Appendix B
Natural Environment Reports

City of Barrie
Schedule C Municipal Class Environmental Assessment
Phase 3 and 4

Natural Heritage Impact Assessment Report
Bryne Drive

Date	Rev.	Status	Prepared By	Checked By	Approved By	Client
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October 5, 2017	B	FINAL	Melissa Torchia Hatch	Melissa Alexander Hatch	Terry Kelly Hatch	Alvaro Almuina City of Barrie
Signatures						

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1. Introduction

The City of Barrie (City) retained Hatch Corporation (Hatch) to carry out a Class Environmental Assessment (EA) for the Transportation Improvements to Bryne Drive, include extending Bryne Drive north approximately 2270 metres to connect Bryne Drive from north of Caplan Avenue to Essa Road (refer to Figure 1). This Class EA was completed in accordance with the requirements for a Schedule 'C' Project as described in the Municipal Engineers Association's (MEA) "Municipal Class Environmental Assessment" (Municipal Class EA) document (October 2000, as amended in 2007, 2011 and 2015). An Environmental Study Report (ESR) has been prepared to document Phases 3 and 4 of the Class EA process. Phases 1 and 2 were previously completed as part of a Multi-Modal Active Transportation Master Plan (MMATMP), further discussed below.

Bryne Drive is a north-south major collector under the jurisdiction of the City. It is currently a five-lane roadway that originates south of Mapleview Drive (at Commerce Park Drive) and travels north of Caplan Avenue where it terminates at a cul-de-sac. As part of the Class EA, Hatch undertook a Natural Heritage Impact Assessment (NHIA) to characterize the terrestrial and aquatic environmental features to support the Class EA, as documented within this Report. To carry out the NHIA, a 50 metre buffer has been applied to Bryne Drive due to the characteristics of the Project Study Area involving a greenfield alignment (hereafter referred to as the Project Study Area). Figure 1 shows both the Project Study Area and the Study Limits for this Project.

1.1 Background

In 2014, a series of six (6) Master Plans were prepared for the City in accordance with the Municipal Class EA process. As noted, a MMATMP was prepared to address Phases 1 and 2 of the Class EA process.

The MMATMP, completed in 2014, identified various projects to address growth in the City, including the required transportation networks to meet the existing and future population demands of the City to the year 2031 and beyond. The MMATMP reviewed other planned transportation projects that will influence the City's transportation network including improvements to Highway 400; improvements to Simcoe County's road network and the provision of increased service for GO Transit.

Within the MMATMP the recommendations for Bryne Drive include the following as it pertains to the Project Study Area:

- Widen to four (4) lanes, including a two-way left turning lane (TWLTL) or continuous median;
- Provision of bike lanes and sidewalks; and
- Provision of a 34 metre right-of-way (ROW).

It is important to note that the intersection of Harvie Road with Bryne Drive was previously determined through the Bryne Drive Master Plan Update (BDMPU) completed in 2016, as well as part of the Harvie Road/Big Bay Point Drive/Highway 400 EA and Detailed Design. From Caplan Avenue north to Harvie Road, the alignment alternatives cannot be shifted to the west given the location of the proposed future Stormwater Pond A. The alignments cannot also be shifted to the east given the location of the future Bryne Drive/Harvie Road intersection. As such, alternative alignments were only considered north of Harvie Road, with the basis of the recommendation from the BDMPU (2016) used as a starting point (i.e., the centre-line alternative). Alternative alignments for the north section of Bryne Drive, north from Harvie Road towards the cul-de-sac approximately 650 metres south of Essa were based on the recommended 3R alignment from the BDMPU (2016) which identified that the alternative alignments consider shifts to the west and east of the identified future centre-line.

1.2 Project Location, Study Limits and Scope of Work

The Project is located within the City, a single-tier municipality situated within the County of Simcoe. As shown in Figure 1, the proposed Bryne Drive Transportation Improvements aim to connect Bryne Drive north of Caplan Avenue approximately 2270 metres to Essa Road. As part of this NHIA, the following scope of work was undertaken:

- Conduct a literature review of background information (e.g., key natural heritage features);
- Consult with the Ontario Ministry of Natural Resources and Forestry (MNRF) and the Lake Simcoe Region Conservation Authority (LSRCA) to collect baseline information;
- Conduct field investigations to collect data on natural features not limited to the following:
    - Terrestrial inventory in accordance with the Ecological Land Classification (ELC) system, including targeted surveys for vegetative species-at-risk (SAR) such as Butternut (*Juglans cinerea*);
    - Three (3) breeding bird surveys based on the Ontario Breeding Bird Atlas (OBBA) Protocol (2001) to incorporate breeding birds and targeted SAR bird species;
    - Fish and Fish habitat site reconnaissance to document water features and any fish observations;
    - Three (3) Eastern Whip-poor Will surveys according to MNRF protocol (2013);
    - Two (2) amphibian surveys according to the Marsh Monitoring Program (MMP) Protocol (2008);
    - Incidental observations of other wildlife, including reptiles and mammals; and
    - An assessment of SAR bats, which was carried out by LGL Limited (2017);

- Prepare a report which outlines the above noted information to be included as part of the ESR which documents:
    - Any consultation and the results of the consultation;
    - Background information collected during the literature review (as required);
    - Existing conditions based on the 2017 field investigations;
    - Assessment of the impacts associated with the alternative design concepts; and
    - Recommendations of best management practices (BMPs) and other impact avoidance or mitigation measures that can be used to prevent or minimize the predicted negative effect(s) of the proposed Transportation Improvements.

It is noted that all field investigations were completed from within the proposed Bryne Drive alignment as identified within the BDMPU (2016), and included an assessment of the area extending approximately 50 metres from the proposed centre-line alignment. As such, natural features were observed within the 50 metre swath and have been supplemented where required using background desktop information as noted within this Report.

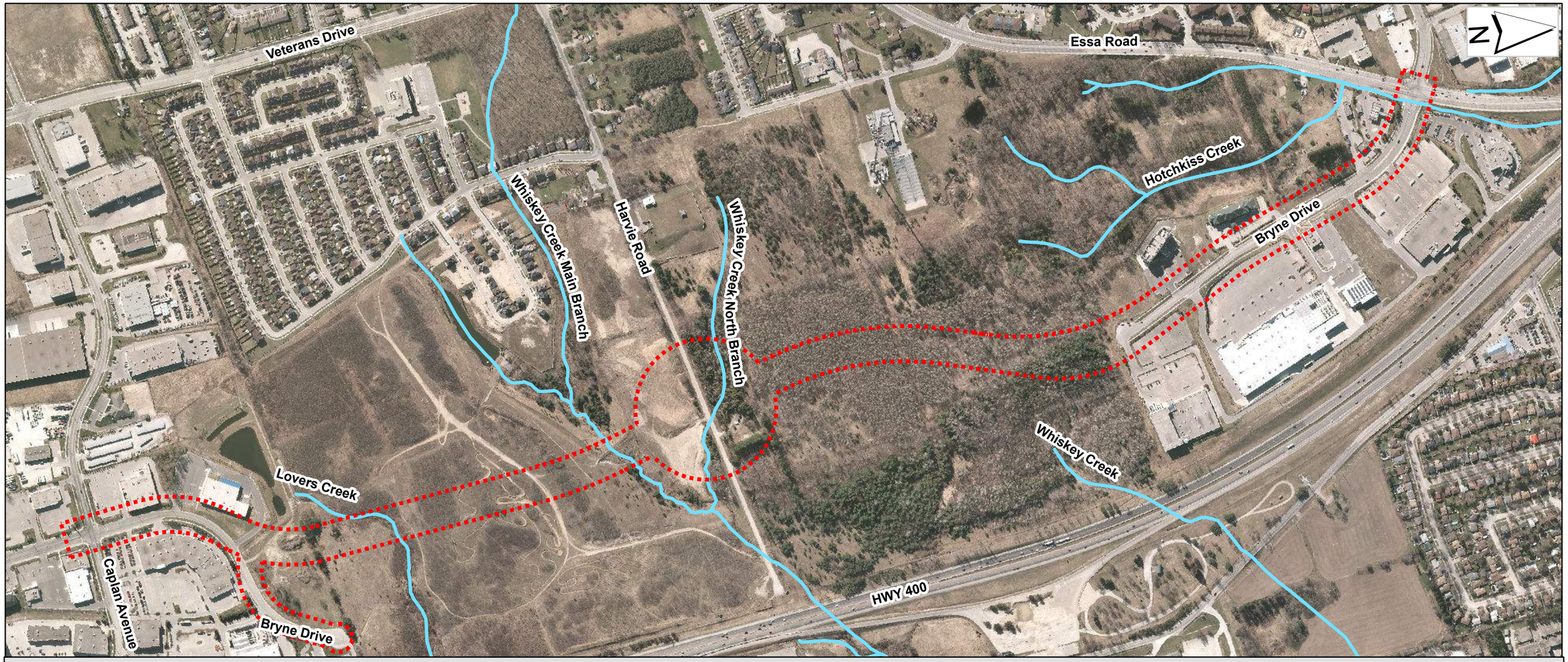
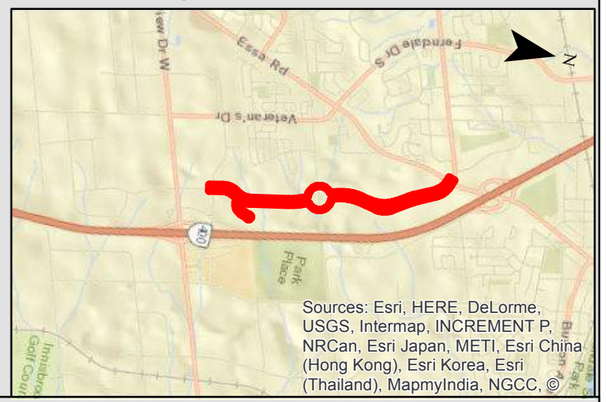


Figure 1 Bryne Drive Transportation Improvements Class Environmental Assessment: Project Study Area and Study Limits

Bryne Drive Study Area

Watercourse



*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 80 160 320 480 640 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

2. Regulatory and Policy Context

This section of the Report summarizes the various federal, provincial and municipal planning policies and regulations related to natural heritage that apply to the proposed Transportation Improvements. Thus, they provide the policy context for this NHIA.

2.1 Federal Legislative Requirements

2.1.1 Federal Fisheries Act

The Federal *Fisheries Act* was established in 1985 with amendments that came into effect on November 25, 2013. This Act provides protection to fish and fish habitat such that:

> "*No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational, or Aboriginal fishery, or to fish that support such a fishery*" (Section 35 (1)).

Fish habitat is defined by the Act as "*spawning grounds, and any other areas, including nursery, rearing food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes*".

The *Fisheries Act* requires that any development project avoid causing serious harm to fish unless authorized by Fisheries and Oceans Canada (DFO). This applies to any works being undertaken in or near waterbodies that support fish that are part of, or that support a commercial, recreational, or Aboriginal fishery. If mitigation measures cannot be applied, and residual effects will cause serious harm to fish then a Request for Review to DFO must be submitted. If DFO identifies that authorization (i.e., approval) for the Project is needed, offsetting measures may be required.

Applicability to the Project

Any waterbody or watercourse that contains fish or contributes to a commercial, recreational or Aboriginal fishery as described in the *Fisheries Act*, is provided protection under the Act. The watercourses within the Project Study Area – Whiskey Creek (Main and North Branch) and Lovers Creek, are known to contain fish, and as such the Project must comply with the *Fisheries Act* and consultation with DFO may be required as the project progresses into detailed design. Hotchkiss Creek is also within the Project Study Area, however, the section of the Creek has been realigned and is presumed to be underground based upon the field investigations completed in 2017. As such, impacts (if any) to the section of Hotchkiss Creek within the Project Study Area, will further be identified during detailed design.

A self-assessment according to DFO will be required during detailed design to determine whether the proposed Transportation Improvements will involve serious harm to fish. If it determined that serious harm will occur, or uncertainty exists, a Request for Review will need

to be submitted to DFO in addition to further consultation. After which, DFO will determine whether authorization (i.e., approval) pursuant to the *Fisheries Act* is required.

2.1.2 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) was passed in 1917 and updated in 1994. The MBCA protects migratory bird populations by regulating potentially harmful anthropogenic activities. The MBCA (1994) and the *Migratory Bird Regulations* (MBR) are federal legislative requirements that are binding on members of the public and all levels of government, including federal and provincial governments.

Bird species[1], protected are listed under Article I of the MBCA, and are native or naturally occurring in Canada, and are species that are known to occur regularly in Canada. The legislation protects certain species, controls the harvest of others, and prohibits commercial sale of all species. As described in Section 6 of the associated MBR:

"Subject to subsection 5(9), no person shall:

- *Disturb, destroy or take a nest, egg, nest shelter, Eider Duck shelter or duck box of a migratory bird, or*
- *Have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird except under authority of a permit therefor."*

The "incidental take" of migratory birds and the disturbance, destruction or taking of the nest of a migratory bird is prohibited. "Incidental take" is the killing or harming of migratory birds due to actions, such as economic development, which are not primarily focused on taking migratory birds. No permit can be issued for the incidental take of migratory birds or their nest or eggs as a result of economic activities. These prohibitions apply throughout the year.

Environment and Climate Change Canada (ECCC) and the Canadian Wildlife Service have compiled nesting calendars that show the variation in nesting intensity by habitat type and nesting zone, within broad geographical areas distributed across Canada. While this does not mean nesting birds will not nest outside of these periods, the calendars can be used to greatly reduce the risk of encountering a nest. It is noted that ECCC advises that avoidance is the best approach.

Applicability to the Project

The MBCA applies to all of Canada. As such, the MBCA is applicable to the entire Project Study Area. Therefore, if a species or their nest, that are listed under the MBCA are

[1] Bird species not regulated under the Act include: Rock Dove, American Crow, Brown-headed Cowbird, Common Grackle, House Sparrow, Red-winged Blackbird, and European Starling. In addition, raptors are not regulated under the MBCA, 1994. However, they are protected under provincial legislation which restricts and regulates the taking or possession of eggs and nests. Furthermore, if the species identified is protected under Ontario's *Endangered Species Act*, 2007 or the federal *Species at Risk Act*, additional restrictions may apply.

encountered during Project works, they must comply with the Act. As vegetation removal is part of future Project works, it is recommended that it occur outside of the core breeding time-period identified by the MBCA which takes place from April 1 to August 31 in any given year. It is important to note, despite the core breeding time, those species and their nests are still protected by the MBCA 365 days a year.

2.2 Provincial Legislative Requirements

2.2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) is the complimentary policy document to the *Planning Act*. The PPS was issued under section 3 of the *Planning Act* and came into effect April 30, 2014, replacing the PPS issued March 1, 2005. The PPS provides direction on matters of provincial interest related to land use planning and development, and promotes the provincial "policy-led" planning system that recognizes and addresses the complex interrelationship among environmental, economic and social factors in land use planning (MMAH, 2014).

The PPS provides for enhanced protection of the environment by identifying the significance of the natural heritage system and water resources, including natural hazards and water quality, air quality and energy use. It also supports the provincial goal to enhance the quality of life for all Ontarians.

The policies of the PPS may be complemented by provincial plans or by locally-generated policies regarding matters of municipal interest. Provincial plans and municipal official plans provide a framework for comprehensive, integrated, place-based and long-term planning that supports and integrates the principles of strong communities, a clean and healthy environment and economic growth for the long term.

The PPS (2014) identifies the natural heritage features and areas which are to be afforded protection within the Province of Ontario. The proposed road work must recognize these features/areas, and the City must carry out the necessary investigations so as to adhere to these regulatory requirements. For the purpose of this NHIA, it is that the term 'development' is defined within the PPS (2014) as the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the *Planning Act*, but does not include "activities that create or maintain infrastructure authorized under an EA process" (MMAH, 2014).

The PPS (2014) defines seven (7) natural heritage features and provides planning policies for each under Natural Heritage Policy 2.1. The Natural Heritage Reference Manual (MNRF, 2010) is a technical document used to help assess the natural heritage features listed below, in addition to the Province's Significant Wildlife Habitat Ecoregion Criteria Schedules for each respective Ecoregion (i.e., 5E, 6E and 7E) (MNRF, 2015). Those natural heritage features identified within the PPS (2014) include:

- Significant wetlands;
- Significant habitat of endangered and threatened species;
- Fish habitat;
- Significant woodlands;
- Significant valleylands;
- Significant areas of natural and scientific interest (ANSIs); and
- Significant wildlife habitat.

Each of these features is afforded varying levels of protection subject to guidelines, and in some cases, regulations. Significant woodlands and valleylands and even wetlands can be designated by municipalities and/or the MNRF (e.g., under the Ontario Wetland Evaluation System). Fish habitat information can be identified by Conservation Authorities, the MNRF and DFO, however the management of fish habitat is governed by DFO. Significant wildlife habitat, habitat of endangered and threatened species, and ANSIs are designated by MNRF.

Applicability to the Project

Municipalities use the PPS to develop their Official Plans. Based on a review of available information within the PPS, the Project Study Area is situated within Ecoregion 6E, the Lake Simcoe-Rideau Region (termed Site Region 6E as per the ELC for Southern Ontario: First Approximation and Its Application Manual (Lee et al., 1998)). Based on a review of available mapping from the MNRF Make a Natural Heritage Mapping Tool (2017) and LSRCA, there are no Provincially Significant Wetlands (PSWs), unevaluated wetlands, significant valleylands or ANSIs within the Project Study Area. Woodlands are present north and south of Harvie Road, and fish habitat is present within Whiskey Creek (Main and North Branch) and Lovers Creek as confirmed by LSRCA. Fish habitat is also known to Hotchkiss Creek, however, as previously noted, the section of Hotchkiss Creek within the Project Study Area is presumed to be underground as there were no visible signs of the channel during the 2017 field investigations.

2.2.2 Ontario Endangered Species Act

The Ontario *Endangered Species Act, 2007* (ESA) was passed into law in 2007 and came into effect on June 30, 2008. Under the ESA, there are more than 200 species in Ontario that are identified as extirpated, endangered, threatened, or of special concern. Section 9 of the ESA generally prohibits the killing or harming of a threatened or endangered species, as well as the destruction of its habitat. Section 10 of the ESA prohibits the damage or destruction of the habitat of all endangered and threatened species. Habitat is broadly characterized within the ESA as the area prescribed by a regulation as the habitat of the species or an area on which the species depends directly or indirectly, to carry on its life processes, including reproduction, rearing of young, hibernation, migration or feeding.

Applicability to the Project

The MNRF Midhurst District Office provided a list of SAR that are known to inhabit the Project Study Area. Based upon consultation and review of habitat criteria, a series of targeted surveys were required for the Project Study Area. A record of correspondence with the MNRF, and the SAR listing is provided in Appendix A of this Report. If threatened and/or endangered species are encountered during the 2017 field investigations, the Project may be subject to a permit under the *Endangered Species Act,* 2007 (ESA) and/or its regulatory exemptions under the Act.

2.3 Municipal Policies

The Project Study Area located within the City, which is a single-tier municipality that is administratively separate from the County of Simcoe. As such, the City is responsible for regulating land use and establishing policies for physical, economic and social development within its respective jurisdiction. However, this responsibility is conducted within a provincial framework.

2.3.1 City of Barrie

The City adopted a new Official Plan (2010) on June 22, 2009, bringing it into conformity with the Growth Plan for the Greater Golden Horseshoe (Ministry of Public Infrastructure Renewal (MPIR), 2006), and addressing new challenges in the City's future growth. The City's Official Plan was approved by the MMAH on April 23, 2010. Several amendments were approved since 2010, and the Plan was consolidated in February 2014, and again in January 2017.

The policies that pertain to natural heritage features are contained mainly in Section 3.5 (Natural Heritage, Natural Hazards and Resources) and Section 4.7 of the Official Plan (Environmental Protection Areas (EPA)). As noted in Section 4.7, Environmental Protection Areas are defined as:

- Aquifer recharges and headwaters;
- Wetlands;
- Rare species including unique plants;
- Important ecological functions;
- Significant habitat of threatened and endangered species;
- ANSIs including both life science and earth science;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;

- Surface water features, valley and stream corridors; and
- Fish habitat.

It is noted that no buildings or structures are permitted in the EPAs other than those necessary for flood and erosion control or for conservation purposes as approved by the City with approval from applicable agencies. Additional policies and permissions as they relate to certain features (e.g., wetlands, habitat of threatened and endangered species) are identified within their respective sections of the City's Official Plan (2017).

Applicability to the Project

Within Schedule D (Road Plan) of the City's Official Plan, the existing sections of Bryne Drive (north and south) are classified as "Major Collector" within the Study Limits, and those where the connection between the two (2) sections is classified as "Future Collector". Review of Schedule B (Planning Areas) of the City's Official Plan (2017) indicates that Bryne Drive will be part of the Highway 400 West Industrial Planning Area.

According to Schedules F (Conservation Authority Regulation Limits and Watercourses) and H (Natural Heritage Resources) of the City's Official Plan the following has been identified for the Project Study Area:

- Watercourses: Lovers Creek and Whiskey Creek (Main and North Branch) traverse the Project Study Area generally within a west to east direction. It is noted that during the field investigation completed on May 10, 2017, there was no visible signs of Hotchkiss Creek at the northern limit of Project Study Area. Even though Hotchkiss Creek was not observed, all watercourses and tributaries are afforded a 30 metre setback;
- Floodplains associated with Whiskey Creek (Main and North Branch), Lovers Creek and Hotchkiss Creek are regulated by the LSRCA;
- Level 1 and 3 resources have been mapped within the Project Study Area (as per Schedule H of the City's Official Plan (2017)). As per Section 3.5.2.4 of the City's Official Plan (2017) Level 1 resources[2] represent critical components of the City's Natural Heritage Resource network. Level 3 resources represent significant and supporting components of the Natural Heritage Resource network. Based on Schedule H of the City's Official Plan (2017) the following features can be identified as Level 1 or Level 3 resources, and are further illustrated on Figures 2a and 2b:
    - Level 1 can include:

[2] As noted within 3.5.2.4 of the City's Official Plan (2017), no development shall be permitted within these areas. An EIS (Environmental Impact Study) is required for any development or site alteration within 120 metres of an area identified as Level 1 or Level 2 on Schedule H. For those identified as Level 3, an EIS is required for any development and site alteration in or within 30 metres.

- PSWs;
- Non-provincially significant wetlands greater than 0.5 hectares;
- Significant woodlands greater than 10 hectares;
- Significant habitat of endangered and threatened species;
- Watercourses with minimum vegetation protection zones and connectivity linkages; and
- Lands identified as EPAs.

- Level 3 can include:
  - Regionally significant life science ANSIs;
  - Woodlands greater than 0.5 hectares but less than 4 hectares;
  - Woodlands that are within 30 metres of Level 1 and 2 features;
  - Cultural thicket or meadow that are contiguous with woodland or wetland patches; and
- Connectivity linkages.

The City's Urban Forestry Department maps regulated woodlands which are subject to the City's Tree Preservation By-law 2014-1150. As defined in the Tree Preservation By-law 2014-1150, private property tree removals, when the tree is part of a woodlot (i.e., woodlands) are regulated to provide for protection in terms of injury or destruction of trees where the woodlot (i.e., woodland) is of ½ acre in size or larger. Based on review of the City's – Discover Barrie Mapping Tool, the woodland north of Harvie Road along the Bryne Drive alignment and those to the south, between Caplan and Harvie are regulated (refer to Figures 2a and 2b). As such, further consultation with the City's Urban Forestry Department will be required during detailed design to determine requirements pursuant to the Tree Preservation By-law 2014-1150.

Trees within or adjacent to Municipal Road ROW's are provided protection either through the Public Tree By-law (2014-116) or the ROW Activity By-law (2005-256). According to the By-law, trees requiring removal on public property as part of a City project, are exempt from the permitting process.

2.4 Lake Simcoe Region Conservation Authority

The LSRCA regulates watercourses, wetlands, and hazard lands (valleylands, shorelines, floodplains) through application of Ontario Regulation 179/06, under Section 28 of the *Conservation Authorities Act*. Ontario Regulation 179/06 applies to hazardous lands that are defined in Section 28(25) of the *Conservation Authorities Act* as lands that could be unsafe for development because of naturally occurring processes associated with flooding, erosion,

dynamic beaches or unstable soil or bedrock. The regulation limit for Ontario Regulation 179/06 is the applicable hazard limits for a property.

The main purpose of Ontario Regulation 179/06 is to ensure public health and safety, and protection of life and property in relation to natural hazards. This regulation establishes guidelines for development, interference with wetlands and alterations to shorelines and watercourses.

Applicability to the Project

Based on review of the LSRCA's Interactive Mapping Tool (accessed August 1, 2017), sections associated with the Whiskey Creek Main Branch and North Branch crossings are mapped within the Authority's regulated area, as well as sections of Hotchkiss Creek (underground) and Lovers Creek (refer to Figure 2b). As such, a permit under Ontario Regulation 179/06 will be required prior to commencement of Project works.

