REPORT

Natural Environment Study Report

Ninth Line (Regional Road 13) Transportation Corridor Improvements from Dundas Street (Regional Road 5) to 407 ETR (Express Toll Route)

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August 2019

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1.0 INTRODUCTION

1.1 Objectives

The Regional Municipality of Halton (RMH) plans to widen Ninth Line (Regional Road 13) from Dundas Street (Regional Road 5) to 407 ETR from two to four lanes, and establish bike lanes, with a proposed right of way of 35 metres (m), in the Town of Oakville and Town of Milton (the Project: Figure 1). The intersections at Dundas Street and William Halton Parkway will not be modified, as the Project will "tie-in" at these locations. This natural environment assessment included a desktop review of information publicly available through the RMH, Town of Oakville, Conservation Halton, the Ministry of Environment, Conservation and Parks (MECP), and the Ministry of Natural Resources and Forestry (MNRF), as well as a field study of key species.

This report is intended to meet the Class Environment Assessment for Municipal Infrastructure Projects natural heritage reporting requirements under the *Environmental Assessment Act* (Government of Ontario 1990).

1.2 Study Area Description

The Project Study Area was defined as lands within 120 m of both sides of the existing Ninth Line from Dundas Street to 407 ETR (Figure 1). Background research included the Study Area, whereas field surveys were limited to publicly accessible areas along the existing road right-of-way. Private property and features within the Study Area were assessed to the extent possible from the roadside during field surveys.

The east side of Ninth Line is predominantly annual row crop agricultural. It also contains an area with baseball diamonds and a tennis club, and two natural areas associated with Joshua's Creek and a wetland (North Oakville-Milton East Wetland Complex Provincially Significant Wetland). A commercial area is located in the southeast corner of the Study Area, south of Dundas Street between Ninth Line and Highway 403. The west side of Ninth Line contains a cemetery and funeral home, a school with a sports field, annual row crop agriculture, and residential properties. Also present on the west side is a marsh, deciduous swamp and forest and old field cultural meadows.

2.0 ENVIRONMENTAL POLICY CONTEXT

Natural heritage features and watercourses described in this report will be governed under the requirements of the following planning policies, government bodies, and regulatory agencies:

- Provincial Policy Statement (MMAH 2014);
- Region of Halton Official Plan (Region of Halton 2015a);
- Town of Milton Official Plan (Milton 2008);
- Town of Oakville Official Plan (Oakville 2006a);
- Region of Peel Official Plan (Peel 2014);
- City of Mississauga Official Plan (Mississauga 2016);
- Conservation Halton (Ontario Regulation 162/06; Government of Ontario 1990);
- Credit Valley Conservation (Ontario Regulation 160/06; Government of Ontario 1990);

- Species at Risk Act (Government of Canada 2002); and
- Endangered Species Act (Government of Ontario 2007).

Sections 2.1 through 2.7 provide a summary of environmental policies that are applicable to the Project.

2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) was issued under Section 3 of the *Planning Act* (MMAH, 2014).

The natural heritage policies of the PPS indicate that:

2.1.4 Development and site alteration shall not be permitted in:

a) Significant wetlands in Ecoregions 5E, 6E and 7E; and

b) Significant coastal wetlands.

2.1.5 Unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration shall not be permitted in:

a) Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;

b) Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River);

c) Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River);

d) Significant wildlife habitat;

e) Significant areas of natural and scientific interest; and

f) Coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b).

2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

2.1.7 Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.

2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5 and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

2.1.9 Nothing in policy 2.1 is intended to limit the ability of agricultural uses to continue.

2.2 Species at Risk

2.2.1 Species at Risk Act (SARA)

At the federal level, species at risk (SAR) designations for species occurring in Canada are initially determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment and Climate Change, species are added to the federal List of Wildlife Species at Risk under the *Species at Risk Act* (SARA; Government of Canada 2002). Species that are included on Schedule 1 as endangered or threatened are afforded protection of critical habitat on federal lands under the SARA. On private or provincially owned lands, only aquatic species listed as endangered, threatened or extirpated are protected under SARA, unless ordered by the Governor in Council.

2.2.2 Endangered Species Act (ESA)

The Study Area is subject to the provincial *Endangered Species Act* (ESA; Government of Ontario 2007). The legislation prohibits the killing, harming, or harassment of species designated as Endangered or Threatened in the ESA and provides immediate general habitat protection until regulations identifying species specific habitat come into effect.

The SAR designations for species in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of Environment, Conservation and Parks, species are added to the provincial ESA which came into effect June 30, 2008 (Government of Ontario 2007). As of June 30, 2008, the SARO list is found in Ontario Regulation (O.Reg.) 230/08 under the ESA. It was last amended by O. Reg 404/18 on August 1, 2018.

General habitat protection is provided by the ESA to all threatened and endangered species. Species-specific habitat (i.e., regulated habitat) protection is only afforded to those species for which a habitat regulation has been prepared and passed into law under the ESA. The ESA has a permitting process where alterations to protected species or their habitats may be considered.

2.3 Fisheries Act

The purpose of the *Fisheries Act* (Canada 1985) is to maintain healthy, sustainable and productive Canadian fisheries through the prevention of pollution, and the protection of fish and their habitat. In 2012, changes were made to the *Fisheries Act* to enhance Fisheries and Oceans Canada's (DFO) ability to manage threats to Canada's commercial, recreational and Aboriginal (CRA) fisheries. Additional changes to the *Fisheries Act* which will provide comprehensive protection for all fish and fish habitat, will be implemented on August 28, 2019. It is unknown, at this time, the implications of the change, and what the regulations and new process for approvals and authorizations will include. It is recommended that DFO be consulted to obtain guidance for projects under the new *Fisheries Act*.

2.4 Migratory Birds Convention Act (MBCA)

The *Migratory Birds Convention Act* (MBCA; Canada 1994) protects migratory birds and their nests. It is unlawful to destroy the nest of a migratory bird protected under the MBCA. Disruption to the nests and harm to migratory birds can be avoided by scheduling all vegetation clearing, including the cutting of trees on private property, outside of the breeding bird season (April 1 to August 15 for the Study Area), or by following Environment and Climate Change Canada (ECCC) guidance for avoidance and mitigation.

2.5 Conservation Halton

The majority of the Study Area is located within the jurisdiction of Conservation Halton. Any work proposed in areas within the regulation limit must be in compliance with Ontario Regulation 162/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. Ontario Regulation 162/06 (Government of Ontario 2013) was issued under the authority of Section 28 of the *Conservation Authorities Act*. The *Conservation Authorities Act* was enacted to ensure public safety by protecting property with respect to natural hazards, and to safeguard watershed health by preventing pollution and destruction of sensitive environmental areas such as wetlands, shorelines and watercourses. Ontario Regulation 162/06 establishes Regulated Areas where development could be subject to flooding, erosion or dynamic beaches, or where interference with wetlands and alterations to shorelines and watercourses might have an adverse effect on those environmental features. Under Ontario Regulation 162/06, any proposed development, interference or alteration within a Regulated Area requires a permit from the Conservation Halton.

2.6 Credit Valley Conservation

The northern end of the Study Area is located within the jurisdiction of Credit Valley Conservation (CVC). Any work proposed in areas with the regulation limit must be in compliance with the regulations of CVC: Ontario Regulation 160/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.

2.7 Regional and Municipal Planning Authorities

Ninth Line is at a regional and municipal boundary. Lands west of Ninth Line are within Halton Region and the Town of Oakville; lands east of Ninth Line are within Peel Region and the City of Mississauga. The northern end of Study Area extends slightly into the Town of Milton Lands (also within Halton Region) which are located north and west of the 407 ETR where it meets Highway 403.

The part of the Study Area within the Town of Oakville jurisdiction is not subject to the policies of the Town of Oakville Official Plan, but rather the policies of the North Oakville East Secondary Plan (Oakville 2009).

Any development or land alteration must comply with the land use planning frameworks outlined in the regional and municipal official plans.

3.0 METHODS

Assessment of existing conditions in the Study Area was undertaken through a desktop review of background information and data collected during the field studies discussed below.

3.1 Background Information Review

A number of existing background information sources and documents were reviewed during the preparation of this report including:

- Region of Halton Official Plan (Region of Halton 2015a);
- Town of Milton Official Plan (Town of Milton 2006);
- Town of Oakville Official Plan (Town of Oakville 2006a);

- North Oakville Creek Subwatershed Study (Town of Oakville, 2006);
- Provincially Significant North Oakville – Milton East Wetland Complex Wetland Evaluation Report (OMNR 2009);
- Survey Update to Wetland Nos. 11, 16, 18 and 36 in the Provincially Significant North Oakville – Milton East Wetland Complex (MNRF 2016).
- Natural Heritage Reference Manual for the Policies of Provincial Policy Statement (MNR 2010);
- Significant Wildlife Habitat Technical Guide (MNF 2000);
- Natural Heritage Information Centre (NHIC) database (MNRF 2019);
- Royal Ontario Museum (ROM) range maps (ROM 2010);
- Atlas of Breeding Birds of Ontario (Cadman et al 2007);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario's Reptile and Amphibian Atlas (Ontario Nature 2019);
- Ontario Butterfly Atlas Online (Jones et al. 2019);
- Bat Conservation International (BCI) range maps (BCI 2019);
- Land Information Ontario (MNRF 2019a);
- Conservation Halton (2016);
- Credit Valley Conservation (2016); and
- Existing aerial imagery.

