### 17. MESIC DECIDUOUS FOREST

- a. sugar maple<sup>3</sup> - red oak<sup>2</sup> - beech<sup>2</sup> - white ash<sup>1</sup> - white oak<sup>1</sup> - (hemlock - white pine)<sup>1</sup> (good)
- b. largetooth aspen<sup>3</sup> - sugar maple<sup>2</sup> - red oak<sup>2</sup> - white ash<sup>1</sup> - beech<sup>1</sup> - (white birch - ironwood - butternut)<sup>1</sup> (fair)

#### 18. DRY MESIC MIXED FOREST

- a. red oak<sup>3</sup> - white oak<sup>3</sup> - sugar maple<sup>1</sup> - largetooth aspen<sup>1</sup> - white pine<sup>1</sup> - hemlock<sup>1</sup> - (beech - ironwood) (excellent)
- b. largetooth aspen<sup>3</sup> - red oak<sup>2</sup> - white oak<sup>2</sup> - white pine<sup>2</sup> - Scots pine (naturally seeded)<sup>1</sup> (poor-fair)

### C. ANTHROPOGENIC VEGETATION

#### 19. OLD FIELD

- a. *Poa pratensis* - *Poa compressa* - *Vitis riparia* - white pine - trembling aspen - red cedar - white birch - white ash - black oak (tree cover 10%) (poor)
- b. *Poa pratensis* - *Vicia cracca* - *Euphorbia cyparissias* - white cedar - American elm - (white spruce - black locust, planted) (10% tree cover) (poor)

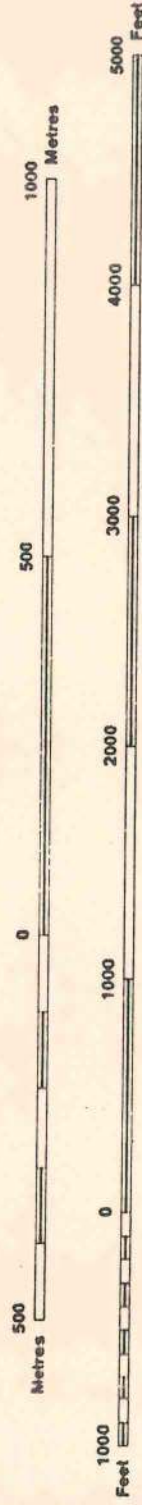
20. SAND BARREN (FORMER SAND PIT): *Poa compressa* - *Danthonia spicata* - *Sporobolus vaginiflorus* - *Juniperus communis* - *J. virginiana* - *Salix* spp. (10% shrub cover) (poor-fair, semi-natural)

#### 21. CONIFER PLANTATION

- a. white pine<sup>10</sup> (intermediate-mature)
- b. red pine<sup>10</sup> (young)
- c. scots pine (young-intermediate)

#### 22. PAVED TWO LANE ROAD

Scale 1:10 000

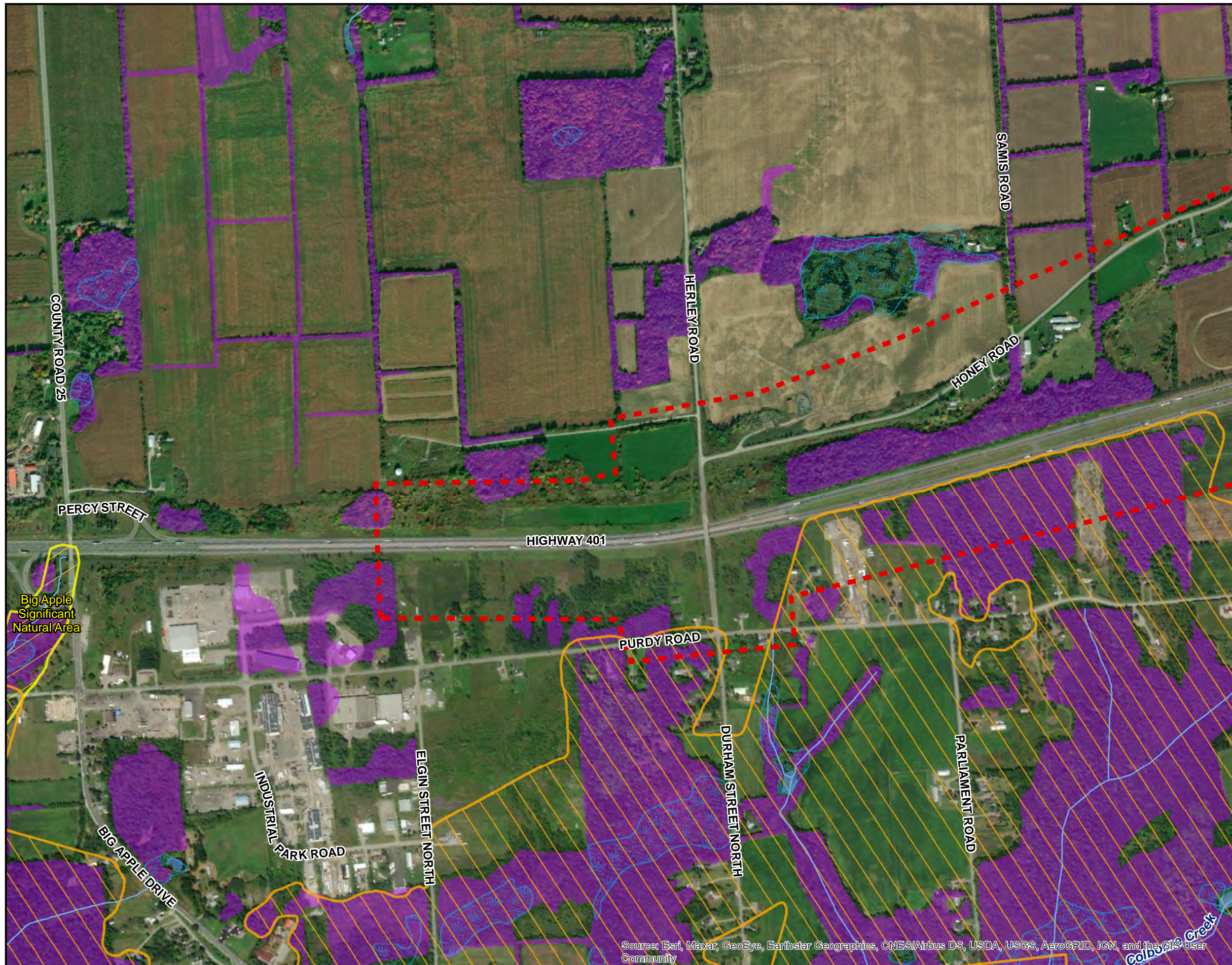




# APPENDIX

## B NATURAL HERITAGE FEATURES MAPPING





126 DON HILLOCK DRIVE, UNIT 2  
 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- ▬ Study Area
- ▬ Watercourse (LIO)
- Natural Heritage System Area (LIO)
- Natural Area - approximate (Lower Trent Conservation)
- Unevaluated Wetland (LIO)
- Wooded Area



250 125 0 250 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
 March 2022

DESIGNED BY:  
 -

DRAWN BY:  
 -

CHECKED BY:  
 -

FIGURE NO:

SCALE:  
 1:10,000

TITLE:

TERRESTRIAL EXISTING CONDITIONS

DISCIPLINE:

ENVIRONMENT

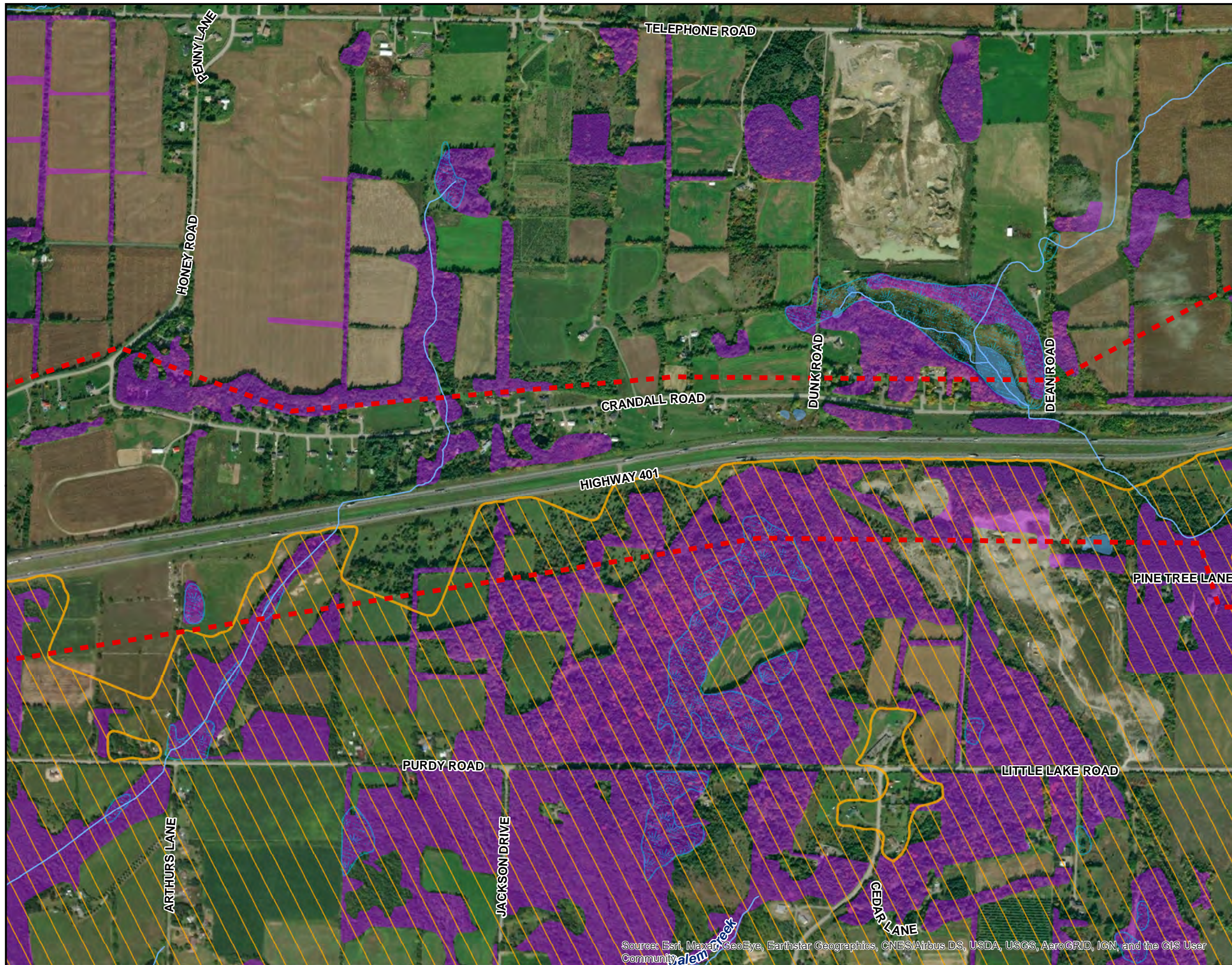
ISSUE:

-

REV.:

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Watercourse (LIO)
- Natural Heritage System Area (LIO)
- Unevaluated Wetland (LIO)
- Wooded Area



250 125 0 250 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

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DATE:  
 March 2022

DESIGNED BY:  
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DRAWN BY:  
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CHECKED BY:  
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FIGURE NO:

SCALE:  
 1:10,000

TITLE:

TERRESTRIAL EXISTING CONDITIONS

DISCIPLINE:

ENVIRONMENT

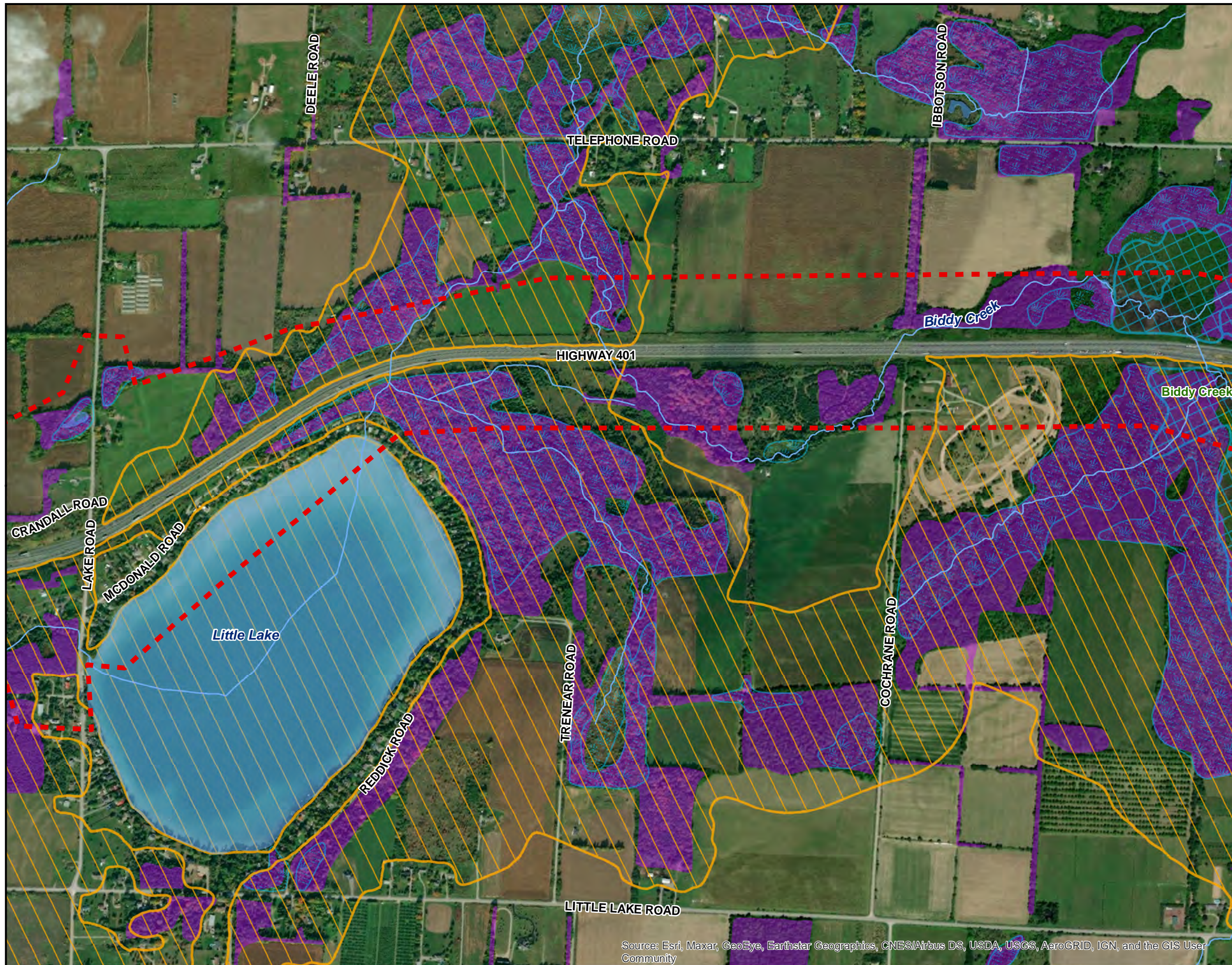
ISSUE:

-

REV.:

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Watercourse (LIO)
- Natural Heritage System Area (LIO)
- Evaluated Wetland (LIO)
- Unevaluated Wetland (LIO)
- Wooded Area



Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: March 2022
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DESIGNED BY:  
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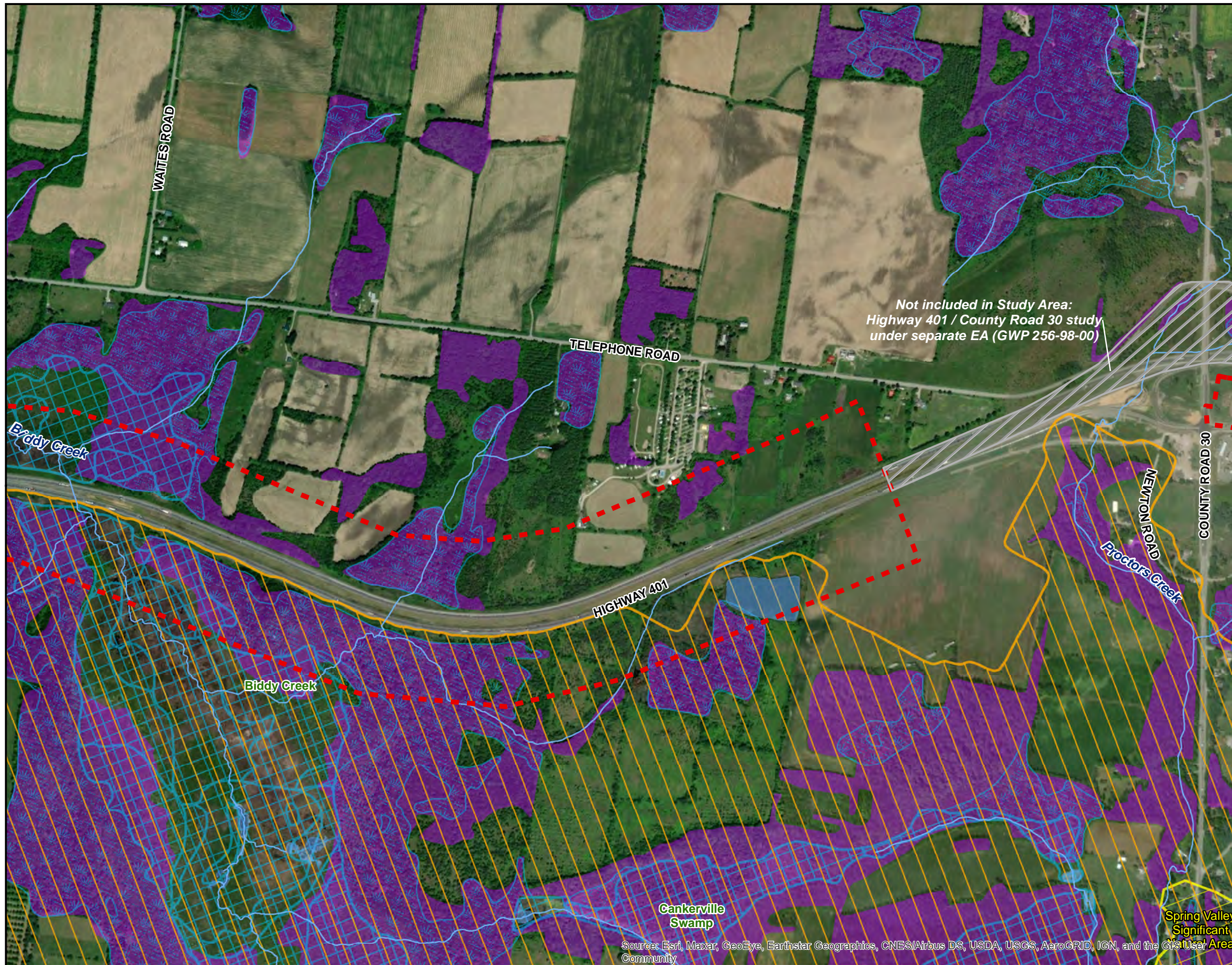
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TITLE:  
 TERRESTRIAL EXISTING CONDITIONS