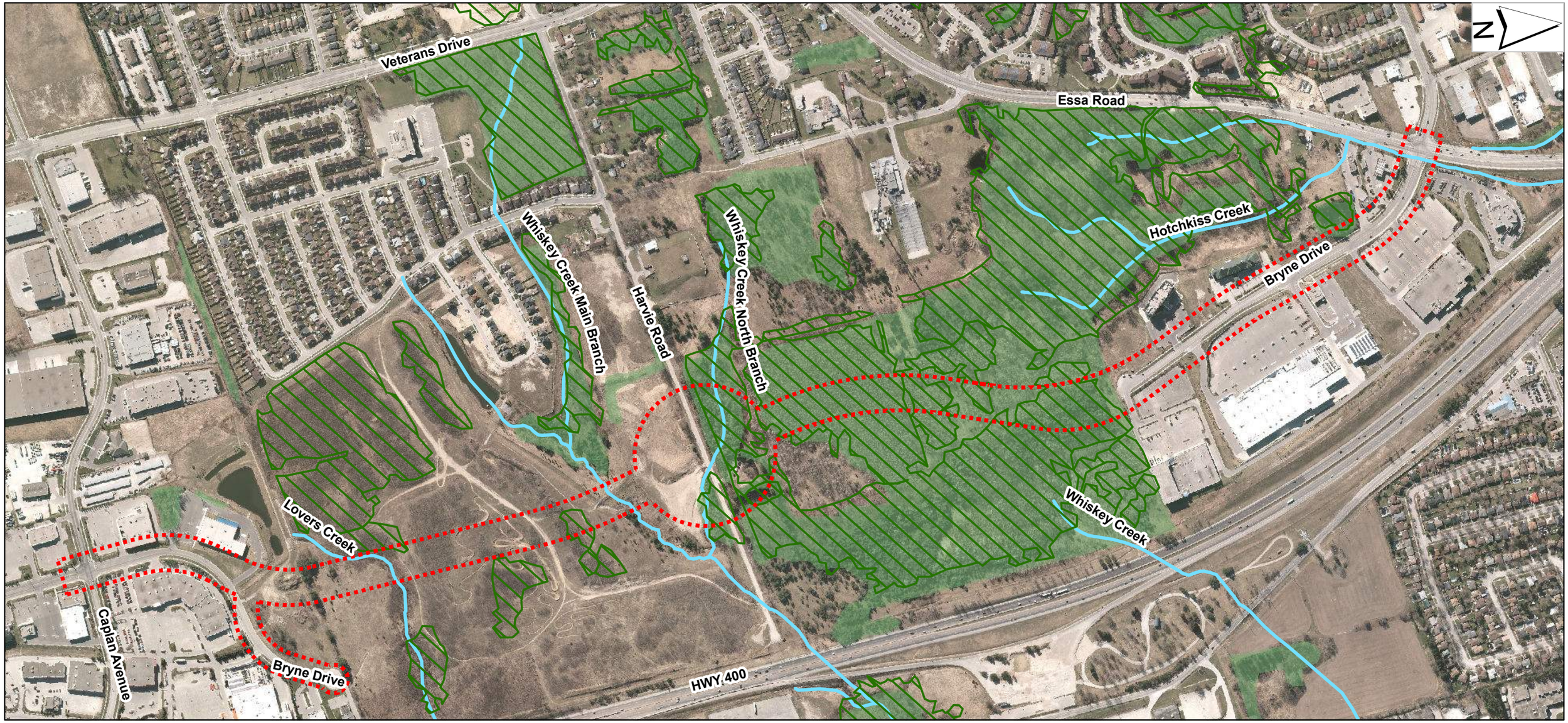


Figure 2a Bryne Drive Transportation Improvements Class Environmental Assessment: Natural Areas

Bryne Drive Study Area

Regulated Woodlot (City of Barrie, 2017)

Wooded Area (County Of Simcoe, 2016)

Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 80 160 320 480 640 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

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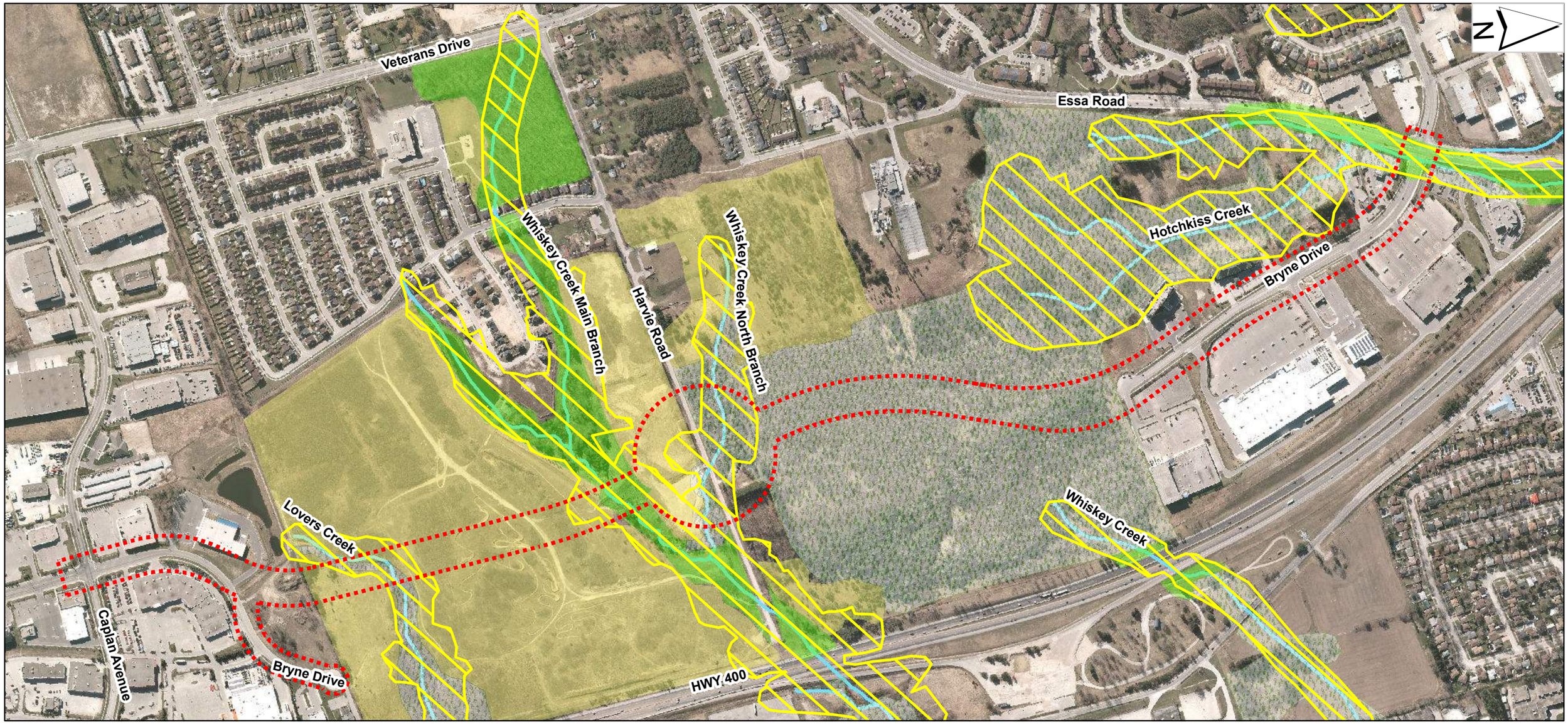

Figure 2b Bryne Drive Transportation Improvements Class Environmental Assessment: Natural Areas

- Bryne Drive Study Area
- Level 1 Natural Heritage Resource With Existing Development Designation (City of Barrie Official Plan, 2017)
- Level 1 Natural Heritage Resource (City of Barrie Official Plan, 2017)
- Level 3 Natural Heritage Resource (City of Barrie Official Plan, 2017)
- LSRCA Regulation Limit
- Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 80 160 320 480 640 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

3. Methodology

The methodology used for this NHIA was guided by information provided by the LSRCA, the MNRF, as well as by regulatory requirements described in Section 2 above.

3.1 Literature Review

The following is a list of information and documentation reviewed as part of this NHIA:

- Bryne Drive (Caplan Avenue to Essa Road) Master Plan Update Addendum #1 (March 2016);
- LGL Limited Natural Heritage Report: Bryne Drive Extension from Veteran's Drive to Commerce Park Drive and North Along Bryne Drive to Essa Road (2005);
- Bryne Drive and Commerce Park Drive Master Plan (2005);
- Lake Simcoe Region Conservation Authority – Barrie Creeks, Lovers Creek, and Hewitt's Creek Subwatershed Plan (2012);
- Lake Simcoe Region Conservation Authority – Whiskey Creek Aquatic Resource Management Plan (2007);
- Information supplied by the LSRCA regarding fisheries, natural heritage features and regulation mapping, March 2017 – email correspondence;
- City of Barrie Official Plan (2017);
- Simcoe County Official Plan (2016);
- Simcoe County Interactive Mapping Tool (2017);
- City of Barrie MMATMP (2014);
- City of Barrie Urban Forestry – Discover Barrie Mapping Tool (2017);
- MNRF (Midhurst District Office) ESA screening information request, April 17, 2017 – email correspondence;
- Provincial Policy Statement (2014);
- *Endangered Species Act*, 2007 (as amended);
- *Fisheries Act,* 1985 (as amended);
- *Migratory Birds Convention Act,* 1994 (as amended);
- Ontario Partners in Flight. 2008. Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain, North American Bird Conservation Region 13;
- Conservation Ontario – DFO Species at Risk Mapping (2017);

- MNRF Fish On-Line Tool (2017);
- Aerial photos (2012 and 2016);
- Topographic maps (2017);
- Soil Map of Simcoe County (1962);
- Make a Map: Natural Heritage Areas and Natural Heritage Information Centre (NHIC) Data - A geographic query of the MNRF natural heritage areas and NHIC data was completed for the 10 kilometre X 10 kilometre square areas (17PK00 and 17PK01) within and immediately surrounding the Project Study Area. The web application provides information on Provincial Parks, conservation reserves, ANSIs, wetlands, woodlands, designated natural heritage systems (e.g., Niagara Escarpment, Oak Ridges Moraine, and Greenbelt Plans) and NHIC data (i.e., rare species and SAR, plant communities, wildlife concentration areas, and natural areas);
- Ontario Breeding Bird Atlas (OBBA, 2001) – a review of breeding birds documented within the 10 kilometre OBBA squares that overlap the Project Study Area (17PK00 and 17PK01) was completed to determine the presence of bird species (including SAR) that have the potential to occur;
- Atlas of Ontario Mammals (1994) – a review of range maps to determine which mammals have the potential to occur within the Project Study Area, specifically SAR;
- Ontario Reptile and Amphibian Atlas (2017) – a review of historic and recent sightings of reptiles and amphibians found within the 10 kilometre squares that overlap the Project Study Area (17PK00 and 17PK01); and
- Land Information Ontario (LIO) database.

3.2 Agency Consultation

An information request was sent to the LSRCA on March 3, 2017. A response and preliminary data was received from the LSRCA on March 17, 2017. Preliminary data included ELC information as well as fisheries information. In addition, supplementary Geographic Information Systems (GIS) files were received on March 21 and March 31, 2017.

An ESA screening information request was sent to the MNRF Midhurst District Office on March 3, 2017 to request information on SAR and additional natural heritage features. Information was provided by the MNRF Midhurst District on April 13, 2017. Follow-up details relating to SAR bats were received on May 10, 2017.

All agency consultation is documented in Appendix A of this Report.

3.3 Field Investigations

A series of field investigations were completed in the Spring and Summer 2017 to collect baseline data. All field investigations were carried out by qualified professionals specializing in terrestrial and aquatic biology, and during the appropriate season and respective timing windows in accordance with applicable protocols as discussed within Section 3 of this Report. A summary of the investigations carried out is provided in Table 3-1. The specific studies completed included: amphibian breeding, breeding birds, targeted SAR surveys and mapping of ELC vegetation communities. Incidental wildlife observations as well as any potential wildlife habitat such as snake hibernacula, or animal burrows were documented (if observed) during the field investigations.

Table 3-1: Summary of field investigations 2017

Date (2017)	Field Investigation Type	Time	Weather Conditions
May 10	Baseline - site reconnaissance including fish and fish habitat documentation	7:00 am – 2:00 pm	14°C; Sunny; low winds
May 17	Amphibian Survey and Eastern Whip-poor Will	9:00 pm – 11:30 pm	28°C; Clear skies; low winds
June 2	Eastern Whip-poor Will	9:00 pm – 11:00 pm	18°C; Clear skies; low winds
June 8	Breeding Birds and Vegetation	6:00 am – 2:30 pm	25°C; Sunny; low winds
June 8	Bats – Acoustic Monitoring	8:00 pm – 11:30 pm	23°C; Clear Skies; low winds
June 14	Amphibian Survey and Eastern Whip-poor Will	9:30 pm – 12:00 am	23°C; Clear skies; low winds
June 28	Breeding Birds & Vegetation	6:30 am – 3:00 pm	25°C; Sunny; low winds
July 4	Bats – Acoustic Monitoring	8:00 pm – 11:30 pm	23°C; Clear Skies; low winds
July 6	Breeding Birds & Vegetation	7:00 am – 2:00 pm	30°C; Sunny; low winds

3.3.1 Terrestrial and Vegetative Species-at-Risk

Terrestrial investigations were completed on June 8, 28, and July 6, 2017. Vegetation communities were identified and delineated with the use of aerial photographs and during the field investigation by applying the ELC for Southern Ontario: First Approximation and its Application (Lee et al., 1998). This information was collectively used to classify and describe vegetation communities within the Project Study Area. Observations on natural and anthropogenic disturbances were also made including documenting observations of vegetative SAR species.

3.3.2 Fisheries and Fish Habitat

Field investigations to document fish habitat within the Project Study Area occurred on May 10, 2017. Field investigations observed Hotchkiss Creek, Whiskey Creek (both the Main Branch and North Branch) as well as Lovers Creek. Fish and fish habitat documentation was recorded through field notes and photographic records only (i.e., no fish trapping and/or collection was performed). Stream form as well as in-water habitat and general fish habitat was also documented. Any visual observations of fish within the Project Study Area during other field investigations noted in Table 3-1 were also recorded.

A literature search and agency consultation was completed to identify any current or historical fish community information within the Project Study Area.

3.3.3 Amphibians and Reptiles

Surveys were completed in order to identify amphibians present within the Project Study Area according to the MMP Protocol for surveying amphibians (2008). Two (2) separate surveys were completed in the evening on May 17 and June 14, 2017 when night-time air temperature was greater than 10ºC during the first survey and 17ºC for the second survey. It should be noted that due to Project timing[3], it was not possible to conduct the survey during the April time-period (April 15 to April 30) as per the above Protocol, and it was thus missed.

In accordance with the MMP Protocol, amphibians were surveyed from pre - determined survey locations near the stream and riparian area(s) within the Project Study Area (refer to Figure 3 for survey locations). An unlimited distance, 180º arc sampling area was surveyed two (2) times for three (3) minutes at a total of four (4) survey locations.

At each survey location, one observer recorded the call level heard from all frog and/or toad species to assess the abundance and intensity of the calls. Call levels for each species heard were categorized into 1 of 5 levels, as follows:

- Level 1 – No calls heard;

[3] Based on a preliminary review of background material for the Project Study Area, habitat for amphibians was deemed absent. Following the initial site reconnaissance completed on May 10, 2017, it was determined suitable habitat existed and therefore surveys should be completed.

- Level 2 – Frog(s) or toad(s) seen or heard
- Level 3 – Frog(s) or toad(s) can be counted, calls do not overlap;
- Level 4 – Frog(s) or toads can be counted, while others are overlapping; or
- Level 5 – Full chorus, continuous and overlapping, cannot distinguish frogs or toads.

Reptile observations (e.g., snakes and turtles) were collected via incidental sightings of either species or observed habitat.

3.3.4 Breeding Birds

Surveys were completed in order to identify birds present along the road corridor based on the OBBA Protocol (2001). Surveys were conducted during the core breeding season for birds on June 8, 28, and July 6, 2017 at a minimum 30 minutes after sunrise. During these surveys, additional efforts to denote the presence or absence of SAR birds was also completed. Figure 4 illustrates the breeding bird survey locations.

3.3.5 Species-at-Risk Bats

Surveys for SAR bats were completed by LGL Limited in Spring and Summer 2017. LGL conducted two (2) nights of evening pedestrian surveys using a hand-held detector (Echo Meter Touch, Wildlife Acoustics) attached to a smart phone (with built in Kaleidoscope software developed by Wildlife Acoustics). Echolocation recordings were then compared to the North American library to assign bat calls to species identification. Pedestrian surveys were used to target portions of the Project Study Area where passive bat detector units were not installed specifically within the wooded areas north of Harvie Road. Methodology using hand-held detectors was discussed and deemed acceptable by the MNRF Midhurst District office in advance of survey work.

3.3.6 Eastern Whip-poor Will

Surveys were completed in order to identify the presence of Eastern Whip-poor Will (*Caprimulgus vociferus*) a threatened bird within the Province of Ontario. The survey methodology followed the MNRF Survey Protocol (2013). According to the Protocol, surveys typically shall be completed between May 18 and June 30 depending on the moon phases in any given year. In addition, surveys must be completed under the following conditions: no precipitation, low noise, little to no wind, clear skies and good visibility. As moon phases are known to impact calling, it is also recommended to complete surveys when the moon phase is 50 percent or greater, and with air temperatures above 10°C. Eastern Whip-poor Wills can be heard up to 500 metres away under good conditions and up to 1 kilometre during ideal conditions.

A total of three (3) separate evening surveys were completed for Eastern Whip-poor Will on May 17, June 2, and June 14, 2017 under good conditions. The May 17 survey was

completed a day earlier due to weather forecasts. Based on a review of ebird, an online database that documents observations from the general public, recorded documentation of Eastern Whip-poor Will were as early as the start of May in areas of Southern Ontario. Therefore, considering the weather, previous experience surveying for the species, and noted observations, May 17 was considered acceptable.

Prior to the initial visit, survey locations were set up within the wooded areas north of Harvie Road and spaced approximately 500 metres apart as shown in Figure 5 using aerial imagery. The locations were then surveyed in the field using a hand-held Global Positioning System (GPS) unit.

3.3.7 Incidental Wildlife Observations

Similar to reptiles, incidental (visual) observations of wildlife species within the Project Study Area were also recorded at the time of the aforementioned 2017 field investigations.

3.4 Methodology Limitations

As noted, all field investigations were completed from within the proposed Bryne Drive alignment, and included assessing the area extending approximately 50 metres from the centre-line identified within the BDMPU (2016). The centre-line was followed using a hand-held GPS that contained coordinates both north and south of Harvie Road. Additional points were incorporated into the unit to identify the 50 metre buffer. Therefore, natural features were observed from within the 50 metre swath and have been supplemented where required using background desktop information as noted within this Report.

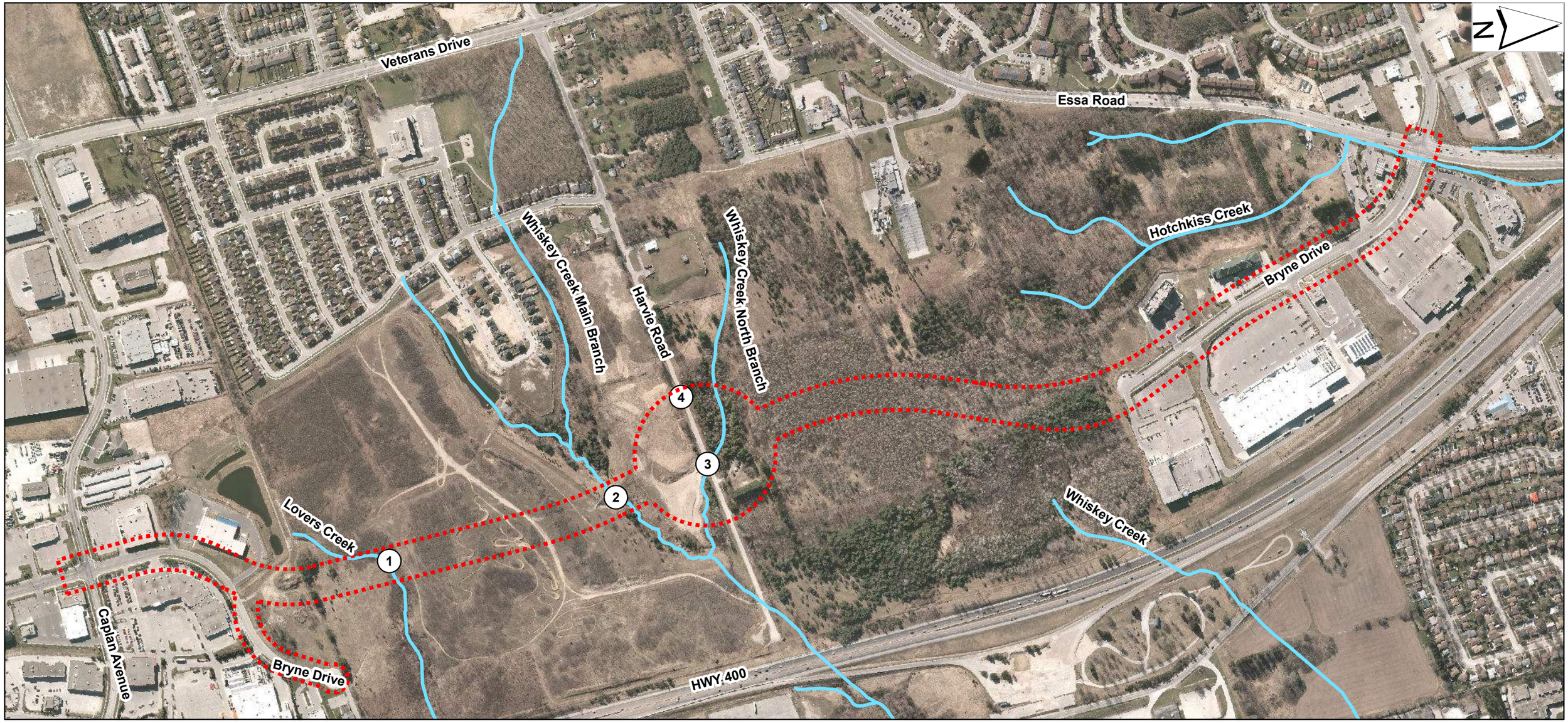

Figure 3 Bryne Drive Transportation Improvements Class Environmental Assessment: Amphibian Survey Locations

Bryne Drive Study Area

Amphibian Survey Locations

Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 80 160 320 480 640 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

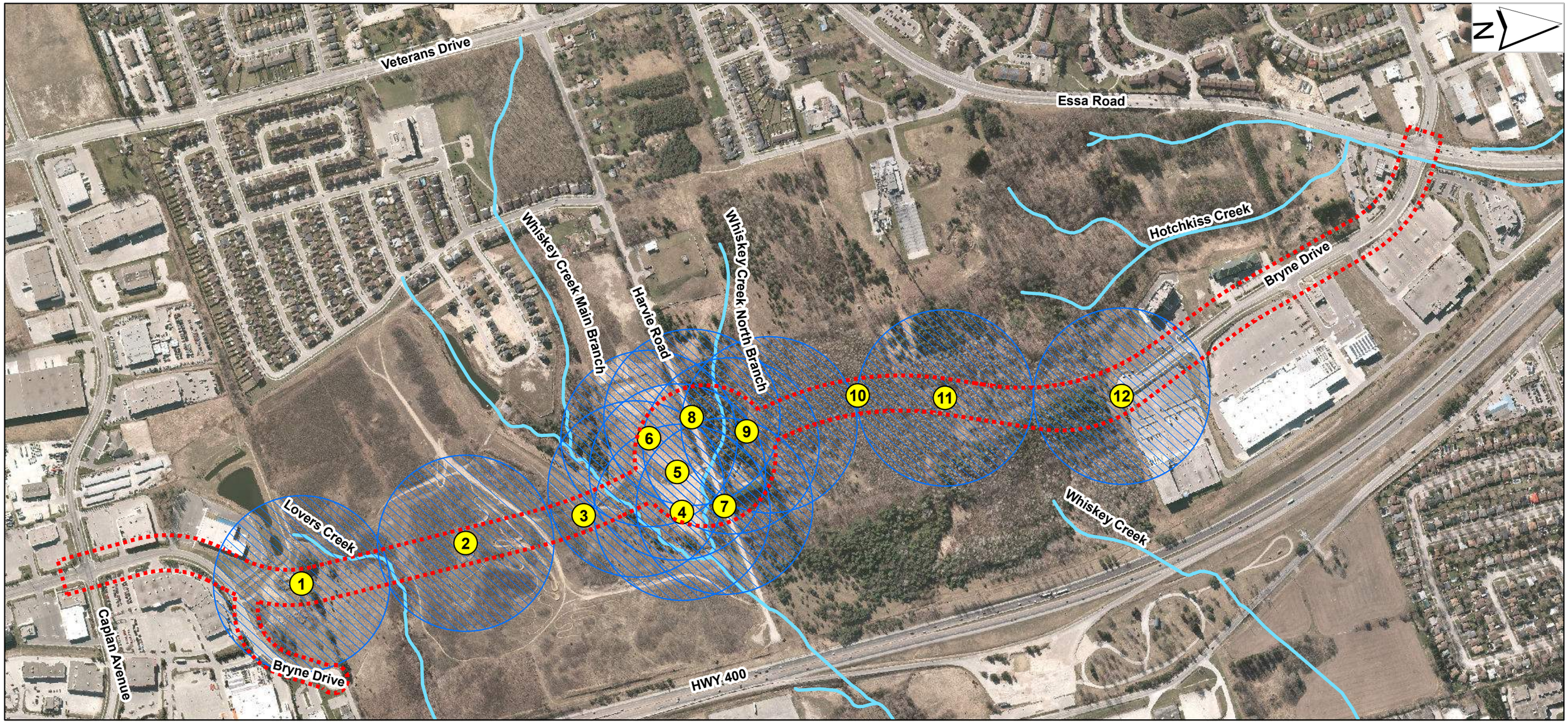

Figure 4 Bryne Drive Transportation Improvements Class Environmental Assessment: Breeding Bird Survey Locations