3.2 Species at Risk Screening

SAR considered for this report include species listed under the ESA (Government of Ontario 2007) and the SARA (Government of Canada 2002), as well as species ranked S1 to S3 by the NHIC (NHIC 2015) and regionally rare species. A desktop screening was completed to determine which SAR have potential to occur within the Study Area. Information for the screening was gathered from the sources listed in Section 3.1. Species with ranges overlapping the Study Area, or with recent occurrence records in the vicinity of the Study Area, were screened by comparing their habitat requirements to habitat conditions in the Study Area.

The potential for species to occur in the Study Area was determined through a probability of occurrence. A ranking of low indicates no suitable habitat is available for the species in the Study Area and there are no historical or recent occurrence records near the Study Area. Moderate probability indicates more potential for a species to occur because suitable habitat is likely present in the Study Area but there have been no historical or recent records for the species near the Study Area. Alternatively, a moderate probability could indicate an observation of a species, but there is no suitable habitat in the Study Area. High probability for occurrence indicates a known species record in the Study Area (including during field surveys or background data review) and good quality habitat is present. The screening was updated and revised at the desktop level in August 2019

to account for any changes to species status and identify any new occurrence records. The results of the SAR screening are presented in Appendix B.

3.3 Field Surveys

The terrestrial and aquatic features in the Study Area were characterized through field surveys conducted between April and September of 2016. During all surveys, area searches were conducted, and additional incidental wildlife, plant, and habitat observations were recorded. Searches were also conducted to assess the presence or absence of suitable habitat, based on habitat preferences, for those species identified in the desktop SAR screening described above. See Table 1 for the schedule of surveys.

Table 1: Field Survey Schedule

Date	Type of Survey
20 April 2016	Site Reconnaissance; Visual Encounter Survey for Reptiles; General Wildlife Survey.
21 April 2016	Anuran Call Count Survey.
11 May 2016	Anuran Call Count Survey.
18 May 2016	Visual Encounter Survey for Reptiles; General Wildlife Survey; Investigation of culvert for Barn Swallow nesting.
09 June 2016	Anuran Call Count Survey.
14 June 2016	Breeding Bird Survey; General Wildlife Survey.
03 July 2016	Breeding Bird Survey; Roadside Confirmation of Desktop ELC; General Wildlife Survey.
21 September 2016	Aquatic Habitat Survey.

3.3.1 Site Reconnaissance

A site reconnaissance was conducted on April 20, 2016 to gain an understanding and conduct an initial assessment of terrestrial and aquatic habitat in the Study Area. The watercourse assessment photo record and watercourse assessment field records are provided in Appendix C and D, respectively.

3.3.2 Ecological Land Classification

Plant communities in the Study Area were first delineated at a desktop level using high-resolution aerial imagery, then ground-truthed in the field using the Ecological Land Classification (ELC) system for Southern Ontario (Lee et al. 1998). Ground-truthing was conducted from roadside concurrently with other surveys.

3.3.3 Amphibian Surveys

Anuran call count surveys were conducted on April 21, May 11, and June 9, 2016. Anuran call count surveys were conducted by a qualified biologist at four survey stations (Figure 1). Surveys were completed using the Marsh Monitoring Program methods (Bird Studies Canada 2009). This method involves collection of call data from fixed stations over three survey periods during the spring and early summer (April to early July), with an interval of at least 15 days between surveys. Surveys began one half-hour after sunset and end by midnight during evenings with appropriate weather conditions (i.e., little wind and a minimum air temperature of 5˚C, 10˚C, and 17˚C for each respective survey period).

3.3.4 Turtle Surveys

A habitat assessment and visual encounter survey was completed on April 20, 2016 to determine the suitability of habitat in the Study Area for turtles and to record incidental observations of turtles.

A second round of visual encounter surveys for turtles was completed at one location in the Study Area on May 18, 2016 (Figure 1). Both surveys were completed using the *Occurrence Survey Protocol for Blanding's Turtle in Ontario* (MNRF 2013) as guidance. The station was located where Ninth Line crosses Joshua's Creek. This protocol is appropriate for detecting most species of turtles. The surveys took place on a sunny day, when water temperatures were least 10ºC, and when air temperatures were warmer than water temperatures. Biologists scanned the perimeter of the sunlight shoreline using 10 power binoculars for 30 minutes during the mid-morning.

3.3.5 Breeding Bird Surveys

Breeding bird surveys were conducted on June 14 and July 3, 2016 in accordance with methods outlined in the Canadian Breeding Bird Survey (Downes and Collins 2003), and the Breeding Bird Atlas of Ontario (OBBA; Cadman et al. 2007), with adaptations. The OBBA protocol requires five-minute point counts with two visits during the breeding season; however, to improve detection of species, and particularly possible species at risk, the observation period was extended to ten minutes. These surveys were conducted at five survey stations in the Study Area (Figure 1).

3.3.6 Aquatic Habitat Surveys

A survey to assess the aquatic habitat in the Study Area was conducted on September 21, 2016. The stream habitat was described and assessed for their potential to provide habitat for fish.

3.3.7 General Wildlife Surveys

General wildlife surveys included visual encounter surveys, which included track and sign surveys, area searches in selected habitats, and incidental observations, concurrent with other field surveys.

The habitat in the Study Area was searched from roadside, with special attention paid to edge habitats and other areas where mammals might be active. Areas of exposed substrate such as sand or mud were located and examined for any visible tracks. Any wildlife (including mammals, butterflies, reptiles and amphibians) seen and identified were recorded. In addition, suitable habitats for SAR that have a moderate or high potential to be found in the Study Area were searched for and sightings or signs of any individuals were recorded (i.e., logs were flipped and piles of rocks were observed for snakes).

3.4 Regionally Rare and Regionally Uncommon Species

The following sources were used to determine the regional rarity status of plant species observed in the Study Area.

- List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E) (Oldham 2017);
- Plants of the Credit Valley Watershed (CVC 2002);
- Distribution and Status of the Vascular Plants of the Greater Toronto Area (Varga *et al.* 2001)

The regional rarity status for each plant species observed is indicated on Appendix A (Wildlife and Vegetation List).

4.0 EXISTING CONDITIONS

4.1 Natural Features

4.1.1 Plant Communities

Due to the lack of off-road access, only those communities visible from the road (i.e., approximately 120 m) were classified and mapped on Figure 1. Plant communities in the Study Area are largely of anthropogenic origin and include annual row crop agriculture, old field cultural meadow, a large cemetery and sports fields. Natural plant communities include deciduous swamp, deciduous forest, woodland, and deciduous thicket (Figure 1). Vegetation is dominated by non-native, disturbance-tolerant plant species. Past and ongoing development has removed much of the native vegetation as agricultural fields, roads, and buildings have fragmented natural plant communities throughout the Study Area. Patches of natural habitat in the Study Area are associated with the North Oakville-Milton East Wetland Complex PSW and Joshua's Creek.

The expansion will occur in the Highway 403 and Ninth Line right-of-ways. The plant species observed in the roadside ditches includes smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), Canada thistle (*Circium arvense*), common buckthorn (*Rhamnus cathartica*), and lamb's quarters (*Chenopodium album*). The agricultural fields between Dundas Street and Burnhamthorpe Road West, east of Ninth Line and west of Highway 403 were soy fields. Soy fields were also present on the west side of Ninth Line north of Burnhamthorpe Road East. Fallow grasslands were noted north of Fern Hill School. Well-manicured lawns were present along Joshua Creek on the west side of Ninth Line and in the Glen Oaks Cemetery.

Wetlands in the Study Area were dominated by deciduous trees, narrow-leaved cattail (*Typha angustifolia*) and European common reed (*Phragmites australis*). Natural woodlands in the Study Area were comprised of an open canopy of oak, hickory, and ironwood trees, with dense ground cover.

A description of the plant communities identified in the Study Area is included in Table 2.

Table 2: Description of Plant Communities

Plant Community	Description
CUM -Cultural Meadow	This plant community type is located in several areas of the study area. These communities are variably dominated by terrestrial grasses and forbs.
CUM/CUS -Cultural Meadow/Cultural Savannah	This plant community is located at the north end of the Study Area and is associated with a residential property. It consists of a mosaic of old field cultural meadow dominated by terrestrial grasses and forbs and cultural savannah with deciduous tree cover estimated between 25% and 35%.