DISCIPLINE:  
 ENVIRONMENT

ISSUE: -	REV.: -
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Watercourse (LIO)
- Natural Heritage System Area (LIO)
- Natural Area - approximate (Lower Trent Conservation)
- Evaluated Wetland (LIO)
- Unevaluated Wetland (LIO)
- Wooded Area



250 125 0 250 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: March 2022
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DESIGNED BY:  
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DRAWN BY:  
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CHECKED BY:  
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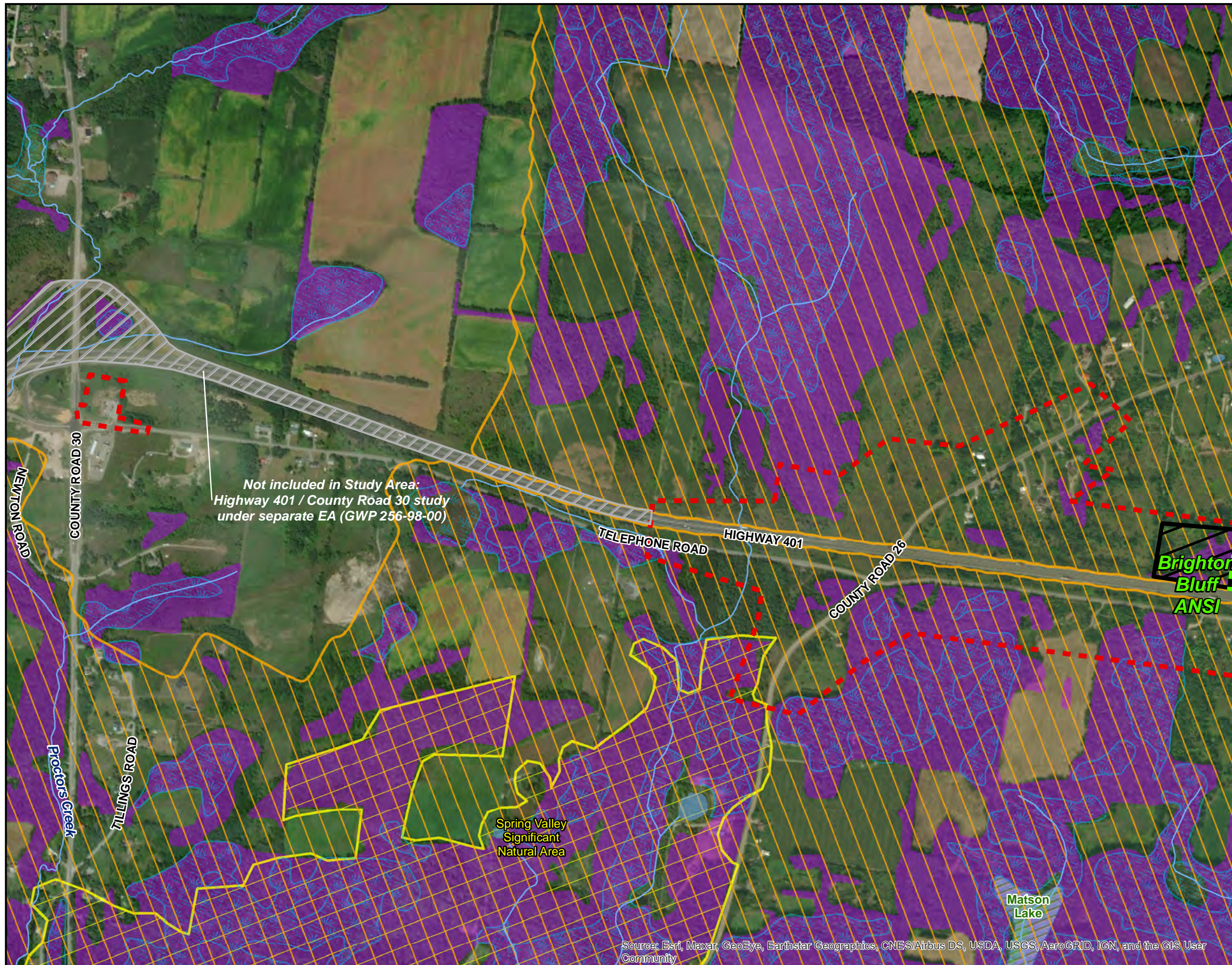
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TITLE:  
 TERRESTRIAL EXISTING CONDITIONS

DISCIPLINE:  
 ENVIRONMENT

ISSUE: -	REV.: -
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- - - Study Area
- Area of Natural and Scientific Interest (LIO)
- Watercourse (LIO)
- Natural Heritage System Area (LIO)
- Natural Area - approximate (Lower Trent Conservation)
- Brighton Provincial Wildlife Area
- Provincially Significant Wetland (LIO)
- Unevaluated Wetland (LIO)
- Wooded Area



250 125 0 250 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: March 2022
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DESIGNED BY:  
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CHECKED BY:  
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FIGURE NO:	SCALE: 1:10,000
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TITLE:  
 TERRESTRIAL EXISTING CONDITIONS

DISCIPLINE:  
 ENVIRONMENT

ISSUE: -	REV.: -
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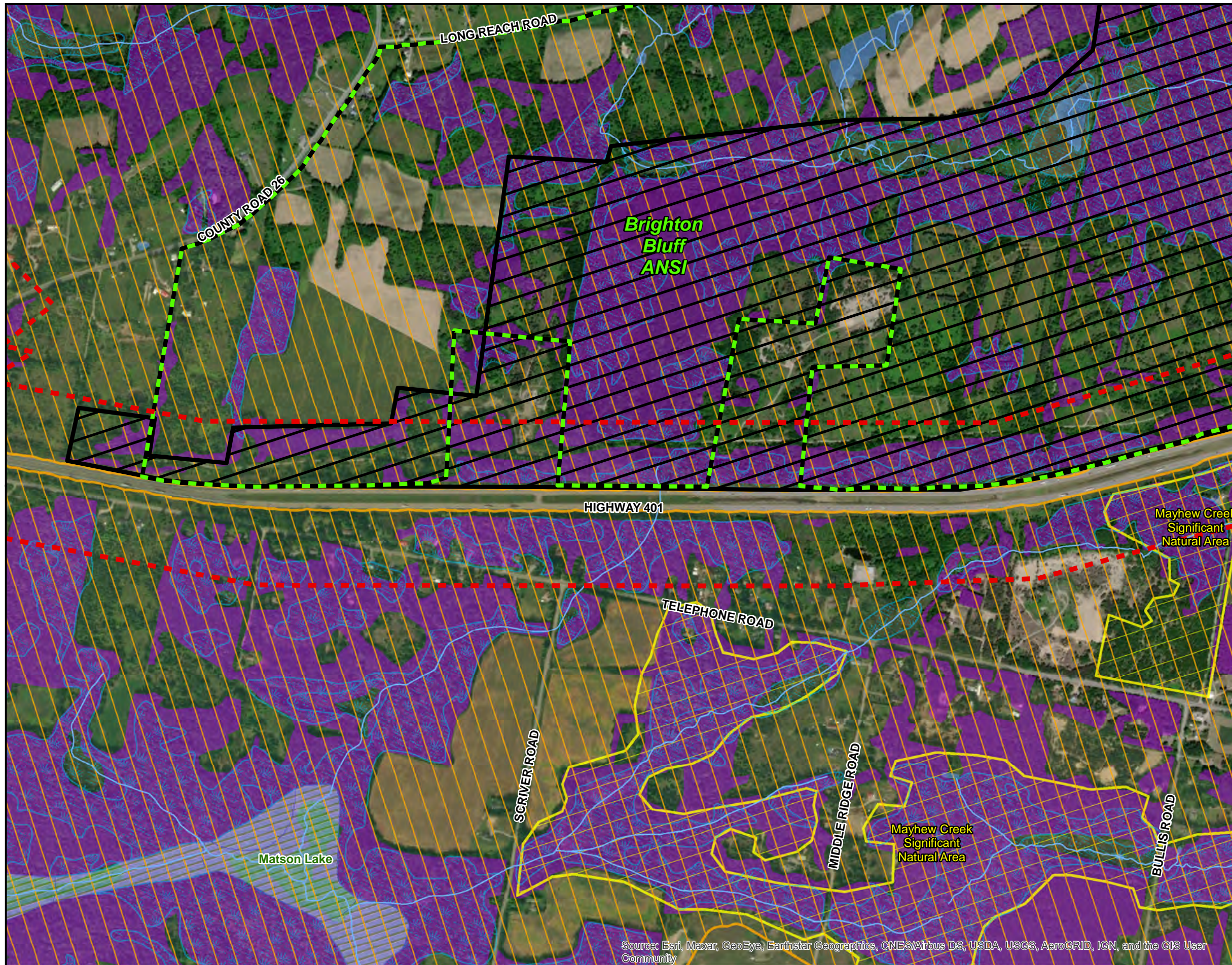
Not included in Study Area:  
 Highway 401 / County Road 30 study  
 under separate EA (GWP 256-98-00)

**Brighton  
 Bluff  
 ANSI**

Spring Valley  
 Significant  
 Natural Area

Matson  
 Lake

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Area of Natural and Scientific Interest (LIO)
- Watercourse (LIO)
- Natural Heritage System Area (LIO)
- Natural Area - approximate (Lower Trent Conservation)
- Brighton Provincial Wildlife Area
- Provincially Significant Wetland (LIO)
- Unevaluated Wetland (LIO)
- Wooded Area



250 125 0 250 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
 March 2022

DESIGNED BY:  
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DRAWN BY:  
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CHECKED BY:  
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FIGURE NO:

SCALE:  
 1:10,000

TITLE:

TERRESTRIAL EXISTING CONDITIONS

DISCIPLINE:

ENVIRONMENT

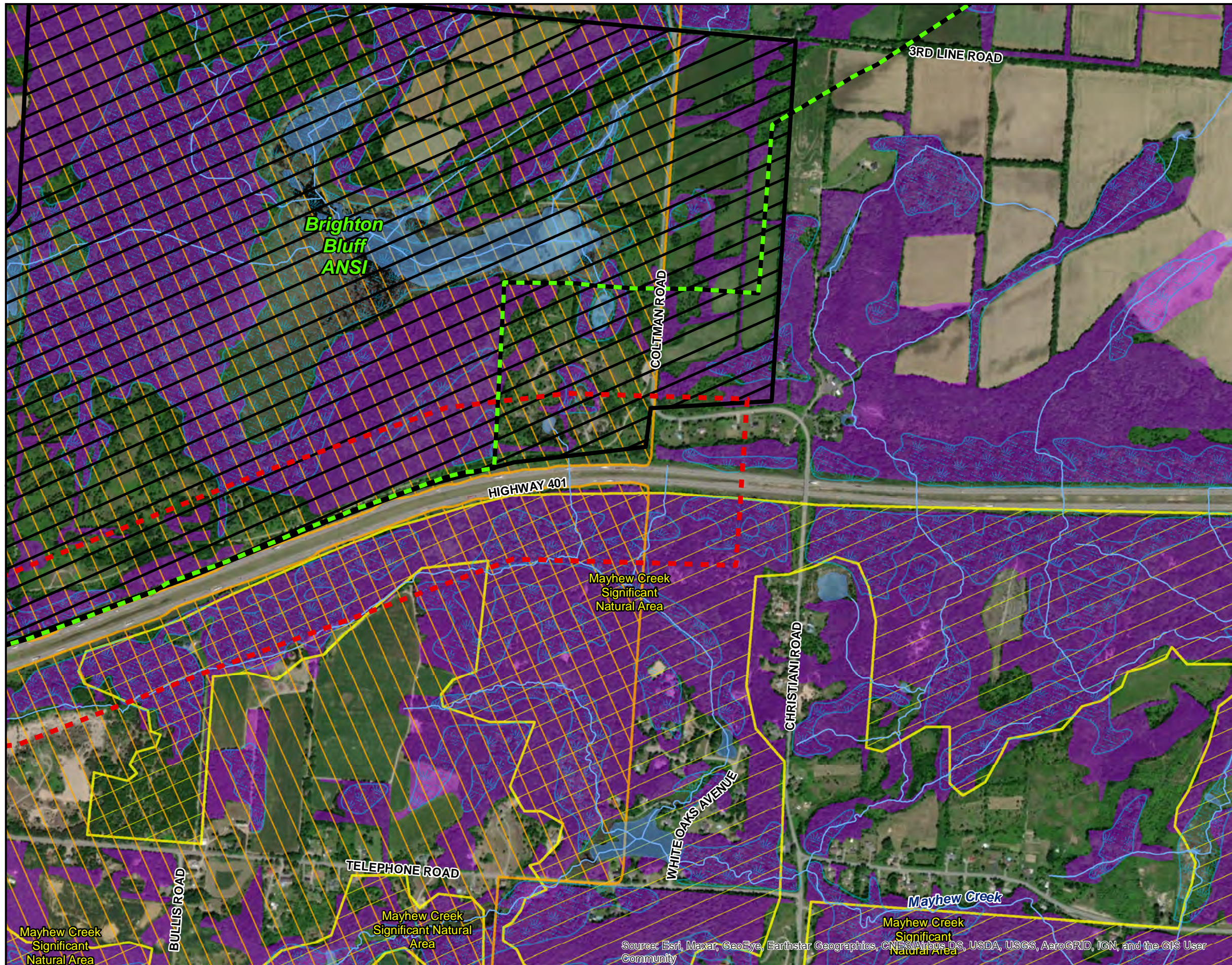
ISSUE:

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
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PROJECT NO: 17M-01712-11	DATE: March 2022
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FIGURE NO:	SCALE: 1:10,000
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TITLE:  
 TERRESTRIAL EXISTING CONDITIONS

DISCIPLINE:  
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ISSUE: -	REV.: -
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# APPENDIX

## C SPECIES AT RISK SCREENING TABLE



Species At Risk Designations		
ENDANGERED		
THREATENED		
SPECIAL CONCERN		
EXTIRPATED		

Species	SARO (ESA) Status	SARA Status	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
<b>Birds (23 Species)</b>								
<b>Bank Swallow (Riparia riparia)</b>	THR	THR	OBBA	It nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers (MNRF Guelph - Waterloo List, 2014)	<b>None</b> - No breeding habitat (i.e. steep eroded banks and stock piles) occurs within study area.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Barn Swallow (Hirundo rustica)</b>	SC	SC	OBBA	prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc. (MNRF Guelph - Waterloo List, 2014)	<b>High</b> - Potential breeding habitat (i.e. barns) observed within the study area	Incidental Wildlife	Adults observed foraging	<b>None</b> - no barns or structures will be removed.
<b>Black Tern (Chlidonias niger)</b>	SC		OBBA	Generally prefer freshwater marshes and wetlands; nest either on floating material in a marsh or on the ground very close to water (MNRF Guelph - Waterloo List, 2014)	<b>None</b> - No potential breeding habitat (i.e. large marsh >20ha) occurs within study area.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Bobolink (Dolichonyx oryzivorus)</b>	THR	THR	OBBA	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands (MNRF Guelph - Waterloo List, 2014)	<b>Moderate</b> - Potential breeding habitat (i.e. hayfields and grasslands) occur within the study area.	Incidental Wildlife	No Observations	<b>None</b> - suitable breeding habitat only occurs beyond the ROW. No impacts will occur beyond the ROW
<b>Canada Warbler (Cardellina canadensis)</b>	SC	THR	OBBA	Generally prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest (MNRF Guelph - Waterloo List, 2014)	<b>Low</b> - Potential breeding habitat (i.e. >10ha mature forest with open understory) occurs within study area; however the study area includes the forest edge	Incidental Wildlife	No Observations	<b>None</b> - suitable breeding habitat only occurs beyond the ROW. No impacts will occur beyond the ROW
<b>Cerulean Warbler (Setophaga cerulea)</b>	THR	END	OBBA	Generally found in mature deciduous forests with an open understory; also nests in older, second-growth deciduous forests (MNRF Guelph - Waterloo List, 2014)	<b>Minimal</b> - Potential breeding habitat (i.e. >10ha mature forest with open understory) occurs within study area; however the study area includes the forest edge	Incidental Wildlife	No Observations	<b>None</b> - suitable breeding habitat only occurs beyond the ROW. No impacts will occur beyond the ROW
<b>Chimney Swift (Chaetura pelagica)</b>	THR	THR	OBBA	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys (MNRF Guelph - Waterloo List, 2014)	<b>Moderate</b> - Potential breeding habitat (i.e. snags and large uncapped chimneys) occurs within study area and this species may be observed foraging overhead.	Incidental Wildlife	No Observations	<b>None</b> - no structures will be removed.
<b>Common Nighthawk (Chordeiles minor)</b>	SC	THR	OBBA	Generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops) (MNRF Guelph - Waterloo List, 2014)	<b>Low</b> - potential breeding habitat (i.e. open vegetation-free habitats and flat-topped roofs) are limited within study area	Incidental Wildlife	No Observations	<b>None</b> - suitable breeding habitat only occurs beyond the ROW. No impacts will occur beyond the ROW
<b>Eastern Meadowlark (Sturnella magna)</b>	THR	THR	OBBA	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps (MNRF Guelph - Waterloo List, 2014)	<b>Moderate</b> - potential breeding habitat (i.e. >5ha grasslands) occur within the study area	Incidental Wildlife	Males heard singing	<b>None</b> - suitable breeding habitat only occurs beyond the ROW. No impacts will occur beyond the ROW
<b>Eastern Whip-poor-will (Caprimulgus vociferus)</b>	THR	THR	OBBA	Generally prefer semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred; In winter they occupy primarily mixed woods near open areas (MNRF Guelph - Waterloo List, 2014)	<b>Minimal</b> - no potential breeding habitat (i.e. >100ha semi-open forests) occurs within study area; however, this species may be observed during migration.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.