- Bryne Drive Study Area
- Breeding Bird Survey Locations
- Breeding Bird Survey Locations 150m Buffer
- Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 80 160 320 480 640 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

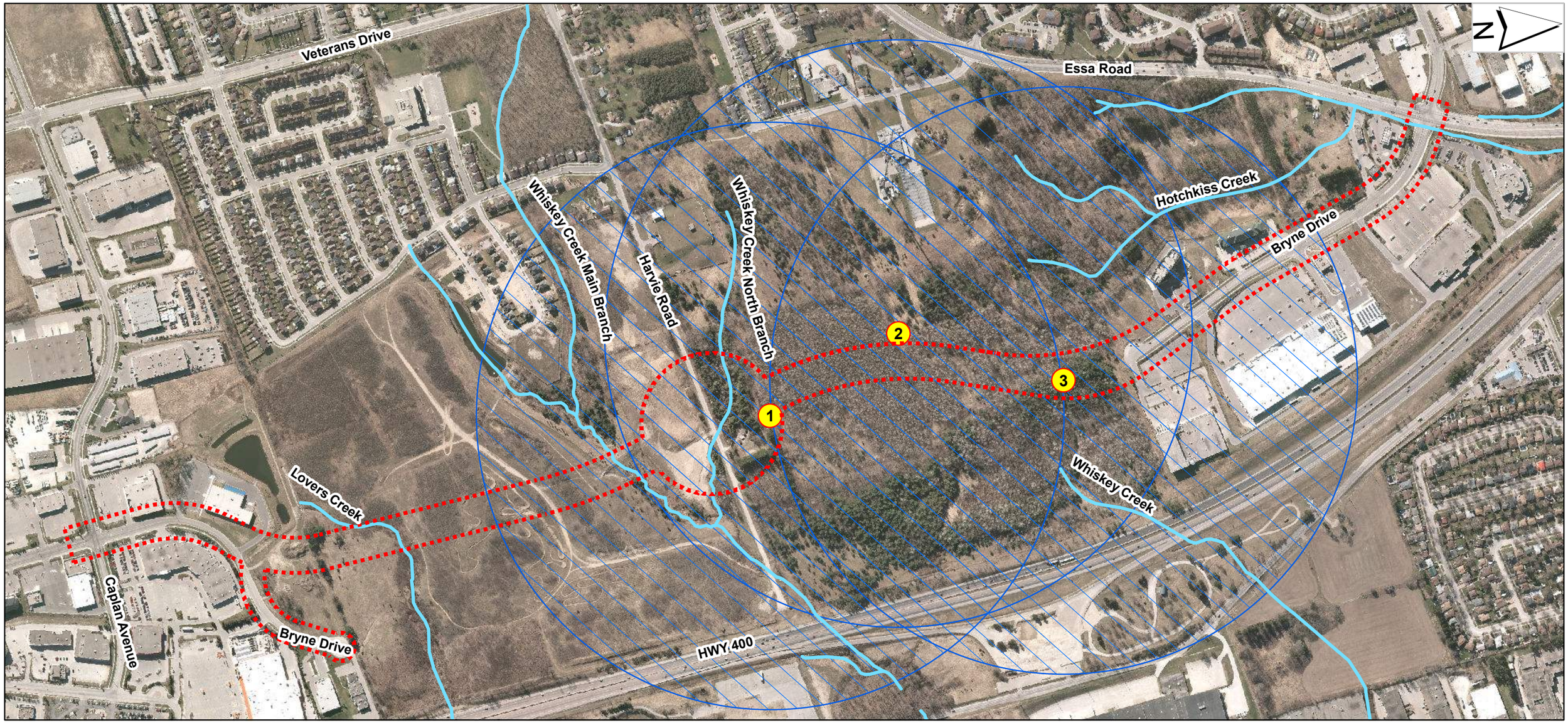

Figure 5 Bryne Drive Transportation Improvements Class Environmental Assessment: Eastern Whip-poor Will Survey Locations

Bryne Drive Study Area

Eastern Whip-poor Will Survey Locations

Eastern Whip-poor Will Survey Locations 500m Buffer

Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 80 160 320 480 640 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

4. Existing Conditions

4.1 Topography and Soils

The topography associated with the Project Study Area between Caplan to Harvie is mainly flat with steeper slopes that lead into Lovers Creek and the Whiskey Creek Main Branch. North of Harvie Road towards the north end of the woodland, topography varies with low points sloping towards Harvie Road, and higher elevations towards the mid and north sections of the woodland. From the north Bryne Drive cul-de-sac the road gradually increases to a higher elevation as it progresses to Essa Road intersection.

According to the Canadian Land Inventory (CLI)[4] Soil Capability for Agriculture Interactive Mapping Tool (2017) available on the Simcoe County website (via its Interactive Mapping Tool), there are three (3) soil classes mapped within the Project Study Area which include: Class 1, 2 or 3 soils. These soils are mapped on the north and south sides the Project Study Area, and correlate with the existing farm lands located south of Harvie Road. It is important to note, areas north of Harvie Road were once agricultural, and as such, are still classified as soils 1, 2 or 3 based on the Soil Capability for Agriculture Interactive Mapping Tool (2017) available via the Simcoe County Interactive Mapping Tool.

The Soil Map of Simcoe County (Hoffman et al., 1962) identifies the Project Study Area as dominantly sandy loam and having good soil drainage (Hoffman et al., 1962). Soils are also identified as being stone-free to moderately stony, a grey, calcareous outwash sand and outwash sand underlain by grey calcareous loam or sandy loam till depths of three (3) feet or less (Tisl and Ds) (Hoffman et al., 1962). They are of the Brown Forest Group and Grey-Brown Podzolic Great Soil Group (Hoffman et al., 1962). Acidity in these areas can be neutral, alkaline and slightly acidic (Hoffman et al., 1962).

4.2 Bedrock, Physiography and Geology

Bedrock geology within the Project Study Area can be classified as a mixture of limestone, dolostone, shale, arkose, and sandstone formation as a part of the Lower Ordovician period (Ontario Geological Survey, 2011).

The Project Study Area is also part of the Peterborough Drumlin Field Physiographic Region and the Till Plains (Drumlinized) Physiographic Landform (Ontario Geological Survey, 2010). The Surficial Geology consists of ice-contact stratified deposits with sand and gravel, minor

[4] The CLI categorizes soils into seven classes which reflect the soil's capability to produce field and forage crops (Department of the Environment, 1972). Lands classified as Class 1 are considered to have the highest capability or potential, while those classified as Class 7 are considered to have the lowest potential. The classification system reflects limitations such as slope, topography, soil depth, climate, drainage and stoniness, among others.

silt, clay and till. Till with stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain is also documented (Chapman and Putnam, 2007).

4.3 Terrestrial

The organizational framework contained within the ELC protocol (Lee et al., 1998) describes communities according to six (6) nested levels: Site Region, System, Community Class, Community Series, Ecosite, and Vegetation Type. Note the ELC protocol is dated and refers to the Ecoregions as defined by the Significant Wildlife Habitat Ecoregion Criteria Schedules and PPS as Site Regions. For ease of understanding, the Site Region reference in the ELC manual will be termed Ecoregion throughout the Report. These nested levels vary in spatial scale, with the Ecoregion classifying communities at the largest spatial scale, and Vegetation Type describing communities at the finest spatial scale (Lee et al., 1998).

There are two (2) Ecoregions in Southern Ontario: 6E and 7E (Lee et al., 1998). The Project Study Area is situated within Ecoregion 6E, the Lake Simcoe-Rideau Ecoregion, which occupies the northern portion of Southern Ontario. The updated ELC codes 2008 were also applied for communities that were not categorized by the 1998 field manual.

A series of ELC maps were prepared for the Project Study Area (refer to Figure 6a, 6b, 6c and 6d and Appendix B for selected Project Study Area photographs).

4.3.1 Vegetation Communities

Characterization of the vegetation observed was undertaken by compiling a generalized botanical inventory then using that information to classify and characterize the vegetation communities according to the ELC protocol (Lee et al., 1998). It is important to note that vegetation communities often have variations within their boundaries. These variations have not been mapped except where necessary to depict a significant vegetation community or feature.

Plant species were identified based on the investigations completed in the Spring and early Summer 2017. A list of dominant vegetative species is provided below in Table 4-1.

There were four (4) different vegetation community classes identified within the Project Study Area which include cultural, forest, swamp and marsh. Commercial and institutional landscapes were also observed.

The dominant communities were split between cultural and forest. As shown in Figure 6a, 6b, 6c and 6d, the vegetation communities present with the Project Study Area include:

- CUM1-1 – Dry-Moist Old Field Meadow Type;
- FOD3-1 – Dry-Fresh Poplar Deciduous Forest Type;
- FODM11 – Naturalized Deciduous Hedge-row Ecosite;

- FOMM4-2 – Dry-Fresh White Cedar – Poplar Mixed Forest Type;
- FODM8-1 – Fresh-Moist Deciduous Forest Type;
- FOMM2-3 – Dry-Fresh White Pine – Harwood Mixed Forest Type
- SWCM1-1 – White Cedar Mineral Coniferous Swamp Type;
- THDM2 – Dry-Fresh Deciduous Shrub Thicket Ecosite;
- WODM5 – Fresh-Moist Deciduous Woodland Ecosite;
- WODM4 – Dry-Fresh Deciduous Woodland Ecosite;
- FOD5 – Dry-Fresh Sugar Maple Deciduous Forest Type;
- MAMM1-2 – Cattail Graminoid Mineral Meadow Marsh Type;
- OAGM1 – Annual Row Crop; and
- CVC – Commercial and Institutional.

Table 4-1: Summary of dominant vegetative species – 2017 field investigation observations

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Trees														
Fagus grandifolia	American Beech	G5/S4		X	X	X						X		
Populus balsamifera	Balsam Poplar	G5/S5			X				X					
Tilia americana	Basswood	G5/S5		X	X		X		X		X	X		
Prunus serotina	Black Cherry	G5/S5		X	X			X				X		
Robinia pseudococia	Black Locust	G5/SNA							X					X
Juglans nigra	Black Walnut	G5/S4			X				X					
Juglans cinerea	Butternut	G4/S3?		X					X					
Populus deltoides	Eastern Cottonwood	G5/S5	X						X					
Thuja occidentalis	Eastern White Cedar	G5/S5				X		X	X					X
Fraxinus pennsylvanica	Green Ash	G5/S5		X	X	X	X				X	X		X
Ostrya virginiana	Iron Wood	G5/S5		X	X							X		
Populus grandidentata	Large-toothed Aspen	G5/S5							X					

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Acer negundo	Manitoba Maple	G5/S5	X	X	X			X	X			X		
Acer platanoides	Norway Maple	GNR/SNA	X	X	X			X	X			X		
Picea abies	Norway Spruce	G5/SNA						X						X
Betula papyrifera	Paper Birch	G5/S5			X	X	X		X		X			
Quercus rubra	Red Oak	G5/S5		X	X			X	X	X		X		
Pinus sylvestris	Scots Pine	GNR/SE5	X											X
Acer saccharinum	Silver Maple	G5/S5	X											
Ulmus rubra	Slippery Elm	G5/S5		X	X	X					X	X		
Acer saccharum	Sugar Maple	G5/S5		X	X							X		
Platanus occidentalis	Sycamore	G5/S4	X											
Larix laricina	Tamarak	G5/S5												X
Populus tremuloides	Trembling Aspen	G5/S5		X	X	X			X		X	X	X	X
Fraxinus americana	White Ash	G5/S4?	X	X	X		X		X		X	X		X

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Ulmus americana	White Elm	G5/S5	X	X	X							X		
Pinus strobus	White Pine	G5/S5		X	X			X	X			X		X
Populus alba	White Poplar	G5/SNA			X									
Salix alba	White Willow	G5/SNA	X				X	X			X			X
Betula alleghaniensis	Yellow Birch	G5/S5				X								
Shrubs														
Cornus alternifolia	Alternate-leaved Dogwood	G5/S5		X	X	X			X			X		
Viburnum opulus ssp. trilobum	American Highbush Cranberry	G5T5/S5		X										
Sorbus americana	American Mountain Ash	G5/S5				X			X					
Lonicera maackii	Amur Honeysuckle	GNR/SNA	X						X		X			
Salix bebbiana	Bebb's Willow	G5/S5	X											X
Prunus virginiana	Choke Cherry	G5/S5		X	X				X			X		X
Rhamnus cathartica	Common Buckthorn	GNR/SE5	X	X	X	X	X	X	X	X	X	X		X

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Lonicera canadensis	Fly Honeysuckle	G5/S5	X					X	X		X			X
Cornus racemosa	Grey Dogwood	G5/S5		X	X	X								X
Crataegus spp.	Hawthorn species	G5/S5	X						X	X				
Salix discolor	Pussy Willow	G5/S5	X				X							
Sambucus racemosa var. racemosa	Red Elderberry	G5T4T5/S5		X										
Cornus stolonifera	Red-osier Dogwood	G5/S5				X				X	X			X
Rhus typhina	Staghorn Sumac	G5/S5			X		X		X	X				X
Lonicera tatarica	Tartarian Honeysuckle	GNR/SE5					X			X				
Rubus idaeus spp. Strigosus	Wild-Red Raspberry	G5T5/S5	X	X	X		X		X		X			X
Herbaceous Plants														
Medicago sativa	Alfalfa	GNR/SE5	X					X						
Trifolium hybridum	Alsike Clover	GNR/SE5	X					X						
Carex stipata	Awl-fruited Sedge	G5/S5				X								

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Lotus corniculata	Bird's-foot Trefoil	GNR/SNA	X					X	X					
Medicago lupulina	Black Medic	GNR/SE5	X					X	X					
Rudbeckia hirta	Black-eyed Susan	G5/S5	X											
Silene vulgaris	Bladder Campion	GNR/SNA	X					X	X					
Caulophyllum thalictroides	Blue Cohosh	G5/S5		X	X									
Verbena hastata	Blue Vervain	G5/S5	X											
Pteridium aquilinum	Bracken Fern	G5/S5			X	X	X					X		
Typha latifolia	Broad-leaved Cattail	G5/S5				X							X	
Linaria vulgaris	Butter-and-eggs	GNR/SNA	X											
Poa compressa	Canada Blue Grass	GNR/SE5	X		X		X	X	X	X				
Sanguinaria canadensis	Canada Bloodroot	G5/S5		X	X							X		
Solidago Canadensis	Canada Goldenrod	G5/S5	X	X	X	X	X	X	X	X				X
Sinapis arvensis	Charlock	GNR/SNA	X					X						

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Cichorium intybus	Chicory	GNR/SNA	X		X		X	X	X	X				
Solanum dulcamara	Climbing Nightshade	GNR/SE5				X			X					
Arctium minus	Common Burdock	GNR/SNA	X											
Potentilla simplex	Common Cinquefoil	G5/S5							X		X			X
Taraxacum officinale	Common Dandelion	G5/SNA	X		X		X	X	X	X				
Malva neglecta	Common Mallow	GNR/SE5	X						X					
Asclepias syriaca	Common Milkweed	G5/S5	X		X		X	X	X	X				
Plantago media	Common Plantain	G5/SE5	X							X				
Ambrosia artemisiifolia	Common Ragweed	G5/S5	X				X	X		X				
Hypericum perforatum	Common St. John's Wort	GNR/SE5	X		X				X					
Dipsacus fullonum	Common Teasel	GNR/SNA	X					X						
Anemone virginiana	Common Thimbleweed	G5/S5	X					X		X				
Vicia cracca	Cow Vetch	GNR/SNA	X		X		X	X	X	X	X			

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Agrostis stolonifera	Creeping Bentgrass	G5/S5	X					X						
Cirsium arvense	Creeping Thistle	G5/SNA	X					X	X					
Rumex crispus	Curly Dock	GNR/SNA	X					X						
Cynanchum rossicum	Dog Strangling Vine	GNR/SE5	X	X				X	X					
Bromus tectorum	Downy Chess	GNR/SNA	X					X						
Maianthemum racemosum	False Solomon's-seal	G5/S5		X	X	X			X			X		
Equisetum arvense	Field Horsetail	G5/S5	X	X	X	X	X		X	X	X		X	X
Poa compressa	Flat-stemmed Blue Grass	GNR/SE5	X					X						
Poa palustris	Fowl Meadow Grass	G5/S5	X					X	X				X	
Carex vulpinoidea	Fox Sedge	G5/S5				X							X	
Alliaria petiolata	Garlic Mustard	GNR/SNA	X	X	X			X	X		X			X
Aster ericoides	Heath Aster	G5/S5	X				X		X					
Geranium robertianum	Herb Robert	G5/SE5		X	X							X		

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Poa pratensis	Kentucky Blue Grass	G5/S5	X				X	X	X				X	
Convallaria majalis	Lily of the valley	G5/SE5		X	X				X					
Aster novae-angliae	New-England Aster	G5/S5	X				X	X	X					
Dactylis glomerata	Orchard Grass	GNR/SE5	X				X	X						
Matteuccia struthiopteris	Ostrich Fern	G5/S5			X	X	X		X		X	X		
Leucanthemum vulgare	Ox-eye Daisey	GNR/SNA	X						X					
Erigeron philadelphicus	Philadelphia Fleabane	G5/S5	X					X	X					
Matricaria discoidea	Pineappleweed	G5/SE5	X					X						
Toxicodendron radicans	Poison Ivy	G5/S5		X	X	X			X					
Elymus repens	Quack Grass	GNR/SE5	X					X	X				X	
Daucus carota	Queen Ann's Lace	GNR/SNA	X					X	X					
Actaea rubra	Red Baneberry	G5/S5			X									
Trifolium pratense	Red Clover	GNR/SNA	X					X						
Trillium erectum	Red Trillium	G5/S5		X				X						

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Phalaris arundinacea	Reed Canary Grass	GNR/S5				X								
Vitis riparia	Riverbank Grape	G5/S5	X	X	X	X	X	X	X	X	X	X		X
Onoclea sensibilis	Sensitive Fern	G5/S5		X	X	X	X		X		X		X	X
Bromus inermis	Smooth Brome Grass	G5/SNA	X					X						
Dryopteris carthusiana	Spinulose Wood Fern	G5/S5		X	X		X		X			X		X
Hordeum jubatum	Squirrel Tail Barley	G5/SE5	X					X						
Ranunculus acris	Tall Buttercup	G5/SE5		X		X			X					
Phleum pratense	Timothy	GNR/SNA	X					X	X					
Echium vilgare	Viper's Bugloss	GNR/SNA	X											
Equisetum fluviatile	Water Horsetail	G5/S5											X	X
Carex aquatilis	Water Sedge	G5/S5				X								
Chenopodium album	White Goosefoot	G5/SE5		X	X									
Melilotus albus	White Sweet Clover	GNR/SNA	X					X	X					
Trillium grandiflorum	White Trillium	G5/S5		X										

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Vegetation Communities											
			CUM1-1	FOD5	WODM4	SWCM1-1	FOMM4-2	FODM11	FOD3-1	THDM2-1	FODM8-1	FOMM2-3	MAMM1-2	WODM5
Clinopodium vulgare	Wild Basil	G5/S5				X			X					
Aquilegia canadensis	Wild Columbine	G5/S5		X										
Vitis spp.	Wild Grape	G5/S5	X	X	X	X	X	X	X	X	X			X
Geum aleppicum	Yellow Avens	G5/S5	X	X	X				X					

Global Rank: G5: Very common; demonstrably secure under present conditions; G#T#: The rank of intraspecific taxa (subspecies or varieties); GNR: Not ranked; S5: Very Common; demonstrably secure under present conditions; S4: Common; usually more than 100 occurrences, usually not susceptible to immediate threats; S#?: Inexact or uncertain rank; SE: exotic, plant is not a native component of Ontario flora; SNA: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

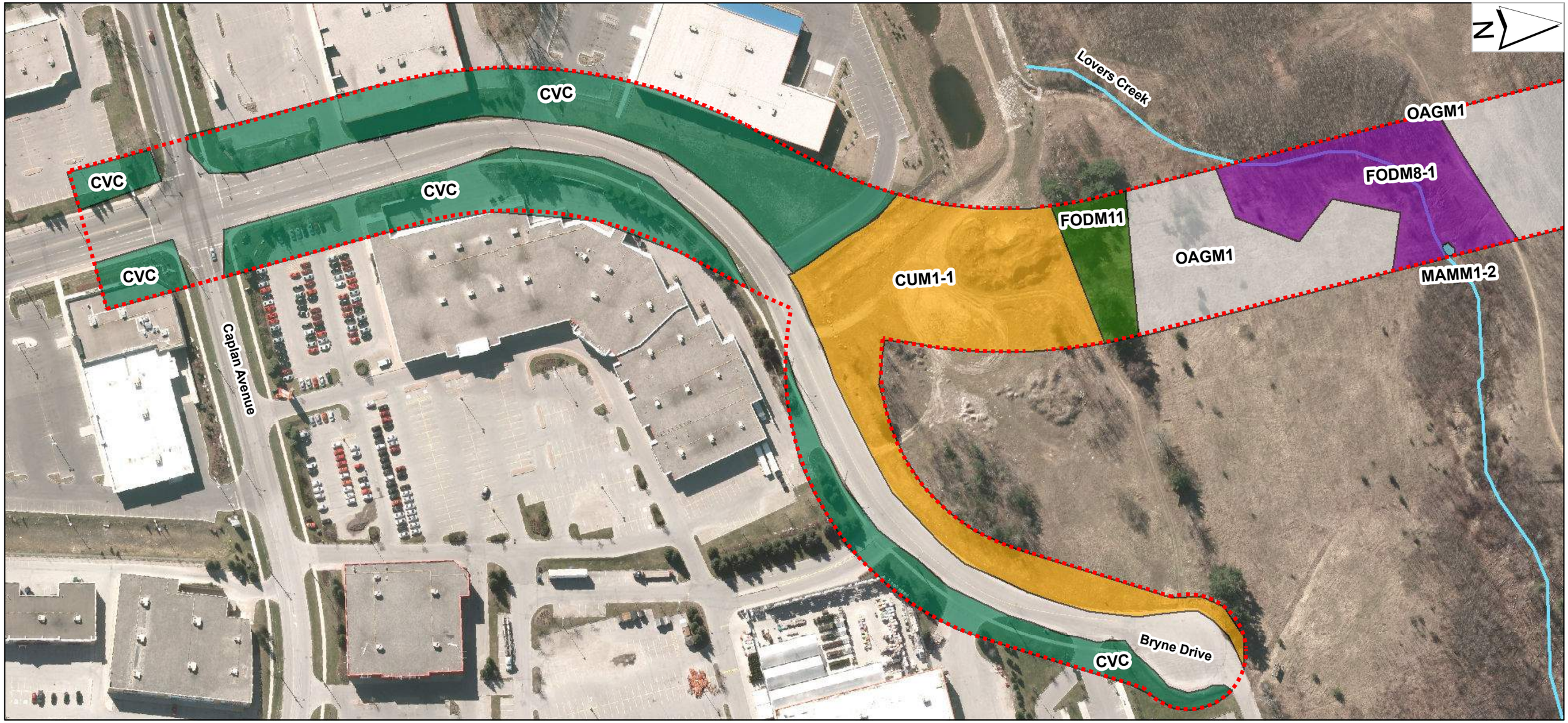

Figure 6a Bryne Drive Transportation Improvements Class Environmental Assessment: Ecological Land Classification

- Bryne Drive Study Area
- CUM1-1 - Dry-Moist Old Field Meadow Type
- CVC - Commercial and Institutional
- FOD3-1 - Dry-Fresh Poplar Deciduous Forest Type
- FOD5 - Dry-Fresh Sugar Maple Deciduous Forest Ecosite
- FODM11 - Naturalized Deciduous Hedge-row Ecosite
- FODM8-1 - Fresh-Moist Deciduous Forest Type
- FOMM2-3 - Dry-Fresh White Pine - Hardwood Mixed Forest Type
- FOMM4-2 - Dry-Fresh White Cedar - Poplar Mixed Forest Type
- MAMM1-2 - Cattail Graminoid Mineral Meadow Marsh Type
- OAGM1 - Annual Row Crop
- SWCM1-1 - White Cedar Mineral Coniferous Swamp Type
- THDM2 - Dry-Fresh Deciduous Shrub Thicket Ecosite
- WODM4 - Dry-Fresh Deciduous Woodland Ecosite
- WODM5 - Fresh-Moist Deciduous Woodland Ecosite
- Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 15 30 60 90 120 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