Plant Community	Description
CUM/CUT -Cultural Meadow/Cultural Savannah	This plant community is located east of Ninth Line and northeast of the PSW. It is a mosaic of old field cultural meadow dominated by terrestrial grasses and forbs and cultural thicket dominated by staghorn sumac (*Rhus typhina*).
FOD -Deciduous Forest	This plant community is located east of Ninth Line and south of the PSW. It contained a variety of deciduous trees including red oak (Quercus rubra), bur oak (*Quercus macrocarpa*), American elm (*Ulmus americana*), Freeman's maple (*Acer* x *freemanii*), and basswood (*Tilia americana*). Small inclusions of deciduous swamp habitat may be present in this community, but this could not be confirmed from the roadside.
FOM -Mixed Forest	This plant community is located west of Ninth Line and north of the PSW. It is mapped as a significant woodland by the City of Oakville. This feature was observed from roadside and aerial imagery and identified as a mixed forest (FOM) containing eastern white pine (*Pinus strobus*), oak (*Quercus* sp.), maple (*Acer* sp.) and American elm (*Ulmus americana*). It is approximately 2.5 hectares in size and is connected to a part of the Oakville-Milton East Wetland Complex by a narrow strip of treed habitat and old field cultural meadow habitat.
SWD -Deciduous Swamp	This plant community is located west of Ninth Line. It forms part of the PSW. It contains maple (*Acer* sp.), and American elm.
FOD/SWD -Deciduous Forest/Deciduous Swamp	This plant community was delineated and classified using aerial imagery as is was not visible from the roadside during field surveys. It is a riparian community that contains areas of both upland deciduous forest and deciduous swamp.
MAS2-1 -Cattail Mineral Shallow Marsh	This plant community is located on both sides of Ninth Line and forms part of the PSW. It is dominated by narrow-leaved cattail (*Typha angustifolia*) and also contain European common reed (*Phragmites australis* subsp. *australis*).
WOD/THD -Deciduous Woodland/Deciduous Thicket	This plant community is located east of Ninth Line along both banks of Joshua's Creek. It consists of a mosaic of deciduous woodland with tree cover estimated between 35% and 60%, and areas of deciduous shrubs.

4.2 Wildlife

Other than the three species of birds discussed below, all other wildlife species observed are common and secure in Ontario. A complete list of wildlife species observed in the Study Area is provided in Appendix A.

4.2.1 Amphibians

Two species of frogs were observed in the Study Area during anuran call count surveys: spring peepers (*Pseudacris crucifer*) and gray tree frogs (*Hyla versicolor*). Both species were observed calling within the North Oakville-Milton East Wetland Complex PSW within 50 m of the existing road and station Ln9-03 (Figure 1). No frogs were observed calling within 100 m of the road at any other of the survey locations, however a full chorus of

distant spring peepers was observed calling southwest of station Ln9-01 from the wooded riparian area of Joshua's Creek (WC4) outside of the Study Area.

4.2.2 Turtles

During the site reconnaissance it was determined that the habitat in the Study Area had low potential for use by turtles. The wetlands were observed to be densely vegetated with European common reed and cattails and very little open water was present. No turtles were observed during the two visual encounter surveys for turtles, or during any of the general wildlife surveys.

4.2.3 Birds

A total of 38 bird species were observed in the Study Area during field surveys. Most bird species observed were disturbance-tolerant species such as mourning dove (*Zenaida macroura*), ring-billed gull (*Larus delawarensis*), song sparrow (*Melospiza melodia*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), savannah sparrow (*Passerculus sandwichensis*), and red-winged blackbird (*Agelaius phoeniceus*). A complete list of birds identified is provided in Appendix A.

Three SAR bird species were observed in the Study Area: barn swallow (*Hirundo rustica*), bank swallow (*Riparia riparia*), and bobolink (*Dolichonyx oryzivorus*). All three species are designated as threatened under the ESA.

4.2.3.1 Barn Swallow

Barn swallow was observed at three breeding bird stations: Ln9-01, Ln-02, and Ln-03. Six barn swallow nests were observed in the culvert which conveys Joshua's Creek (WC4) under Ninth Line. Surveys determined that two of these nests were active during the 2016 breeding season. Three barn swallow fledglings were observed at station Ln9-02 nearby by the culvert during the second round of breeding bird surveys. This breeding evidence indicates that barn swallows successfully nested in the Joshua's Creek culvert.

4.2.3.2 Bank Swallow

Bank swallows were observed flying over the Study Area at stations Ln9-01 and Ln9-02 during the first round of breeding bird surveys. No evidence of bank swallow nesting was observed in the Study Area, and it is likely that these individuals are nesting outside of the Study Area.

4.2.3.3 Bobolink

Suitable habitat for grassland birds including bobolink was identified in two areas in the Study Area. Both are located west of Ninth Line. Breeding bird survey stations Ln9-02 and Ln9-03 were established to survey this habitat. During the first round of breeding bird surveys no bobolink were observed in the Study Area. During the second round bobolinks were observed in both areas of grassland habitat at survey stations Ln9-02 and Ln9-03. From station Ln9-02 a pair was observed within the suitable habitat. This observation is considered probable breeding evidence according to the methods of the Atlas of the Breeding Birds of Ontario (OBBA). From station Ln9-03 two pair of bobolink were observed in the grassland habitat. The bobolink observed from Ln9-03 were observably agitated by the surveyor's presence. This observation is considered probable breeding evidence.

4.2.4 Aquatic Habitat

During the aquatic habitat survey, four surface water features were identified in the Study Area and identified as: WC1, WC2, WC3 and WC4 (Figure 1).

WC1 is an agricultural ditch which originates on the east side of Ninth Line, just southeast of Fern Hill School. The stream flows east, and the channel form is straightened. The watercourse was identified as a portion of RL-03 in the fluvial geomorphic report. The watercourse was surveyed starting at Ninth Line and ending approximately 30 m east of Ninth Line, within the Required Access Area outlined on Figure 1.

Flow was observed at the culvert on the east side of Ninth Line. At the 30 m downstream (d/s) location the channel was wetted, but flow was not discernable. The channel was observed to be choked with cattails and terrestrial grasses. The substrate was silt. Culvert diameter at Ninth Line is 0.70 m. Riparian vegetation was active soybean field. Measurements were taken at the 30 m d/s location, which are representative of the surveyed reach: bankfull width 3.2 m, bankfull depth 0.5 m, Wetted width 0.80 m, Wetted depth 0.05 m. No barriers to fish passage were observed. No evidence of groundwater discharge was observed. Overall habitat potential for fish in this reach was considered low.

WC2 is a marshy area northwest of Fern Hill School, within the Hydro One property. It was dry at the time of the survey and no defined channel could be located. This watercourse was identified as RL-04 in the fluvial geomorphic report. The area was choked with cattails and European common reed. The watercourse is likely seasonally wetted/flowing but was not providing habitat to fish under the flow conditions observed during the survey. The culvert connecting the watercourse through Ninth Line is 0.30 m in diameter. No barriers to fish passage were observed. No evidence of groundwater discharge was observed.

WC3 is a roadside ditch that runs along the west side of Ninth Line from WC2 to just past Fern Hill School. This watercourse is connected to WC1 through a culvert. It was identified as a portion of RL-03 in the fluvial geomorphic report. The ditch was overgrown with cattails and European common reed. The ditch was not flowing at the time of the survey, but there was standing water in some locations. Representative measurements were collected near the north driveway to Fern Hill School. Bankfull width 3.8 m, bankfull depth 0.85 m, wetted depth 0.10 m, wetted width 0.5 m. Substrate is silt with sparse gravel. The ditch was not considered of value as fish habitat, as it would only contain water during runoff periods, and it did not appear to be well connected to permanent watercourses.

Joshua's Creek (WC4) was surveyed from approximately 125 m south (d/s) from Ninth Line where the watercourse meanders through Glen Oaks Funeral Home and Cemetery. This watercourse was identified as RL-02 (upstream of Ninth Line) and RL-01 (downstream of Ninth Line) in the fluvial geomorphic report. The watercourse continues upstream where it crosses Ninth Line. Upstream of Ninth Line the watercourse flows southwest through a riparian area between agricultural fields. The survey extended approximately 80 m east of Ninth Line. This watercourse is also referred to as JC22 in the North Oakville Creeks Subwatershed Study (NOCSS: Oakville 2006), where it is identified as being "high constraint – requiring rehabilitation."