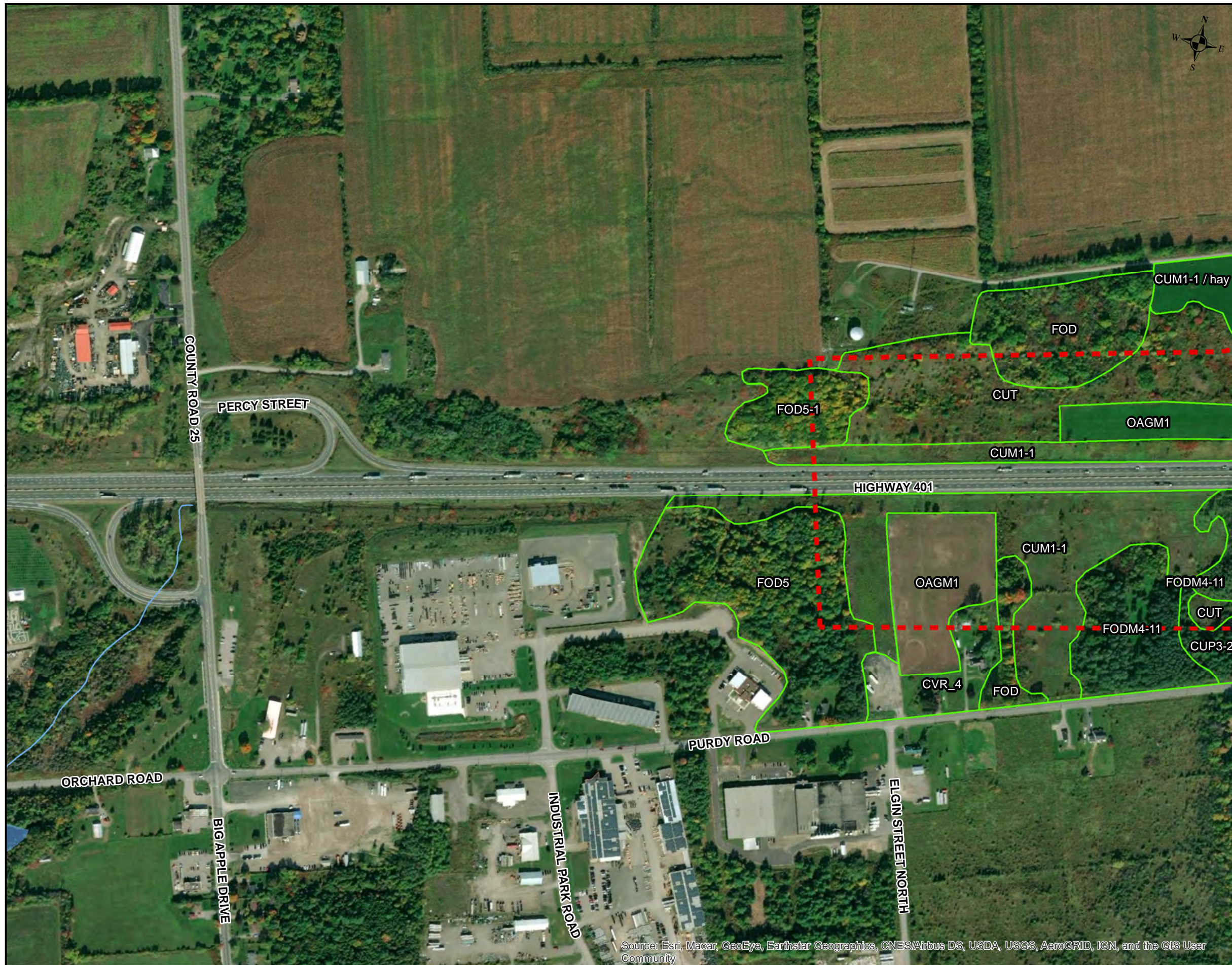
<b>Eastern Wood-pewee (Contopus virens)</b>	SC	SC	NHIC	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges (MNRF Guelph - Waterloo List, 2014)	<b>High</b> - potential breeding habitat (i.e. forest with open understory) occurs within study area.	Incidental Wildlife	One male heard singing	<b>Moderate</b> - this species is likely breeding within the woodland habitats. The proposed works will require some tree/shrub removals within woodland habitat. The Contract documents should specify that no tree removals shall occur during the breeding bird season (April 1 - Aug 31).
<b>Evening Grosbeak (Coccothraustes vespertinus)</b>	SC		OBBA	Nested in arctic and subarctic. During fall migration, used inland and coastal areas including heath land with crowberries, meadows, pastures, old fields, inter-tidal mudflats, salt marshes and sand dunes. During spring migration, found in tallgrass prairies and cultivated fields (MNRF Species Profile Online 2014).	<b>Minimal</b> - No potential breeding habitat (i.e. arctic) occurs within study area; however, this species may be observed during migration.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Golden-winged Warbler (Vermivora chrysoptera)</b>	SC	THR	OBBA	Generally prefer areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas (MNRF Guelph - Waterloo List, 2014)	<b>Minimal</b> - Suitable breeding habitat (i.e. early successional habitat) is limited within study area.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Grasshopper Sparrow (Ammodramus savannarum)</b>	SC	SC	OBBA	Medium to large grasslands with grasses of intermediate height in both native and tame grasslands including agricultural fields and cattle pastures (COSEWIC 2013b)	<b>None</b> - No suitable breeding habitat (i.e. >10ha grasslands with patches of bare ground) occurs within study area.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Least Bittern (Ixobrychus exilis)</b>	THR	THR	OBBA	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants (MNRF Guelph - Waterloo List, 2014)	<b>None</b> - No potential breeding habitat (i.e. >5ha 'hemi-marsh') occurs within study area.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Loggerhead Shrike (Lanius ludovicianus)</b>	END	END	OBBA	Generally prefer a combination of pasture or other grassland with scattered low trees and shrubs. They build their nests in small trees or shrubs (MNRF Guelph - Wellington List, 2015).	<b>None</b> - No potential breeding habitat (>25ha scrubland with thorny shrubs) occurs within study area	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>King Rail (Rallus elegans)</b>	END	END	OBBA	Generally this species requires large marshes with open shallow water that merges with shrubby areas (MNRF Guelph - Hamilton List, 2013)	<b>None</b> - No potential breeding habitat (i.e. large 'hemi-marsh') occurs within study area	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Northern Bobwhite (Colinus virginianus)</b>	END	END	OBBA	Generally inhabits a variety of edge and grassland type - habitats including non-intensively farmed agricultural lands (MNRF Guelph - Waterloo List, 2014)	<b>Minimal</b> - Potential breeding habitat (i.e. mosaic of grassland / forest) is limited within study area and this species is very rare in Ontario.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Olive-sided Flycatcher (Contopus cooperi)</b>	SC	THR	OBBA	Generally prefers natural forest edges and openings adjacent to rivers or wetlands. Commonly nest in conifers such as White and Black Spruce, Jack Pine and Balsam Fir. (MNRF Guelph - Wellington List, 2015)	<b>Moderate</b> - Potential breeding habitat (i.e. conifers adjacent to forest and wetlands) occurs within study area	Incidental Wildlife	No Observations	<b>Moderate</b> - this species is likely breeding within the woodland habitats. The proposed works will require some tree/shrub removals within woodland habitat. The Contract documents should specify that no tree removals shall occur during the breeding bird season (April 1 - Aug 31).
<b>Red-headed Woodpecker (Melanerpes erythrocephalus)</b>	SC	THR	OBBA	Generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks (MNRF Guelph - Waterloo List, 2014)	<b>Moderate</b> - Potential breeding habitat (i.e. large trees in open habitat) occurs within study area (forest edge, cultural plantation, hedgerow)	Incidental Wildlife	No Observations	<b>Moderate</b> - this species is likely breeding within the woodland habitats. The proposed works will require some tree/shrub removals within woodland habitat. The Contract documents should specify that no tree removals shall occur during the breeding bird season (April 1 - Aug 31).
<b>Short-eared Owl (Asio flammeus)</b>	SC	SC	OBBA	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields (MNRF Guelph - Waterloo List, 2014)	<b>None</b> - No potential breeding habitat (i.e. >75 ha open fields or wetlands) occurs within study area .	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.

<b>Wood Thrush</b> ( <i>Hylocichla mustelina</i> )	SC	THR	NHIC	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments (MNRF Guelph - Waterloo List, 2014)	<b>High</b> - Potential breeding habitat (>1ha forest with well-developed understory) occurs within study area.	Incidental Wildlife	No Observations	<b>Moderate</b> - this species is likely breeding within the woodland habitats. The proposed works will require some tree/shrub removals within woodland habitat. The Contract documents should specify that no tree removals shall occur during the breeding bird season (April 1 - Aug 31).
<b>Yellow-breasted Chat</b> ( <i>Icteria virens virens</i> )	END	END	OBBA	Generally prefer dense thickets around wood edges, riparian areas, and in overgrown clearings (MNRF Guelph - Waterloo List, 2014)	<b>None</b> - No potential breeding habitat (i.e. >4ha thicket) occurs within study area; this species is very rare in Ontario.	Incidental Wildlife	No Observations	<b>None</b> - no suitable breeding habitat in study area.
<b>Insects (1 Species)</b>								
<b>Monarch</b> ( <i>Danaus plexippus</i> )	SC	SC	MECP, 2021	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces (MNRF Guelph - Waterloo List, 2014)	<b>High</b> - potential breeding habitat (i.e. Milkweed) and foraging habitat (i.e. wildflowers) is abundant within study area.	Incidental Wildlife	Adults observed foraging	<b>Moderate</b> - potential breeding habitat for Monarch will be removed in the ROW. The Contract documents should specify that disturbed areas shall be reseeded with a native wildflower mix including Milkweed species for breeding.
<b>Mammals (4 Species)</b>								
<b>Little Brown Bat (Little Brown Myotis)</b> ( <i>Myotis lucifugus</i> )	END	END	Bat Conservation International	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh) (MNRF Guelph - Waterloo List, 2014)	<b>High</b> - Potential breeding habitat (i.e. large trees with cavities or loose bark) occurs within study area and this species has a wide range in Ontario.	Incidental Wildlife	No Observations	<b>High</b> - some of the woodlands proposed for removal may have potential bat maternity roost habitat. The Contract documents should specify that no removals shall occur during the bat breeding season (April 1 - Sept 30).
<b>Northern Long-eared Bat (Northern Myotis)</b> ( <i>Myotis septentrionalis</i> )	END	END	Bat Conservation International	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)(MNRF Guelph - Waterloo List, 2014)	<b>Moderate</b> - Potential breeding habitat (i.e. large trees with cavities or loose bark) occurs within study area.	Incidental Wildlife	No Observations	<b>Moderate</b> - some of the woodlands proposed for removal may have potential bat maternity roost habitat. The Contract documents should specify that no removals shall occur during the bat breeding season (April 1 - Sept 30).
<b>Small-footed Bat</b> ( <i>Myotis leibii</i> )	END		Bat Conservation International	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark (MNRF Guelph - Waterloo List, 2014)	<b>Moderate</b> - Potential breeding habitat (i.e. large trees with cavities or loose bark) occurs within study area.	Incidental Wildlife	No Observations	<b>Moderate</b> - some of the woodlands proposed for removal may have potential bat maternity roost habitat. The Contract documents should specify that no removals shall occur during the bat breeding season (April 1 - Sept 30).
<b>Tri-colored Bat</b> ( <i>Perimyotis subflavus</i> )	END	END	Bat Conservation International	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Manmade structures or tree cavities. Foraging over still water, rivers, or in forest gaps (COSEWIC 2013f)	<b>Moderate</b> - Potential breeding habitat (i.e. large trees with cavities or loose bark) occurs within study area.	Incidental Wildlife	No Observations	<b>Moderate</b> - some of the woodlands proposed for removal may have potential bat maternity roost habitat. The Contract documents should specify that no removals shall occur during the bat breeding season (April 1 - Sept 30).
<b>Plants (1 Species)</b>								
<b>Butternut</b> ( <i>Juglans cinerea</i> )	END	END	MECP, 2021	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows (MNRF Guelph - Waterloo List, 2014).	<b>High</b> - Potential habitat (i.e. hedgerow, edges and deciduous forest) occurs within study area.	ELC/Botanical Inventory	Two potential hybrids observed	<b>Minimal</b> - Three Butternut trees were recorded. If these trees are to be impacted by the proposed works, a Butternut Health Assessment report must be submitted to the MECP at least 30 days in advance of any impact to the trees.
<b>Reptiles (4 Species)</b>								

<b>Blanding's Turtle (<i>Emydoidea blandingii</i>)</b>	THR	THR	NHIC	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in	<b>Moderate</b> - Potential habitat (i.e. waterbodies such as Little Lake) occurs within study area.	Incidental Wildlife	No Observations	<b>None</b> - suitable habitat is limited within the project limits and this species is unlikely to occur within the study area.
<b>Milksnake (<i>Lampropeltis triangulum</i>)</b>		SC	ORAA	Generally occur in rural areas, where it is most frequently reported in and around buildings, especially old structures. It is also found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. They must also be in proximity of water, and suitable locations for basking and egg-laying (MNRF Guelph - Waterloo List, 2014).	<b>High</b> - potential habitat (i.e. meadow, woodland) occurs within study area and this species is widespread in southern Ontario.	Incidental Wildlife	No Observations	<b>Moderate</b> - The proposed works will require removal of portions of thicket, meadow and woodland habitat. General awareness of potential species presence during construction.
<b>Northern Map Turtle (<i>Graptemys geographica</i>)</b>	SC	SC	ORAA	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day (MNRF Guelph - Waterloo List, 2014)	<b>Moderate</b> - Potential habitat (i.e. waterbodies such as Little Lake) occurs within study area.	Incidental Wildlife	No Observations	<b>Moderate</b> - turtles may encountered during construction in areas adjacent to wetlands and watercourses and any in-water works have potential to impact hibernating turtles. The Contract documents will include Contractor Awareness and Encounter protocols as mitigation for SAR turtles
<b>Snapping Turtle (<i>Chelydra serpentina</i>)</b>	SC	SC	NHIC	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits (MNRF Guelph - Waterloo List, 2014)	<b>High</b> - Suitable habitat (i.e. permanent watercourses and waterbodies) occurs within the study area and this species is widespread in southern Ontario.	Incidental Wildlife	No Observations	<b>Moderate</b> - turtles may encountered during construction in areas adjacent to wetlands and watercourses and any in-water works have potential to impact hibernating turtles. The Contract documents will include Contractor Awareness and Encounter protocols as mitigation for SAR turtles which may wander into the work zone. No in-water works will be completed during the turtle hibernation season (Sept 1 - April 30). Exclusion fencing will be installed in areas adjacent to watercourses/wetlands.

# APPENDIX

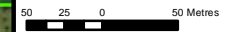
## D ELC EXISTING CONDITIONS MAPPING



126 DON HILLOCK DRIVE, UNIT 2  
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**Legend**

- Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP3-2: White Pine Coniferous Plantation
- CUT: Cultural Thicket
- CVR\_4: Rural Property
- FOD: Deciduous Forest
- FOD5: Dry - Fresh Sugar Maple Deciduous Forest
- FOD5-1: Dry - Fresh Sugar Maple Deciduous Forest
- FODM4-11: Dry - Fresh Black Locust Deciduous Forest
- OAGM1: Annual Row Crops



Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: November 2021
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FIGURE NO: Plate 1	SCALE: 1:5,000
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TITLE:  
 VEGETATION COMMUNITIES

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP3-2: White Pine Coniferous Plantation
- CUT: Cultural Thicket
- CUW: Cultural Woodland
- CVC\_2: Light Industry
- CVR\_1: Low Density Residential
- CVR\_4: Rural Property
- FOC4: Fresh - Moist White Cedar Coniferous Forest
- FOD: Deciduous Forest
- FOD3-1: Dry - Fresh Poplar Deciduous Forest
- FODM4-11: Dry - Fresh Black Locust Deciduous Forest
- FOM: Mixed Forest
- HR: Hedgerow
- MAS2-1: Cattail Mineral Shallow Marsh
- OAGM1: Annual Row Crops

50 25 0 50 Metres  
 Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

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FIGURE NO: Plate 2	SCALE: 1:5,000
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TITLE:  
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DISCIPLINE:  
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**Legend**

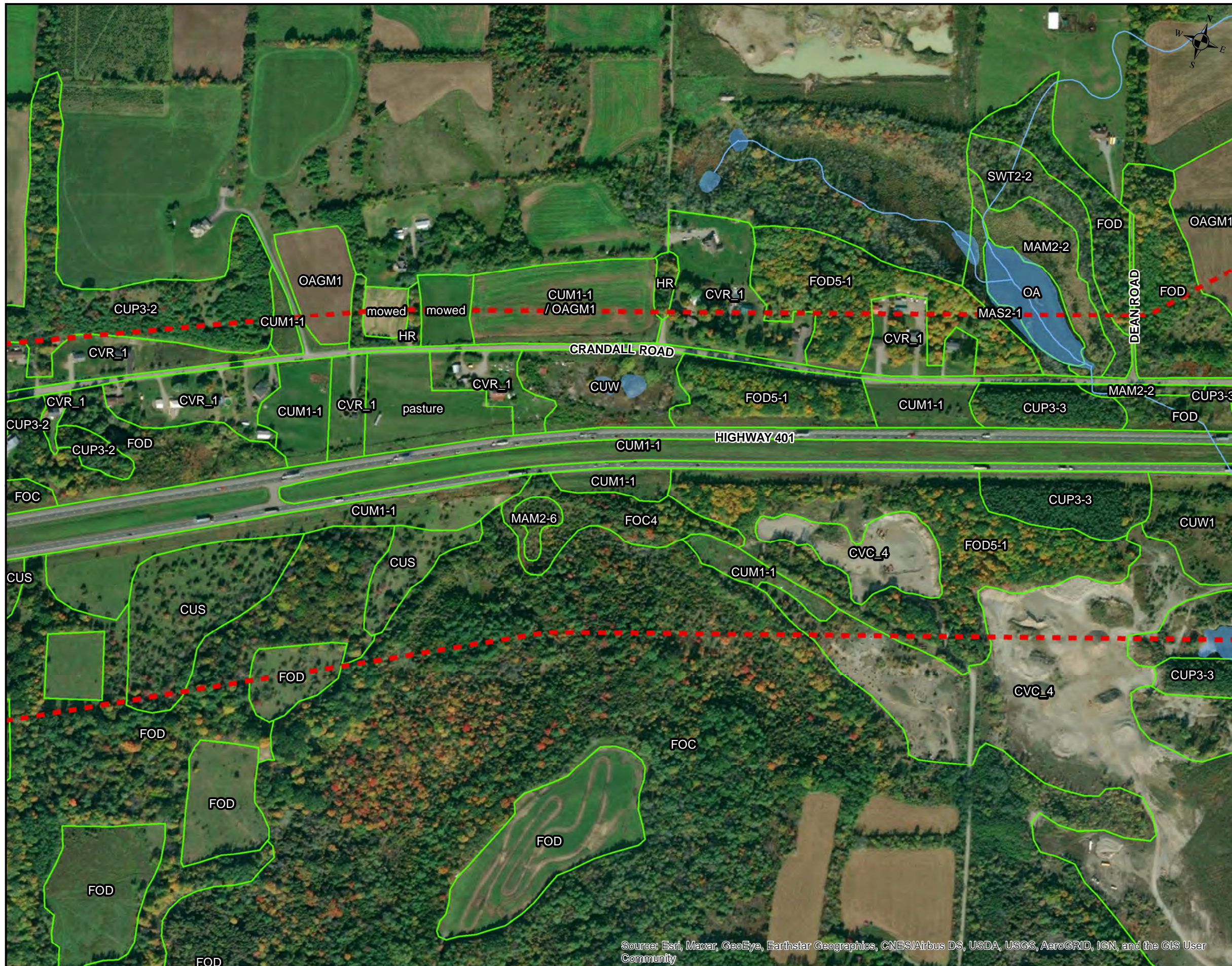
- Butternut Location
- - - Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP: Cultural Plantation
- CUP3-2: White Pine Coniferous Plantation
- CUS: Cultural Savannah
- CVR\_1: Low Density Residential
- CVR\_4: Rural Property
- FOC: Coniferous Forest
- FOD: Deciduous Forest
- FODM4-11: Dry - Fresh Black Locust Deciduous Forest
- FOM: Mixed Forest
- FOM5: Dry - Fresh White Birch - Poplar - Conifer Mixed Forest
- HR: Hedgerow
- OAGM1: Annual Row Crops

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:	
ONTARIO MINISTRY OF TRANSPORTATION	
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HIGHWAY 401 COLBORNE TO BRIGHTON	
PROJECT NO: 17M-01712-11	DATE: November 2021
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FIGURE NO: Plate 3	SCALE: 1:5,000
TITLE:  VEGETATION COMMUNITIES	
DISCIPLINE:  ENVIRONMENT	
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