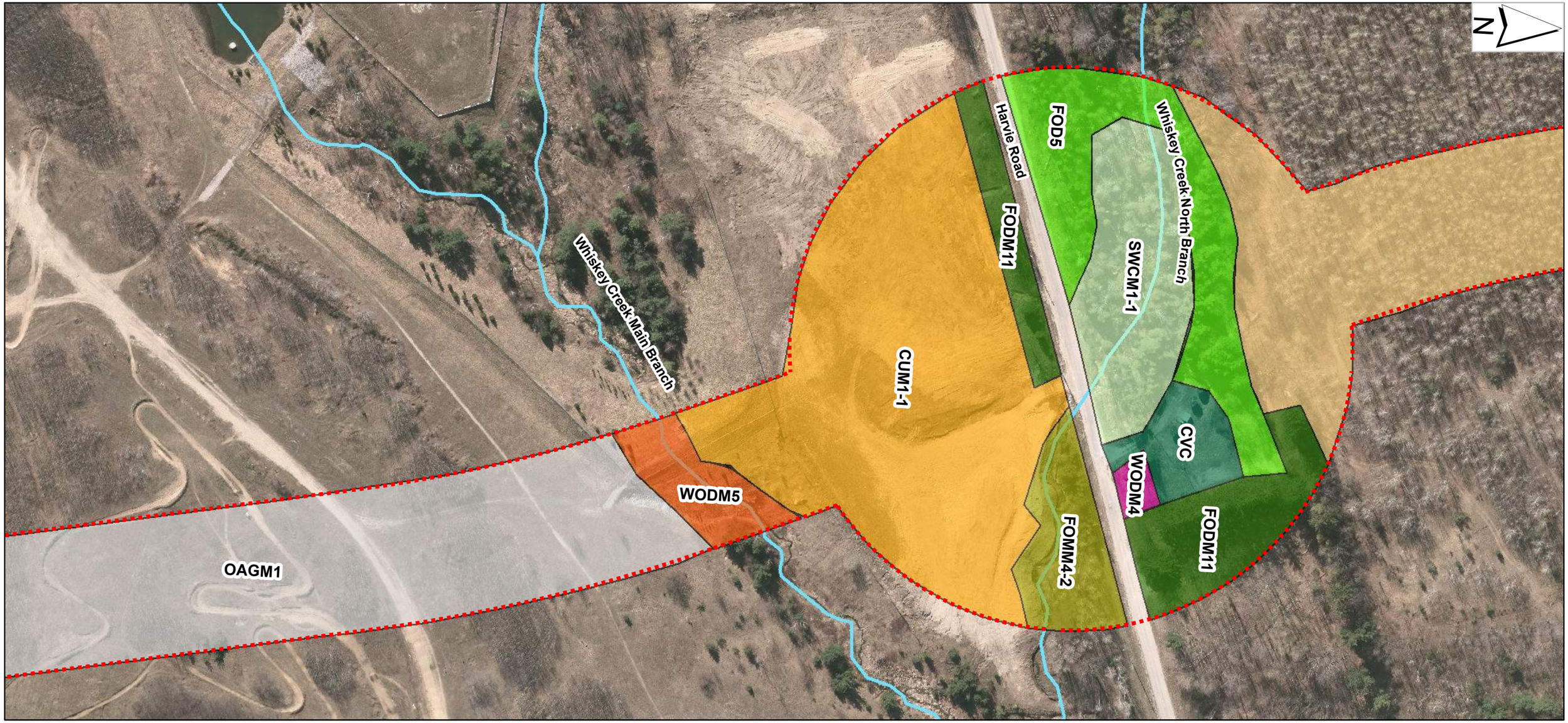

Figure 6b Bryne Drive Transportation Improvements Class Environmental Assessment: Ecological Land Classification

- Bryne Drive Study Area
- CUM1-1 - Dry-Moist Old Field Meadow Type
- CVC - Commercial and Institutional
- FOD3-1 - Dry-Fresh Poplar Deciduous Forest Type
- FOD5 - Dry-Fresh Sugar Maple Deciduous Forest Ecosite
- FODM11 - Naturalized Deciduous Hedge-row Ecosite
- FODM8-1 - Fresh-Moist Deciduous Forest Type
- FOMM2-3 - Dry-Fresh White Pine - Hardwood Mixed Forest Type
- FOMM4-2 - Dry-Fresh White Cedar - Poplar Mixed Forest Type
- MAMM1-2 - Cattail Graminoid Mineral Meadow Marsh Type
- OAGM1 - Annual Row Crop
- SWCM1-1 - White Cedar Mineral Coniferous Swamp Type
- THDM2 - Dry-Fresh Deciduous Shrub Thicket Ecosite
- WODM4 - Dry-Fresh Deciduous Woodland Ecosite
- WODM5 - Fresh-Moist Deciduous Woodland Ecosite
- Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 15 30 60 90 120 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

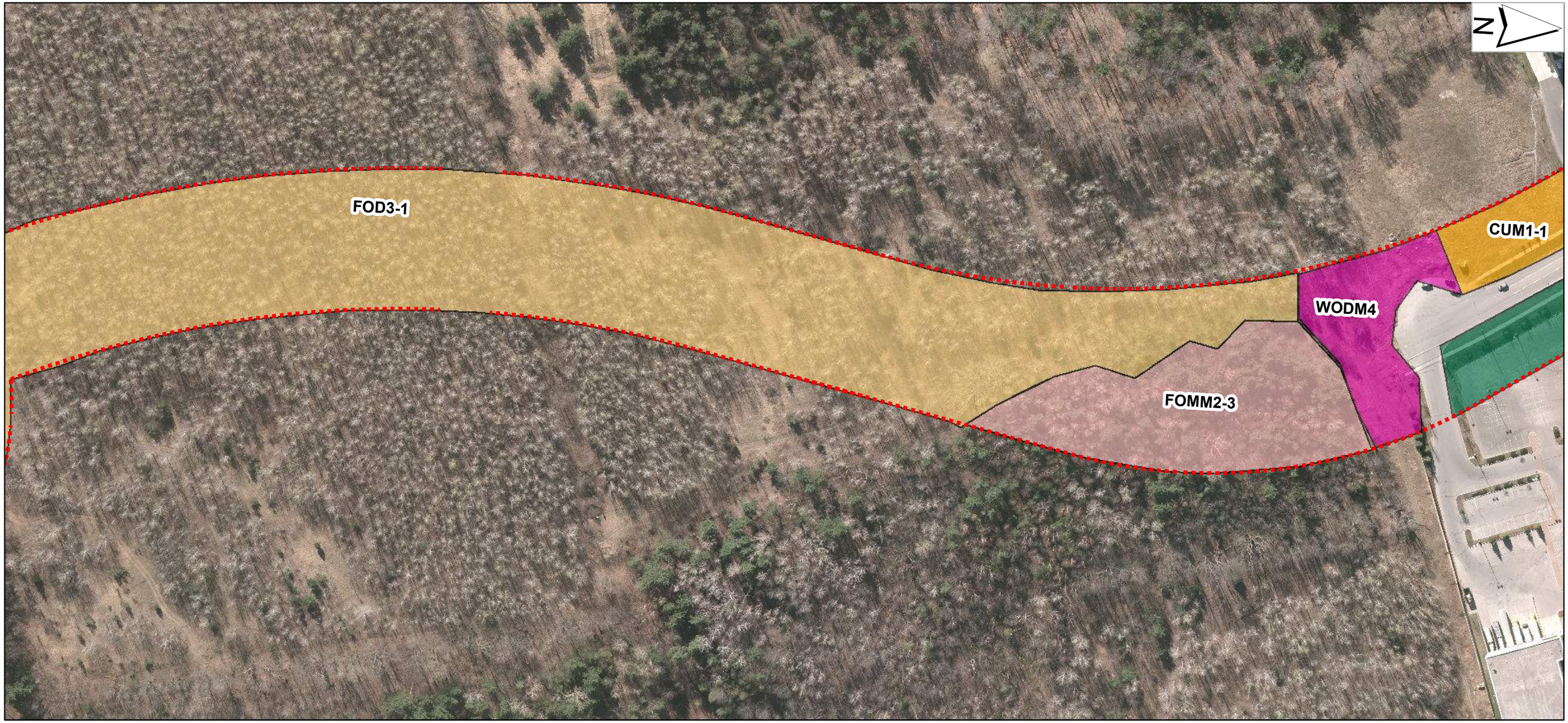

Figure 6c Bryne Drive Transportation Improvements Class Environmental Assessment: Ecological Land Classification

- Bryne Drive Study Area
- CUM1-1 - Dry-Moist Old Field Meadow Type
- CVC - Commercial and Institutional
- FOD3-1 - Dry-Fresh Poplar Deciduous Forest Type
- FOD5 - Dry-Fresh Sugar Maple Deciduous Forest Ecosite
- FODM11 - Naturalized Deciduous Hedge-row Ecosite
- FODM8-1 - Fresh-Moist Deciduous Forest Type
- FOMM2-3 - Dry-Fresh White Pine - Hardwood Mixed Forest Type
- FOMM4-2 - Dry-Fresh White Cedar - Poplar Mixed Forest Type
- MAMM1-2 - Cattail Graminoid Mineral Meadow Marsh Type
- OAGM1 - Annual Row Crop
- SWCM1-1 - White Cedar Mineral Coniferous Swamp Type
- THDM2 - Dry-Fresh Deciduous Shrub Thicket Ecosite
- WODM4 - Dry-Fresh Deciduous Woodland Ecosite
- WODM5 - Fresh-Moist Deciduous Woodland Ecosite
- Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 15 30 60 90 120 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

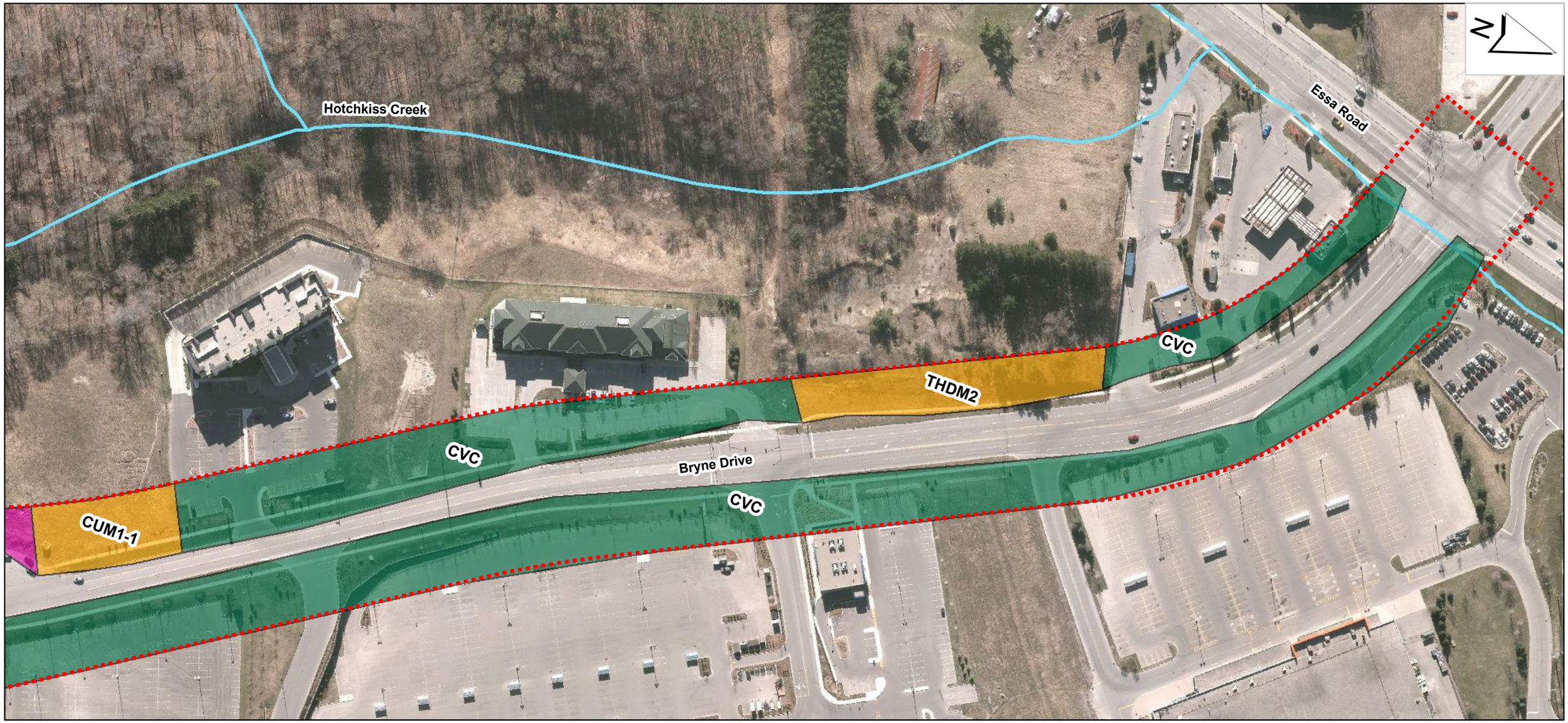

Figure 6d Bryne Drive Transportation Improvements Class Environmental Assessment: Ecological Land Classification

- Bryne Drive Study Area
- CUM1-1 - Dry-Moist Old Field Meadow Type
- CVC - Commercial and Institutional
- FOD3-1 - Dry-Fresh Poplar Deciduous Forest Type
- FOD5 - Dry-Fresh Sugar Maple Deciduous Forest Ecosite
- FODM11 - Naturalized Deciduous Hedge-row Ecosite
- FODM8-1 - Fresh-Moist Deciduous Forest Type
- FOMM2-3 - Dry-Fresh White Pine - Hardwood Mixed Forest Type
- FOMM4-2 - Dry-Fresh White Cedar - Poplar Mixed Forest Type
- MAMM1-2 - Cattail Graminoid Mineral Meadow Marsh Type
- OAGM1 - Annual Row Crop
- SWCM1-1 - White Cedar Mineral Coniferous Swamp Type
- THDM2 - Dry-Fresh Deciduous Shrub Thicket Ecosite
- WODM4 - Dry-Fresh Deciduous Woodland Ecosite
- WODM5 - Fresh-Moist Deciduous Woodland Ecosite
- Watercourse

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 15 30 60 90 120 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

4.4 Fisheries and Fish Habitat

The Project Study Area is within the Barrie Creeks and Lovers Creek subwatersheds (LSRCA, 2012). The proposed extension of Bryne Drive between the north and south limits will cross a small headwater branch of Lovers Creek as well as the Main and North Branches of Whiskey Creek. As previously noted, Hotchkiss Creek is presumed to be enclosed underground at the intersection of Essa Road and Bryne Drive. Details regarding the fisheries and fish habitat for the watercourses within the Project Study Area are provided below. Both Hotchkiss Creek and Whiskey Creek are part of the Barrie Creeks subwatershed, both creeks do not form a confluence with other named creeks, whereby both drain into Lake Simcoe separately (LSRCA, 2012). To the east of the Barrie Creeks subwatershed, is the Lovers Creek subwatershed. The Lovers Creek subwatershed comprises 2.3 percent of the Lake Simcoe watershed, and is the only named stream within the Lovers Creek subwatershed (LSRCA, 2012). Lovers Creek, similar to both Hotchkiss and Whiskey Creek(s), also flows north towards Lake Simcoe (LSRCA, 2012).

The proposed Transportation Improvements will cross the Main and North Branches of Whiskey Creek, the tributary of Lovers Creek, and will be within the Hotchkiss Creek regulated area as shown on Figures 7a, 7b and 7c. Transportations Improvements, aside from road widening, will also involve upsizing and replacing culverts associated with the Whiskey Creek crossings along Harvie Road and the Lovers Creek crossing. Improvements will also involve measures to maintain function of existing culverts associated with Whiskey Creek and Lovers Creek at Highway 400 outside of the proposed alignment.

No fish collection was completed as part of the 2017 field investigations, as data provided and correspondence with LSRCA identified the thermal regime for Whiskey Creek, Lovers Creek and Hotchkiss Creek as it relates to construction timing windows. A summary of historic species documented within these creeks as provided by LSRCA is provided in Table 4-2 below:

Table 4-2: Summary of historic and recent species found in the Project Study Area

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Whiskey Creek	Lovers Creek	Hotchkiss Creek
Pomoxis nigromaculatus	Black Crappie	G5/S4	X		
Notropis heterodon	Blackchin Shiner	G5/S4		X	
Rhinichthys atratulus	Blacknose Dace	G5/SNR	X	X	X
Notropis heteroepis	Blacknose Shiner	G5/S5		X	
Pimephales notatus	Bluntnose Minnow	G5/S5	X	X	X

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Whiskey Creek	Lovers Creek	Hotchkiss Creek
Hybognathus hankisoni	Brassy Minnow	G5/S5		X	X
Culaea spp.	Brook Stickleback	G5/S5		X	X
Salvelinus fontinalis	Brook Trout	G5/S5	X	X	X
Ameriurus nebulosus	Brown Bullhead	G5/S5		X	
Umbra limi	Central Mudminnow	G5/S5	X	X	
Luxilus cornutus	Common Shiner	G5/S5		X	
Catostomus commersoni	Common White Sucker	G5/S5	X	X	X
Semotilus atromaculatus	Creek Chub	G5/S5	X	X	X
Notorpis atherinouds	Emerald Shiner	G5/S5	X	X	X
Pimephales promelas	Fathead Minnow	G5/S5		X	X
Phoxinus neogaeus	Finescale Dace	G5/S5		X	X
Notemigonis crysoleucas	Golden Shiner	G5/S5	X		
Nocomis biguttatus	Hornyhead Chub	G5/S4		X	X
Etheostoma exile	Iowa Darter	G5/S5	X	X	
Micropterus salmoides	Largemouth Bass	G5/S5		X	
Percina caprodes	Logperch	G5/S5	X		
Rhinichthys cataractae	Longnose Dace	G5/S5	X	X	X
Cottus bairdi	Mottled Sculpin	G5/S5	X	X	X
Phoxinus eos	Northern Redbelly Dace	G5/S5	X	X	X
Margariseus margarita	Pearl Dace	G5/S5		X	X
Lepomis gibbosus	Pumpkinseed	G5/S5	X	X	X
Etheostoma caeruleum	Rainbow Darter	G5/S4		X	

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Whiskey Creek	Lovers Creek	Hotchkiss Creek
Osmerus mordax	Rainbow Smelt	G5/S5	X		
Oncorhynchus mykiss	Rainbow Trout	G5/SNA		X	
Nocomis micropogon	River Chub	G5/S4		X	
Ambloplites rupestris	Rock Bass	G5/S5	X	X	
Notorpis rubellus	Rosyface Shiner	G5/S4		X	
Notropis husonius	Sand Shiner	G5/S4			X
Notropis photgenis	Silver Shiner	G5/S2S3		X	
Cottus cognatus	Slimy Sculpin	G5/S5	X	X	
Micropterus dolomieu	Smallmouth Bass	G5/S5	X	X	
Notropis hudsonius	Spottail Shiner	G5/S5	X		
Campostoma anomalum	Stoneroller	G5/S4			X
Percopsis omiscomaycus	Trout-Perch	G5/S5			X

Global Rank: G5: Very common; demonstrably secure under present conditions; S5: Very Common; demonstrably secure under present conditions; S4: Common; usually more than 100 occurrences, usually not susceptible to immediate threats; S3: Rare to uncommon in Ontario; S2: Very rare in Ontario; SNR: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends; SNA: A conservation status rank is not applicable because the species is not a suitable target for conservation activities; S#S#: A numeric range rank is used to indicate any range of uncertainty about the status of the species or community.

4.4.1 Lovers Creek

Lovers Creek is considered a coolwater fishery according to the LSRCA and is known to support Brook Trout (*Salvelinus fontinalis*) in some areas. Lovers Creek is approximately 93.1 kilometres in total length draining an area of approximately 59.9 square kilometres. The unnamed tributary of Lovers Creek that transects the Project Study Area is approximately 3.5 kilometres in length, originating approximately 200 metres west of the proposed road alignment as shown in Figure 7a. Fish noted by LSRCA to occur within Lovers Creek are documented in Table 4-2.

Habitat conditions described by LGL Limited (2005) and confirmed by Hatch in 2017, indicate that the section of Lovers Creek within the Project Study Area does not sustain enough flow to support fish in general. However, it is anticipated this section does support downstream fish communities through water contribution and may possess limited seasonal utilization dependant on upstream movement barriers (LGL Limited, 2005).

Based on the field investigations completed on June 8, 2017 as well as previous habitat documentation, the section of Lovers Creek within the Project Study Area is described as a vegetated, defined channel approximately 0.5 metres in width with a bankfull width of approximately 2.5 metres. The channel possesses very little flow as noted by LGL Limited (2005) and observed on June 8, 2017. Grasses, sedges and ferns line the banks (refer to Photographs 1 and 2 of Figure 7a). Substrates were observed to be primarily silts and sands within the Project Study Area which is consistent with the low flow velocities and surrounding land-use.

4.4.2 Whiskey Creek

The proposed extension of Bryne Drive crosses the Main and North Branches of Whiskey Creek as shown in Figure 7a and 7b. Whiskey Creek is considered a coolwater fishery according to LSRCA and is known to support Brook Trout in some areas. Whiskey Creek is approximately 12 kilometres in length draining an area of approximately six (6) square kilometres.

The Main Branch of Whiskey Creek within the Project Study Area consists primarily of an existing concrete water control structure with the intake upstream of the Project Study Area. Whiskey Creek exits the structure approximately halfway through the proposed alignment. The downstream end is grated with concrete baffles installed to dissipate flows (refer to Photograph 3 of Figure 7a). Immediately downstream of the structure, Whiskey Creek is stable, with heavily vegetated banks of grasses, sedges and willow species and emergent vegetation within the channel (refer to Photograph 4 of Figure 7a). Installed baffles and instream vegetation effectively dissipate flows, creating a disposition area of sands (refer to Photograph 5 of Figure 7a) after which the creek transitions to a relatively long, stable, shaded, riffle segment with course rip rap substrates as it exits the Project Study Area (refer to Photograph 6 of Figure 7a).

The Main Branch of Whiskey Creek is a permanent watercourse potentially supporting limited coolwater fisheries. The high gradient portions contain a relatively abundant benthic invertebrate community likely contributing to the success of any present fish as well as any fish communities further downstream. Table 4-2 identifies, historic and recent species documented to inhabit Whiskey Creek (LSRCA, 2012). However, fish sampling completed in close proximity to the Project Study Area by LGL Limited in August 2005, and Azimuth Consulting in April 2003, did not capture any fish. As part of the City's Harvie Road/Big Bay Point Drive/Highway 400 Detailed Design Project, LGL Limited identified small bait fish

associated with coolwater thermal regimes within the Main Branch of Whiskey Creek as it relates to the Bryne Drive Project Study Area during their 2017 field investigations.

The North Branch of Whiskey Creek can be described as a natural channel, originating approximately 450 metres northwest of the existing Harvie Road culvert. Immediately upstream of Harvie Road, the creek is contained within a well defined and shaded channel, which is relatively stable, with abundant woody debris and void of shoreline vegetation due to shading from the White Cedar (*Thuja occidentalis)* canopy (refer to Photograph 7 of Figure 7b).

The bankfull width ranged from 0.5 to 1.5 metres with minimal water depths of approximately 10 centimetres. A few small pools less than one (1) metre in length or width possessed water at depths greater than 20 centimetres. Nearing the existing culvert, the channel gradient increases, the vegetation becomes more prevalent due to the increased sunlight penetration associated with the road clearing, and the substrate becomes coarser as a result of material used during the initial culvert installation (refer to Photograph 8 of Figure 7b). Similar to the upstream end, the downstream end of the culvert contains coarse material (refer to Photograph 9 of Figure 7b) creating a series of vertical drops expected to be a barrier to upstream fish movement (refer to Photograph 10 of Figure 7b). The North Branch continues approximately 150 metres before discharging into Whiskey Creek's Main Branch south of Harvie Road.

Upstream of the confluence, the North Branch of Whiskey Creek is expected to be an intermittent watercourse with limited fish usage. The lack of deep pools to sustain fish life during dry and winter periods combined with the barriers to upstream movement located downstream of the Harvie Road culvert are expected to be the limiting factors. The North Branch is however expected to contribute to downstream fisheries through hydraulic, nutrient and benthic invertebrate production.

There is evidence that that Brook Trout are successfully spawning and surviving in sections of Whiskey Creek (Main Branch) downstream of the Project Study Area, which is due to contributions of groundwater that moderate water temperatures (LSRCA, 2012). Shallow groundwater influences have historically been observed within the central portion of the drainage area in the Lackie's Bush area, and downstream to the confluence with Lake Simcoe (LSRCA, 2012). Flow conditions are permanent from Lackie's Bush downstream to Lake Simcoe, with intermittent and ephemeral conditions occurring upstream of Lackie's Bush owing to several factors including urban influences and stormwater management systems, as well as reductions in groundwater contributions. Though Brook Trout are very sensitive to disturbances and require the highest level of mitigation to protect their populations, the locations in which Brook Trout have been recorded are outside the Project Study Area, within the downstream reaches near the creek's outlet with Kempenfelt Bay.