The majority of the downstream reach (from Ninth Line to 125 m downstream of Ninth Line) has a defined channel, but the channel was poorly defined in areas. The channel form is irregular meander, and high flows have carved out pools and caused bank scouring on inside turns. Banks were frequently unstable along this reach due to erosion. Substrate is dominated by silt, with sparse gravel and cobble. The riparian area was manicured lawn right to the edge of the bank on both sides of the watercourse. The watercourse was dry at the time of the survey, and not providing habitat to fish. Evidence of flow from bank erosion suggests the watercourse sustains flow during high water periods such as freshet or after rainfall events, and the habitat would be available to fish at these times.

Upstream of Ninth Line, the watercourse is broader and poorly defined upstream as it widens into a low area choked with grasses and cattails. Substrate was silt. The riparian area within 10-15 m of the watercourse consisted of long grasses, goldenrod, thistles, and deciduous trees (pear). The narrow riparian area was adjacent to soybean fields on either side. This reach was also dry during the survey.

Under high flow conditions, it is expected that the culvert allows for fish passage. No barriers to fish passage were observed along the reaches surveyed. No evidence of groundwater discharge was observed. No fish were observed during the aquatic habitat surveys.

5.0 NATURAL HERITAGE FEATURES

5.1 Areas of Significance

5.1.1 Areas of Natural and Scientific Interest (ANSI)

ANSIs are designated by the province according to standardized evaluation procedures. ANSIs are ranked by the MNRF as being either provincially or regionally significant. There are no ANSIs in or adjacent to the Study Area.

5.1.2 Significant Wetlands

The MNRF designates provincially significant wetlands (PSWs). PSWs are determined based on a scientific point-based ranking system known as the Ontario Wetland Evaluation System (OWES). A part of the North Oakville-Milton East Wetland Complex is present in the Study Area. West of Ninth Line the wetland consists of a deciduous swamp dominated by silver or Freeman's maple (*Acer saccharinum* or *Acer* x *freemanii*) and American elm (*Ulmus americana*), and a mineral shallow marsh dominated by narrow-leaved cattail (*Typha angustifolia*). A culvert under Ninth Line maintains a surface water connection between this cattail marsh and another area of cattail marsh to east of Ninth Line.

5.1.3 Significant Woodlands

Significant woodlands are defined and designated by the local planning authority (MNRF 2010). A treed area located west of Ninth Line and north of the Oakville-Milton East Wetland Complex is designated as a significant woodland under the Oakville Official Plan (Oakville 2006a, Figure F1 Natural Features). This feature was observed from roadside and identified as a mixed forest (FOM) containing eastern white pine (Pinus strobus), oak (*Quercus* sp.), maple (*Acer* sp.) and American elm (*Ulmus americana*). It is approximately 2.5 hectares in size and is connected to a part of the Oakville-Milton East Wetland Complex by a narrow strip of treed habitat and old field cultural meadow habitat.

5.1.4 Significant Wildlife Habitat

The Natural Heritage Reference Manual (MNRF, 2010) includes criteria and guidelines for designating significant wildlife habitat (SWH). There are two other documents, the Significant Wildlife Habitat Technical Guide (SWHTG) and the Significant Wildlife Habitat Ecoregion Criteria Schedules (SWHECS), which provide specific values and criteria for identifying SWH and offer some general information and ideas regarding the consideration of thresholds for the definition of significance. The Significant Wildlife Habitat Mitigation Support Tool (SWHMiST; MNRF 2014) is also used in conjunction with the SWHECS to determine appropriate mitigation for disturbance or removal of SWH.

There are four general types of significant wildlife habitat: migration corridors, seasonal concentration areas, rare or specialized habitats, and species of conservation concern. Each of these types of significant wildlife habitat is discussed below in relation to the Study Area.

5.1.4.1 Migration Corridors

The SWHTG defines animal movement corridors as elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. This is generally in response to different seasonal habitat requirements. For example, trails used by deer to move to wintering areas or areas used by amphibians between breeding and summer habitat. To qualify as significant wildlife habitat, these corridors would be a critical link between habitats that are regularly used by wildlife.

The North Oakville-Milton East Wetland Complex which is present in the Study Area is likely to contain animal movement corridors on a local scale. A small portion of the PSW is located on the east side of Ninth Line and is connected to the larger part of the PSW through via a watercourse flowing through a culvert. Opportunities for increased wildlife passage in this area is discussed in Section 7 (Summary of Recommendations and Opportunities). Improvements to wildlife passage in the area of the PSW may reduce herptile road mortality.

5.1.4.2 Seasonal Concentration Areas

Seasonal concentration areas are those areas where large numbers of a species congregate at one particular time of the year. Examples include deer yards, amphibian breeding habitat, bird nesting colonies, bat hibernacula, raptor roosts, and passerine migration concentrations. If a species is at risk, or if a large proportion of the population may be lost if significant portions of the habitat are altered, all examples of certain seasonal concentration areas may be designated.

The SWHTG identifies the following 14 types of seasonal concentrations of animals that may be considered significant wildlife habitat, and outlines means of identifying such habitat. They are:

- Winter deer yards;
- Moose late winter habitat;
- Colonial bird nesting sites;
- Waterfowl stopover and staging areas (aquatic and/or terrestrial);
- Waterfowl nesting areas;
- Shorebird migratory stopover areas;
- Landbird migratory stopover areas;
- Raptor winter feeding and roosting areas;
- Wild turkey winter range;
- Turkey vulture summer roosting areas;
- Reptile hibernacula (and turtle wintering areas);
- Bat hibernacula;

- Bullfrog concentration areas; and
- Migratory butterfly stopover areas.

In addition to the above list, the SWHECS considers bat maternity colonies and bat migratory stopover areas as seasonal concentration areas for wildlife.

Deer and moose management is an MNRF responsibility, and deer winter congregation areas considered significant are mapped by the MNRF. There have neither been deer yards identified in the Study Area, nor is there any identified moose late winter habitat.

There are no banks, cliffs, rocky islands or peninsulas suitable for colonial bird nesting habitat in the Study Area. Further, no heronries were identified during the site investigation.

No areas suitable for supporting waterfowl during migration times (stopover and staging) were identified during the site investigation. No terrestrial stopover or staging habitat was observed in the Study Area, nor was any evidence of waterfowl nesting observed during the site investigation.

Shorebird stopover sites are typically well-known and have a long history of use. The Study Area does not have areas of suitable shorebird foraging habitat. In addition, no concentrations of shorebirds or presence of the listed species was identified through background review or during the site investigation.

The Study Area is not located in close enough proximity (i.e., within 5 kilometres [km]) to the Great Lakes to provide suitable significant landbird migratory stopover areas.

Ideal raptor winter roosting areas are generally located in mature mixed or coniferous woodlands that abut windswept fields that do not get covered by deep snow. The mixed woodlands in the Study Area are mid-aged to mature in small areas, and not likely to represent significant habitat for raptor winter feeding and roosting.

Suitable habitat for wild turkey includes a mix of forest and open land such as natural grassland or agriculture. For wintering, wild turkeys tend to prefer large dense coniferous forests adjacent to open land and close to both a food source and groundwater seeps. There are no large areas of dense coniferous forest in the Study Area.

No significant turkey vulture summer roosting habitat was observed in the Study Area.

Scattered hibernacula for individual snakes may be present in the form of mammal burrows, etc. but are not considered significant for the purposes of this report as they would not support congregations.

Turtle over-wintering habitat was not observed in the Study Area. During the site reconnaissance it was determined that the habitat in the Study Area had low potential for use by turtles. The wetlands were observed to be densely vegetated with European common reed and cattails and very little open water was present. No turtles were observed during the two visual encounter surveys for turtles, or during any of the general wildlife surveys.

No karst features such as surface crevices or holes were observed in the Study Area. Based on this, no bat hibernacula potential is attributed to the Site. Based on site investigations, no areas in the Study Area provide the necessary number (>10/ha) of large (>25cm DBH) habitat trees to be considered significant maternity roost habitat. No potentially suitable roost trees were observed during the site investigation. No bat migratory stopover areas are identified in this eco-region.

The Study Area does not provide suitable large open water areas for bullfrog.

The Study Area is not located within 5 km of Lake Ontario, and therefore does not meet the criteria for significant migratory butterfly stopover habitat.

5.1.4.3 Rare or Specialized Habitats

Rare Habitats

Rare habitats are those with plant communities that are considered rare in the province, such as sand barrens, alvars, old growth forests, savannah and tallgrass prairie. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. Generally, communities assigned an SRANK of S1 to S3 (extremely rare to rare-uncommon) by the NHIC qualify as rare.

None of the plant communities identified in the Study Area are ranked S1 to S3 by the NHIC.