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**Legend**

- Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP3-2: White Pine Coniferous Plantation
- CUP3-3: Scotch Pine Coniferous Plantation
- CUS: Cultural Savannah
- CUW: Cultural Woodland
- CUW1: Mineral Cultural Woodland
- CVC\_4: Extraction
- CVR\_1: Low Density Residential
- FOC: Coniferous Forest
- FOC4: Fresh - Moist White Cedar Coniferous Forest
- FOD: Deciduous Forest
- FOD5-1: Dry - Fresh Sugar Maple Deciduous Forest
- HR: Hedgerow
- MAM2-2: Reed-canary Grass Mineral Meadow Marsh
- MAM2-6: Broad-leaved Sedge Mineral Meadow Marsh
- MAS2-1: Cattail Mineral Shallow Marsh
- OA: Open Aquatic
- OAGM1: Annual Row Crops
- SW2-2: Willow Mineral Thicket Swamp

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:	
ONTARIO MINISTRY OF TRANSPORTATION	
PROJECT:	
HIGHWAY 401 COLBORNE TO BRIGHTON	
PROJECT NO:	DATE:
17M-01712-11	November 2021
DESIGNED BY:	-
DRAWN BY:	-
CHECKED BY:	-
FIGURE NO:	SCALE:
Plate 4	1:5,000
TITLE:	
VEGETATION COMMUNITIES	
DISCIPLINE:	
ENVIRONMENT	
ISSUE:	REV.:
-	-

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Butternut Location
- - - Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP3-1: Red Pine Coniferous Plantation
- CUP3-3: Scotch Pine Coniferous Plantation
- CUW: Cultural Woodland
- CUW1: Mineral Cultural Woodland
- CVC\_4: Extraction
- CVR\_1: Low Density Residential
- CVR\_4: Rural Property
- FOD: Deciduous Forest
- FOD3-1: Dry - Fresh Poplar Deciduous Forest
- HR: Hedgerow
- MAM2-2: Reed-canary Grass Mineral Meadow Marsh
- MAMM1-12: Common Reed Graminoid Mineral Meadow Marsh
- MAS2-1: Cattail Mineral Shallow Marsh
- OA: Open Aquatic
- OAGM1: Annual Row Crops
- SWC1-1: White Cedar Mineral Coniferous Swamp
- SWD3: Maple Mineral Deciduous Swamp
- SWM1: White Cedar Mineral Mixed Swamp

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:

17M-01712-11

DATE:

November 2021

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FIGURE NO:

Plate 5

SCALE:

1:5,000

TITLE:

VEGETATION COMMUNITIES

DISCIPLINE:

ENVIRONMENT

ISSUE:

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REV.:

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP3-3: Scotch Pine Coniferous Plantation
- CVR\_1: Low Density Residential
- CVR\_4: Rural Property
- FOC1-2: Dry - Fresh White Pine - Red Pine Coniferous Forest
- FOC2-1: Dry - Fresh Red Cedar Coniferous Forest
- FOD: Deciduous Forest
- FOD3-1: Dry - Fresh Poplar Deciduous Forest
- FOD5-1: Dry - Fresh Sugar Maple Deciduous Forest
- HR: Hedgerow
- MAM2-2: Reed-canary Grass Mineral Meadow Marsh
- MAS2-1: Cattail Mineral Shallow Marsh
- SWC1-1: White Cedar Mineral Coniferous Swamp

50 25 0 50 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
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PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: November 2021
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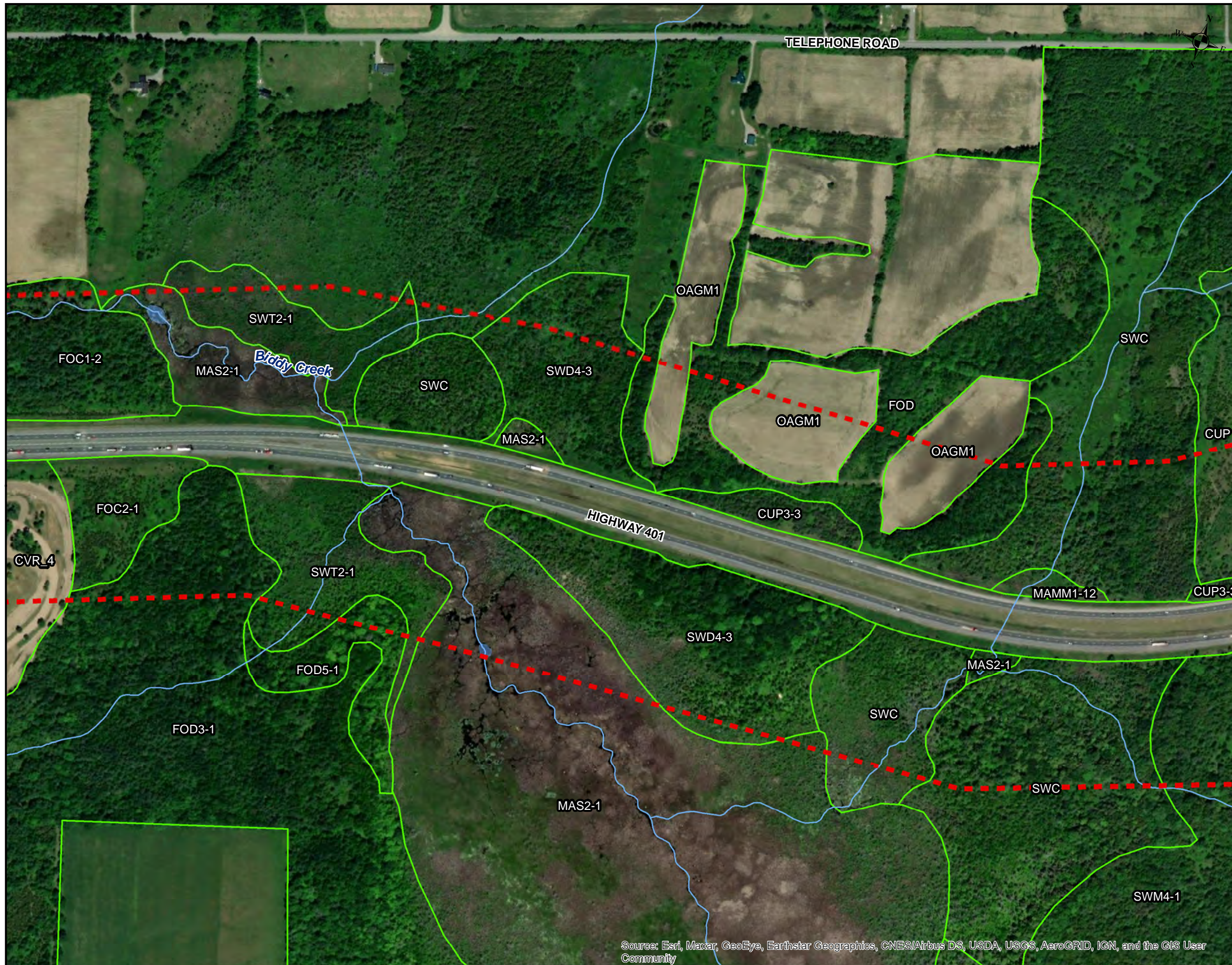
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TITLE:  
 VEGETATION COMMUNITIES

DISCIPLINE:  
 ENVIRONMENT

ISSUE: -	REV.: -
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Watercourse (LIO)
- ELC
- CUP: Cultural Plantation
- CUP3-3: Scotch Pine Coniferous Plantation
- CVR\_4: Rural Property
- FOC1-2: Dry - Fresh White Pine - Red Pine Coniferous Forest
- FOC2-1: Dry - Fresh Red Cedar Coniferous Forest
- FOD: Deciduous Forest
- FOD3-1: Dry - Fresh Poplar Deciduous Forest
- FOD5-1: Dry - Fresh Sugar Maple Deciduous Forest
- MAMM1-12: Common Reed Graminoid Mineral Meadow Marsh
- MAS2-1: Cattail Mineral Shallow Marsh
- OAGM1: Annual Row Crops
- SWC: Coniferous Swamp
- SWD4-3: White Birch - Poplar Mineral Deciduous Swamp
- SWM4-1: White Cedar - Hardwood Organic Mixed Swamp
- SWT2-1: Alder Mineral Thicket Swamp

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
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PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: November 2021
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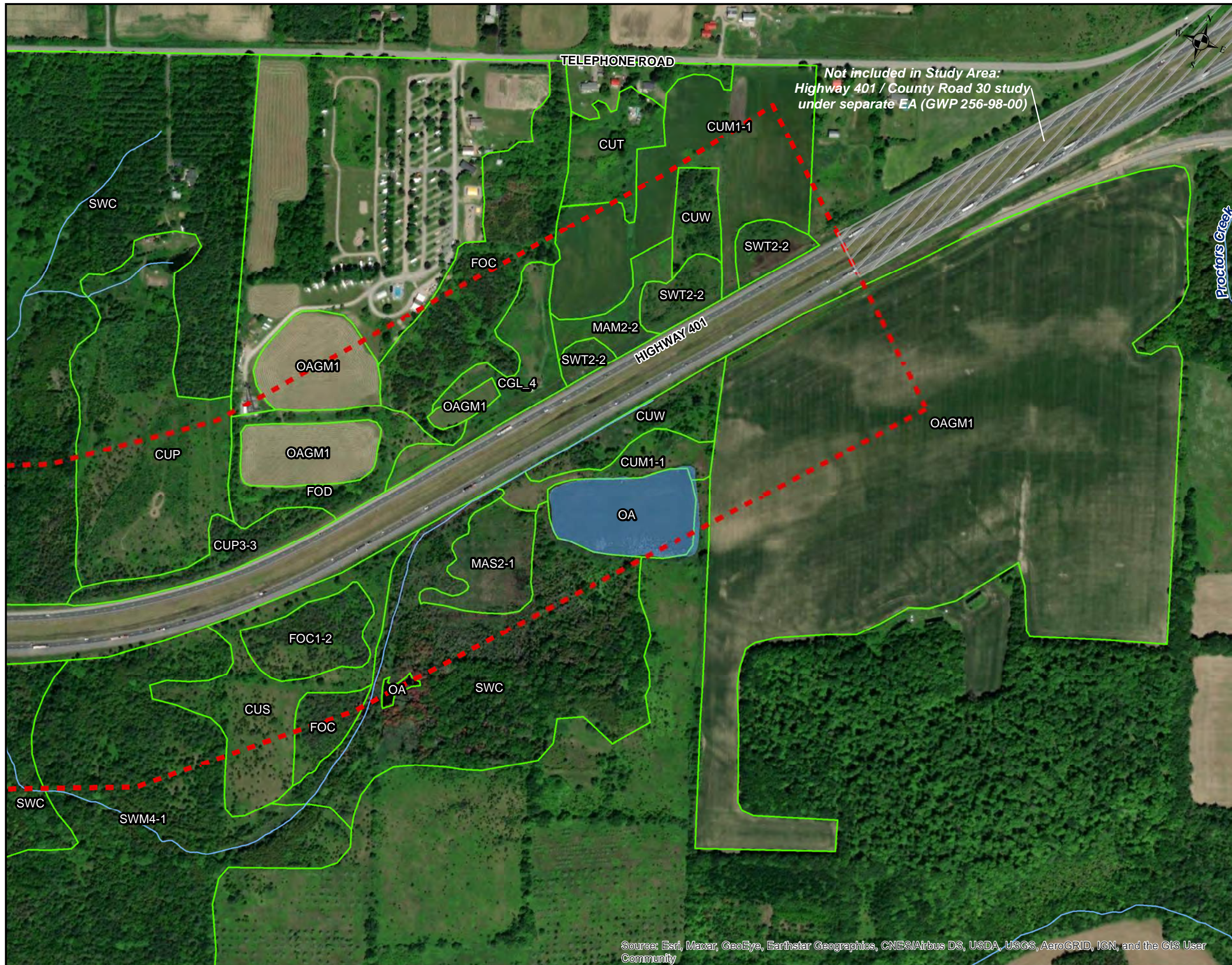
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TITLE:  
 VEGETATION COMMUNITIES

DISCIPLINE:  
 ENVIRONMENT

ISSUE: -	REV.: -
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Not included in Study Area:  
Highway 401 / County Road 30 study  
under separate EA (GWP 256-98-00)



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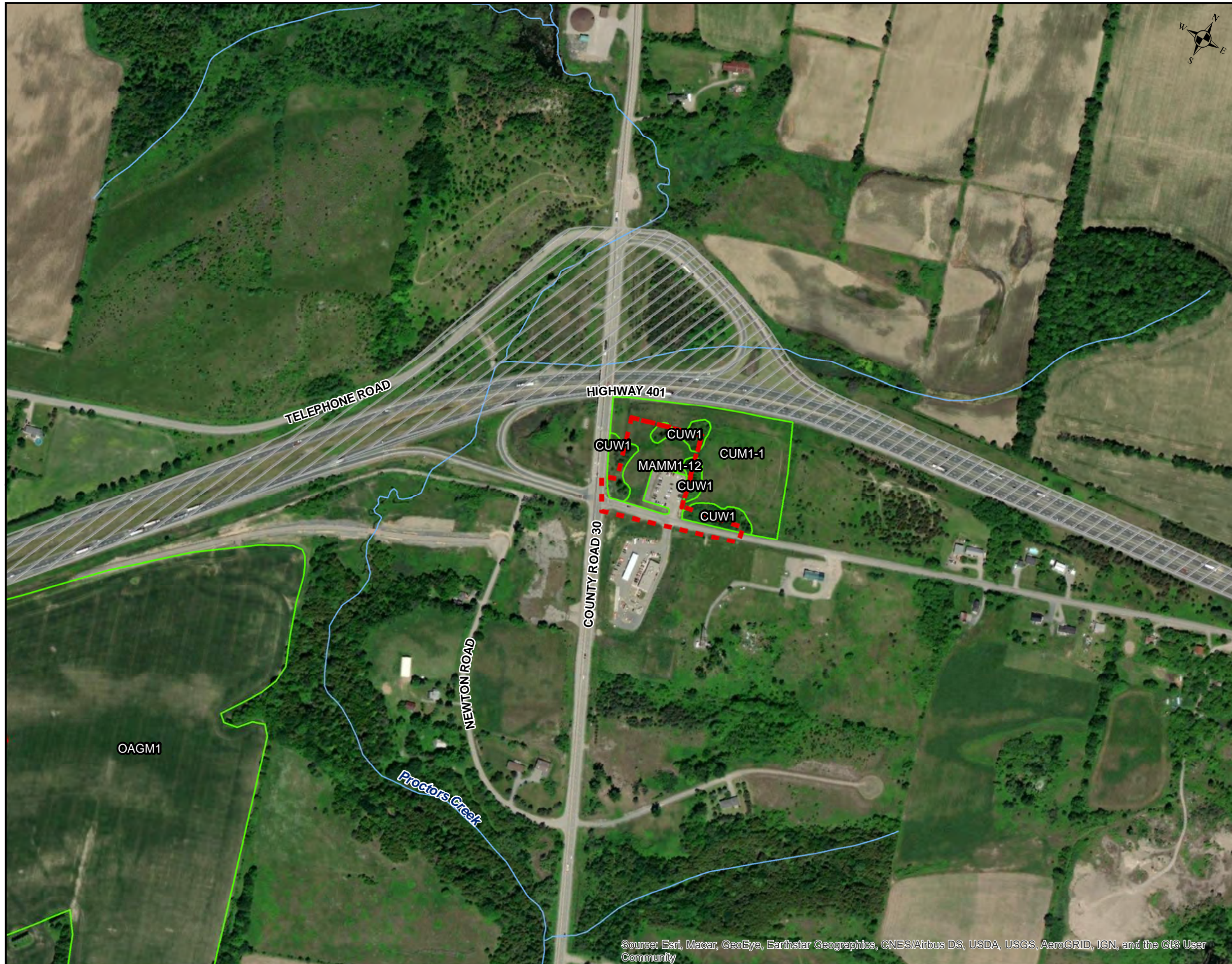
**Legend**

- Study Area
- Area Not Included In Study Area
- Watercourse (LIO)
- ELC
- CGL\_4: Recreational
- CUM1-1: Dry - Moist Old Field Meadow
- CUP: Cultural Plantation
- CUP3-3: Scotch Pine Coniferous Plantation
- CUS: Cultural Savannah
- CUT: Cultural Thicket
- CUW: Cultural Woodland
- FOC: Coniferous Forest
- FOC1-2: Dry - Fresh White Pine - Red Pine Coniferous Forest
- FOD: Deciduous Forest
- MAM2-2: Reed-canary Grass Mineral Meadow Marsh
- MAS2-1: Cattail Mineral Shallow Marsh
- OA: Open Aquatic
- OAGM1: Annual Row Crops
- SWC: Coniferous Swamp
- SWM4-1: White Cedar - Hardwood Organic Mixed Swamp
- SWT2-2: Willow Mineral Thicket Swamp

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:	
ONTARIO MINISTRY OF TRANSPORTATION	
PROJECT:	
HIGHWAY 401 COLBORNE TO BRIGHTON	
PROJECT NO: 17M-01712-11	DATE: November 2021
DESIGNED BY: -	
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CHECKED BY: -	
FIGURE NO: Plate 8	SCALE: 1:5,000
TITLE:  VEGETATION COMMUNITIES	
DISCIPLINE:  ENVIRONMENT	
ISSUE: -	REV.: -

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Area Not Included In Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUW1: Mineral Cultural Woodland
- MAMM1-12: Common Reed Graminoid Mineral Meadow Marsh
- OAGM1: Annual Row Crops