4.4.3 Hotchkiss Creek

As previously noted, Hotchkiss Creek is presumed to be enclosed underground within the Project Study Area. Further identification of mitigation measures will be identified during detailed design, but impacts are expected to be limited. Figure 7c illustrates the reaches of Hotchkiss Creek presumed to be underground based on the 2017 field investigations. Photographs 11 and 12 of Figure 7c depict the eastern side of Essa Road facing south and north respectively.

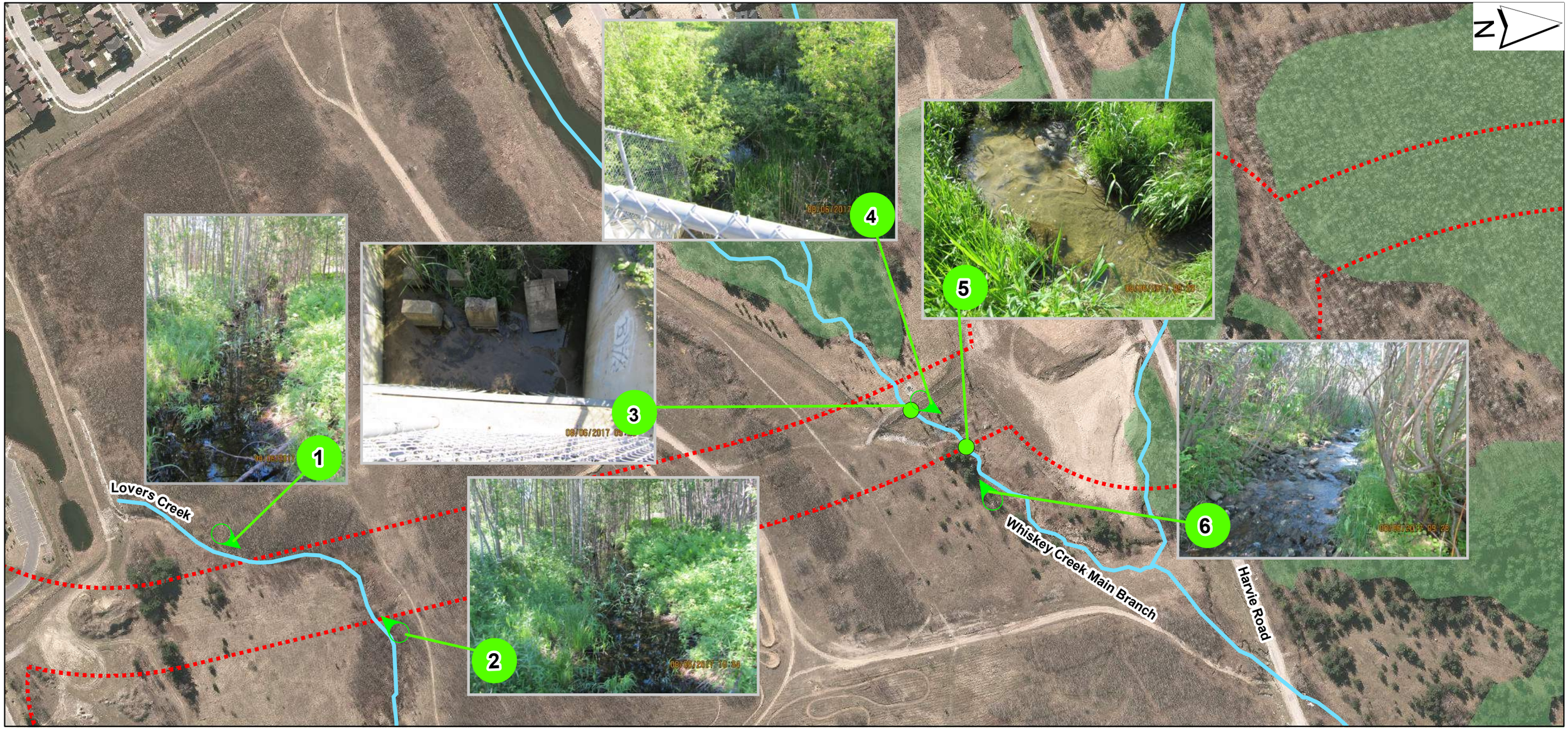

Figure 7a Bryne Drive Transportation Improvements Class Environmental Assessment: Fisheries Map

Bryne Drive Study Area

Wooded Area (County of Simcoe, 2016)

Watercourse

Photograph No.

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 20 40 80 120 160 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

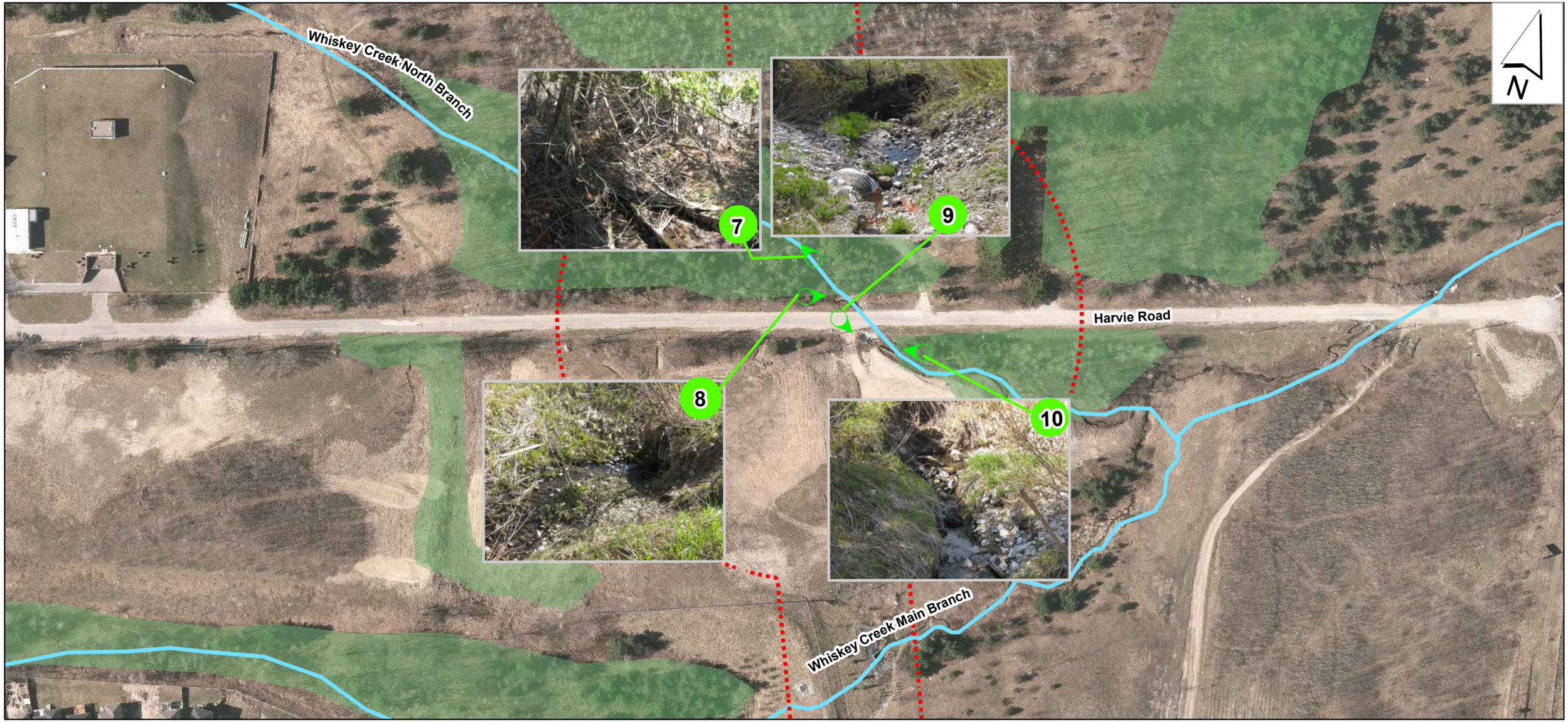

Figure 7b Bryne Drive Transportation Improvements Class Environmental Assessment: Fisheries Map

Bryne Drive Study Area

Wooded Area (County of Simcoe, 2016)

Watercourse

Photograph No.

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 20 40 80 120 160 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

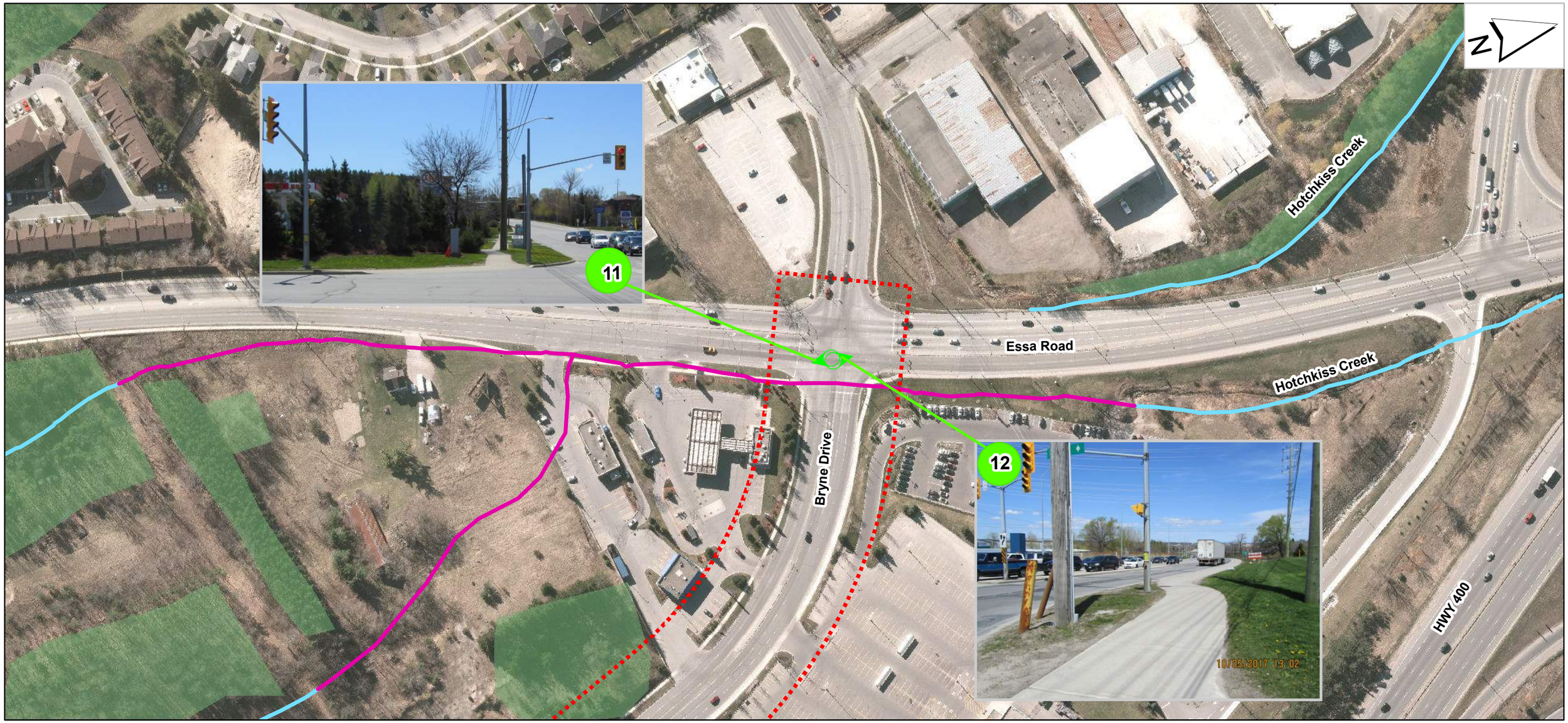

Figure 7c Bryne Drive Transportation Improvements Class Environmental Assessment: Fisheries Map

- Bryne Drive Study Area
- Photograph No.
- Wooded Area (County of Simcoe, 2016)
- Watercourse
- Watercourse not present presumed underground

*The information displayed is derived from sources with varying accuracies and all boundaries should therefore be considered approximate

0 20 40 80 120 160 Meters

Coordinate System: NAD 1983 UTM Zone 17N
Aerial Date: 2012, 2016

HATCH

4.5 Amphibian and Reptiles

Over the course of the Spring 2017 field investigations, Hatch biologists performed targeted amphibian surveys in addition to searching for herpetofauna habitat (i.e., snake hibernacula).

A review of the Ontario Reptile and Amphibian Atlas identified 22 species that are known to occur within the 10 kilometre X 10 kilometre squares containing the Project Study Area. This included five (5) species that are listed under the ESA (2007). Four (4) of the five are listed as special concern: Snapping Turtle (*Chelydria serpentina*), Northern Map Turtle (*Graptemys geographica*), Milksnake (*Lampropeltis triangulum*), and Common Five-lined Skink (Southern Shield Population) (*Plestiodon fasciatus*). The fifth species was identified as threatened: Blanding's Turtle (*Emydoisea blandingii*). The Blanding's Turtle observation was made in 2016 according to the atlas data in the 10 kilometre square 17PK01.

It is noted that habitat for the above species, with the exception of Milksnake was not identified within the Project Study Area. Additional information about SAR is provided in Section 4.8 of this Report.

4.5.1 Amphibian Breeding Survey Results

Amphibian breeding surveys were completed using the MMP Protocol (2008). However, it is noted that the first timing window for amphibian surveys (April 15 to April 30) was missed due to Project timing. Species were identified during the second (May 15 to May 30) and third (June 15 to June 30) timing windows, give or take a day or two. Surveys were completed on May 17 and June 14, 2017 beginning 30 minutes after sunset and completed before midnight. Three (3) minute survey counts were completed for both dates depicted in Figure 3. Table 4-2 below outlines the results for both surveys.

Table 4-3: Summary of amphibian survey results 2017

Date (2017)	Weather	Survey Locations			
		1	2	3	4
May 17	28°C; Clear skies; low winds	No calls – Level 1	No calls – Level 1	1 – Gray Tree Frog – Level 3	1 – Gray Tree Frog – Level 3
June 14	23°C; Clear skies; low winds	No calls – Level 1	No calls – Level 1	No calls – Level 1	No calls – Level 1

4.5.2 Expected Amphibian and Reptile Usage

Based on the survey results for amphibians, no life cycle dependant habitat is expected to occur within the Project Study Area, as limited observations were documented during the two (2) surveys completed. Although the first survey window was missed, those species (e.g., spring peeper) would still be calling during the second survey based on previous experience with amphibian surveys in the Barrie Region.

As noted above, there is no habitat within the Project Study Area that would support turtles. Though snakes tend to forage in all areas, including road corridors in search of food and cover, no snakes were observed during the 2017 field investigations. It is important to note that the observations made during the field investigation do not indicate absence of habitat and species occurrence outside of the proposed alignment.

4.6 Breeding Birds

According to the OBBA for the 10 kilometre X 10 kilometre squares that cover the Project Study Area, there are approximately 125 bird species known to inhabit the area. A number of these species are considered waterfowl and/or area sensitive species that require large transects of woodland within a minimum of 100 metre interior woodland habitat. Of the 125 species, nine (9) are listed under the ESA (2007) with six (6) considered threatened: Bank Swallow (*Riparia riparia*), Barn Swallow (*Hirundo rustica*), Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*), Chimney Swift (*Chaetura pelagica*), and Eastern Whip-poor Will (*Caprimulgus vociferus*). Six (6) are considered special concern: Grasshopper Sparrow (*Ammodramus savannarum*), Olive-sided Flycatcher (*Contopus cooperi*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Common Nighthawk (*Chordeiles minor*), Wood Thrush (*Hylocichla mustelina*) and Eastern Wood-pewee (*Contopus virens*). None of these species were observed within the Project Study Area during the 2017 field investigations. Additional information about SAR is provided in Section 4.8 of this Report.

Over the course of seven (7) field investigations, which included targeted SAR bird surveys, bird observations were recorded within the Project Study Area. A total of 12 locations were assessed during the field investigations in 2017, with a total of 43 different species visually and/or vocally observed to be within the Project Study Area as provided in Table 4-4. A 150 metre survey radius to each survey stop location was generally applied, and may vary at different survey locations depending on the terrain, noise, type of vegetative cover, and weather conditions. Please refer to Figure 4 for the survey locations.

Table 4-4: Summary of breeding bird survey results 2017

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Breeding Evidence
Empidonax alnorum	Alder Flycatcher	G5/S5B	S
Corvus brachyrhynchos	American Crow	G5/S5B	X
Spinus tristis	American Goldfinch	G5/S5B	P
Setophaga ruticilla	American Redstart	G5/S5B	S
Turdus migratorius	American Robin	G5/S5B	P
Icterus galbula	Baltimore Oriole	G5/S5B	X

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Breeding Evidence
Mniotilta varia	Black-and-white Warbler	G5/S5B	S
Coccyzus erythropthalmus	Black-billed Cuckoo	G5/S4B	S
Poecile atricapillus	Black-capped Chickadee	G5/S5B	S
Cyanocitta cristata	Blue Jay	G5/S5	H
Toxostoma rufum	Brown Thrasher	G5/S5B	S
Molothrus ater	Brown-headed Cowbird	G5/S4B	H
Bombycilla cedrorum	Cedar Waxwing	G5/S5B	H
Setophaga pensylvanica	Chestnut-sided Warbler	G5/S5B	P
Quiscalus quiscula	Common Grackle	G5/S5B	H
Geothlypis trichas	Common Yellowthroat	G5/S5B	S
Picoides pubescens	Downy Woodpecker	G5/S5B	S
Tyrannus	Eastern Kingbird	G5/S4B	H
Contopus virens	Eastern Wood-Pewee	G5/S5B	P
Sturnus vulgaris	European Starling	G5/SNA	P
Spizella pusilla	Field Sparrow	G5/S5B	S
Dumetella carolinensis	Gray Catbird	G5/S5B	S
Ardea herodias	Great Blue Heron	G5/S5B	X
Carpodacus mexicanus	House Finch	G5/SE	S
Passer domesticus	House Sparrow	G5/SE	H
Troglodytes aedon	House Wren	G5/S5B	S
Zenaida macroura	Mourning Dove	G5/S5B	H
Cardinalis	Northern Cardinal	G5/S5	S
Colaptes auratus	Northern Flicker	G5/S4B	S
Seiurus aurocapillus	Ovenbird	G5/S5B	S

Scientific Name	Common Name	Global G-Rank and Ontario S-Rank	Breeding Evidence
Setophaga pinus	Pine Warbler	G5/S5B	S
Vireo olivaceus	Red-eyed Vireo	G5/S5	S
Agelaius phoeniceus	Red-winged Blackbird	G5/S4	P
Larus delawarensis	Ring-billed Gull	G5/S5B	X
Bonasa umbellus	Ruffed Grouse	G5/S5	S
Melospiza melodia	Song Sparrow	G5/S5B	H
Vireo gilvus	Warbling Vireo	G5/S5B	S
Hylocichla mustelina	Wood Thrush	G5/S5B	S
Charadrius vociferus	Killdeer	G5/S5	P
Haemorhous purpureus	Purple Finch	G5/S5B	S
Cathartes aura	Turkey Vulture	G5/S4B	X
Sitta carolinensis	White-breasted Nuthatch	G5/S5	S
Setophaga petechia	Yellow Warbler	G5/S5B	P

Regional Conservation Status – Priority Landbird Sp

[1] Species listed as special concern within Ontario under the Endangered Species Act, 2007, as amended.

X: Observed: Species observed in its breeding season (no evidence of breeding). Presumed migrants should not be recorded; H: Possible Breeding: Species observed in its breeding season in suitable nesting habitat; S: Possible Breeding: Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat; P: Probably Breeding: Pair observed in their breeding season in suitable nesting habitat.

Global Rank: G5: Very common; demonstrably secure under present conditions; S5: Very Common; demonstrably secure under present conditions; S4: Common; usually more than 100 occurrences, usually not susceptible to immediate threats; S#B: Breeding status rank; S#N: Non-Breeding status rank; SE; Exotic, not believed to be a native component of Ontario's fauna.

The majority of birds observed were considered possible breeders within the Project Study Area. The number of birds is consistent with surveys completed in open field areas and disturbed previously disturbed areas. There were however, a number of the area sensitive species (i.e., warblers) noted within the woodlands particularly those north of Harvie Road that rely on larger transects of woodland to complete their life cycle.

All of the birds documented based on this NHIA are common to Southern Ontario. There were eight (8) species that had regional conservation status which included the Baltimore Oriole (*Icterus galbula*), Brown Thrasher (*Toxostoma rufum*), Black-billed Cuckoo (*Coccyzus erythropthalmus*), Eastern Kingbird (Tyrannus tyrannus), Eastern Wood-Pewee, Field Sparrow (*Spizella pusilla*), Northern Flicker (*Colaptes auratus*) and Wood Thrush (Ontario Partners in Flight (OPIF), 2008).

Two (2) of the birds are listed as special concern in Ontario, Eastern Wood-Pewee and Wood Thrush. The Eastern Wood-Pewee was vocally heard during all three (3) breeding bird surveys to the east of FOD3-1 (outside of the proposed alignment) and the Wood Thrush was heard during the June 28 breeding bird survey also to the east of FOD3-1 (outside of the proposed alignment). It is expected that based on the observations, both species were utilizing the more mature forest sections towards the east, in addition to the noted wetlands likely for foraging purposes. It is important to note, that species listed as special concern are not considered endangered or threatened but may become threatened or endangered due to a combination of biological characteristics and identified threats (e.g., habitat loss). As both species are listed as special concern, they do not receive species or habitat protection under the ESA (2007), however, based on the 2017 field observations, the woodland north of Harvie Road would be considered significant wildlife habitat for species of conservation concern as per the Ecoregion Criteria Schedule 6E.

No additional SAR birds were observed both audibly or visually during the 2017 field investigations.

4.7 Incidental Wildlife Observations

A review of the Atlas of Mammals of Ontario (1994) identified 18 species that are known to occur in proximity to the Project Study Area. This list included two (2) endangered species: Little Brown Myotis (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*). These species and their habitat are protected under the ESA (2007). Based on the field investigations completed in 2017, habitat for these two (2) species was deemed to be present within the Project Study Area. Additional information about SAR is provided in Section 4.8 of this Report.

Incidental wildlife sightings made outside of the formal field surveys are presented in Table 4-5.

Table 4-5: Incidental wildlife observations 2017

Scientific Name	Common Name	Observation	Global G-Rank and Ontario S-Rank
Sciurus carolinensis	Grey Squirrel	3 – visual in 2017	G5/S5
Sciurus carolinensis	Black Squirrel	2 – visual in 2017	G5/S5
Sylvilagus floridanus	Eastern Cottontail	2 – visual in 2017	G5/S5

Scientific Name	Common Name	Observation	Global G-Rank and Ontario S-Rank
Tamias striatus	Eastern Chipmunk	1 – visual in 2017	G5/S5
Tamiasciurus hudsonicus	Red Squirrel	1 – vocal in 2017	G5/S5
Odocoileus virginianus	White-tailed Deer	1 – fawn (visual) in 2017	G5/S5

Global Rank: G5: Very common; demonstrably secure under present conditions; S5: Very Common; demonstrably secure under present conditions.

4.8 Species-at-Risk

An ESA screening information request was submitted to the MNRF Midhurst District Office on March 3, 2017. In response, the MNRF provided a list of 16 SAR that relate to the three (3) separate projects being carried out concurrently by the City – Bryne Drive, Harvie Road and Essa Road. With respect to the Bryne Drive Project, all 16 SAR were identified to potentially occur within the Project Study Area based on habitat requirements. A summary of these species is provided below in Table 4-6 which identifies the species, their preferred habitat, and presence of noted habitat within the Project Study Area. Lastly, Table 4-6 also notes if the species was observed during the 2017 field investigations. Though the Wood Thrush (special concern) was not provided by the MNRF it was also observed within the Project Study Area during the 2017 field investigations.

4.8.1 Butternut Survey

An assessment of the Project Study Area to confirm the presence of endangered Butternut was completed. The Project Study Area was searched. Based on the assessment, a total of six (6) Butternuts were documented by Hatch, with an additional two (2) documented by LGL Limited during the 2017 field investigations. Due to the status and sensitivity of this species, exact locations are not provided within this Report, but details of exact locations are on file for further consultation with MNRF. The specimens observed were quite small in DBH (i.e., <10 centimetres). To facilitate further discussions with the MNRF and possible permitting requirements under the ESA (2007), a Butternut Health Assessment (BHA) is required for any Butternut located within or to be impacted by the Project.

Further to the investigations completed by Hatch and LGL Limited, information provided by Skelton Brumwell and Associates in September 2017 as part of an Environmental Impact Study (EIS) for Bell Media, revealed three (3) additional Butternuts within the woodlands north of Harvie Road. Butternuts are provided a 50 metre protective buffer in order to protect the individual tree, as well as the surrounding ecosystem that provides habitat.