Specialized Habitats

Specialized habitats are microhabitats that provide a critical resource to some groups of wildlife. The SWHTG defines 14 specialized habitats that may be considered significant wildlife habitat, and outlines means of identifying such habitats. They are:

- Habitat for area-sensitive species;
- Forests providing a high diversity of habitats;
- Old-growth or mature forest stands;
- Foraging areas with abundant mast;
- Amphibian woodland breeding ponds;
- Turtle nesting habitat;
- Specialized raptor nesting habitat;
- Moose calving areas;
- Moose aquatic feeding areas;
- Mineral licks;
- Mink, otter, marten, and fisher denning sites;
- Highly diverse areas;
- Cliffs; and
- Seeps and springs.

In addition to the above list, the SWHECS considers waterfowl nesting habitat, bald eagle and osprey nesting, foraging and perching habitat, woodland raptor nesting habitat, and amphibian wetland (i.e., non-woodland) breeding habitat as specialized habitat for wildlife. Waterfowl nesting was discussed under Section 5.4.3.2 (Seasonal Concentration Areas).

The woodlands in the study area are not large enough to meet the criteria for area-sensitive breeding bird habitat according to the criteria in the SWHECS (i.e., no area 200 m from any edge).

The woodlands in the study area are not considered complex in terms of their plant communities and are not considered forests providing a high diversity of habitats. The trees in the study area are not over 140 years old, and beech or oak trees were not abundant. Therefore, the study area has not been considered old-growth forest or forest providing an abundance of mast.

Targeted anuran call count surveys were performed at roadside as part of this study. Two species of frog were observed calling at a distance >100 m from the road. No significant woodland amphibian breeding ponds were identified though the anuran call count surveys.

The SWHECS indicates that exposed mineral soils in open sunny areas must be present to support turtle nesting. No evidence of turtle nesting was observed along the road shoulders during surveys.

Nesting habitat for raptors, as well as perching and foraging habitat for bald eagle and osprey, were not identified in the study area as no raptors or raptor nests were observed during site investigation. Further, to meet the SWHECS criteria for this habitat type, there must be > 10 ha of interior forest habitat (measured 200 m from any edge) present. This is not present in the study area.

No moose calving or aquatic feeding areas are present in the study area as it is not within the geographic range of moose. No mineral licks, or mink, otter, marten or fisher denning sites were observed during the site investigation.

Highly diverse areas are described in the SWHTG as areas with a high species or plant community diversity. The majority of the study area is characterized by anthropogenic landcover. The area containing a part of the North Oakville-Milton East Wetland Complex contained a moderately diverse assemblage of plant communities compared to the surrounding anthropogenic landscape. Recommendations for the mitigation of negative effects of the plants communities in this area are discussed in Section 6 (Discussion of Design Alternatives) and Section 7 (Summary of Recommendations and Opportunities).

There is no cliff / talus habitat in the study area, according to the criteria presented in the SWHECS.

No evidence of groundwater seepage or springs were observed in the study area.

5.1.4.4 Habitat for Species of Conservation Concern

Species of Conservation Concern includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the rest of the world.

Rare species are considered at five levels: globally rare, nationally rare, provincially rare, regionally rare; and locally rare (in the municipality). This is also the order of priority that should be attached to the importance of protection for these species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. Examples include species vulnerable to forest fragmentation and species such as woodland raptors that may be vulnerable to forest management or human disturbance. The final group of species of conservation concern includes species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions.

Through the desktop SAR screening it was determined that there is potential habitat in the Study Area for the following Species of Conservation Concern: Monarch (*Danaus plexippus*) and eastern ribbonsnake (*Thamnophis sauritius*). Although these species were not observed during the field surveys, the majority of the field surveys were conducted from roadside and these species may be present in areas that were not visible from the road.

Monarch may utilize the cultural meadow and field edge habitats in the Study Area. Eastern ribbonsnake may utilize the watercourse riparian and wetland habitats in the Study Area. No impacts to these species are expected to result from this proposed construction activities on site if the mitigation measures described in Section 7 are implemented.

5.1.5 Conservation Halton

The Project crosses two Conservation Halton regulated areas. One regulated area is associated with the North Oakville-Milton East Wetland Complex, which is a Provincially Significant Wetland (PSW). The other Conservation Halton Regulation Area is associated with the Joshua Valley Park North. Development at these locations will require permits from Conservation Halton.

5.1.6 Municipal and Regional Official Plans -Natural Features

On Map 1G of the Region of Halton Official Plan (OP), the lands associated with the PSW and the reach of Joshua's Creek are identified as Key Features within the Natural Heritage Systems (Region of Halton 2015b). The remainder of the Study Area is mapped as Urban Area. The Region's OP states that local municipalities in their official plans shall ensure that these Key Features are protected through appropriate area-specific plans or studies related to development and/or site alteration.

Under the North Oakville East Secondary Plan, the lands in the Study Area that are west of Ninth Line are zoned as Cemetery Area, Employment Area, Institutional Area, Utility Corridor and Natural Heritage System Area.

On Schedule 2 of the City of Mississauga OP, a portion of the Study Area is designated as Significant Natural Areas and Natural Green Spaces under the Natural Heritage System.

Development or site alteration in areas designated as Natural Heritage System under the Regional and Municipal OPs must comply with the requirements of these plans.

5.1.7 North Oakville Creeks Subwatershed Study

The North Oakville Creeks Subwatershed Study (NOCSS, Oakville 2006) identifies each subwatershed and includes recommendations on setbacks and protective measures. The Joshua Creek Core Area (#11) was delineated based on the combination of wetland and upland communities and the drainage system of several tributaries which come to a confluence at the Joshua Creek. The Joshua Creek Core Area also includes open country habitat, which are the fields located on the west side of Ninth Line. The boundary of the Joshua Creek Core Area on the northeast corner abuts Ninth Line and is recognized as part of the Natural Heritage System (Figure 1 and 2). Within this core area, there are several sensitive plant species identified in the wetlands that are part of the North Oakville-Milton East Wetland Complex. The NOCSS suggests setbacks from wetlands of at least 30 m, but as much as 100-200 m for more sensitive wetland features. One of the key sensitive communities within the Joshua Creek Core Area is Buttonbush Swamp. Although a larger portion of Buttonbush Swamp is located within Core Area #10 to the west of Joshua Creek Core Area, there are small patches of this community in Joshua Creek Core Area. Buttonbush communities were not observed from Ninth Line, but a small Buttonbush community (0.06 ha) was identified in the North Oakville-Milton Wetland evaluation approximately 65 m to the east of Ninth Line. There is another small Buttonbush community (0.08 ha) to the west of Ninth Line, approximately 130 m from Ninth Line. Ninth Line appears to be a partial barrier to water flow from the wetland pockets on the east side to the west side of the road, with only one small culvert connecting these wetlands, but not directly where the wetlands would cross Ninth Line. The NOCSS management recommendations for the Joshua Creek Core Area includes retention of the woodlands and wetlands. Other recommendations include improving the linkages between this

Core Area and Core Area #10 or between the Joshua Creek Core Area and the natural areas to the south across Dundas Street. Improving the linkages within the Joshua Creek Core Area itself, including across Ninth Line could also prove beneficial to the quality of the wetland.

5.2 Species at Risk (Endangered and Threatened Species)

Based on the breeding bird surveys conducted in 2016, it was determined that bobolink habitat is present in the Study Area. Two areas of cultural meadow located west of Ninth Line were occupied by pairs of bobolink during the breeding season.

Active barn swallow nests were observed in the culvert that conveys Joshua's Creek under Ninth Line.

Although bank swallow were observed flying over the Study Area, no nesting habitat was observed in the Study Area.

No other threatened or endangered species were observed in the Study Area.

Development or site alteration is prohibited within habitat of threatened or endangered species except in accordance with provincial and federal permitting requirements.

5.3 Regionally Rare and Regionally Uncommon Species

No regionally rare species were observed in the Study Area during the field surveys. The surveys conducted for this NESR were conducted from roadside which limited the surveyor's opportunity to search for rare species. However, plant lists for each plant community within the PSW were compiled for the wetland evaluation and were reviewed for this NESR. No regionally rare species were observed in the wetland plant communities located in the Study Area during the wetland evaluation conducted in 2009 (OMNR 2009) or the update to the wetland evaluation conducted in 2016 (MNRF 2016).

6.0 DISCUSSION OF DESIGN ALTERNATIVES

Golder completed an assessment of the potential impacts of five design alternatives, including do nothing, on the following natural environment components: aquatic, avian and wildlife, natural areas, species at risk, vegetation, and watercourses. The four design alternatives included: Option 1 (widen equally east and west), Option 2 (widen to east), Option 3 (widen to west) and Option 4 (mitigated design) and Do Nothing. The mitigated design of Option 4 consisted a narrower road right of way through the PSW. The assessment of the potential impacts of the four design alternatives is presented in Table 3.