50 25 0 50 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

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 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: November 2021
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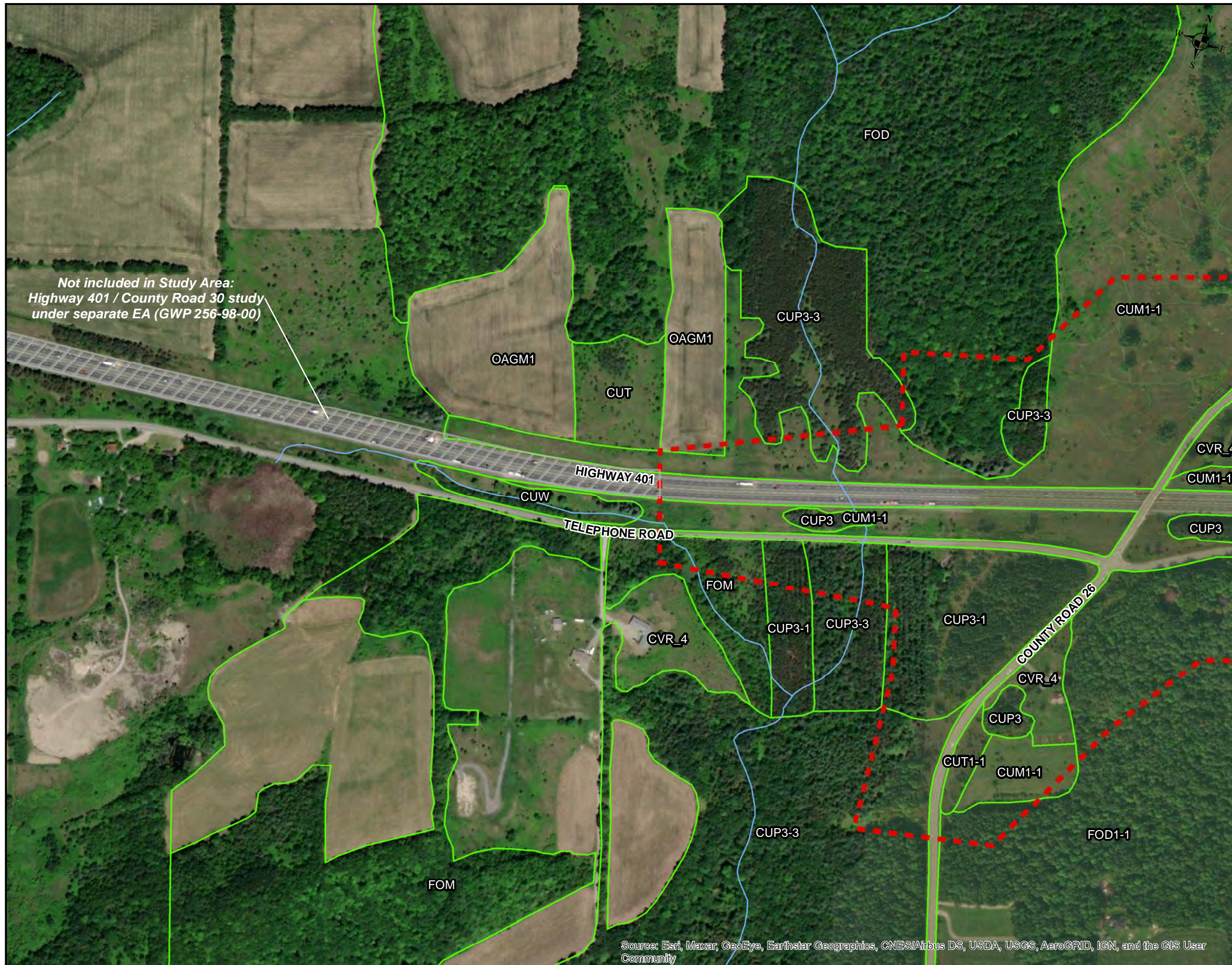
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TITLE:  
 VEGETATION COMMUNITIES

DISCIPLINE:  
 ENVIRONMENT

ISSUE: -	REV.: -
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Not included in Study Area:  
Highway 401 / County Road 30 study  
under separate EA (GWP 256-98-00)



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**Legend**

- Study Area
- Area Not Included In Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP3: Coniferous Plantation
- CUP3-1: Red Pine Coniferous Plantation
- CUP3-3: Scotch Pine Coniferous Plantation
- CUT: Cultural Thicket
- CUT1-1: Sumac Cultural Thicket
- CUW: Cultural Woodland
- CVR\_4: Rural Property
- FOD: Deciduous Forest
- FOD1-1: Dry - Fresh Red Oak Deciduous Forest
- FOM: Mixed Forest
- OAGM1: Annual Row Crops

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
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HIGHWAY 401  
COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: November 2021
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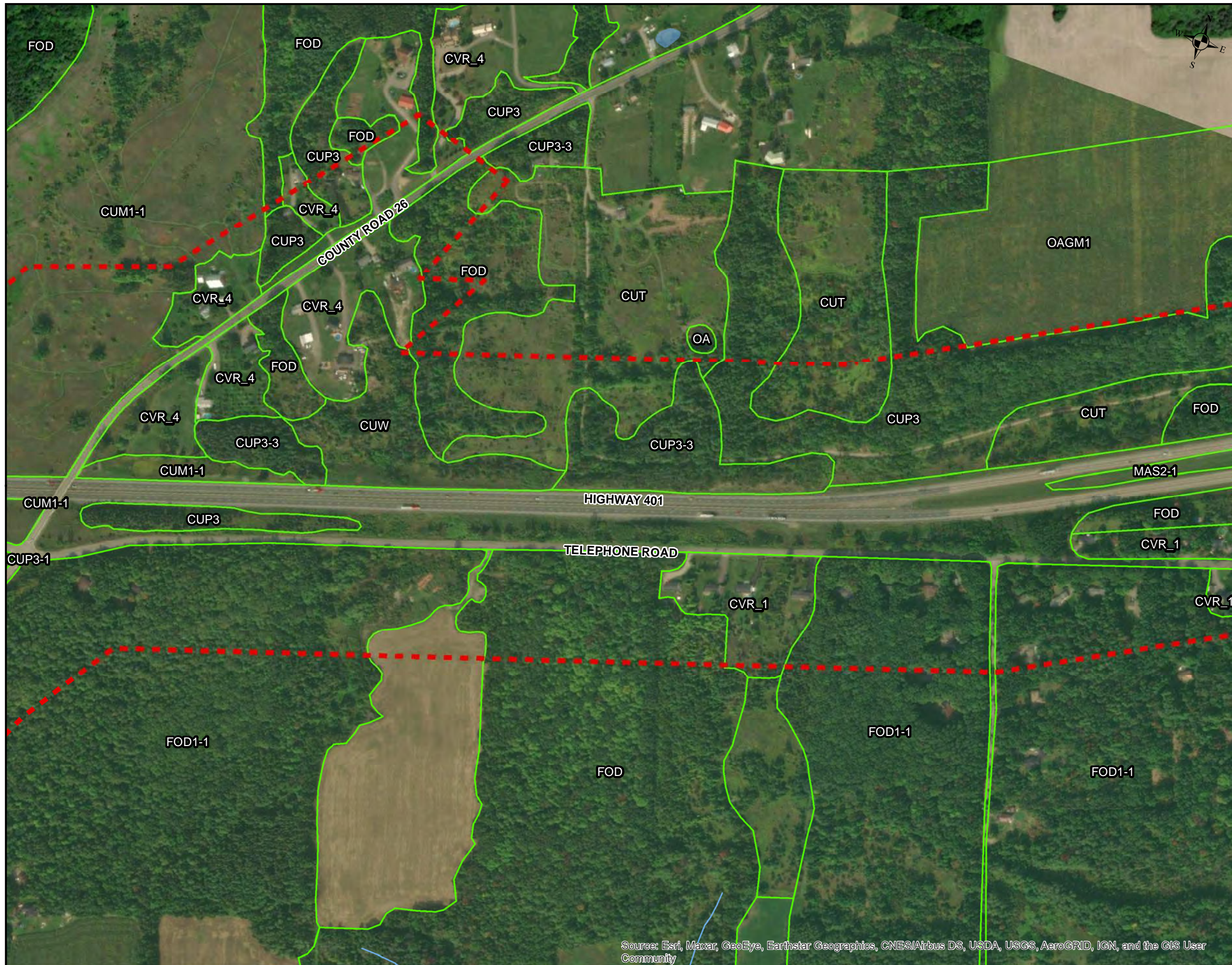
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TITLE:  
VEGETATION COMMUNITIES

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ENVIRONMENT

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP3: Coniferous Plantation
- CUP3-1: Red Pine Coniferous Plantation
- CUP3-3: Scotch Pine Coniferous Plantation
- CUT: Cultural Thicket
- CUW: Cultural Woodland
- CVR\_1: Low Density Residential
- CVR\_4: Rural Property
- FOD: Deciduous Forest
- FOD1-1: Dry - Fresh Red Oak Deciduous Forest
- MAS2-1: Cattail Mineral Shallow Marsh
- OA: Open Aquatic
- OAGM1: Annual Row Crops

50 25 0 50 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

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PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: November 2021
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FIGURE NO: Plate 11	SCALE: 1:5,000
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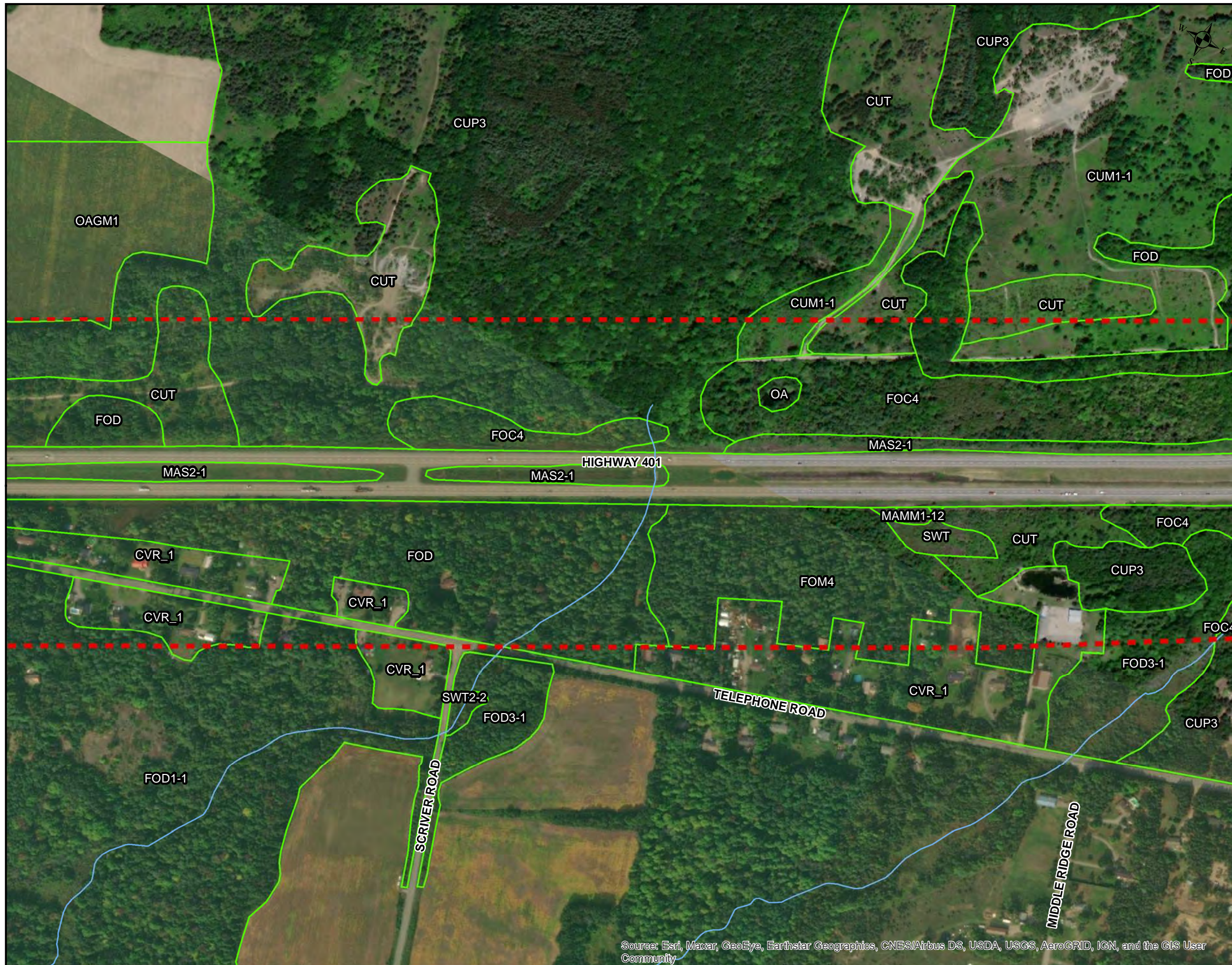
TITLE:  
 VEGETATION COMMUNITIES

DISCIPLINE:  
 ENVIRONMENT

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





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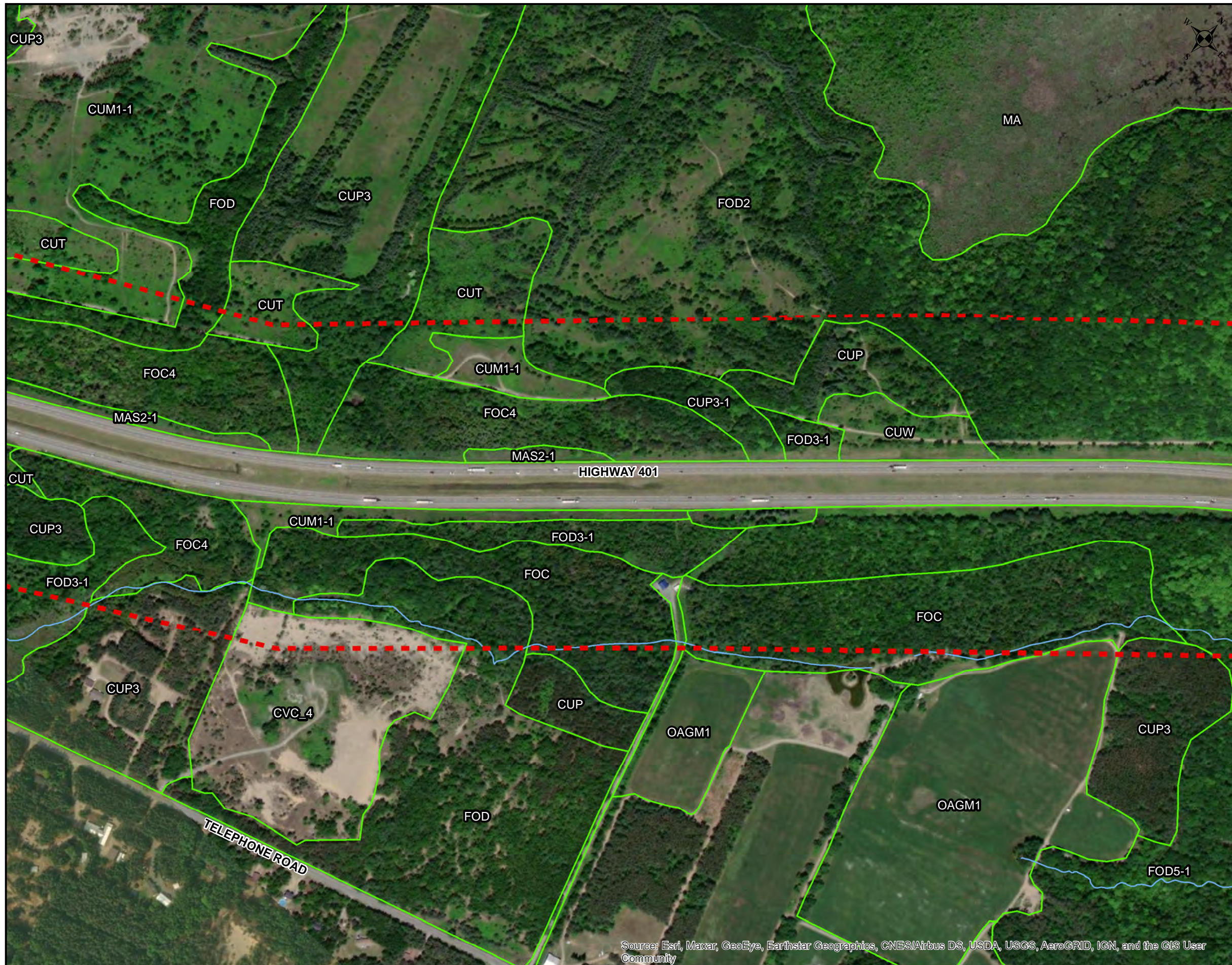
**Legend**

- Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP3: Coniferous Plantation
- CUT: Cultural Thicket
- CVR\_1: Low Density Residential
- FOC4: Fresh - Moist White Cedar Coniferous Forest
- FOD: Deciduous Forest
- FOD1-1: Dry - Fresh Red Oak Deciduous Forest
- FOD3-1: Dry - Fresh Poplar Deciduous Forest
- FOM4: Dry - Fresh White Cedar Mixed Forest
- MAMM1-12: Common Reed Graminoid Mineral Meadow Marsh
- MAS2-1: Cattail Mineral Shallow Marsh
- OA: Open Aquatic
- OAGM1: Annual Row Crops
- SWT: Thicket Swamp
- SWT2-2: Willow Mineral Thicket Swamp

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

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PROJECT NO:	DATE:
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FIGURE NO:	SCALE:
Plate 12	1:5,000
TITLE:	
VEGETATION COMMUNITIES	
DISCIPLINE:	
ENVIRONMENT	
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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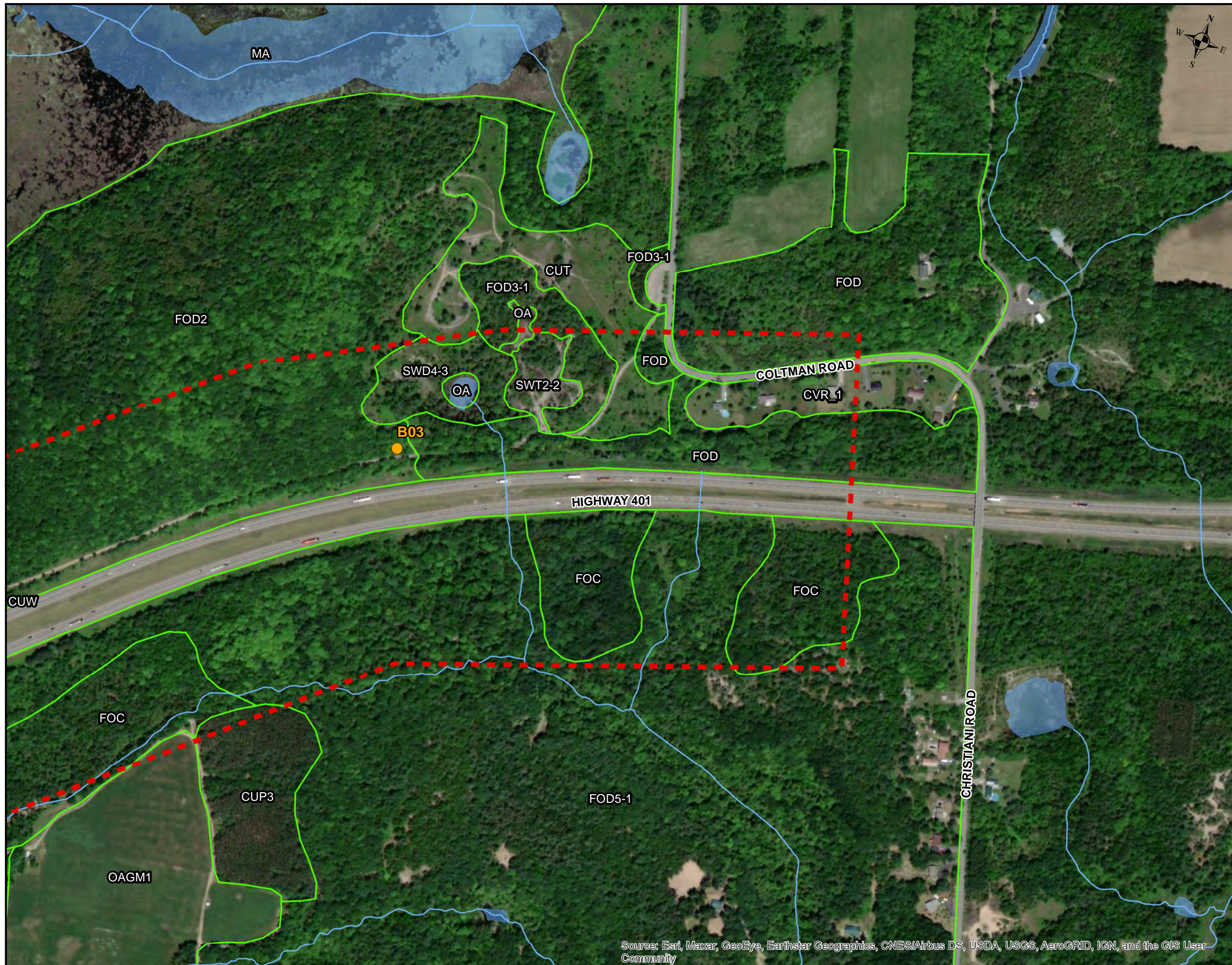
**Legend**