Due to buffer requirements for endangered Butternut as part of the ESA and associated Regulations, further consultation with MNRF and coordination with Skelton Brumwell and

Associates related to Butternut will be completed during the detailed design phase as part of the permitting and approval process.

4.8.2 Eastern Whip-poor Will Survey

A total of three (3) evening surveys were completed for Eastern Whip-poor Will during good weather conditions. A summary of the surveys is provided in Table 4-7 below. As noted therein, no Eastern Whip-poor Will's were documented during the three (3) surveys.

Table 4-7: Summary of Eastern Whip-poor Will survey results 2017

Date (2017)	Weather	Survey Locations		
		1	2	3
May 17	28°C; Clear skies; low winds; Moon - 65.8%	No calls	No calls	No calls
June 2	18°C; Clear skies; low winds; Moon - 65.3%	No calls	No calls	No calls
June 14	23°C; Clear skies; low winds; Moon - 79.9%	No calls	No calls	No calls

4.8.3 Species-at-Risk Bat Survey

Surveys for SAR bats were completed by LGL Limited in Spring and Summer 2017 for the Bryne Drive Project. LGL Limited conducted two (2) nights of evening pedestrian surveys on June 8 and July 4 using a hand-held detector (Echo Meter Touch, Wildlife Acoustics) attached to a smart phone (with built in Kaleidoscope software developed by Wildlife Acoustics). Echolocation recordings were then compared to the North American library to assign bat calls to species identification. Based on the recordings of the hand-held detectors, no SAR bats were detected by LGL Limited.

Similar to Butternut, Skelton Brumwell and Associates also completed SAR bat surveys as part of their EIS for Bell Media. As part of their works, they installed passive acoustic bat detector units within the woodlands that include the Bryne Drive Project Study Area. Based on their preliminary data analysis in September 2017, occurrences on the detector noted the presence of Little Brown Myotis within the woodlands just east of the Project Study Area north of Harvie Road (outside the proposed alignment). Little Brown Myotis are considered endangered in Ontario, whereby the species and their habitat are provided protection. Due to these findings and preliminary analysis, further coordination with Skelton Brumwell and Associates and MNRF will be needed during detailed design, as the woodlands are continuous with the Bryne Drive Project Study Area. Again, similar to Butternut, due to the sensitivity of SAR, no maps with the location of Myotis habitat has been provided within this Report.

Table 4-6: Species-at-Risk records provided by the MNRF*

Scientific Name	Common Name	SARO	Preferred Habitat	Habitat Present within the Project Study Area	Conclusions of Field Investigations 2017
Juglans cinerea	Butternut	END	Commonly associated with riparian habitat with rich moist, well-drained soils. They are intolerant to shade.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	A total of six (6) Butternut's were observed by Hatch and additional two (2) were observed by LGL Limited. An additional consultant, Skelton Brumwell and Associates also completed a search of the woodlands as part of an EIS for Bell Media. Skelton Brumwell and Associates documented an additional three (3) Butternuts within the woodlands north of Harvie Road. A Butternut Health Assessment and further coordination with Skelton Brumwell and Associates and consultation with MNRF will be completed during detailed design.
Contopus virens	Eastern Wood-Pewee	SC	Commonly found in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. Mostly found within intermediate-age mature forest stands with very little understory.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	Eastern Wood-Pewee's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species.
Caprimulgus vociferous	Eastern Whip-poor Will	THR	Usually found in areas with a mix of open and forested areas, such as	Yes – based on aerial imagery, habitat for this	No Eastern Whip-poor Will's were documented during the targeted SAR surveys for the species.

Scientific Name	Common Name	SARO	Preferred Habitat	Habitat Present within the Project Study Area	Conclusions of Field Investigations 2017
			savannahs, open woodlands or where there are openings in mature deciduous, coniferous and mixed forests.	species is present within the Project Study Area.	
Melanerpes erythrocephalus	Red-headed Woodpecker	SC	Commonly found in open woodland and woodland edges and is often found in parks, golf courses and cemeteries.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Red-headed Woodpecker's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species.
Myotis lucifugus *Myotis leibii* *Myotis septentrionalis* *Perimyotis subflavus*	SAR bats: Little Brown Myotis Eastern Small-footed Myotis Northern Myotis Tri-colored Bat	END	Roosting sites are within trees and buildings. Rock outcrops, buildings, under bridges, caves, mines and hollow trees. Roosts under loose bark and in cavities of trees. Roosts in a variety of forested habitats – but mainly in older forests and occasionally in barns and other structures.	Yes – based on aerial imagery, habitat for these species are present within the Project Study Area.	No SAR bats were documented by LGL Limited during their acoustic monitoring within the Project Study Area. Skelton Brumwell and Associates documented occurrence of Little Brown Myotis to the east just outside of the Bryne Drive Project Study Area as part of their EIS for Bell Media. Due to the preliminary nature of the data, and protection of this species and habitat, further coordination with Skelton Brumwell and Associates and consultation with MNRF will be needed during detailed design.

Scientific Name	Common Name	SARO	Preferred Habitat	Habitat Present within the Project Study Area	Conclusions of Field Investigations 2017
Hirundo rustica	Barn Swallow	THR	Commonly associated with human structures such as buildings, open barns, bridges and culverts where their mud nest-cups can be built.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Barn Swallow's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species
Chordeiles minor	Common Nighthawk	SC	Traditionally associated with open areas with little to no ground vegetation, but have been known to be along gravel roads and railways, in urban parks, nesting in cultivated fields, orchards and mine tailings	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Common Nighthawks's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species
Dolichonyx oryzivorus	Bobolink	THR	Commonly found in areas with medium to tall grass – meadows or tall grass prairies.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Bobolink's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species.
Sturnella magna	Eastern Meadowlark	THR	Primarily in moderately tall grasslands, such as pastures and hayfields – can also be found in alfalfa fields, weedy borders of croplands, roadsides, orchards, overgrown fields and other open areas.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Eastern Meadowlark's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species.

Scientific Name	Common Name	SARO	Preferred Habitat	Habitat Present within the Project Study Area	Conclusions of Field Investigations 2017
Ammodramus henslowii	Henslow's Sparrow	END	Associated with abandoned farm fields, pastures and wet meadows.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Henslow's Sparrow's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species.
Vermivora chrysoptera	Golden-winged Warbler	SC	Tends to nest in shrubby areas that are surrounded by mature forests – locations of recent disturbance which include, fields, hydro and utility corridors and logged areas.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Golden-winged Warbler's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species.
Danaus plexippus	Monarch	SC	Caterpillars utilize milkweed plants found in meadows and open areas. Adult butterflies found in diverse areas where nectar from wildflowers is present.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Monarch's were observed during the incidental wildlife observations along the road corridor.
Asio flammeus	Short-eared Owl	SC	Tends to be found in large grasslands and marshes and tundra habitats.	Yes – based on aerial imagery, habitat for this species is present within the Project Study Area.	No Short-eared Owl's were observed within the Project Study Area during the breeding bird and targeted SAR surveys for the species.

*This table only reflects those species that had habitat within the Project Study Area. For the full list of SAR from the ESA screening refer to Appendix A.
END: Endangered; THR: Threatened; SC: Special Concern.
SARO: Species-at-Risk in Ontario List is the official list of endangered, threatened, special concern and extirpated animals and plants in Ontario. Those species listed as endangered, threatened, or extirpated are protected under the ESA (2007) as amended.
Source: Ministry of Natural Resources and Forestry Endangered Species Screening results April 13, 2017 (refer to Appendix A); Government of Ontario: https://www.ontario.ca/page/species-risk.

5. Key Natural Heritage Features

Key natural heritage features are defined as those that contain wetlands, fish habitat, woodlands, valleylands, habitat for endangered and threatened species, wildlife habitat, and ANSIs. All of these features are important for their environmental and social values as defined within the *Planning Act* and explained within the PPS (MMAH, 2014).

5.1 Significant Wetlands and Fish Habitat

Wetlands are defined as areas that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface (Lee et al., 1998). A significant wetland is an area identified as a PSW by the MNRF using evaluation procedures established by the Province, as amended from time to time (Lee et al., 1998).

Fish habitats are identified as spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly and or indirectly in order to carry out their life processes (Lee et al., 1998). Fish habitats commonly occur in many natural heritage areas such as wetlands, valleylands, woodlands and ANSIs.

Based on the review of applicable background materials, no PSWs or unevaluated wetlands have been mapped for the Project Study Area by the LSRCA, the MNRF, Simcoe County or the City. During the 2017 field investigations, two (2) wetland communities SWCM1-1 – White Cedar Mineral Coniferous Swamp and MAMM1-2 – Cattail Graminoid Mineral Meadow Marsh Type were identified with the Project Study Area (refer to Figure 6a and 6b). Due to this classification, additional follow-up with LSRCA to confirm requirements under their Ecological Offsetting Plan (2017) as it relates wetland communities will be required during detailed design.

Fish habitat has been identified by the LSRCA within Whiskey Creek (Main and North Branch) and Lovers Creek. Both watercourses exhibit signs of fish barriers, either at the culverts along Harvie Road, or debris material within the woodland communities. The LSRCA did document fish within Hotchkiss Creek, however, as noted, the section of Hotchkiss Creek within the Project Study Area was not observed, as it is presumed to be enclosed underground.

As the Main Branch of Whiskey Creek and Lovers Creek are known to support Brook Trout downstream of the Project Study Area, both creeks thermal regimes would follow the cool-cold water timing window for Project construction. As such, in-water works can be completed between July 16 to September 30 in any given year for both watercourses unless otherwise noted by MNRF or DFO. As the North Branch of Whiskey Creek is connected to the Main Branch, it too would follow a cool-cold water timing window as noted above.

5.2 Woodlands

Woodlands are treed areas that provide environmental or economic benefits such as erosion prevention, water retention, recreation and the sustainable harvest of woodland products. Woodlands include treed areas, woodlots or forested areas, and vary in their level of significance (MMAH, 2014). Woodland significance is typically determined by evaluating key criteria which relate to woodland size, ecological function, uncommon woodland species, and economic and social value. It is noted that larger woodlands are more likely to contain a greater diversity of plant and animal species and communities than smaller woodlands, and are better buffered against edge effects or agricultural and urban activities.

Woodlands have been mapped by both the LSRCA and MNRF, as well as by Simcoe County and the City of Barrie within the Project Study Area. According to the City of Barrie's Urban Forestry Department, the woodlands north and south of Harvie Road are regulated (see Figure 2a). Woodlands that are considered regulated are provided protection under the City's Tree Preservation By-law 2014-1150. This By-law's in place to regulate the injuring or destruction of trees within woodlots and only applies to trees that are part of a woodlot (i.e., woodlands) of ½ acre in size or larger. Due to this classification, additional follow-up with the City's Urban Forestry Department is recommended during detailed design as well as with LSRCA to confirm requirements under their Ecological Offsetting Plan (2017) as it relates to woodland communities.

Woodland communities based on the 2017 field observations include: FOD3-1 – Dry-Fresh Poplar Deciduous Forest, FOD5 – Dry-Fresh Sugar Maple Forest, FOMM4-2 - Dry-Fresh White Cedar – Poplar Mixed Forest, SWCM1-1 – White Cedar Mineral Coniferous Swamp, WODM4 - Dry-Fresh Deciduous Woodland, WODM5 – Fresh-Moist Deciduous Woodland, FOMM2-3 – Dry-Fresh White Pine – Hardwood Mixed Forest and FODM8-1 – Fresh-Moist Deciduous Forest. Each of these woodlands contained native and non-native species, with the majority of the trees comprised of native species.

Given the size of the woodlands on the north side of Harvie Road (i.e., the amount of interior woodland habitat provided was greater than 10 hectares), coupled with its species composition (i.e., dominantly native), this woodland would be considered significant based on the MNRF Natural Heritage Reference Manual (2010). Additional confirmation of significance should be sought out with the City's Urban Forestry Department. Conversely, the woodlands to the south of Harvie Road are too small, and although regulated, would not be considered significant due to their size, age class, and species composition.

5.3 Valleylands

The PPS (MMAH, 2014) identifies significant valleylands as a "natural area that occurs in a valley or landform depression that has water" for some period of the year. Based on the

observations during the 2017 field investigations, there are no valleylands within the Project Study Area.

5.4 Areas of Natural and Scientific Interest

The PPS (2014) defines ANSIs as areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education. The ANSI program designates natural features in two (2) broad biophysical categories, earth science (geological) or life science (biological) depending on the features present. Specifically, a life science ANSI can contain specific types of forests, valleys, prairies and/or wetlands of ecological importance (MNRF, 2010). That is, they represent examples that are relatively undisturbed in terms of vegetation community and/or landforms associated with that vegetation (MNRF, 2010). Those listed as provincially significant life science ANSIs are the best examples of that particular natural heritage feature in the Province (MNRF, 2010). In contrast, earth science ANSIs are representative examples of geological processes in Ontario (i.e., exposed bedrock on road cuts, fossils and landforms) (MNRF, 2010).

Based on review of the MNRF Make a Map: Natural Heritage Areas and NHIC Data, there are no ANSIs mapped within the Project Study Area.

5.5 Wildlife Habitat

Wildlife habitat is defined as areas where plants, animals and other organisms live and are able to find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitat of concern may include areas where species concentrate at a point in their annual life cycle, and those areas which are important to migratory and non-migratory species.

A wildlife habitat is considered “significant” if it is deemed ecologically important in terms of feature, function, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System (MMAH, 2014). According to the Significant Wildlife Habitat Ecoregion Criteria Schedules for Ecoregion 6E (MNRF, 2015), significant wildlife habitat may consist of:

- Seasonal concentration areas for animals;
- Rare vegetation communities;
- Specialized habitat for wildlife; and
- Habitat for species of conservation concern.

Seasonal Concentration Areas may consist of Waterfowl Stopover and Staging Areas, Bat Hibernacula, Reptile Hibernacula. Due to the high level of disturbance (i.e., active farming south of Harvie Road and heavily vegetated areas north of Harvie Road) seasonal

concentration areas associated with the Project Study Area were observed to be limited based on Hatch's 2017 field investigations. As noted previously, LGL Limited completed acoustic monitoring within the woodlands north of Harvie Road in order to detect bat maternity colony presence (seasonal concentration area). Based on their two (2) surveys, no SAR bats were identified, however a number of non-SAR bat species (Big Brown Bat) were noted, thus qualifying the woodland north of Harvie Road as significant wildlife habitat supporting a seasonal concentration area for bat maternity roosting.

In addition to the above, information provided by Skelton Brumwell and Associates in September 2017 as part of their EIS for Bell Media, documented one (1) species of SAR bat (Little Brown Myotis) in the woodlands north of Harvie Road, just east of the proposed alignment. They also documented a number of non-SAR bats throughout the north woodland area similar to LGL Limited. Little Brown Myotis are considered endangered in Ontario, whereby the species and their habitat are provided protection. Due to these findings, the continuity between woodland communities, and number of non-SAR bats, the findings from Skelton Brumwell and Associates further affirm the usage of the woodland north of Harvie Road as significant wildlife habitat for bat maternity roosting.

Rare Vegetation Communities are those that contain provincially rare vegetation communities, or those which are rare to the area. Based on a review of the vegetation observed, none of the communities were considered rare.

Specialized Habitats for Wildlife consist of those which support wildlife that have highly specific habitat requirements (e.g., nesting habitat – vernal pools), those areas that contain high species and community diversity and those which provide habitat that can greatly enhance species survival (MNRF, 2000).

Based on the documented species via targeted surveys and incidental observations, as well as vegetation characteristics specialized habitat for wildlife associated with the Project Study Area was observed to be limited.

Habitats for Species of Conservation Concern are those that contain species that are rare or substantially declining, or have high percentage of their global population in Ontario and are rare or uncommon in the planning area. These habitats are often associated with special concern species as identified under the ESA or the SARO list.

The MNRF provided an ESA screening and identified six (6) species of special concern that have the potential to occur: the Eastern Wood-Pewee, Common Nighthawk, Golden-winged Warbler (*Vermivora chrysoptera*), Monarch (*Danaus plexippus*), Red-headed Woodpecker and the Short-eared Owl (*Asio flammeus*). Breeding Bird surveys and incidental wildlife sightings completed during the 2017 field investigations revealed the presence of Eastern Wood-Pewee and Wood Thrush (a species not previously identified by MNRF). Both species were identified within the large woodland north of Harvie Road, but outside of the Project

Study Area towards the more mature woodlands along the eastern side. Due to their occurrence within the woodland north of Harvie Road, and the absence of gaps within the woodland communities, the woodland would qualify for significant wildlife habitat for species of conservation concern. Therefore, significant wildlife habitat for species of conservation concern is identified for the Bryne Drive Project.

5.5.1 Wildlife Movement Corridors

Wildlife movement corridors are habitats that link two (2) or more other wildlife habitats that are critical to the maintenance of a population of a particular species or group of species. The key ecological function of wildlife movement corridors is to enable wildlife to move between areas of significant habitat or core natural areas with minimum mortality. Wildlife movement corridors can provide critical links between shelter, feeding, watering, growing and nesting locations (Lee et al., 1998).

Wildlife and/or habitat corridors can help increase genetic diversity and aid in the re-establishment of populations after random events such as fires or disease outbreaks. These corridors can help to increase biodiversity and population stabilization (Lee et al., 1998).

According to the Significant Wildlife Habitat Ecoregion Criteria Schedules for Ecoregion 6E (MNRF, 2015), wildlife movement corridors to be considered include amphibian and deer movement corridors.

Based on the Criteria Schedule 6E, amphibian movement corridors are determined based on identifying significant breeding habitat. Based on the limited observations during the two (2) surveys for amphibians completed in 2017, the Project Study Area is not deemed to be significant breeding habitat. Therefore, amphibian movement corridors are deemed absent for the Project Study Area.

According to feedback received from the MNRF, there are no deer wintering habitats mapped for the Project Study Area. Thus, there are no deer movement corridors deemed present within the Project Study Area.

6. Identification and Assessment of Alternatives

An updated traffic analysis which incorporated new developments proposed within the Project Study Area since the completion of the MMATMP in 2014 was carried out as part of the Class EA Study. As a result, it was recommended that the south and north sections of Bryne Drive connect. It is important to note that, the intersection of Harvie Road with Bryne Drive had previously been determined through the BDMPU completed in 2016, as well as part of the Harvie Road/Big Bay Point Drive/Highway 400 EA and Detailed Design. From Caplan Avenue north to Harvie Road, the alignment alternatives cannot be shifted to the west, given the location of the proposed future Stormwater Pond A, nor can the alignments be shifted to the east, given the location of the future Bryne Drive/Harvie Road intersection. As such,

alternative alignments were only considered north of Harvie Road, with the basis of the recommendation from the BDMPU (2016) used as a starting point. Alternative alignments for the north section of Bryne Drive, north from Harvie Road towards the cul-de-sac approximately 650 metres south of Essa were based on the recommended 3R alignment from the BDMPU (2016). The BDMPU (2016) noted that the alternative alignments consider shifts to the west and east of the identified future centre-line. Therefore, the Preferred Solution included widening to four (4) lanes including a TWLTL, or continuous median through the proposed alignment. The Preferred solution will also include the provision of bike lanes and sidewalks within a proposed 34 metre future ROW.

As part of the Class EA, four (4) design concepts will be assessed for only those areas north of Harvie Road, as there are no alternative alignments for the proposed Bryne Drive alignment south of Harvie Road (from Caplan north to Harvie Road) as previously noted. The four (4) design concepts include:

- Alternative 1 – do nothing;
- Alternative 2 – shifting to the west;
- Alternative 3 – along a proposed centre-line as determined by the BDMPU (2016); and
- Alternative 4 – shifting to the east.

With the exception of Alternative 1 (do nothing), the three (3) remaining design concepts will have similar cross-sections and will be implemented using similar construction methods. An assessment of the generalized impacts associated with the proposed works, combined with the prescribed mitigation measures to avoid or minimize the anticipated impacts on the natural heritage environment is summarized in Table 6-1.

Table 6-1: Generalized impacts and proposed mitigation and monitoring

Activity	Feature	Potential Impacts	Mitigation	Monitoring
Pre-Construction - land clearing, site preparation	Topography and Soils	• Changes to soil moisture. • Increased erosion and soil compaction. • Changes to drainage and surface runoff.	• Minimize footprint disturbance to the extent possible. • Maintain existing stormwater strategies (as required). • Prepare an erosion and sediment control (ESC) plan in accordance with the Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Control Guidelines for Urban Construction (2006). • Minimize soil exposure - restore or stabilize areas using erosion matting as work progresses. • Schedule work to avoid peak runoff volumes (i.e., during spring freshet). • All ESC measures to remain in place until all areas associated with construction activities have been stabilized.	• Inspect ESC measures after installation and before construction to ensure they were installed in accordance with specifications. • Monitor construction areas and ESC measures daily and prior to and immediately after precipitation events to ensure they are functioning according to design details and are maintained throughout construction.
	Vegetation	• Changes to overall tree cover and vegetation composition. • Introduction of invasive (non-native) species. • Impacts to endangered Butternut.	• Minimize footprint disturbance to the extent possible. • Minimize soil exposure - restore or stabilize areas using erosion matting as work progresses. • Avoid impacts within 50 metres of identified Butternut observed in the Project Study Area. Further consultation and assessment during detailed design will be required for the species. • Provide restoration and/or compensation using native, non-invasive seed mix, trees and shrubs (as required). All work zones to be clearly identified on design drawings. • Provide detailed clearing, ESC and restoration plans.	• Pre-construction clearing will be monitored to ensure clearing activities are completed in accordance with approved and specified work zones. • Inspect tree protection and ESC measures after installation and before construction to ensure they were installed in accordance with specifications. • If clearing works will be within 50 metres of a Butternut, the tree should be monitored throughout clearing activities to ensure no impacts to its survival occur as a result of the Project. Additional consultation with MNRF will