Table 3: Assessment of Design Alternatives

Natural Environment Component	Do Nothing	Alternative 1 Widen Equally East and West	Alternative 2 Widen to East	Alternative 3 Widen to West	Alternative 4 Mitigated Design
Aquatic	No Impact	Low impact. Joshua's creek is seasonally dry in the year and although it provides direct fish habitat, fish have access to this habitat for only periods when high water conditions are present. Anticipated impacts from the project can be fully mitigated. There is no potential for serious harm to fish and fish habitat associated with this Alternative (1). Impacts to tributaries are likewise not expected to result in risk to fish and fish habitat when mitigation is implemented	Low impact. Joshua's creek is seasonally dry in the year and although it provides direct fish habitat, fish have access to this habitat for only periods when high water conditions are present. Anticipated impacts from the project can be fully mitigated. There is no potential for serious harm to fish and fish habitat associated with this Alternative (2). Impacts to tributaries are likewise not expected to result in risk to fish and fish habitat when mitigation is implemented.	Low impact. Joshua's creek is seasonally dry in the year and although it provides direct fish habitat, fish have access to this habitat for only periods when high water conditions are present. Anticipated impacts from the project can be fully mitigated. There is no potential for serious harm to fish and fish habitat associated with this Alternative (3). Impacts to tributaries are likewise not expected to result in risk to fish and fish habitat when mitigation is implemented	Low impact. Joshua's creek is seasonally dry in the year and although it provides direct fish habitat, fish have access to this habitat for only periods when high water conditions are present. Anticipated impacts from the project can be fully mitigated. There is no potential for serious harm to fish and fish habitat associated with this Alternative (4). Impacts to tributaries are likewise not expected to result in risk to fish and fish habitat when mitigation is implemented
Avian and Wildlife	No Impact	Represents minimal level of intrusion into woodlands and associated wildlife habitat, but moderate level of intrusion into wetlands and associated wildlife habitat (973 m^2).	Represents minimal level of intrusion into woodlands and associated wildlife habitat, but moderate level of intrusion into wetlands and associated wildlife habitat (979 m^2).	Represents minimal level of intrusion into woodlands and associated wildlife habitat, but moderate level of intrusion into wetlands and associated wildlife habitat (977 m^2).	Represents minimal level of intrusion into woodlands and wetlands and associated wildlife habitat. Compared to the other Alternatives, Alternative 4 represents the least amount of intrusion into wetland habitat (831 m^2) through the area with the most environmentally sensitive and wildlife rich habitat along the route.
Natural Areas	No Impact	Road widening encroaches approximately 973 m^2 into the North Oakville-Milton East Complex Provincially Significant Wetland.	Road widening encroaches approximately 979 m^2 into the North Oakville-Milton East Complex Provincially Significant Wetland.	Road widening encroaches approximately 977 m^2 into the North Oakville-Milton East Complex Provincially Significant Wetland.	Road widening encroaches approximately 831 m^2 into the North Oakville-Milton East Complex Provincially Significant Wetland.; less than alternatives 1, 2 and 3 as the right-of-way is mitigated with reduced boulevard width through this section.
Species at Risk	No Impact	Three (3) SAR species were observed within the Study Area: bobolink, barn swallow, and bank swallow. Construction can occur during non-nesting season; safe harbor habitat can be provided during construction. This Alternative represents a moderate intrusion into bobolink habitat breeding habitat.	Three (3) SAR species were observed within the Study Area: bobolink, barn swallow, and bank swallow. Construction can occur during non-nesting season; safe harbor habitat can be provided during construction. This Alternatives less of an intrusion into bobolink breeding habitat than Alternatives 1 and 3 and the same amount of intrusion as Alternative 4.	Three (3) SAR species were observed within the Study Area: bobolink, barn swallow, and bank swallow. Construction can occur during non-nesting season; safe harbor habitat can be provided during construction. This Alternative represents a moderate intrusion into bobolink breeding habitat.	Three (3) SAR species were observed with the Study Area: bobolink, barn swallow, and bank swallow. Construction can occur during non-nesting season; safe harbor habitat can be provided during construction. This Alternatives less of an intrusion into bobolink breeding habitat than Alternatives 1 and 3 and the same amount of intrusion as Alternative 2.

Natural Environment Component	Do Nothing	Alternative 1 Widen Equally East and West	Alternative 2 Widen to East	Alternative 3 Widen to West	Alternative 4 Mitigated Design
Vegetation	No Impact	Vegetation along the majority of the alignment is dominated by non-native, disturbance-tolerant plant species. A higher density of native and wetland plants are present in the North Oakville-Milton East Complex PSW.	Vegetation is dominated by non-native, disturbance-tolerant plant species. A higher density of native and wetland plants are present in the North Oakville-Milton East Complex PSW.	Vegetation is dominated by non-native, disturbance-tolerant plant species. A higher density of native and wetland plants are present in the North Oakville-Milton East Complex PSW.	Vegetation is dominated by non-native, disturbance-tolerant plant species. A higher density of native and wetland plants are present in the North Oakville-Milton East Complex PSW. Compared to the other Alternatives, this Alternative represents the least amount of impact to native wand wetland vegetation as the right-of-way is mitigated with reduced boulevard width through PSW section.
Watercourses	No Impact	Joshua's Creek meanders south-west of Ninth Line. Requires channel realignment at the downstream end of culvert and energy dissipation feature to mitigate downstream erosion.	Joshua's Creek meanders south-west of Ninth Line. Requires channel realignment at the downstream end of culvert and energy dissipation feature to mitigate downstream erosion.	Joshua's Creek meanders south-west of Ninth Line. Requires channel realignment at the downstream end of culvert and energy dissipation feature to mitigate downstream erosion.	Joshua's Creek meanders south-west of Ninth Line. Requires less channel realignment at the downstream end of culvert compared to other alternatives due to retaining wall. Energy dissipation feature to mitigate downstream erosion is required.

6.1 Summary of Design Alternatives Assessment

Doing nothing would result in no impact to the aquatic and terrestrial natural environment.

Alternative 1 (widen equally east and west) would result in less intrusion into bobolink breeding habitat than alternative 3 but more intrusion than alternatives 2 and 4. It would result in a moderate impact on the PSW and vegetation and a low impact aquatic habitat.

Alternative 2 (widen to east) would result in less intrusion into bobolink breeding habitat than alternatives 1 or 3 and the same amount of intrusion as alternative 4. It would result in a moderate impact on the PSW and vegetation, and a low impact on aquatic habitat.

Alternative 3 (widen to west) would result in greater intrusion into bobolink breeding habitat than alternatives 1, 2 and 4. It would result in a moderate impact on the PSW and vegetation, and a low impact on aquatic habitat.

Alternative 4 (mitigated design) would result in less of an intrusion into bobolink breeding habitat than alternatives 1 and 3 and the same amount of intrusion as alternative 2. It would result in the least impact on the PSW, vegetation and aquatic habitat.

7.0 SUMMARY OF RECOMMENDATIONS AND OPPORTUNITIES

The NOCSS recommends retention of existing woodland and wetland features in the Joshua Creek Core Area #11. Ninth Line is a partial barrier to the movement of water within this Core Area and between pockets of the North Oakville-Milton East Wetland Complex. Improvements to water flow under the Ninth Line, including potential for wildlife passage could be considered to improve the connectivity and quality in the wetland:

- It is recommended that the existing circular corrugated steel pipe culvert located at the PSW be replaced with the proposed open bottom concrete box with a 0.5 m wide bench 0.3 m above the bottom to facilitate animal passage. It is anticipated that improved animal passage will reduce the risk of herptile road mortality in this area. Open bottom culverts with natural bottom substrates that match upstream and downstream substrates facilitates fish passage and maintains watercourse connectivity (Massachusetts 2010). Further evaluation of culvert options and sizing will be included in the Environmental Study Report (ESR).
- It is recommended that the existing closed bottom box culvert that conveys Joshua Creek under Ninth Line be replaced with a taller and wider open bottom concrete box culvert to facilitate fish passage, wildlife passage, and to maintain watercourse connectivity. Further evaluation of culvert options and sizing will be included in the Environmental Study Report (ESR).
- To mitigate the risk of herptile mortality during construction, it is recommended that wildlife exclusion fencing be installed around the perimeter of the construction areas within 50 meters of the PSW and Joshua Creek.
- Hydro poles are located along the east side of Ninth Line and will require relocation. The impacts associated with the relocation of the poles will be limited to the proposed right-of-way. It is recommended that special consideration be given to areas crossing the wetland, including the siting of pole locations outside of the wetland. The siting of hydro poles will be confirmed during detailed design.