- Study Area
- Watercourse (LIO)
- ELC
- CUM1-1: Dry - Moist Old Field Meadow
- CUP: Cultural Plantation
- CUP3: Coniferous Plantation
- CUP3-1: Red Pine Coniferous Plantation
- CUT: Cultural Thicket
- CUW: Cultural Woodland
- CVC\_4: Extraction
- FOC: Coniferous Forest
- FOC4: Fresh - Moist White Cedar Coniferous Forest
- FOD: Deciduous Forest
- FOD2: Dry - Fresh Oak - Maple - Hickory Deciduous Forest
- FOD3-1: Dry - Fresh Poplar Deciduous Forest
- FOD5-1: Dry - Fresh Sugar Maple Deciduous Forest
- MA: Marsh
- MAS2-1: Cattail Mineral Shallow Marsh
- OAGM1: Annual Row Crops

50 25 0 50 Metres  
 Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:	
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PROJECT:	
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PROJECT NO:	DATE:
17M-01712-11	November 2021
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CHECKED BY:	-
FIGURE NO:	SCALE:
Plate 13	1:5,000
TITLE:	
VEGETATION COMMUNITIES	
DISCIPLINE:	
ENVIRONMENT	
ISSUE:	REV.:
-	-

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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**Legend**

- Butternut Location
- Study Area
- Watercourse (LIO)
- ELC
- CUP3: Coniferous Plantation
- CUT: Cultural Thicket
- CUW: Cultural Woodland
- CVR\_1: Low Density Residential
- FOC: Coniferous Forest
- FOD: Deciduous Forest
- FOD2: Dry - Fresh Oak - Maple - Hickory Deciduous Forest
- FOD3-1: Dry - Fresh Poplar Deciduous Forest
- FOD5-1: Dry - Fresh Sugar Maple Deciduous Forest
- MA: Marsh
- OA: Open Aquatic
- OAGM1: Annual Row Crops
- SWD4-3: White Birch - Poplar Mineral Deciduous Swamp
- SWT2-2: Willow Mineral Thicket Swamp

50 25 0 50 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:  
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PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: November 2021
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FIGURE NO: Plate 14	SCALE: 1:5,000
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TITLE:  
 VEGETATION COMMUNITIES

DISCIPLINE:  
 ENVIRONMENT

ISSUE: -	REV.: -
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# APPENDIX

## E WILDLIFE SPECIES LIST

Common Name	Scientific Name	GRANK <sup>1</sup>	SRANK <sup>2</sup>	SARO (ESA) Status <sup>3</sup>	COSEWIC Status <sup>4</sup>	SARA Status <sup>5</sup>	Schedule <sup>5</sup>	MNR Area Sensitive <sup>7</sup>	Area Sensitive Birds - Ecoregion 6E	Habitat Use <sup>8</sup>	Dependency on Wetlands <sup>9</sup>	NHIC Tracked	Protected Under MBCA
<b>Birds (56 Species)</b>													
American Crow	<i>Corvus brachyrhynchos</i>	G5	S5B							E		N	
American Goldfinch	<i>Spinus tristis</i>	G5	S5B							E		N	✓
American Redstart	<i>Setophaga ruticilla</i>	G5	S5B					X		I		N	✓
American Robin	<i>Turdus migratorius</i>	G5	S5B							E		N	✓
Baltimore Oriole	<i>Icterus galbula</i>	G5	S4B							E		N	✓
Barn Swallow	<i>Hirundo rustica</i>	G5	S4B	THR	THR	THR	1					N	✓
Belted Kingfisher	<i>Megasceryle alcyon</i>	G5	S4B									N	
Black-and-white Warbler	<i>Mniotilta varia</i>	G5	S5B					X		I		N	✓
Black-capped Chickadee	<i>Poecile atricapillus</i>	G5	S5							I/E		N	✓
Black-throated Green Warbler	<i>Setophaga virens</i>	G5	S5B					X	X	I		N	✓
Blue Jay	<i>Cyanocitta cristata</i>	G5	S5							I/E		N	
Brown-headed Cowbird	<i>Molothrus ater</i>	G5	S4B							E		N	
Brown Thrasher	<i>Toxostoma rufum</i>	G5	S4B							E		N	✓
Canada Goose	<i>Branta canadensis</i>	G5	S5							M/F	D	N	✓
Cedar Waxwing	<i>Bombycilla cedrorum</i>	G5	S5B							E		N	✓
Chipping Sparrow	<i>Spizella passerina</i>	G5	S5B							E		N	✓
Common Grackle	<i>Quiscalus quiscula</i>	G5	S5B							E		N	✓
Common Yellowthroat	<i>Geothlypis trichas</i>	G5	S5B							I/E	D	N	✓
Downy Woodpecker	<i>Picoides pubescens</i>	G5	S5							I/E		N	✓
Eastern Kingbird	<i>Tyrannus tyrannus</i>	G5	S4B							E		N	✓
Eastern Meadowlark	<i>Sturnella magna</i>	G5	S4B	THR	THR	THR	1					N	✓
Eastern Phoebe	<i>Sayornis phoebe</i>	G5	S5B							I/E		N	✓
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	G5	S4B							I/E		N	✓
Eastern Wood-pewee	<i>Contopus virens</i>	G5	S4B	SC	SC	SC	1			I/E		N	✓
European Starling	<i>Sturnus vulgaris</i>	G5	SNA							E		N	
Field Sparrow	<i>Spizella pusilla</i>	G5	S4B							E		N	✓
Gray Catbird	<i>Dumetella carolinensis</i>	G5	S4B							I/E		N	✓
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	G5	S4B							I/E		N	✓
Hermit Thrush	<i>Catharus guttatus</i>	G5	S5B					X		I		N	✓
House Wren	<i>Troglodytes aedon</i>	G5	S5B							E		N	✓
Indigo Bunting	<i>Passerina cyanea</i>	G5	S4B							E		N	✓
Killdeer	<i>Charadrius vociferus</i>	G5	S5B,S5N									N	✓
Least Flycatcher	<i>Empidonax minimus</i>	G5	S4B					X		E		N	✓
Mourning Dove	<i>Zenaidura macroura</i>	G5	S5							E		N	✓
Northern Cardinal	<i>Cardinalis cardinalis</i>	G5	S5							I/E		N	✓
Northern Flicker	<i>Colaptes auratus</i>	G5	S4B							I/E		N	✓
Ovenbird	<i>Seiurus aurocapilla</i>	G5	S4B					X	X	I		N	✓
Pileated Woodpecker	<i>Dryocopus pileatus</i>	G5	S5					X		I		N	✓
Pine Warbler	<i>Setophaga pinus</i>	G5	S5B					X		I		N	✓
Red-breasted Nuthatch	<i>Sitta canadensis</i>	G5	S5					X	X	I		N	✓
Red-eyed Vireo	<i>Vireo olivaceus</i>	G5	S5B							I/E		N	✓
Red-tailed Hawk	<i>Buteo jamaicensis</i>	G5	S5							E		N	✓
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	G5	S4							E	P	N	✓
Ring-billed Gull	<i>Larus delawarensis</i>	G5	S5B,SZN									N	✓
Rock Pigeon	<i>Columba livia</i>	G5	SNA									N	✓
Song Sparrow	<i>Melospiza melodia</i>	G5	S5B							E		N	✓
Spotted Sandpiper	<i>Actitis macularius</i>	G5	S5									N	✓
Swamp Sparrow	<i>Melospiza georgiana</i>	G5	S5B							E	D	N	✓
Tree Swallow	<i>Tachycineta bicolor</i>	G5	S4B							E	P	N	✓

### **<sup>7</sup> MNR Area Sensitive Species**

Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers

*From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.*

*From: Ministry of Natural Resources and Forestry. 2015. Significant Wildlife Habitat Criteria Schedules For Ecoregion 6E. January, 2015. Regional Operations Division, Southern Region Resources Section. 39pp.*

### **<sup>8</sup> Habitat Use**

I=interior species, I/E=interior edge species, E=edge species (Freemark and Collins, 1989); M/F=Marsh/Fen, S/B=Treed Swamp/Bog. Interior bird species require habitat which is often found 100m from the forest edge while Interior/Edge species are found within both interior and edge habitat. Often Interior and Interior/Edge are more sensitive to urban encroachment as they require these large, relatively undisturbed forest habitats to support viable populations. The increasing urbanization of rural areas often results in increased parasitism and predation as well as disturbance from human recreational activities (e.g. illegal bike trails, dumping and pets.) (Freemark, K. and Collins, B. 1989. *Landscape ecology of birds breeding in temperate forest fragments*. – In: Hagan III, J. M. and Johnston, D. W. (eds), *Ecology and conservation of neotropical migrant landbirds*. Smithsonian Inst. Press, pp. 443–454)

### **<sup>9</sup> Dependency on Wetlands**

Wetlands are home to many species of birds. Wetland birds are determined by the kind of habitat and the seasonal movement of migrating species.

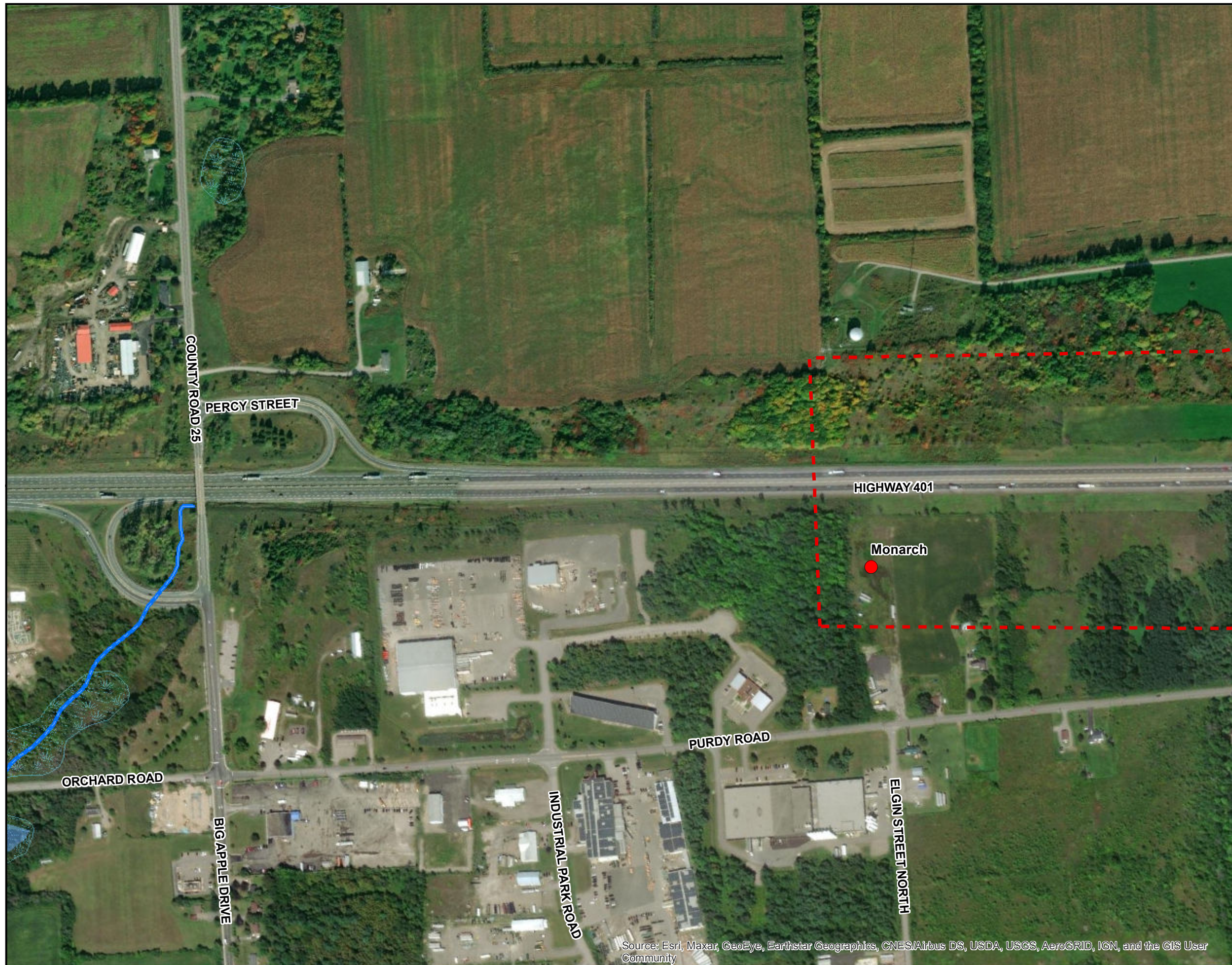
Dependant (D) - These species depend on wetlands for their survival. Most nest within wetlands, a few such as the Great Blue Heron, nest elsewhere but feed extensively in wetlands, and other such as the Wood Duck, nest away from wetlands but rear their young in marshes and fens.

Partially Dependant (P) - These species use wetlands habitats extensively for breeding or feeding, as well as other types of habitat.

*Van Patter, Mark and Stewart Hiltz. 1985. Some Important Wetlands of Ontario South of the Precambrian Shield. Federation of Ontario Naturalists.*

# APPENDIX

## F WILDLIFE OBSERVATIONS AND HABITAT MAPPING



126 DON HILLOCK DRIVE, UNIT 2  
 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- - - Study Area
- - - Intermittent Watercourse
- Permanent Watercourse
- Coldwater Watercourse
- ▨ Unevaluated Wetland (LIO)
- Observed Species at Risk (SAR)



50 25 0 50 Metres

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: MARCH 2022
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DESIGNED BY:  
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DRAWN BY:  
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CHECKED BY:  
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FIGURE NO: PLATE 1	SCALE: 1:5,000
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TITLE:  
 WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:  
 ENVIRONMENT

ISSUE: -	REV.: -
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





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 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- - - Study Area
- Permanent Watercourse
- Coldwater Watercourse
- Unevaluated Wetland (LIO)
- Area Sensitive Bird Species
- Eastern Meadowlark / Bobolink Habitat



50 25 0 50 Metres

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
 MARCH 2022

DESIGNED BY:

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FIGURE NO:  
 PLATE 2

SCALE:  
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TITLE:

WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:

ENVIRONMENT

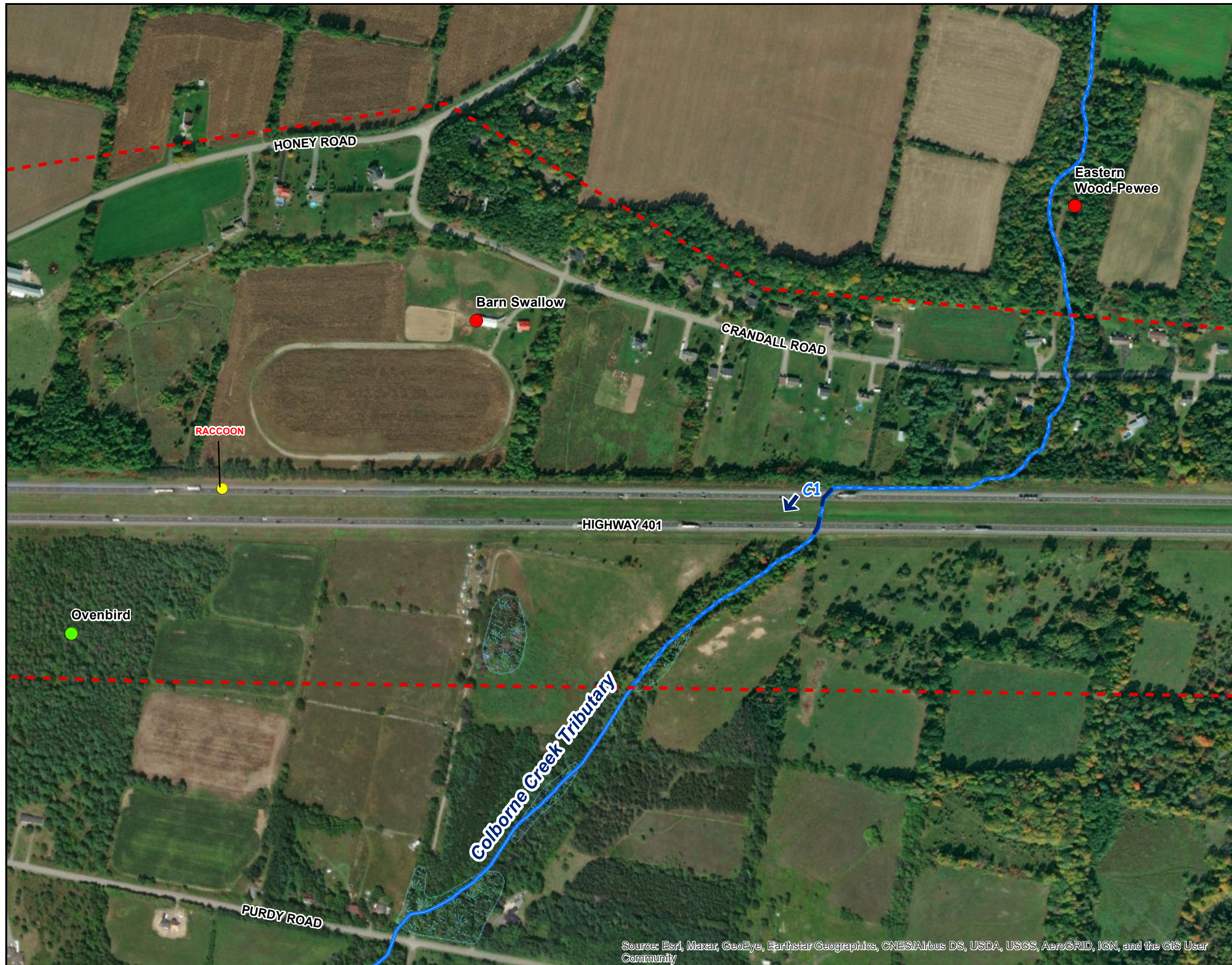
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- - - Study Area
- Culvert
- ➔ Flow Direction
- Permanent Watercourse
- Coldwater Watercourse
- Unevaluated Wetland (LIO)
- Wildlife Mortality Location
- Observed Species at Risk (SAR)
- Area Sensitive Bird Species



50 25 0 50 Metres

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
 MARCH 2022

DESIGNED BY:

DRAWN BY:

CHECKED BY:

FIGURE NO:  
 PLATE 3

SCALE:  
 1:5,000

TITLE:

WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:

ENVIRONMENT

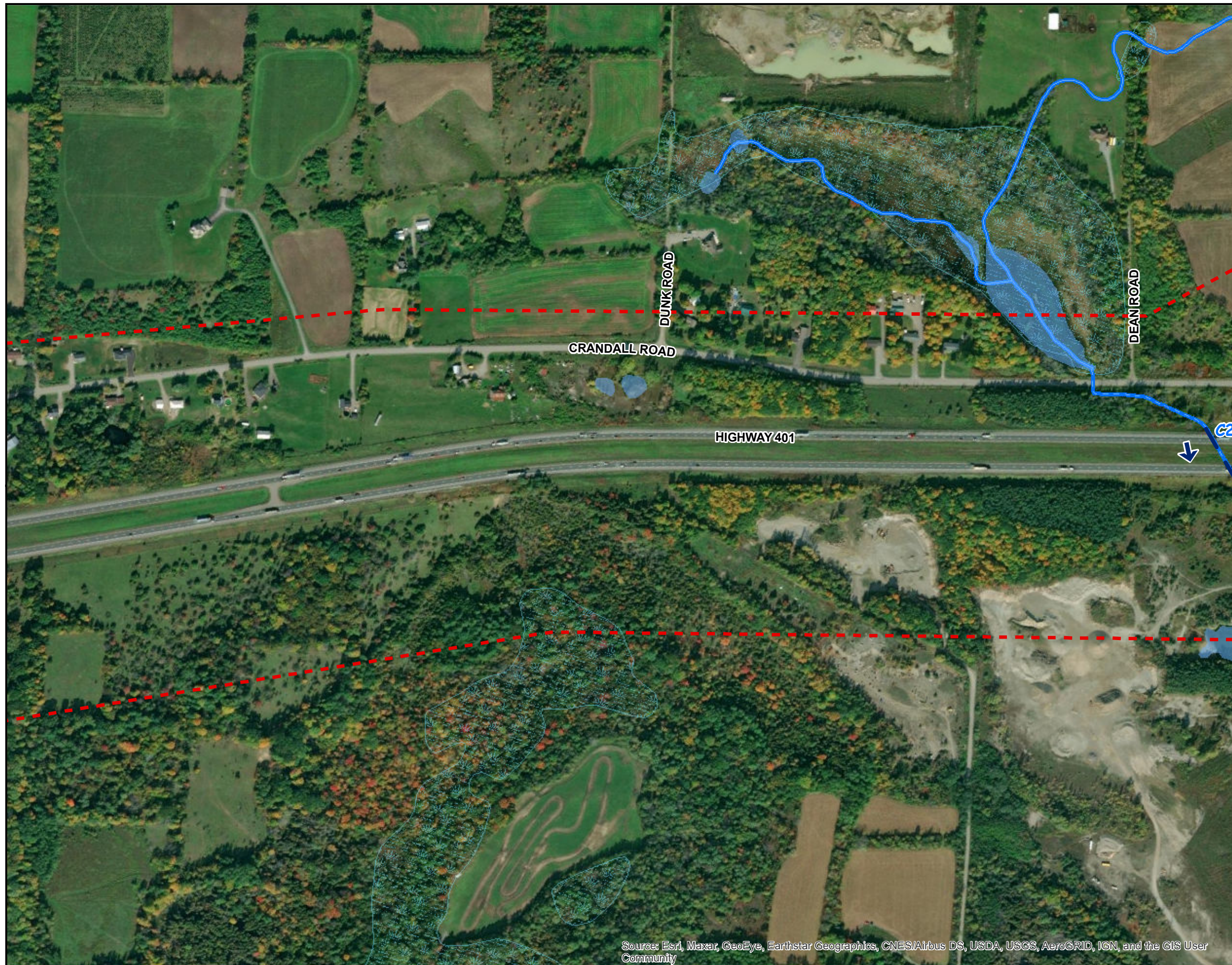
ISSUE:

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- - - Study Area
- Culvert
- ➔ Flow Direction
- Permanent Watercourse
- Coldwater Watercourse
- ▨ Unevaluated Wetland (LIO)



50 25 0 50 Metres

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: MARCH 2022
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DESIGNED BY:  
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FIGURE NO: PLATE 4	SCALE: 1:5,000
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TITLE:  
 WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:  
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ISSUE: -	REV.: -
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

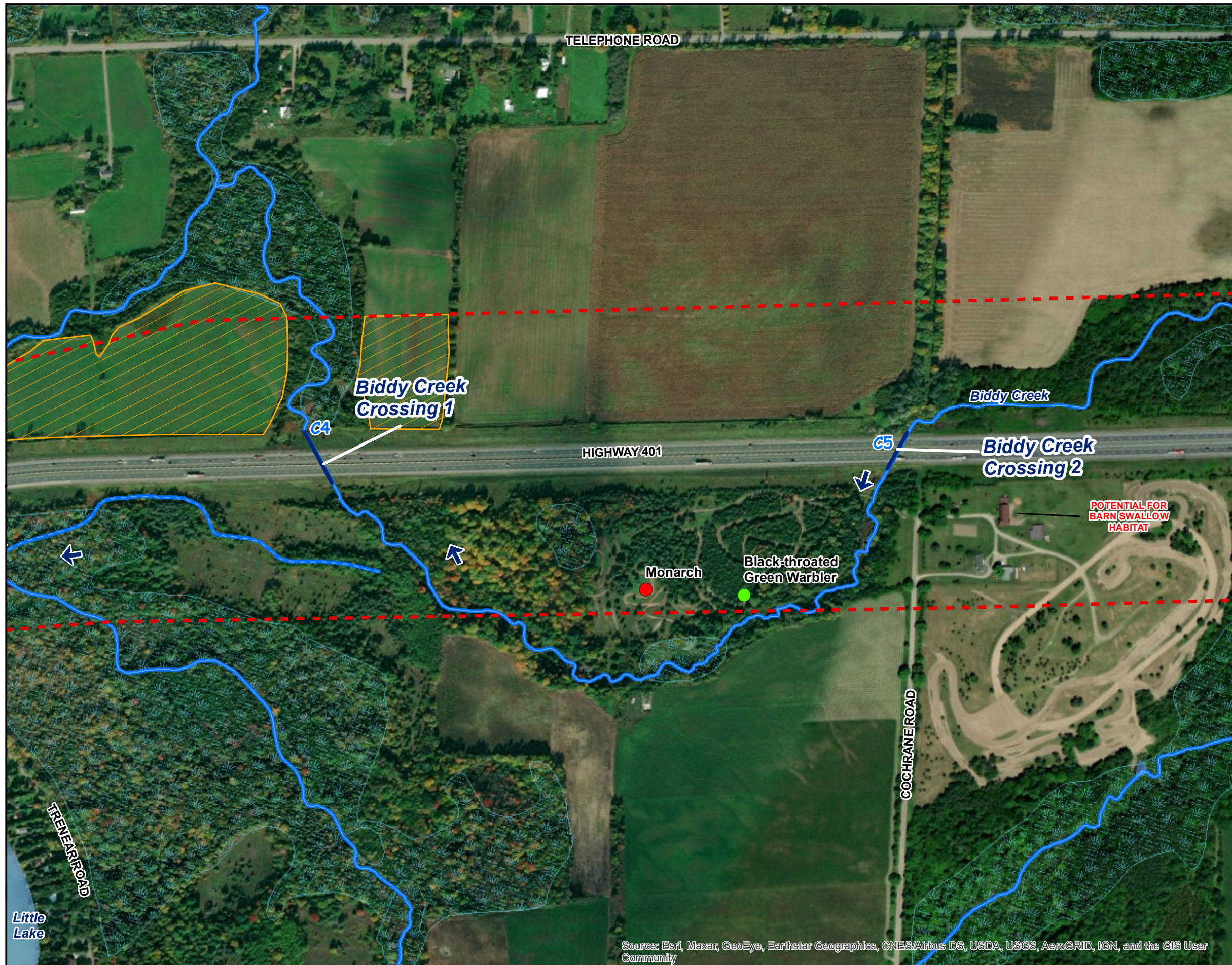
- - - Study Area
- Culvert
- ➔ Flow Direction
- Permanent Watercourse
- Coldwater Watercourse
- ▨ Unevaluated Wetland (LIO)
- Wildlife Mortality Location
- Observed Species at Risk (SAR)
- ▨ Eastern Meadowlark / Bobolink Habitat



50 25 0 50 Metres

CLIENT:	
ONTARIO MINISTRY OF TRANSPORTATION	
PROJECT:	
HIGHWAY 401 COLBORNE TO BRIGHTON	
PROJECT NO: 17M-01712-11	DATE: MARCH 2022
DESIGNED BY: -	
DRAWN BY: -	
CHECKED BY: -	
FIGURE NO: PLATE 5	SCALE: 1:5,000
TITLE:  WILDLIFE OBSERVATIONS AND HABITAT	
DISCIPLINE:  ENVIRONMENT	
ISSUE: -	REV.: -

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- - - Study Area
- Culvert
- Flow Direction
- Permanent Watercourse
- Coldwater Watercourse
- Unevaluated Wetland (LIO)
- Observed Species at Risk (SAR)
- Area Sensitive Bird Species
- Eastern Meadowlark / Bobolink Habitat

50 25 0 50 Metres



CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: MARCH 2022
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DESIGNED BY:  
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FIGURE NO: PLATE 6	SCALE: 1:5,000
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TITLE:  
 WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:  
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 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- Study Area
- Culvert
- ➔ Flow Direction
- Permanent Watercourse
- Coldwater Watercourse
- Evaluated Wetland (LIO)
- Unevaluated Wetland (LIO)
- Wildlife Mortality Location
- Area Sensitive Bird Species



50 25 0 50 Metres

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: MARCH 2022
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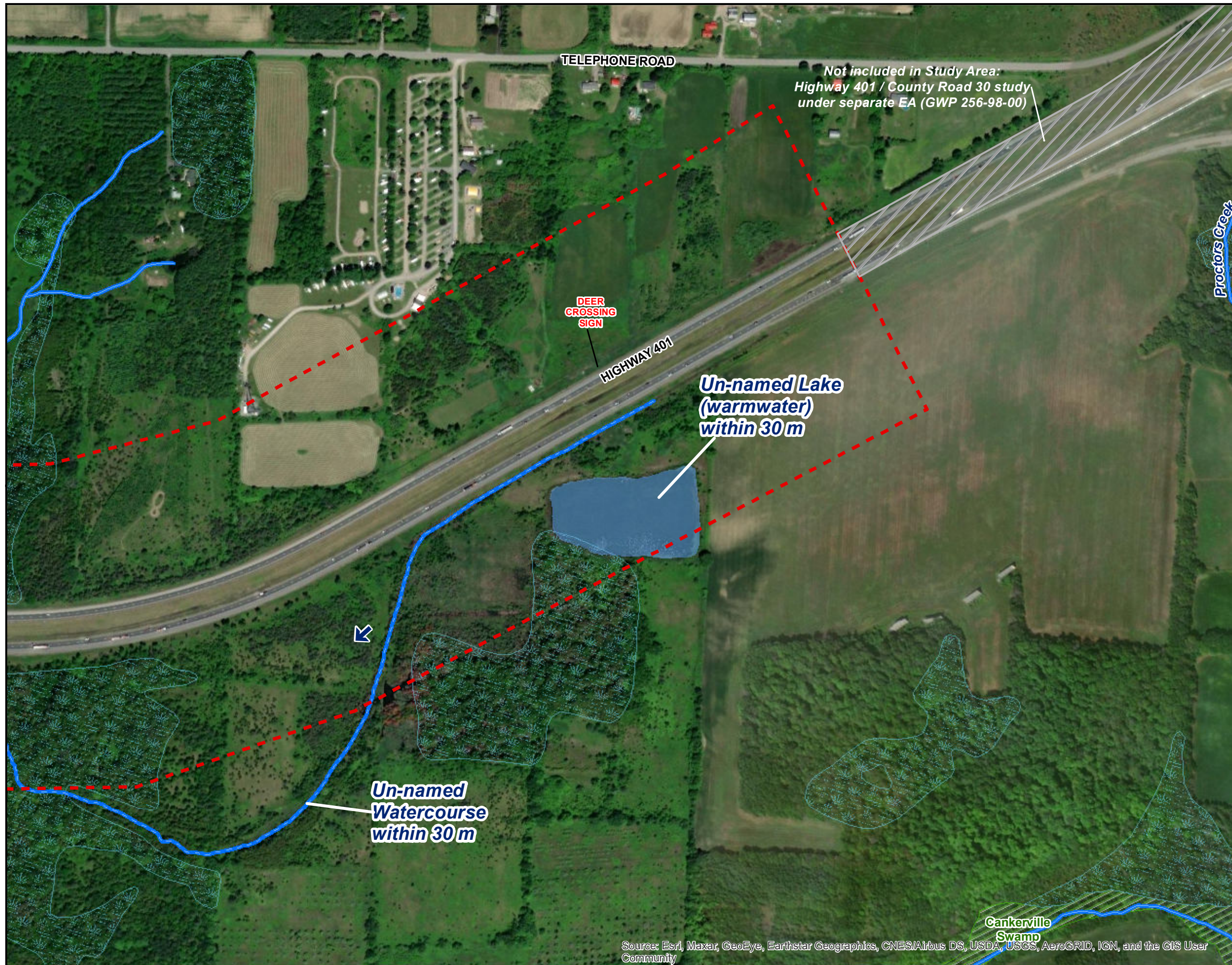
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TITLE:  
 WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:  
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- - - Study Area
- Flow Direction
- Permanent Watercourse
- Coldwater Watercourse
- ▨ Evaluated Wetland (LIO)
- ▨ Unevaluated Wetland (LIO)



50 25 0 50 Metres

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
 MARCH 2022

DESIGNED BY:

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FIGURE NO:  
 PLATE 8

SCALE:  
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TITLE:

WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:

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 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- - - Study Area
- Permanent Watercourse
- Coldwater Watercourse
- ▨ Unevaluated Wetland (LIO)
- Observed Species at Risk (SAR)
- ▨ Eastern Meadowlark / Bobolink Habitat



50 25 0 50 Metres

CLIENT:  
 ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:  
 HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO: 17M-01712-11	DATE: MARCH 2022
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DESIGNED BY:  
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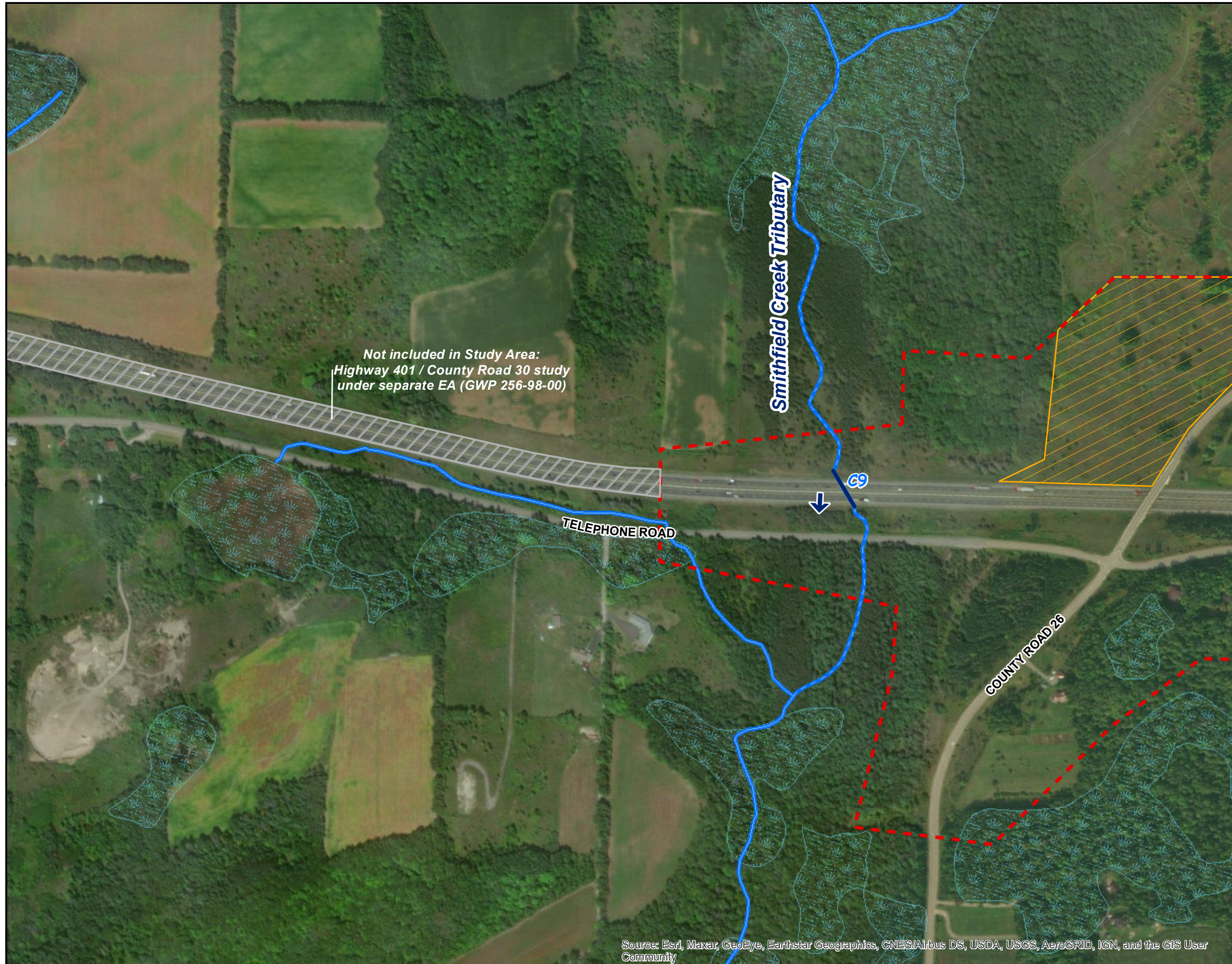
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TITLE:  
 WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:  
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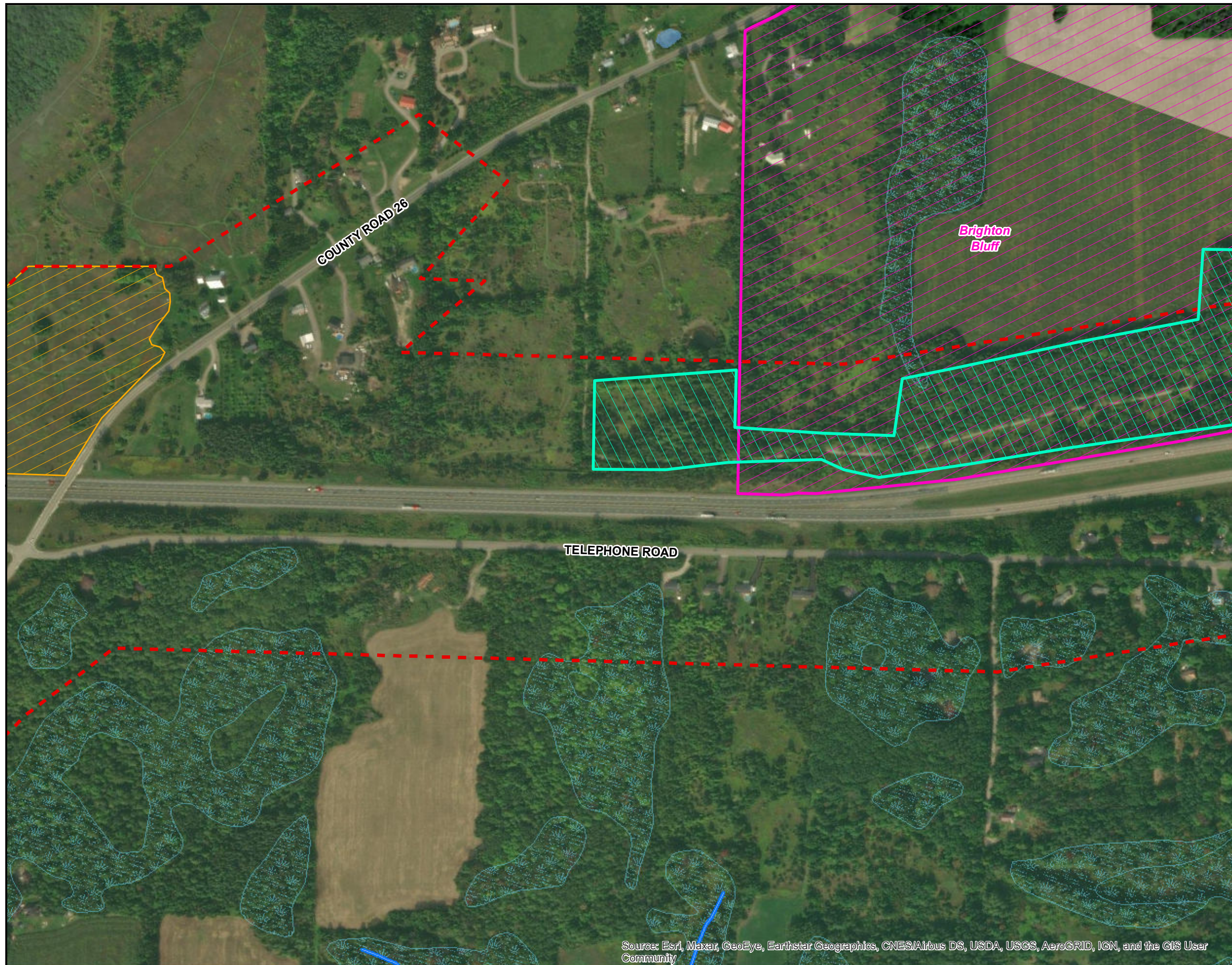
**Legend**