Activity	Feature	Potential Impacts	Mitigation	Monitoring
			• Clearly identify stockpile and laydown/staging areas on detailed drawings. • All trees shall be protected in accordance with the City's Tree Protection Manual (2010), Public Tree By-law (2014-116) and the Tree Preservation By-law (2014-115). • Tree protection to be installed prior to construction works. • Those areas designated as tree protection zones (TPZs) are to be considered "no-go" zones, whereby no stockpiles, storage materials or grade changes shall occur within its' boundary.	determine any additional monitoring requirements during detailed design. •
	Fish and Fish Habitat and Watercourses	• Impacts to fisheries and fish habitat within Whiskey Creek and Lovers Creek. • Increase in sediment loading into Whiskey Creek and Lovers Creek and roadside ditches. • Depending on design, potential for impacts to Hotchkiss Creek.	• Develop and implement an ESC Plan. • Designate areas for equipment storage a minimum of 30 metres away from both the Main and North Branches of Whiskey Creek, Lovers Creek, and Hotchkiss Creek or roadside ditches that outlet either sections. • Establish a spill prevention plan. • Prepare a fish rescue plan. • Ensure pumps have proper intake screens to prevent fish from entrainment or impingement.	• Inspect ESC measures after installation and before construction to ensure they were installed in accordance with specifications. • Monitor construction areas and ESC measures daily and prior to and immediately after precipitation events ensure they are functioning according to design details and are maintained throughout construction. • Inspect pumps prior to construction to ensure equipment is ready to begin Project works.
	Wildlife	• Changes to wildlife dynamics (i.e., attract different species). • Impacts to nesting birds protected under the MBCA. • Changes and impacts to significant wildlife habitat.	• Minimize footprint disturbance to the extent possible. • Maintain woodland size north of Harvie Road as much as possible to meet 100 metres of interior woodland habitat for area sensitive species.	• Monitor pre-construction clearing activities to ensure wildlife are not impacted. • Monitor nests as needed (e.g., daily) until inactive.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
			• Maintain woodland as much as possible to minimize impacts to seasonal concentration areas for bat maternity roosting. Consult with MNRF to determine best strategy for clearing in relation to bat and life cycle requirements. • Restore area to existing or better condition with native, non-invasive plant materials. • Avoid clearing during the breeding bird window - April 1 to August 31. If not possible, a bird nest survey by a qualified avian biologist should be conducted to determine presence and locations of active nests prior to construction. Bird nest surveys should be completed immediately prior to clearing events. If a nesting migratory bird is identified within or adjacent to the construction site, the contractor must stop work within the immediate area and contact the contract administrator for next steps.	
	Species-at-Risk (SAR)	• A total of six (6) endangered Butternut were documented by Hatch and two (2) identified by LGL Limited during 2017 field investigations. Additional details provided by Skelton Brumwell and Associates revealed three (3) more Butternut within the woodlands north of Harvie Road. • Two (2) species of conservation concern, Eastern Wood-Pewee and Wood Thrush were noted	• Minimize impacts to the woodland north of Harvie and tree line south of Harvie as much as possible. • Avoid impacts within 50 metres of identified Butternuts observed within the Project Study Area. Further consultation and assessment during detailed design will be required for the species. • If additional SAR are encountered during construction, works within the immediate area must cease and MNRF Midhurst District office must be notified immediately.	• Monitoring requirements for Little Brown Myotis will be provided following future consultation with MNRF during detailed design. • If clearing works will be within 50 metres of a Butternut, the tree should be monitored throughout clearing activities to ensure no impacts to its survival occur as a result of the Project. Additional consultation with MNRF will determine any additional monitoring requirements during detailed design.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
		within the woodlands north of Harvie Road. • Data provided by Skelton Brumwell and Associates in September 2017, noted endangered Little Brown Myotis within the woodlands just adjacent to Harvie Road just outside the Project Study Area. Further consultation with MNRF will determine mitigation requirements for these species during detailed design.	• MNRF will prescribe additional information relating to Little Brown Myotis in relation to the Bryne Drive Project.	• If additional SAR are encountered, monitoring will follow proper protocols as identified by MNRF and in accordance with the *Endangered Species Act*, (ESA), 2007 and associated Regulations.
Construction	Topography and Soils	• Changes to drainage and surface runoff. • Grading and soil disturbance during construction can lead to erosion and sedimentation. • Stockpiled materials, equipment or construction activities may encroach on natural areas beyond the proposed impact areas which may cause greater soil compaction.	• Develop and implement an ESC plan. • Minimize footprint disturbance to the extent possible. • Maintain existing stormwater strategies (as required). • Minimize soil exposure - restore or stabilize areas using erosion matting as work progresses. • Schedule work to avoid peak runoff volumes (i.e., during spring freshet). • All ESC measures to remain in place until all areas associated with construction activities have been stabilized.	• Monitor construction areas and ESC measures daily and prior to and immediately after precipitation events to ensure they are functioning according to design details and are maintained throughout construction.
	Vegetation	• Stockpiled materials, equipment or construction activities may encroach on natural areas beyond the proposed impact areas which may cause greater vegetative loss.	• Minimize footprint disturbance to the extent possible. • Minimize soil exposure - restore or stabilize areas using erosion matting as work progresses. • Provide restoration using native, non-invasive seed mix, trees and shrubs (as	• Monitor construction areas, tree protection and ESC measures daily and prior to and immediately after precipitation events to ensure they are functioning according to design details and are maintained throughout construction.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
		• Disturbed areas as a result of site clearing activities may allow for invasive species to be introduced and spread throughout natural areas, which may prevent natural species from re-establishing. • Dust from work activities has the potential to settle on adjacent vegetation. • Impacts to endangered Butternut.	required). All work zones to be clearly identified on design drawings. • Ensure stockpile and staging/laydown areas are in designated areas. • All trees shall be protected in accordance with the City's Tree Protection Manual (2010), Public Tree By-law (2014-116) and the Tree Preservation By-law (2014-115). • Those areas designated as tree protection zones (TPZs) are to be considered "no-go" zones, whereby no stockpiles, storage materials or grade changes shall occur within its' boundary. • Use dust suppressants during construction (e.g., water trucks). • Avoid impacts within 50 metres of identified Butternut observed just north of the Project Study Area. Further consultation and assessment during detailed design will be required for the species.	• If construction works will be within 50 metres of a Butternut, the tree should be monitored throughout construction to ensure no impacts to its survival occur as a result of the Project. Additional consultation with MNRF will determine any additional monitoring requirements during detailed design.
	Fish and Fish Habitat and Watercourses	• Contamination of surface waters due to the unplanned release or discharge of deleterious substances to the environment, including fuels (diesel and propane), lubricants (engine oil, transmission oil, etc.), and coolants (ethylene glycol). • Increased erosion and sedimentation due to adjacent construction works. • Culvert replacement at the Main Branch and North Branch of Whiskey Creek and that for	• Develop and implement an ESC Plan. • Designate areas for equipment storage a minimum of 30 metres away from both the Main and North Branches of Whiskey Creek, Lovers Creek or roadside ditches that outlet either sections. • Vehicle handling, fueling and fuel storage are to be conducted in accordance with the *Technical Standards and Safety Act* (Ontario Regulation 217/01) which is administered by the Ontario Technical Standard and Safety Authority (TSSA). • Establish a spill prevention plan.	• Monitor construction areas during dewatering activities as required. • Monitor during construction activities and relocate fish as necessary in accordance with the Wildlife Scientific Collectors Permit (to be obtained during detailed design). • Monitor construction areas and ESC measures daily and prior to and immediately after precipitation events ensure they are functioning according to design details and are maintained throughout construction.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
		Lovers Creek may have the potential to harm fish and fish habitat due to near/in-water work. • Dust from work activities has the potential to settle in Whiskey Creek and Lovers Creek, and depending on design there is potential to impact Hotchkiss Creek.	• All deleterious substances and stockpiled materials should be stored and used in a manner which prevents substances from entering ditches and both the Main Branch and North Branch of Whiskey Creek, Lovers Creek and Hotchkiss Creek. • All equipment refueling and maintenance should be completed in a designated area. • Complete in-water works as per respective timing window between July 16 to September 30 in any given year. • Complete all culvert works in the dry using temporary water management systems to isolate the work area from active flows. • Prepare a fish rescue plan. • Ensure pumps have proper intake screens to prevent fish from entrainment or impingement. • Install open bottom culvert. • Use dust suppressants during construction (e.g., water trucks).	• All spills to be reported immediately to the Ontario Spills Action Centre in accordance with reporting requirements to 1-800-268-6060. • Monitor spill kits to ensure supplies are available and replenished as necessary. • Monitor dust.
	Wildlife	• Interaction with wildlife. • Dust from work activities has the potential to settle on adjacent vegetation and may disrupt wildlife and their habitat. • Noise from construction may disrupt wildlife and their life cycle processes (e.g., predator calls). • Changes and impacts to significant wildlife habitat.	• Develop and implement an ESC Plan, including wildlife exclusion measures. • Provide wildlife crossing passage in culvert. • Install bat boxes/motels as part of restoration and/or compensation efforts. • Use dust suppressants during construction (e.g., water trucks). • Maintain woodland size north of Harvie Road as much as possible (i.e., minimize disturbance as much as possible) to meet 100 metres of interior woodland habitat for area sensitive species.	• Monitor during construction activities and relocate wildlife as necessary in accordance with the Wildlife Scientific Collectors Permit (to be obtained during detailed design). • Monitor dust and noise levels and mitigate accordingly.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
			• Maintain woodland as much as possible to minimize impacts to seasonal concentration areas for bat maternity roosting. Consult with MNRF to determine best strategy for clearing in relation to bat and life cycle requirements. • Follow noise prevention measures as identified during detailed design and respective City's Noise By-law 2017-017 (as required).	
	Species-at-Risk (SAR)	• A total of six (6) endangered Butternut were documented by Hatch and two (2) identified by LGL Limited during 2017 field investigations. Additional details provided by Skelton Brumwell and Associates revealed three (3) more Butternut within the woodlands north of Harvie Road. • Two (2) species of conservation concern, Eastern Wood-Pewee and Wood Thrush were noted within the woodlands north of Harvie Road. • Data provided by Skelton Brumwell and Associates in September 2017, noted endangered Little Brown Myotis within the woodlands just adjacent to Harvie Road just east of the Project Study Area. Further consultation with MNRF will determine mitigation	• Minimize impacts to the woodland north of Harvie and tree line south of Harvie as much as possible. • Avoid impacts within 50 metres of identified Butternuts observed within the Project Study Area. Further consultation and assessment during detailed design will be required for the species. • If additional SAR are encountered during construction, works within the immediate area must cease and MNRF Midhurst District office must be notified immediately. • MNRF will prescribe additional information relating to Little Brown Myotis in relation to the Bryne Drive Project.	• Monitoring requirements for Little Brown Myotis will be provided following future consultation with MNRF during detailed design. • If construction works will be within 50 metres of a Butternut, the tree should be monitored throughout construction to ensure no impacts to its survival occur as a result of the Project. Additional consultation with MNRF will determine any additional monitoring requirements during detailed design. • If additional SAR are encountered, monitoring will follow proper protocols as identified by MNRF and in accordance with the *Endangered Species Act*, (ESA), 2007 and associated Regulations.

Activity	Feature	Potential Impacts	Mitigation	Monitoring
		requirements for these species during detailed design.		
Operation and Maintenance	Topography and Soils	• If upgrades or future repair (e.g., re-paving, culvert repair) are required may require in-water works and/or excavation activities similar to those experienced during construction.	• Upgrades and/or future repair to be completed in accordance with applicable mitigation measures as identified during the construction activity phase. • All required permitting and/or approvals to be obtained as required.	• Monitoring will be completed subject to the scale of maintenance work.
	Vegetation	• Trees adjacent to the ROW may need to be pruned or removed.	• Tree pruning to be kept to a minimum and shall be completed by a qualified tree care professional.	• Monitoring will be completed subject to the scale of maintenance work.
	Fish and Fish Habitat and Watercourses	• Fuel spills or other hazardous substances during operation and/or maintenance could affect water quality and associated fish and fish habitat. • Increased road salt due to increase in surface area may cause increased chloride loading into Whiskey Creek, Lovers Creek and Hotchkiss Creek.	• Spills into watercourses (i.e., Whiskey Creek, Lovers Creek and Hotchkiss Creek) shall be contained and cleaned up immediately in accordance with Provincial standards. • Salt application shall be on an as needed bases, and or alternative de-icing methods should be explored (e.g., sand).	• City officials and/or maintenance contractors are responsible for reporting spills to ensure they are cleaned in a timely manner. • City officials and/or maintenance contractors are responsible for implementing de-icing strategies as required.
	Wildlife	• Increased traffic volumes may increase wildlife and vehicle collision numbers. • Increased traffic volumes may increase noise and vehicle pollution which may interfere with wildlife activities.	• Traffic volumes will be assessed and discussed within the Environmental Study Report (ESR). Recommendations within the ESR shall assist with mitigating impacts associated with increased traffic etc.	• No monitoring required.
	Species-at-Risk (SAR)	• No impacts to SAR during operation and maintenance is anticipated. Requirements post construction will be identified	• If additional SAR are encountered during operation and maintenance, MNRF Midhurst District office must be notified immediately.	• Monitoring requirements for Little Brown Myotis and Butternut post construction during the operation and maintenance phases will be provided following future

Activity	Feature	Potential Impacts	Mitigation	Monitoring
		further during detailed design through consultation with MNRF.	• MNRF will prescribe additional information relating to Little Brown Myotis and Butternut during detailed design.	consultation with MNRF during detailed design.

6.1 Recommended Alternative

Apart from the “do nothing” concept, which will result in no impacts on the natural heritage environment, the remaining three (3) design concepts will have impacts on the woodland and wetlands within the Project Study Area. As all three (3) design concepts for the proposed alignment south of Harvie Road are the same, and transverse through mainly agricultural fields, there is no comparison in their impacts to the natural features from Caplan north to Harvie Road as all impacts associated with the proposed alignment are identical.

In relation to the three (3) design concepts as it related to fish and fish habitat, all will have similar impacts to fisheries and fish habitat associated with the Whiskey Creek and the Lovers Creek crossings both north and south of Harvie Road, as the alternative alignments (shift to the west, shift to the east and construct along the proposed centre-line) are identical at each watercrossing. As such, methods during construction should aim to correct current fish barriers and incorporate some form of plantings to help keep the creek systems cool as each is known to support Brook Trout further downstream and well outside the Project Study Area. Installation of a new culvert along the North Branch of Whiskey Creek will allow for removal to existing fish movement barriers and greater remediation of fish movement that was observed immediately downstream of the existing culvert. This will increase seasonal usage of the North Branch of Whiskey Creek in the future when the installation of the new culvert is complete.

All three (3) concepts north of Harvie Road will have a significant impact on vegetation loss – as it will result in a large removal of the woodland – that based on size and existing characteristics, is considered significant per the MNRF Natural Heritage Manual (2010). Given the composition and known locations of endangered Butternut, a proposed shift to the west would be the most favourable concept, as it will result in less impacts to endangered Butternut with shifting to the east having the greatest impact to the species.

In terms of significant wildlife habitat for bat maternity roosting and well as habitat for species of conservation concern, all three (3) design concepts will result in similar impacts. The proposed centre-line alignment as determined from the BDMPU (2016), will have a greater impact on the poplar woodland stand (FOD3-1) which is less mature and is comprised of a smaller number of snag trees (suitable bat maternity roosting habitat). Therefore, when comparing the proposed alignments from a significant wildlife habitat perspective, the proposed centre-line alignment is more favourable than those associated with the proposed east and west alignments which each contain more mature trees, and greater number of snags.

Overall, based on the above review of the general impacts and associated design concepts, shifting to the west and along the centre-line are favourable from a natural heritage perspective as the shift to the west will limit the number of endangered Butternut to be

impacted either through removal or works within their 50 metre buffer, and choosing the centre-line alignment will provide a better opportunity to limit the removal of more mature trees which bat species tend to roost in.

In general, it is important to keep in mind that the footprint (i.e., overall disturbance area size) and construction methods of all the design concepts are similar. Several mitigation measures and BMPs will be necessary to limit the impacts associated with the proposed Transportation Improvements, with further consideration of additional measures during detailed design.

Further consultation with MNRF relating to endangered Little Brown Myotis and Butternut will be required during detailed design. Similarly, additional consultation with LSRCA in terms of restoration efforts and compensation requirements as per their Ecological Offsetting Plan (2017) will be identified during detailed design once design limits and impacts are better understood.

7. Summary of Mitigation Measures

As the Project progresses to detailed design, site-specific mitigation measures should be developed in order to protect both terrestrial and aquatic environments and their respective ecological function. Where possible, avoidance measures should be implemented before resorting to mitigation and lastly rehabilitation to minimize negative effects on natural heritage features. If the mitigation measures and/or BMPs are implemented, they will likely reduce the possible effects from the proposed Transportation Improvements.

7.1 Construction Timing

Construction timing should take into consideration natural heritage features, more specifically the wildlife that inhabit the features within the Project Study Area. Vegetation removal should not take place during the local breeding bird season which is established from April 1 to August 31, to comply with the MBCA. Due to the uncertainty that lies with nest sweeps during construction, especially during leaf-on conditions, it is recommended that all tree clearing occur outside the above-noted breeding bird window.

Due to the presence of Brook Trout spawning activities further downstream, no in-water works should occur between October 1 and July 15 in any given year according to DFO timing windows. As such, in-water works can only occur from July 16 to Sept 30, unless otherwise noted by the MNRF and/or DFO. Discussions with respect to the in-water timing window should be discussed with MNRF and/or DFO during the detailed design phase once the design components are better understood. This will also enable the City to confirm whether the proposed works will require a *Fisheries Act* Authorization from DFO.

Construction timing as it relates to tree removals in association with documented bat maternity roosting and additional parts of their life cycle will be identified during detailed design through consultation with MNRF.

7.2 Erosion and Sediment Control Measures

No development, construction or grading should occur outside of the construction envelope once it has been confirmed during the detailed design phase. An ESC plan should be developed prior to construction, and applicable ESC measures implemented to avoid impacts to terrestrial and aquatic features.

Efforts should be made to reduce areas of exposed soils, and erosion and sediment transport during the construction phase. Erosion and sediment controls should be installed prior to construction activities, and remain in place until all disturbed areas are fully stabilized so as to retain sediment on-site and prevent its entry into Whiskey Creek and adjacent ditches. In addition, all ESC measures should be monitored/inspected during construction to confirm they are functioning properly and are maintained and/or upgraded as required. If not functioning properly, no further work should occur until the erosion and/or sediment problem is addressed. All ESC measures (e.g., sediment control logs) should be reflected on all construction drawings with notes on requirements.

7.3 Tree Clearing Protection and Replacement

No development, construction or grading should occur outside of the construction envelope once it has been confirmed during the detailed design phase.

Trees shall be protected in accordance with the City's Tree Protection Manual (2010). Trees within or adjacent to Municipal Road ROW's are provided protection either through the Public Tree By-law (2014-116) or the ROW Activity By-law (2005-256). The Manual prescribes minimum Tree Protection Zones that should be followed based on the trees measured diameter at breast height (DBH). Tree protection barriers shall follow the City's specifications and consist of 1.2 metre high orange plastic web snow fencing on a 2' X 4" frame or attached to 2" X 2" wooden stakes.

It is noted that trees situated on public property are protected under the City's Public Tree By-law 2014-116. Public trees are those which have 50 percent or more of its main stem situated on a public park, highway or lands owned by the City. According to the By-law, trees requiring removal on public property as identified by the City, are exempt from the permitting process. Additional discussions with the City are recommended during detailed design to fine-tune tree protection requirements.

The City regulates private property tree removals when those trees are part of a woodland/woodlot as defined by the Tree Preservation By-law 2014-115. This applies to those forested areas that are 0.20 hectares (or 0.5 acres) in size or larger. The woodlands within the Project Study Area would qualify for the By-law and have been mapped as regulated by City's Urban Forestry Department. Additional discussions with the City are recommended during detailed design to fine-tune tree protection requirements along the proposed alignment and existing ROW.

All disturbed areas should be restored with native, non-invasive seed mix, in addition to native trees and shrubs that are reflective of existing communities. Compensation for loss of woodland and wetland should be in line with LSRCA's Ecological Offsetting Plan (2017). Exact details of compensation will be further identified during detailed design through continued consultation with LSRCA.

7.4 Wildlife Protection Measures

Efforts should be made for the protection of wildlife during construction. The contractor should make reference to the MNRF SAR Handling Manual (2011) to ensure wildlife encountered during construction are properly handled and/or reported as necessary.

If a migratory bird happens to nest within the work area, Project works within the immediate area should cease. Measures should be taken to ensure protection of the nest is established such that the fledglings can successfully hatch and the requirements under the MBCA are met. Additional guidance on the species observed should be sought from the Canadian Wildlife Service as required.

The installation of the new culvert(s) within Whiskey Creek (Main and North Branch) and that which is associated with Lovers Creek should follow guidelines as prescribed by DFO, MNRF, and LSRCA and should be constructed in a manner that does not impede fish passage. It is recommended that the new culverts where feasible be constructed using an open-bottom scenario such that proper substrate can be implemented to sustain and if not improve existing conditions. Additionally, wildlife crossing measures could be installed within the culverts to allow small mammals and/or amphibians and reptiles to travel under the roadway. Information on culvert installation will be further fine-tuned during detailed design.

If dewatering activities are required during in-water works, a fish rescue plan should be prepared. All in-take pumps should be fitted with screens to prevent fish entrainment and impingement. Additional measures to avoid causing harm to fish and fish habitat should be discussed and confirmed with DFO during detailed design.

In relation to bat maternity roosting, measures relating to mitigation measures will be further fine-tuned during detailed design and through consultation with MNRF.

8. Permits and Approvals

Based on a preliminary assessment, it is anticipated that the following permits and approvals will be required for this Project:

- A Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation permit from the LSRCA under Ontario Regulation 179/06 to facilitate works within the regulated area associated with Whiskey Creek (i.e., culvert works);

- Ministry of the Environment and Climate Change Permit-to-Take-Water (PTTW) or Registration. Approval is required if more than 50,000 litres of water per day will be taken during Project activities. For those transportation projects that will take more than 50,000 litres but less than or equal to 400,000 litres per day, may meet the requirements to register their Project using the new Ministry of the Environment and Climate Change (MOECC) Environmental Activity and Sector Registry (EASR) protocol. Those projects that require more than 400,000 litres per day, or do not meet the qualifications of an EASR will have to obtain a PTTW. Further assessment of requirements for water take will be identified during detailed design;
- A DFO Self-assessment will be required once the exact details of construction are understood during detailed design. If after the initial assessment, it is deemed that serious harm to fish may occur, a Request for Review will be required to be submitted to DFO, upon which, DFO will identify whether authorization (i.e., approval) under the *Fisheries Act* is required;
- Permits and/or approvals associated with Butternut and SAR Bats (Little Brown Myotis) will be further investigated during detailed design once follow-up consultation with Skelton Brumwell and Associates, MNRF and City representatives occurs; and
- Wildlife Scientific Collectors Permit for potential defishing and/or wildlife relocation during construction.

Please note the above list is not exhaustive, and additional permits and approvals may be required and will be confirmed during the detailed design phase.

9. Summary and Recommendations

A summary of environmental findings and recommendations are as follows:

- The majority of the Project Study Area is classified by forest vegetative communities and cultural landscapes;
- The Project Study Area is located within the Barrie Creeks and Lovers Creek subwatersheds (LSRCA, 2012) and sections of the Project Study Area are regulated and provided protection under Ontario Regulation 179/06 governed by the LSRCA;
- Eastern Wood-Pewee and Wood Thrush, two (2) special concern birds, were observed within the woodlands north of Harvie Road to the east outside of the proposed Bryne Drive alignment. It is expected that both these species were breeding within the more mature woodlands to the east. As both these species were documented, the woodlands north of Harvie Road (including those associated with the Project Study Area) would be considered significant wildlife habitat for species of conservation concern;

- A total of six (6) endangered Butternuts were documented by Hatch, with an additional two (2) documented by LGL Limited. Additional data received from Skelton Brumwell and Associates identified three (3) more endangered Butternuts within the woodland north of Harvie Road. Further consultation with MNRF related to Butternut will be completed during the detailed design phase as part of the permitting and approval process;
- A Butternut Health Assessment will need to be completed for each of the impacted Butternuts identified for the Bryne Drive Project Study Area as part of detailed design and submitted to MNRF;
- The woodlands north and south of Harvie Road are regulated by the City's Urban Forestry Department. Based on criteria in the Natural Heritage Reference Manual (2010), the woodland to the north of Harvie Road is considered significant due to its size, available interior habitat and species composition;
- Data received from Skelton Brumwell and Associates in September 2017 identified occurrences of endangered Little Brown Myotis in the woodlands adjacent Harvie Road just east of the Bryne Drive Project Study Area. As these woodlands are continuous with those for the Bryne Drive Project Study Area, permits and/or approvals associated with SAR Bats will be further investigated during detailed design once follow-up consultation with Skelton Brumwell and Associates, MNRF and City representatives occur;
- Data received from Skelton Brumwell and Associates in September 2017 identified a number of non-SAR bats within the woodlands north of Harvie Road, similarly from data collected by LGL Limited. Based on these findings, the woodland north of Harvie Road to the north extent of Bryne Drive would be considered significant wildlife habitat providing a seasonal concentration area for bat maternity roosting. It is recommended that lost of suitable roosting trees be compensated through the installation of bat boxes and/or motels, as further discussed with LSRCA and MNRF during detailed design, once impacts are fine-tuned;
- No wetlands have been mapped by agencies, but a White Cedar – Poplar Swamp (SWCM1-1) and Cattail Graminoid Mineral Meadow Marsh were observed north and south of Harvie Road respectively during the 2017 field investigations;
- A DFO Self-assessment or Request for Review will be required once plans for proposed culverts (two (2) along Whiskey Creek and one (1) along Lovers Creek) are confirmed;
- Vegetation removal should not take place during the local breeding bird season which is established from April 1 to August 31, to comply with the MBCA. Due to the uncertainty that lies with nest sweeps during construction, especially during leaf-on conditions, it is recommended that all tree clearing occur outside the above-noted breeding bird window;

- Due to the presence of Brook Trout spawning activities further downstream, it is recommended that no in-water works occur between October 1 and July 15 in any given year. As such, in-water works should only occur from July 16 to Sept 30, unless otherwise noted by the MNRF and/or DFO;
- Vegetation clearing and/or grubbing should be kept to a minimum and areas should be restored to equal or better condition with native, non-invasive species that are reflective of vegetation common to the region;
- Compensation for loss of vegetative communities (i.e., woodland and wetland communities) should follow LSRCA Ecological Offsetting Plan (2017);
- Treed areas to be preserved should be protected using protective hoarding according to the City's Tree Preservation By-law and Public By-law following future consultation with the City's Urban Forestry Department;
- Monitoring pre-construction and during construction is recommended with additional monitoring for restoration/compensation as directed that will be further refined during the detailed design phase;
- During detailed design an ESC, spill prevention, fish rescue and restoration plan should be developed and implemented in advance of construction to prevent potential impacts to Whiskey Creek and other natural heritage features within the Project Limits; and
- It is recommended that the above mitigation measures be further developed during the detailed design phase, based on further consultation with DFO, the MNRF, and the LSRCA.

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Appendix A

Agency Consultation

Agency Consultation:

Lake Simcoe Region Conservation Authority

Lajkosz, Alex

From: Kate Lillie <K.Lillie@lsrca.on.ca>
Sent: Friday, March 17, 2017 2:38 PM
To: Torchia, Melissa
Cc: Alvaro Almuina (Alvaro.Almuina@barrie.ca); Kelly, Terry; Alexander, Melissa
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

Hi Melissa,

We've compiled the aquatic data you requested. The files are quite large so I've made them available through an FTP network. You can access this information through most FTP programs with the following login information:

IP Address/Host: 205.211.113.195
Username: kate
Password: password.2017

If you don't have an FTP program already, we use a free one which you can download from this website: https://filezilla-project.org/

Please let me know if you have any trouble accessing it.

Have a great weekend!