- In order to comply with the MBCA, all vegetation clearing, including the cutting of trees on private property, should be scheduled outside of the breeding bird season (April 1 to August 15 for the Study Area). If vegetation clearing between these dates is required, nesting surveys should be conducted by a qualified biologist immediately prior to the commencement of vegetation clearing;
- Joshua's Creek could provide intermittent warmwater fish habitat. No in-water work should be conducted during the timing window restriction for warmwater fish (April 1 to June 30). The NOCSS recommends improvement of JC22 from Ninth Line to Joshua Creek;
- It is recommended that DFO be consulted to obtain guidance for projects under the new *Fisheries Act*.
- A permit from Conservation Halton (CH) will be required for work within the regulated areas (O. Reg. 162/06; Ontario 2006). The requirements of the permit must be determined in consultation with CH and may include culvert design features that improve connectivity and wildlife passage; control of invasive plant species; and monitoring.
- All four options described in Table 3 will impact habitat for bobolink and barn swallow. When the project design has been finalized, the activity must be registered with the MECP with the submission a Notice of Activity (NoA). Habitat management plans and compensation habitat may be required for work in bobolink and barn swallow habitat.
- A habitat management plan, if required, may include habitat creation or enhancement as outlined in Ontario Regulation 242/08 under the ESA. The requirements of the habitat management plan are to be confirmed through consultation with the MECP.

8.0 SUMMARY OF CONSTRAINTS

Based on the background review and SAR screening and field surveys, there are several natural heritage constraints within the Study Area including:

- North Oakville-Milton East Wetland Complex PSW;
- Natural Heritage System (Mississauga and Oakville);
- Significant Woodland (Oakville);
- Fish habitat;
- Habitat for provincially threatened species (bobolink and barn swallow); and
- Conservation Halton regulated areas.

9.0 CONCLUSIONS

The assessment of design alternatives identified alternative 4 (mitigated design) as having the least impact on the PSW, bobolink breeding habitat, vegetation and aquatic habitat.

If the guidance provided in Section (7.0) is followed including: the replacement of culverts with the recommended designs, adherence to restricted activity periods, and engagement with agencies regarding the identified permitting processes, it is anticipated that the project will not have a significant negative impact on the natural heritage features and functions in the Study Area.

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Signature Page

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Heather Melcher, MSc
Principal, Senior Ecologist

LO/HM/wlm

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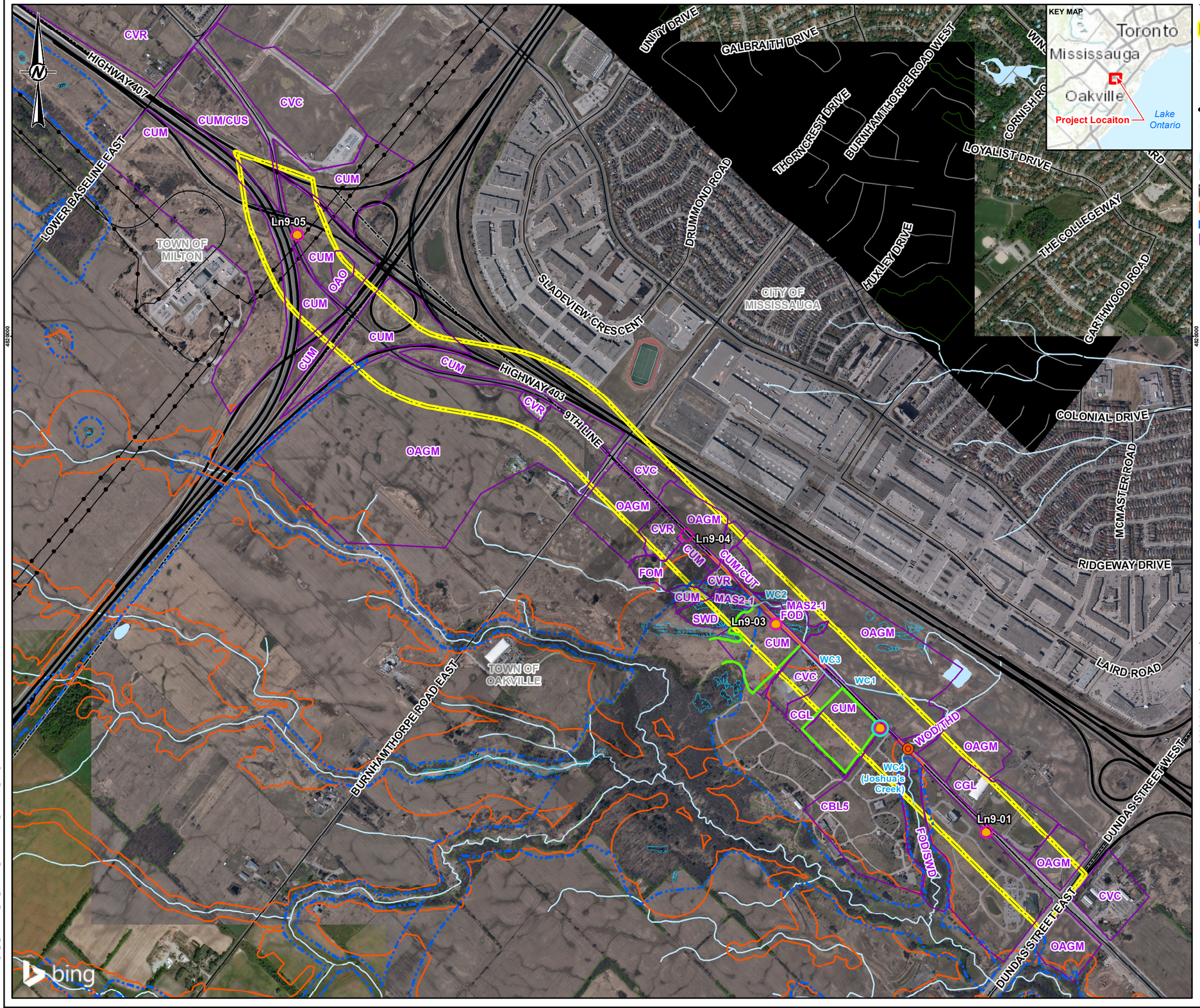
FIGURE



LEGEND

- SITE BOUNDARY
- RAILWAY
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- UTILITY LINE
- WATERCOURSE
- WATER BODY
- WETLAND
- WOODED
- MUNICIPAL BOUNDARY
- REGULATION LIMIT
- NATURAL HERITAGE SYSTEM
- ECOLOGICAL LAND CLASSIFICATION
- ANURAN CALL COUNT SURVEY STATION
- BARN SWALLOW NESTS
- BREEDING BIRD SURVEY STATION
- TURTLE VISUAL ENCOUNTER SURVEY STATION
- AQUATIC SURVEY WATERCOURSE
- BOBOLINK HABITAT

Label	Description
CBL5	Memorial / Cemetary
CGL	Greenlands (E.G. parkland, golf course)
CUM	Cultural Meadow
CUM/CUS	Cultural Meadow / Cultural Savannah
CUM/CUT	Cultural Meadow / Cultural Thicket
CVC	Commercial and Institutional
CVR	Residential
FOD	Deciduous Forest
FOD/SWD	Deciduous Forest / Deciduous Swamp
FOM	Mixed Forest
MAS2-1	Cattail Mineral Shallow Marsh
OAGM	Open Agricultural Field
OAO	Open Water
SWD	Deciduous Swamp
WOD/THD	Deciduous Woodland / Deciduous Thicket

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1:13,000 KILOMETRES

NOTE(S)

REFERENCE(S)

BASE DATA - MNR LIO, OBTAINED 2019
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2019
IMAGERY: REGION OF HALTON, 2015.
BACKGROUND IMAGERY: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
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REGULATION LIMITS: CONSERVATION HALTON, 2012.
PROJECTION: PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 1983 UTM ZONE 17N

CLIENT
REGION OF HALTON

PROJECT
HALTON NINTH LINE EA

TITLE
ECOLOGICAL LAND CLASSIFICATION

CONSULTANT
GOLDER

YYYY-MM-DD	2019-08-26
DESIGNED	LMM
PREPARED	LMM
REVIEWED	LO
APPROVED	HM

PROJECT NO.	CONTROL	REV.	FIGURE
1648031	-	-	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: S:\Clients\Region_of_Halton\Ninth_Line_Oakville\99_PROJ\1648031\40_PROD\0001_Ecological\Land\Classification\1648031-0001-RT-0001.mxd PRINTED ON: 2019-08-26 AT: 3:02:53 PM