- - - Study Area
- Culvert
- ➔ Flow Direction
- Permanent Watercourse
- Coldwater Watercourse
- ⊞ Unevaluated Wetland (LIO)
- ⊞ Eastern Meadowlark / Bobolink Habitat

50 25 0 50 Metres



CLIENT:		ONTARIO MINISTRY OF TRANSPORTATION	
PROJECT:		HIGHWAY 401 COLBORNE TO BRIGHTON	
PROJECT NO:	DATE:		
17M-01712-11	MARCH 2022		
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DISCIPLINE:		ENVIRONMENT	
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**Legend**

- - - Study Area
- Brighton Provincial Wildlife Area
- Area of Natural and Scientific Interest (LIO)
- Permanent Watercourse
- Coldwater Watercourse
- Unevaluated Wetland (LIO)
- Eastern Meadowlark / Bobolink Habitat



50 25 0 50 Metres

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
 MARCH 2022

DESIGNED BY:  
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FIGURE NO:  
 PLATE 11

SCALE:  
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TITLE:

WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:

ENVIRONMENT

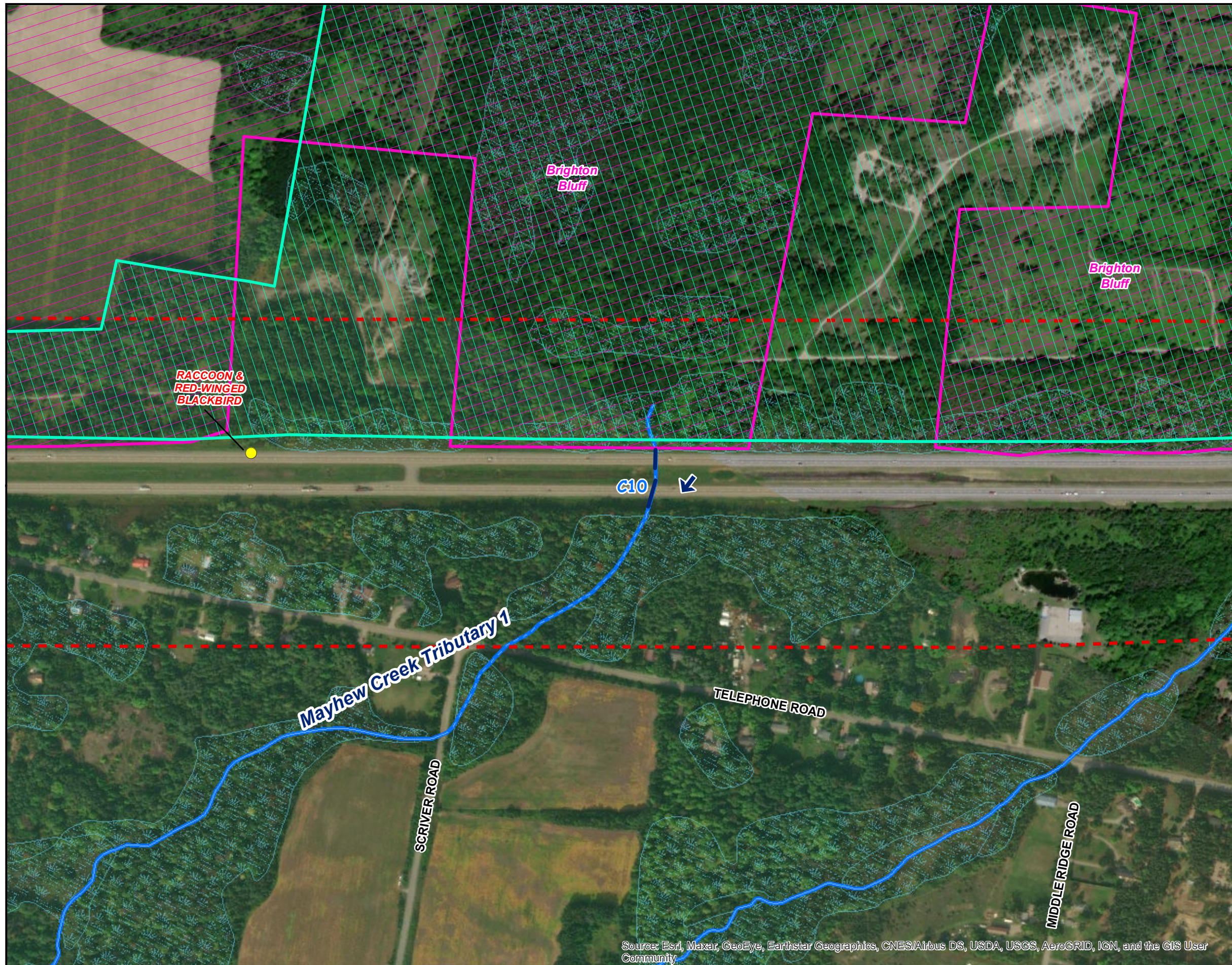
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 AURORA, ONTARIO CANADA L4G 0G9  
 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- Study Area
- Culvert
- Flow Direction
- Brighton Provincial Wildlife Area
- Area of Natural and Scientific Interest (LIO)
- Permanent Watercourse
- Coldwater Watercourse
- Unevaluated Wetland (LIO)
- Wildlife Mortality Location



50 25 0 50 Metres

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
 MARCH 2022

DESIGNED BY:

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FIGURE NO:  
 PLATE 12

SCALE:  
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TITLE:

WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:

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ISSUE:

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 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- Study Area
- Brighton Provincial Wildlife Area
- Area of Natural and Scientific Interest (LIO)
- Permanent Watercourse
- Coldwater Watercourse
- ▨ Unevaluated Wetland (LIO)
- Area Sensitive Bird Species



50 25 0 50 Metres

CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
 MARCH 2022

DESIGNED BY:

DRAWN BY:

CHECKED BY:

FIGURE NO:  
 PLATE 13

SCALE:  
 1:5,000

TITLE:

WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:

ENVIRONMENT

ISSUE:

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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 TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

**Legend**

- - - Study Area
- Culvert
- ➔ Flow Direction
- Brighton Provincial Wildlife Area
- Area of Natural and Scientific Interest (LIO)
- Permanent Watercourse
- Coldwater Watercourse
- Unevaluated Wetland (LIO)
- Observed Species at Risk (SAR)

50 25 0 50 Metres



CLIENT:

ONTARIO MINISTRY OF TRANSPORTATION

PROJECT:

HIGHWAY 401  
 COLBORNE TO BRIGHTON

PROJECT NO:  
 17M-01712-11

DATE:  
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FIGURE NO:  
 PLATE 14

SCALE:  
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TITLE:

WILDLIFE OBSERVATIONS AND HABITAT

DISCIPLINE:

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# APPENDIX

## G WILDLIFE MOVEMENT ASSESSMENT AND OPPORTUNITIES TECHNICAL MEMO



## MEMO

**TO:** Muhammad Waseem, PM and Amanda Dickson, EP, Ministry of Transportation

**FROM:** Jeff Warren, Senior Terrestrial Ecologist, WSP, Christine Vazz, EP, WSP

**SUBJECT:** Highway 401 Planning Study from Colborne to Brighton, Preliminary Design and Class Environmental Assessment Study – Wildlife Movement Existing Conditions and Opportunities – GWP 4054-17-00

**DATE:** June 2, 2022

### 1. BACKGROUND

The Ministry of Transportation Ontario (MTO) has retained WSP Canada Inc to complete the Planning, Preliminary Design and Environmental Assessment Study on Highway 401 for the replacement and rehabilitation of bridges and structural culverts, establishing the future Highway 401 footprint for an interim six lanes and ultimate right lanes to address current and future transportation needs, and commuter parking lot improvements from 0.8 km east of Percy Street to 0.4 km west of Christiani Road. As part of the terrestrial ecosystems scope of work the MTO has requested providing an assessment of wildlife movement and opportunity for crossing the highway. This memo provides a preliminary review of wildlife presence, movement and crossing opportunity based on field work observations and existing crossing structures.

### 2. GENERAL HIGHWAY CORRIDOR AND LANDSCAPE CONDITIONS

Highway 401 is a four-lane divided highway with 2 lanes in each of the eastbound and westbound directions. Approximately 10.1 km of the highway has a grassed median that is approximately 25 m in width.

The highway right-of-way (ROW) is cultural meadow vegetation (field herbs and grasses). Negligible tree and shrub cover occurs within the ROW.

Beyond the ROW, the surrounding landscape is a mosaic of natural features such as woodland and wetland, shrub thickets, plantations and agricultural lands interspersed with areas of private residential property. The agricultural lands include large meadow areas (naturalized, hay, pasture) and active crop fields. Meadow areas provide potential habitat for grassland birds including species at risk (SAR) eastern meadowlark (*Sturnella magna*) and bobolink (*Dolichonyx oryzivorus*). The topography is variable ranging from gently rolling to local areas of hills and steeper slopes with the latter occurring just beyond the ROW in some locations.

Greater areas of natural vegetation cover that include woodland, wetland and form an area of habitat connectivity across the landscape includes the following areas:

- South side of highway west of Lake Road
- South side of highway east of Little Lake

- In easterly project section; east of westerly project limit (includes Brighton Provincial Wildlife Area, Brighton Bluff ANSI, Mayhew Creek Significant Natural Area)

There are 12 watercourses that cross the highway (from fisheries survey). Of these, 4 cross the highway through a structural culvert. The remainder are smaller sized box culverts, csp and plastic pipes. A total of 35 non-structural culverts have been identified as part of the drainage study and of those there are 11 locations where there is both an EBL and WBL crossing that connects water flow at the same location. For the culverts for which there is available information, the majority are 900 mm diameter culverts. The type of culvert is not known at this time.

Culvert locations and general landscape and habitat conditions in the ROW and beyond are shown in the figures in Appendix A.

### 3. WILDLIFE DOCUMENTATION

For purposes of this assessment, wildlife refers to mammals, reptiles and amphibians; wildlife groups that travel on the ground and have habitat requirements and territories that may promote movement through the landscape including crossing Highway 401 in the study area.

Observations of wildlife and evidence of activity were made during three surveys:

- Fall fisheries survey: October 14-16, 2020
- Spring fisheries survey: May 11, 2021
- Terrestrial (vegetation/wildlife) survey – June 7-10, 2021

The terrestrial survey (vegetation/wildlife) was carried out mostly from the ROW edge as permission to enter had been granted for only a few properties. Therefore, documentation was limited to making observations of wildlife and their evidence from the ROW. Efforts were made to record the following information:

- Observations of wildlife concentration areas
- Evidence at structural culverts – terrestrial and fisheries investigations
- Roadkill observations – location/species

Locations of vehicle/wildlife collision data between 2012 and 2016 was plotted. The data is presented in figures in Appendix A.

The Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR) was contacted to obtain information on Deer Wintering Areas within and adjacent to the project limits. They reported that there are no known Deer Wintering Areas within or adjacent to the project.

The Brighton Provincial Wildlife Area at the east limit of the project area on the north side of Highway 401 is managed for wildlife and recreational use which includes hunting.

### 4. RESULTS

#### 4.1 Observations and Wildlife Concentration Areas

There were no observations of locations where wildlife was concentrated. There were limited observations/evidence of wildlife at culvert ends. Locations of observed wildlife presence at the





ROW are presented in the figures in Appendix A and presented briefly below. Photos of culverts are presented in Appendix B.

C3 – raccoon tracks in exposed substrate; deer pellets in vicinity of culvert on north side of highway; roadkill snapping turtle in WBL

C4 – beaver chewed trees on south side of highway

C6 – roadkill Midland painted turtle in EBL (large marsh on south side of highway)

C7 – deer bedding (single) to east (adjacent to small waterbody) on south side of highway

#### **4.2 Vehicle/Wildlife Collision Review**

There were a total of 34 vehicle/wildlife collisions recorded between 2012 and 2016. Data includes collisions within the area of the Highway 401/30 interchange (not part of this study) and locations immediately outside of the east limit of the east segment of the project limits in order to provide a greater amount of data for the larger landscape adjacent to the project area. The collision data is presented in Appendix C. The locations are shown on the figures in Appendix A. The locations are generally spread throughout the project limits with some notable areas where there is a greater concentration of collisions. The type of wildlife is not identified in the collision data however, since it is reported by the OPP, it can be assumed that they are larger animals (deer, coyote, fox) that would cause a traffic incident to be recorded.

The data shows the following results:

- 5 vehicle/wildlife collisions in area of Herley Road
- 6 vehicle/wildlife collisions west of Lake Road
- 6 vehicle/wildlife collisions in area of Highway 401/30 interchange (outside project limits)
- Cty. Road 26: 3 vehicle/wildlife collisions
- Brighton Provincial Wildlife Area: 11 vehicle/wildlife collisions with 2 collisions at 2 of the locations. It also includes 3 vehicle/wildlife collisions immediately to the east just beyond project limits. Seven (7) collisions occurred in the eastbound direction and 4 occurred in the westbound direction.
- Overall, 56% of collisions occurred with vehicles travelling eastbound and 44% of collisions occurred with vehicles travelling westbound

In summary, it would appear that wildlife crossing activity may be more prevalent in the area of the Brighton Provincial Wildlife Area at the east end of the project area. There are large areas of natural habitat on both sides of the highway that provide cover for wildlife that may attempt to cross the highway. A grass median in this area does not create an obstruction to crossing.

An area just west of Lake Road shows some concentrated wildlife activity. This area to the south of the highway is a large percentage of woodland cover with scattered patches of agricultural and disturbed land and residential land at the west end of Little Lake.

It is recognized that the vehicle/wildlife collision data equates to approximately 1 event per year for 3 of the 5 areas reviewed, less than 1 event for Cty. Rd 26 and approximately 2 per year for the

Brighton Provincial Wildlife Area. These are low frequency events and therefore do not appear to warrant providing mitigation.

## 5. WILDLIFE PASSAGE OPPORTUNITY

The following is a review of wildlife passage opportunities based on the above results of wildlife observations and vehicle/wildlife collision data and the availability of suitably sized culverts in the project limits that could support and enhance wildlife crossing opportunities.

### 5.1 Structural Culverts

There are 4 structural culverts in the project limits. They occur in close proximity to each other in the area of Little Lake; 3 are associated with the drainage system of Biddy Creek and one is a tributary to Little Lake.

The openness ratio (OR) is calculated for each of the culverts. Openness is an indicator of visible light seen within the crossing structure that is attractive to wildlife to cross through the structure. Openness ratio's have been developed for different wildlife groups to identify whether a crossing structure would be supportive for wildlife to use. The OR targets for wildlife groups used in this assessment is based on guidelines developed by Halton Conservation (2018).

The OR for each of the structural culverts is as follows:

C3 – 0.26

C4 – 0.32

C5 – 0.26

C6 – 0.19

The OR's are similar as the culvert sizes are the same with the exception of a difference in the culvert length. Another factor that has contributed to a different OR is that some of the culverts have a greater depth of sediment accumulation and for those cases the height of the culvert that can provide light is reduced.

Based on the guidelines, the range of OR would support use by turtles which have a target OR of equal to/greater than 0.25. The exception is C6 which is less than the target. These culverts are wet and therefore it is appropriate that conditions would be suitable for supporting opportunities for turtles to use them.

The culverts are too small to be used by large mammals such as deer. They require a minimum height and width of equal to/greater than 3 m, an OR of 0.6 – 1 and should be dry culverts. They are also just below the target OR of equal to/greater than 0.4 to support mid-sized mammals and the culvert would also need to be dry.

These culverts are being investigated to identify whether they are currently sized to pass the design storm flow and whether they would need to be increased in size to provide flow capacity for the highway expansion. As part of this investigation a fluvial geomorphological assessment is being undertaken to identify if channel modifications are required should a larger culvert be required.

As described above, the culvert provides passage opportunity for turtles. Should the culvert be enlarged and the channel modified there may be an opportunity to include a seasonally dry bench or elevated passage way attached to the culvert side to permit medium sized wildlife to pass.

## **5.2 Drainage Culverts**

The OR was calculated for the largest non-structural culvert crossing. The crossing is identified as C1 and has an EBL and WBL culvert with a grassed median between. The culvert is a concrete box with a height and width of 1.52 m. The OR for each culvert was calculated as 0.09. This size culvert would support small mammals (mice, voles), but is not large enough to support larger wildlife such as white-tailed deer. From fisheries surveys in both fall 2020 and spring 2021, the culvert was dry. Small mammals of this size are often overlooked in wildlife habitat designs, particularly since they do not pose a threat to driver safety. However, such a culvert would provide an opportunity to permit safe passage across the highway corridor.

## **5.3 Opportunity for New Wildlife Culverts**

The highway profile was examined to identify locations where there was suitable height of roadway above the surrounding land at the ROW that would permit construction of larger dry culverts that would allow passage by larger animals (white-tailed deer) and would also support passage by smaller sized animals. The criteria for identifying suitable conditions would be a minimum height of 3 m plus a fill height clearance of 0.6 to 1 m. Potential locations identified were then compared to the wildlife collision data and adjacent landscape conditions to identify where crossing locations would be appropriate.

Due to the topography at, adjacent to, the ROW there were very few locations that would provide sufficient depth below the highway surface to locate a culvert specific for wildlife passage. At one potential location that was examined further there were no records of vehicle/wildlife collisions nearby and a dedicated dry wildlife culvert would conflict with an existing structural culvert that is being replaced.

In summary, there is no suitable opportunity to provide a dedicated wildlife culvert.