Kate Lillie, B.Sc., EP, ISA
Natural Heritage Ecologist
Lake Simcoe Region Conservation Authority
120 Bayview Parkway,
Newmarket, Ontario L3Y 3W3
905-895-1281, ext. 527 | 1-800-465-0437
k.lillie@LSRCA.on.ca | www.LSRCA.on.ca

From: Torchia, Melissa [mailto:melissa.torchia@hatch.com]
Sent: Tuesday, March 07, 2017 1:17 PM
To: Kate Lillie
Cc: Alvaro Almuina; Kelly, Terry; Alexander, Melissa; Darren Campbell; Frank Pinto
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

Thanks Katie,

It is my understanding that the City and Conservation Authorities have an agreement in place which prevents any sort of fees. However, if there are fees, or if this agreement has changed, we will coordinate the requirements needed on our end once advised by either Darren or Frank.

I will contact both Darren and Frank in separate emails as per your request below.

Thanks again,
Melissa

Melissa Torchia, M.A.Sc.
Environmental Planner / Infrastructure

Tel: +1 289 288 2740 Fax: +1 905.315.3569
5035 South Service Road, Sixth Floor, Burlington
Ontario Canada L7L 6M9

HATCH

From: Kate Lillie [mailto:K.Lillie@lsrca.on.ca]
Sent: Tuesday, March 7, 2017 1:03 PM
To: Torchia, Melissa <melissa.torchia@hatch.com>
Cc: Alvaro Almuina <Alvaro.Almuina@barrie.ca>; Kelly, Terry <terry.kelly@hatch.com>; Alexander, Melissa <melissa.alexander@hatch.com>; Darren Campbell <D.Campbell@lsrca.on.ca>; Frank Pinto <F.Pinto@lsrca.on.ca>
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

Hi Melissa,

Thanks for providing the data request form. Please be advised that a data sharing agreement may be required for some of the information you've requested and that there may be a fee associated with this data request. We will advise you of any anticipated fees once we've assessed the type and amount of data that we have available for your study area.

For the engineering related data that you've requested, Frank Pinto (cc'd), will be coordinating and packaging any available information for you. Please contact Frank directly to confirm as he may require additional information from you to complete a data sharing agreement.

For the GIS layers that you've requested, Darren Campbell (cc'd), our GIS Coordinator, will be coordinating and packaging this information. Please contact Darren directly as well as he will likely require some additional information from you regarding the study area.

I will compile the Natural Heritage data you've requested and will provide that to you directly in .pdf format.

If you have any questions, please let me know.

Thanks,

Kate Lillie, B.Sc., EP, ISA
Natural Heritage Ecologist
Lake Simcoe Region Conservation Authority
120 Bayview Parkway,
Newmarket, Ontario L3Y 3W3
905-895-1281, ext. 527 | 1-800-465-0437
k.lillie@LSRCA.on.ca | www.LSRCA.on.ca

From: Torchia, Melissa [mailto:melissa.torchia@hatch.com]
Sent: Friday, March 03, 2017 4:31 PM
To: Kate Lillie
Cc: Alvaro Almuina; Kelly, Terry; Alexander, Melissa
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

March 3, 2017

Hi Katie,

Hope all is well.

As noted below by my colleague Melissa, we are working on the continuation to the roadway improvements to the following sections of road, as per the Multi-Modal Transportation Master Plan undertaken by the City of Barrie :

- Harvie Road (From Essa Road to just west of Hwy 400)
- Essa Road (from Mapleview Drive to Coughlin Road)
- Bryne Road (from Mapleview Drive to Essa Road)

I have used a data request form to provide you the information we are hoping to receive, along with a pdf showing the individual project locations.
If you have any questions, please feel free to give me a call to discuss.

We look forward to working with you on this project!

Kind regards,
Melissa

Melissa Torchia, M.A.Sc.
Environmental Planner / Infrastructure

Tel: +1 289 288 2740 Fax: +1 905.315.3569
5035 South Service Road, Sixth Floor, Burlington
Ontario Canada L7L 6M9

HATCH

From: Alexander, Melissa
Sent: Thursday, March 2, 2017 9:57 AM
To: Shauna Fernandes <S.Fernandes@lsrca.on.ca>; Kate Lillie <K.Lillie@lsrca.on.ca>
Cc: Alvaro Almuina <Alvaro.Almuina@barrie.ca>; Kelly, Terry <terry.kelly@hatch.com>; Torchia, Melissa <melissa.torchia@hatch.com>
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

Thank you Shauna,

We also anticipate that a teleconference meeting with the LSRCA and the NVCA will also be required once we have a review of the background data to confirm expectations and coordination.

Can you advise who else from the LSRCA should be included on this call.

Melissa Alexander, B.Sc., MCIP, RPP
Environmental Planner / Transportation & Logistics

Tel: +1 519 489 4109
Burlington

From: Shauna Fernandes [mailto:S.Fernandes@lsrca.on.ca]
Sent: Thursday, March 02, 2017 9:45 AM
To: Alexander, Melissa; Kate Lillie
Cc: Alvaro Almuina; Kelly, Terry; Torchia, Melissa
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

Good Morning Melissa,

Thank you for your email. Kate Lillie in our office is the Natural Heritage Ecologist for the City of Barrie and will be able to assist you on this project.

Thanks,

Shauna

Shauna Fernandes Chagani, HBSc
Natural Heritage Ecologist
Lake Simcoe Region Conservation Authority
120 Bayview Parkway,
Newmarket, Ontario L3Y 3W3
905-895-1281, ext. 247 | 1-800-465-0437
s.fernandes@LSRCA.on.ca | www.LSRCA.on.ca

Twitter: @LSRCA
Facebook: LakeSimcoeConservation

From: Alexander, Melissa [mailto:melissa.alexander@hatch.com]
Sent: Wednesday, March 01, 2017 5:09 PM
To: Shauna Fernandes
Cc: Alvaro Almuina; Kelly, Terry; Shauna Fernandes; Torchia, Melissa
Subject: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

HI Shauna,

We reached out to you as part of our kick-off meeting for the Hewitt's Secondary Plan Class EA and I hope that you're still the contact to request data for the above noted project.

The City of Barrie has recently initiated the continuation to the roadway improvements to the following sections of road:

- Harvie Road (From Essa Road to just west of Hwy 400)
- Essa Road (from Mapleview Drive to Coughlin Road)
- Bryne Road (from Mapleview Drive to Essa Road)

The recommendation for these improvements were presented in the Multi-Modal Transportation Master Plan which was undertaken by the City of Barrie.

We are the process of gathering all existing Natural Heritage information for the Study Area (i.e., GIS). Can you please advise what you need from us in order to expedite this process? I believe that last time we completed a Data Request form.

Please let me know if you have any questions. And if you are the correct contact person.

Thank you,

Melissa Alexander, B.Sc., MCIP, RPP
Environmental Planner / Hatch Infrastructure

Tel: +1 519 489 4109
5035 South Service Road, Sixth Floor, Burlington
Ontario Canada L7L 6M9

HATCH

Lajkosz, Alex

From: Darren Campbell <D.Campbell@lsrca.on.ca>
Sent: Tuesday, March 21, 2017 10:42 AM
To: Torchia, Melissa
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA
Attachments: LSRCAData.zip

Hi Melissa,

I checked and according to our floodplain layer there is none that falls within your study area. I have attached a zipfile with the data that we do have that falls in your study area.

Engineering prefers to do their own agreements so you will need to contact Frank.

If you have any questions please don't hesitate to contact me.

Thanks

Darren

From: Torchia, Melissa [mailto:melissa.torchia@hatch.com]
Sent: Monday, March 20, 2017 1:45 PM
To: Darren Campbell
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

Hi Darren,

Please find attached.
In your original email you mentioned floodplain only I do not see that on the list of data. Will you only be sharing the regulation limit?
Previously, Katie Lillie mentioned contacting Frank Pinto RE engineering data (hydrological modelling). I contacted Frank a while back but have not heard a response, can that data be sent as part of the same license agreement or is that something separate...?

Let me know, and perhaps I will try Frank again..

Thanks,
Melissa

Melissa Torchia, M.A.Sc.
Environmental Planner / Infrastructure

Tel: +1 289 288 2740 Fax: +1 905.315.3569
5035 South Service Road, Sixth Floor, Burlington
Ontario Canada L7L 6M9

HATCH

From: Darren Campbell [mailto:D.Campbell@lsrca.on.ca]
Sent: Monday, March 20, 2017 1:25 PM
To: Torchia, Melissa <melissa.torchia@hatch.com>
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

Hi Melissa,

Please find the attached data sharing agreement, if you could please review and once you agree to the terms sign and return a copy to me.

Thanks

Darren

From: melissa.torchia@hatch.com [mailto:melissa.torchia@hatch.com]
Sent: Monday, March 20, 2017 10:02 AM
To: Darren Campbell
Subject: RE: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA

You have received 1 secure file from melissa.torchia@hatch.com.
Use the secure link below to download.

Hi Darren,

Please try these files, if you still have an error please let me know what the error is so I can advise my GIS tech.

Thanks in advance,
M

Secure File Downloads:

Available until: **19 April 2017**

Click link to download:

GIS Files for Darren.zip
16.28 KB, Fingerprint: 49c73ac80b97215e7a9b30f0c0f274f1 (What is this?)

You have received secure links within this email sent via Hatch Ltd. Secure File Sharing. To retrieve the files, please click on the links above. To learn how your company can benefit from Accellion Secure File Sharing, please visit http://www.accellion.com

Secured by Accellion

Lake Simcoe Region conservation authority

Whiskey Creek Sampling Site
Harvie Road Data Request
City of Barrie

Site Identification Summary

Date Report Printed: 2017/03/10

Stream Name: Whiskey Creek **Stream Code:** WHY **Site Code:** WHYF **Year:** 2007 **Sample:** 1

	Grid	Easting	Northing	GIS Source		Deg.	Min.	Sec.
Uncorrected UTM's	17	604333	4911161		**Latitude**			
Corrected UTM's	17	604339.8	4911164		**Longitud**			

Source of Coordinates: LSRCA GPS **Datum:** NAD 83

Township BARRIE **Lot:** 1 **Concession:** 12

MNR District: MIDHURST **Watershed**

Site Descriptio TAKE SOUTRH DIRT PATH TO PILE OF GARBAGE, HEAD SOUTHEAST TO SITE MAKER APPROX 150 METRES

First Year Site Surveyed 2007

Sample is included in the following projects:

Project Code	Project Title	Lead Agency
WHISKEY	WHISKEY CREEK AQUATIC RESOURCE MANAGEMENT PLAN	LSRCA

Fish Community Summary

Date Report Printed: 2017/03/10

Stream Name: Whiskey Creek Stream Code: WHY Site Code: WHYF Year: 2007 Sample: 1

Date of Assessment: 2007/08/07

Survey Type: Single Pass:

- ☐ Screening (# of runs = 1; effort<6 sec/m^2)
- ☑ Standard (# of runs = 1; effort>6 sec/m^2)
- ☐ Unknown (# of runs = 1; effort = unknown)

OR ☐ Multiple Pass (# of runs > 1)

Run 1 of 1	Start Time: 10:50:00 AM	Shocker Seconds: 509	Effort (Seconds/m²): 15.93
	Stop Time: 11:15:00 AM	Area (m²): 31.96	

Summary of fish captured for which weight data was available, allowing estimation of biomass.

Species Code	Common Name	Scientific Name	Size Class (<100mm. T.L. = 1 >=100mm.T.L.=2) (Non-salmonids are all class 1)	Number Caught	Number Caught / 100 m²	Weight Caught (gm.)	Weight (gm.)/ 100m²	Estimated Biomass (g/100m²) (Only calculated for salmonids.)
								NA
			Total All Species:					

Fish Community Summary

Date Report Printed: 2017/03/10

Stream Name: Whiskey Creek Stream Code: WHY Site Code: WHYF Year: 2007 Sample: 1

Date of Assessment: 2007/08/07

Agency Consultation:

Ministry of Natural Resources and Forestry

Lajkosz, Alex

From: Findlay, Graham (MNRF) <graham.findlay@ontario.ca>
Sent: Thursday, April 13, 2017 3:46 PM
To: Torchia, Melissa
Subject: RE City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA - Project Contact Inquiry and ESA Screen Request

Original email ...

From: Torchia, Melissa [mailto:melissa.torchia@hatch.com]
Sent: March-03-17 4:50 PM
To: Mott, Ken (MNRF); Benner, Kim (MNRF)
Cc: Alvaro Almuina; Kelly, Terry; Alexander, Melissa
Subject: City of Barrie - Harvie, Bryne and Essa Road - Phase 3 and 4 Class EA - Project Contact Inquiry and ESA Screen Request

March 3, 2017

Good afternoon Ken and Kim,

Hope all is well.
Previously we had been working with Maria Jawaid on projects in Barrie, but I understand now she has switched positions. As such, I have included you both on this email, in hopes to confirm a project contact at the MNRF.

To provide some context, the City of Barrie has recently initiated the continuation to the roadway improvements to the following sections of road:

- Harvie Road (From Essa Road to just west of Hwy 400)
- Essa Road (from Mapleview Drive to Coughlin Road)
- Bryne Road (from Mapleview Drive to Essa Road)

The recommendation for these improvements were presented in the Multi-Modal Transportation Master Plan which was undertaken by the City of Barrie. The City has retained Hatch to undertake these EA's and we were hoping to obtain an ESA screening request. For the previous project that we worked on with Maria (Hewitt's Secondary Plan), we sent our requests directly through her. If you would like us to contact a general esa mailbox or the management bio directly, that works for us, but if you can kindly identify the contact detail(s) that would be much appreciated.

I have attached some figures that show the three above noted project locations.

If you have any questions, or require additional details, please do not hesitate to contact me. We look forward to hearing from you.

Kindest regards,
Melissa

Melissa just to confirm our approach to information requests – We in Midhurst have an expectation that consultants have a level of species at risk (SAR) knowledge and access to the Species at Risk in Ontario (SARO) List and to the Natural Heritage Information Centre (NHIC) database. As a result, given the volume of SAR information requests we receive, we typically require a requestor provide us a summary of their initial SAR screening and/or a summary of the SAR that it is reasonable to expect could be present based on the available

habitats in the subject study area(s). On review of your preliminary screening we can advise on additional species of interest based on available local data and knowledge of the area.

Further, you are likely aware the species at risk records found in the NHIC database are not exhaustive and are based on **known** occurrences only. As a result, although there may be no record (or confirmation) of a SAR on site it does not mean that they are not present if appropriate habitat exists. Due diligence is therefore still required and would include an appropriate consideration of what species could be present based on available habitat at the noted study areas. Your field work should inform you on what species on the SARO list could possibly be encountered based on available habitats in the areas of the study and the possible survey methodologies required during your site assessments.

Digital data for natural heritage features (e.g. wetland and ANSI mapping) and fish community data can be obtained through Land Information Ontario, and through the Make a Map: Natural Heritage Areas tool through LIO at ...

Land Information Ontario: https://www.ontario.ca/page/land-information-ontario

Make a Map: Natural Heritage Areas: http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US Make A Map also has a function that provides access to data on SAR available in the NHIC. Make A Map does not provide fish community data.

Evaluating for other natural heritage values for example candidate significant wildlife habitats (SWH) will be informed by direction in the Natural Heritage Reference Manual, the Significant Wildlife Habitat Technical Guide and SWH Ecoregion 6E Criteria Schedule. Similarly to SAR occurrence reports, that natural heritage features might not have been mapped may not be indicative they are not on site, rather the assessments to identify them have not been done. Again, your field work will inform your review of the study areas for natural heritage features and functions.

Having said all that, regarding your request below is a preliminary review for features. The following features and/or species based on photo interpretation might be encountered within your three study areas (combined) might include **(but may not be limited to)** ...

- Natural Heritage features – there are no evaluated wetlands, ANSIs, or deer wintering habitat in the immediate area of the three study zones.
- The headwater reaches of Whiskey Creek originate in the area of the Harvie Road and Bryne Drive study areas. However we do not have fish community data for the upper reaches of Whiskey Creek. A headwater tributary to Bear Creek crosses the Essa Road study area, again we do not have fish community data for that headwater reach.
- Barn swallow (Threatened)
- Henslow's sparrow (Endangered)
- Golden-winged warbler (Special Concern)
- Eastern wood-peewee (SC)
- Short-eared owl (SC)
- Whip-poor-will (T)
- Common nighthawk (SC)
- Eastern meadowlark (T)
- Bobolink (T)

- Red-headed woodpecker (SC)
- Monarch butterfly (SC)
- Endangered species of bats
- Butternut (E)

Do call with any further questions.

Regards,

Graham Findlay
Management Biologist
Huronia Resources Management Team,
Midhurst, MNRF
705-725-7530
705-725-7584 (fax)
graham.findlay@ontario.ca

Lajkosz, Alex

From: Findlay, Graham (MNRF) <graham.findlay@ontario.ca>
Sent: Wednesday, May 10, 2017 11:38 AM
To: Torchia, Melissa
Subject: bat survey protocol
Attachments: Midhurst District- Maternity Roost Surveys Treed Habitats (April 2017).docx

Melissa as just discussed ...

Regards,

Graham Findlay
Management Biologist
Huronia Resources Management Team,
Midhurst, MNRF
705-725-7530
705-725-7584 (fax)
graham.findlay@ontario.ca

Maternity Roost Surveys (Forests/Woodlands)

Until comprehensive approved habitat guidance is developed for these species, the following is a recommended approach for surveying maternity roosts for the little brown myotis and northern myotis. Much of the information presented in this section comes from MNRF's *Bat and Bat Habitat: Guidelines for Wind Power Projects* (2011).

This methodology may be considered for any development type to verify occupancy of bat maternity roosts within woodlands.

Mist netting and radio telemetry work to determine exact location of bat maternity roosts within the habitat should be considered as a last resort and will only be permitted if the additional work is deemed necessary by the MNRF.

STEP 1: Identify Potential Maternity Roost Habitat

Ecological Land Classification (ELC) is an effective tool for identifying potential maternity roost habitats. As little brown myotis and northern myotis are known to form roosts in forests and swamps (Foster and Kurta, 1999), maternity roost habitat may include the following ELC communities:

- Deciduous Forests (FOD)
- Mixedwood Forests (FOM)
- Coniferous Forests (FOC)
- Deciduous Swamp (SWD)
- Mixedwood Swamps(SWM)
- Coniferous Swamps (SWC)

STEP 2: Snag Density Calculations

Snag density is an indicator of high quality potential maternity roost habitat. When using an ELC-based method, snag density is calculated using the following procedure:

- Select random plots across the represented area of the ELC plot.
- Survey fixed area 12.6m radius plots (equates to 0.05ha)
- Measure the number of snags/cavity trees ≥25cm dbh in each plot
- Use the formula $\pi r2$ to determine number of snags per hectare
- Survey a minimum of 10 plots for sites ≤10 hectares and add another plot for each extra hectare up to a maximum of 35 plots.
- Surveys are best conducted during the leaf-off period (i.e. fall to early spring) so viewing of tree cavities and crevices is not obscured by foliage.
- Map locations where each snag density plot is calculated.
- Record the snag density for each ELC plot.

STEP 3: Selection of Acoustic Monitoring Locations

If maternity roost habitat is identified using ELC, acoustic monitoring is recommended to determine if little brown myotis and/or northern myotis are recorded in the area.

If the snag density is calculated to be ≥10 snags/hectare then this ELC polygon should be considered high quality potential maternity roost habitat.
All high quality maternity roost habitat should be monitored to ensure full coverage of the ELC polygon.
Recommend positioning acoustic monitoring stations within 10m of a candidate roost tree. Multiple stations may be required to cover the area adequately. Most broadband acoustic detectors have a microphone range of 20-30m therefore full coverage would require 4 stations/hectare.
The best candidate roost trees are selected according to the following criteria (in order of importance):

- Tallest snag/cavity tree
- Exhibits cavities or crevices most often originating as cracks, scars, knot holes or woodpecker cavities
- Has the largest diameter breast height (>25cm diameter at breast height)
- Is within the highest density of snags/cavity trees (e.g. cluster of snags)
- Has a large amount of loose, peeling bark
- Cavity or crevice is high in snag/cavity tree (>10m)
- Tree species that provide good cavity habitat (e.g. white pine, maple, aspen, ash, oak)
- Canopy is more open (to determine canopy cover, determine the percentage of the ground covered by a vertical projection of the outermost perimeter of the natural spread of the foliage of trees); and
- Exhibits early stages of decay (decay Class 1-3; refer to Watt and Caceres, 1999).

STEP 4: Acoustic Field Data Collection

Monitoring in Ontario should occur in the evenings between June 1 and June 30. If activity is not observed at the site on the initial visit, a minimum of 10 visits should take place to confirm that the site is not maternity roost habitat.
Acoustic monitoring should begin at dusk and continue for 5 hours, for up to 10 nights, or until the maternity roost habitat is confirmed.
Surveys should occur on warm/mild nights (i.e. ambient temperature above approximately 10°C) with low winds and no precipitation.
Acoustic monitoring should use modern broadband bat detectors (these may be automated systems in conjunction with computer software analysis packages or manual devices) with condenser microphones.
Acoustic monitoring systems should allow the observer to determine the signal to noise ratio of the recorded signal (e.g. from oscillograms or time-amplitude displays). These systems provide information about signal strength and increase the quality and accuracy of the data being analyzed.
Microphones should be positioned to maximize bat detection (e.g. microphone(s) situated away from nearby obstacles to allow for maximum range of detection, microphone(s) angled slightly away from the prevailing wind to minimize wind noise).
It is recommended that the same brand and/or model acoustic recording system be used throughout the survey (if multiple devices are required), as the type of system may influence

detection range/efficiency. If different systems must be used, this variation should be quantified.
Information on the equipment used should be recorded, including information on all adjustable settings (e.g. gain level), the position of the microphones, dates and times by station when recoding was conducted.

STEP 5: Detailed Mapping of Snag/Cavity Trees

The following considerations are recommended to identify the presence of potential maternity roost habitat:
The presence of SAR bats through acoustic monitoring
Quality of potential habitat through snag density
Potential habitat as a whole (e.g. through ELC polygon delineation)
Where proponents intend to build within the potential habitat as a whole it is recommended that proponents map the location of the highest quality habitat by delineating locations of candidate roost trees.
The following procedure is recommended for mapping maternity roost habitat:

- All surveys should be done during leaf-off
- All surveys should be conducted with binoculars
- Walk transects 20m apart throughout the entire polygon in open woodlands with good visibility
- Walk transects 5m apart throughout the entire polygon in woodlands with coniferous understory or poor visibility
- Plot all snags/cavity trees using a GPS and noting characteristics (refer to criteria in STEP 3)
- Conduct surveys only on days with no precipitation and not after recent snowfall

Once the snags/cavity trees are mapped and the best quality trees are identified (refer to criteria in Step 3), bat habitat eco-elements (e.g. clusters of the best quality trees) may be identified and may assist in determining if avoidance of those eco-elements is appropriate to address negative impacts.

Additional Recommendations: Identification of Tree Roosts Using Mist Netting and Radio-telemetry

Proponents require an ESA permit or regulatory exemption to conduct mist netting and radio-telemetry with SAR bats.
The *Indiana Bat Summer Survey Guidelines (January 2014)* developed by the US Fish & Wildlife Service (USFWS, 2014b) provides a description how to carry out this kind of work. Additionally, the Indiana bat is a Myotis bat species with a life history that is similar to that of little brown myotis and northern myotis.
It is strongly recommended that mist netting and radio-telemetry work be treated as a last resort to gain information for a development proposal. Proponents of development projects and district staff should consider seeking advice from their regional coordinator should mist netting and radio-telemetry work be deemed necessary to assess the status of SAR bat habitat.

Appendix B

Selected Project Study Area Photographs

Photograph No.1: Dry-Fresh Poplar Deciduous Forest north side of Harvie Road in early spring; facing north

Photograph No.2: Agricultural field, approximately 600m north of Bryne Drive; facing east

Photograph No.3: Whiskey Creek approximately 200 m south Harvie Road within the Fresh-Moist Deciduous Woodland; facing east

Photograph No.4: Fresh-Moist Deciduous Woodland approximately 150m south of Harvie Road; facing north

Photograph No.5: Dry-Fresh Poplar Deciduous Forest north side of Harvie Road in late spring; facing north

Photograph No.6: White Cedar Mineral Coniferous Swamp just north of Harvie; facing west

Photograph No.7: Dry-Fresh Sugar Maple Deciduous Forest just north of Harvie; facing west

Photograph No.8: Agricultural field approximately 150 m west of Highway 400; facing north east

Photograph No.9: Snags within the White Cedar Mineral Coniferous Swamp just north of Harvie; facing west

Photograph No.10: Cultural Meadow and Fresh-Moist Deciduous Woodland approximately 100 m south of Harvie Road; facing south

Photograph No.11: Cattail marsh approximately 200 m west of Highway 400 within the Fresh-Moist Deciduous Woodland surrounding the main branch of Whiskey Creek, facing north

Photograph No.12: Fresh-Moist Deciduous Forest surrounding Lover's Creek near the south end of the Project Study Area; facing south

Photograph No.13: Catttail Graminoid Mineral Meadow Marsh adjacent to Lover's Creek , facing north

Photograph No.14: Bryne Drive at Essa Road, facing esouth

Photograph No.15: Approximately 10 m south of Bryne Drive; facing north

Photograph No.16: Dry-Fresh White Pine – Hardwood Mixed Forest; facing south