APPENDIX A

Wildlife and Vegetation List

Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	Regional Rarity[e]	SARA[c]	ESA[d]
Reptiles and Amphibians (2 taxa)							
Grey tree frog	*Hyla versicolor*	N	G5	S5			
Spring peeper	*Pseudacris crucifer*	N	G5	S5			
Birds (38 taxa)							
Alder flycatcher	*Empidonax alnorum*	N	G5	S5B			
American crow	*Corvus brachyrhynchos*	N	G5	S5B			
American goldfinch	*Carduelis tristis*	N	G5	S5B			
American kestrel	*Falco sparverius*	N	G5	S4			
American redstart	*Setophaga ruticilla*	N	G5	S5B			
American robin	*Turdus migratorius*	N	G5	S5B			
Bank swallow	*Riparia riparia*	N	G5	S4B			THR
Barn swallow	*Hirundo rustica*	N	G5	S4B			THR
Black-capped chickadee	*Poecile atricapillus*	N	G5	S5			
Bobolink	*Dolichonyx oryzivorus*	N	G5	S4B			THR
Brown-headed cowbird	*Molothrus ater*	N	G5	S4B			
Cedar waxwing	*Bombycilla cedrorum*	N	G5	S5B			
Chipping sparrow	*Spizella passerina*	N	G5	S5B			
Cliff swallow	*Petrochelidon pyrrhonota*	N	G5	S4B			
Common grackle	*Quiscalus quiscula*	N	G5	S5B			
Common yellowthroat	*Geothlypis trichas*	N	G5	S5B			
Downy woodpecker	*Picoides pubescens*	N	G5	S5			
European starling	*Sturnus vulgaris*	I	G5	SNA			
Gray catbird	*Dumetella carolinensis*	N	G5	S4B			
Great blue heron	*Ardea herodias*	N	G5	S4			
Horned lark	*Eremophila alpestris*	N	G5	S5B			
House sparrow	*Passer domesticus*	N	G5	SNA			
Killdeer	Charadrius vociferus	N	G5	S5B,S5N			

Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	Regional Rarity[e]	SARA[c]	ESA[d]
Mallard	*Anas platyrhynchos*	N	G5	S5			
Mourning dove	*Zenaida macroura*	N	G5	S5			
Northern cardinal	*Cardinalis cardinalis*	N	G5	S5			
Northern rough-winged swallow	*Stelgidopteryx serripennis*	N	G5	S4B			
Red-tailed hawk	*Buteo jamaicensis*	N	G5	S5			
Red-winged blackbird	*Agelaius phoeniceus*	N	G5	S4			
Ring-billed gull	*Larus delawarensis*	N	G5	S5B,S4N			
Rock pigeon	*Columba livia*	I	G5	SNA			
Savannah sparrow	*Passerculus sandwichensis*	N	G5	S4B			
Song sparrow	*Melospiza melodia*	N	G5	S5B			
Spotted sandpiper	*Actitis macularius*	N	G5	S5			
Swamp sparrow	*Melospiza georgiana*	N	G5	S5B			
Tree swallow	*Tachycineta bicolor*	N	G5	S4B			
Willow flycatcher	*Empidonax traillii*	N	G5	S5B			
Yellow warbler	*Setophaga petechia*	N	G5	S5B			
Mammals (2 taxa)							
Norway Rat	*Rattus norvegicus*	I	G5	SNA			
Woodchuck	*Marmota monax*	N	G5	S5			
Plants (24 taxa)							
Alfalfa	*Medicago sativa*	I	GNR	SNA	I		
American elm	*Ulmus americana*	N	G5	S5	C		
Ash	*Fraxinus sp.*	N					
Basswood	*Tilia americana*	N	G5	S5	C		
Beech	*Fagus grandifolia*	N	G5	S4	C		
Broad-leaf cattail	*Typha latifolia*	N	G5	S5	C		
Bur oak	*Quercus macrocarpa*	N	G5	S5	C		
Canada goldenrod	*Solidago canadensis*	N	G5	S5	C		

Common Name	Scientific Name	Origin[a]	Global Rarity Status[b]	Ontario Rarity Status[b]	Regional Rarity[e]	SARA[c]	ESA[d]
Canada thistle	*Cirsium arvense*	I	G5	SNA	I		
Choke Cherry	*Prunus virginiana*	N	G5	S5	C		
Common buckthorn	*Rhamnus cathartica*	I	GNR	SNA	I		
Eastern white pine	*Pinus strobus*	N	G5	S5	C		
European common reed	*Phragmites australis subsp. Australis*	I	G5	SNA	C		
Freeman's maple	*Acer x freemanii*	N	GNA	SNA	hybrid		
Hickory	*Carya sp.*	N					
Honeysuckle	*Lonicera sp.*						
Ironwood	*Ostrya virginiana*	N	G5	S5	C		
Kentucky bluegrass	*Poa pratensis*	(N)	G5	S5	C		
Lamb's quarters	*Chenopodium album*	I	G5	SNA	I		
Narrow-leaved cattail	*Typha angustifolia*	I	G5	SNA	I		
Oxeye daisy	*Leucanthemum vulgare*	I	GNR	SNA	I		
Red oak	*Quercus rubra*	N	G5	S5	C		
Reed canary grass	*Phalaris arundinacea*	N	G5	S5	C		
Riverbank grape	*Vitis riparia*	N	G5	S5	C		
Smooth brome	*Bromus inermis*	I	G5	SNA	I		
Staghorn sumac	*Rhus typhina*	N	G5	S5	C		
Soya	*Glycine max*	I	GNR	SNA	I		

[a] Origin: N = Native; (N) = Native but not in Study Area region; I = Introduced.

[b] Ranks based upon determinations made by the Ontario Natural Heritage Information Centre (2012).

G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.

SNA = Not applicable for Ontario Ranking (e.g. Exotic species); SNR = Provincial conservation status not yet assessed; B = status applies to the breeding population of the species

[c] Species at Risk Act (SARA), 2002. Schedule 1 (Last amended 6 July 2012);

[d] Ontario Endangered Species Act (ESA), 2007 (O.Reg 242/08 last amended 1 July 2012 as O.Reg 122/12). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 24 Jan 2013 as O.Reg 25/13, s. 1.);

[e] Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp.

C = Common, R = Rare, U = uncommon, I = introduced

APPENDIX B

SAR Screening

Taxon	Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
Amphibian	Jefferson salamander	*Ambystoma jeffersonianum*	END	END	END	S2	In Ontario, Jefferson salamander is found only in southern Ontario, along southern portions of the Niagara Escarpment and western portions of the Oak Ridges Moraine. Jefferson salamander prefers moist, well-drained deciduous and mixed forests with a closed canopy. It overwinters underground in mammal burrows and rock fissures, and moves to vernal pools and ephemeral wetlands in the early spring to breed. Breeding ponds are typically located in or near to forested habitats, and contain submerged debris (i.e. sticks, vegetation) for egg attachment sites. Ephemeral breeding pools need to have water until at least mid-summer (mid to late July) (Jefferson Salamander Recovery Team 2010).	Low	No large forests or breeding ponds occur in the study area to support Jefferson salamander.
	Western chorus frog - Great Lakes St. Lawrence/Canadian Shield Population	*Pseudacris triseriata*	THR	—	THR	S3	In Ontario, habitat of this amphibian species typically consists of marshes or wooded wetlands, particularly those with dense shrub layers and grasses, as this species is a poor climber. They will breed in almost any fishless pond including roadside ditches, gravel pits and flooded swales in meadows. This species hibernates in terrestrial habitats under rocks, dead trees or leaves, in loose soil or in animal burrows. During hibernation, this species is tolerant of flooding (Environment Canada 2015).	Low	No individuals have been observed during targeted surveys.
Arthropod	Monarch	*Danaus plexippus*	SC	SC	END	S2N, S4B	In Ontario, monarch is found throughout the northern and southern regions of the province. This butterfly is found wherever there are milkweed (Asclepius spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks. Important staging areas during migration occur along the north shores of the Great Lakes (COSEWIC 2010).	Moderate	The roadside and field edges may be suitable for foraging.
	Mottled duskywing	*Erynnis martialis*	—	END	END	S2	In Ontario, the mottled duskywing is found in the same habitat as its food plant Ceanothus spp.: open or partially open, dry, sandy areas, or limestone alvars. These habitats are relatively uncommon and include dry open pine and pine oak woodland, other open dry woodlands, alvars, savannah and other dry open sandy habitats. Usually seen nectaring on wildflowers, or on wet sandy roads in the company of other duskywing species (Linton 2015).	Low	Suitable alvar or open, sandy habitat does not occur in the study area.

Taxon	Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
	Rapids clubtail	*Gomphus quadricolor*	END	END	END	S1	In Ontario, rapids clubtail has been recorded in only four rivers in southwestern and southeastern Ontario: Thames, Humber, Credit and Mississippi. This dragonfly's nymph inhabits medium to large, swift-flowing streams with interspersed rapids and muddy pools. Gravel or cobble substrate is preferred, and protruding boulders are used by adults to perch. Riparian forest habitat is also required for adult females (Hamill 2010).	Low	None of the four known occupied rivers occur in the study area.
	Rusty-patched bumble bee	*Bombus affinis*	END	END	END	S1	In Ontario, rusty-patched bumble bee is found in areas from the southern Great Lakes – St. Lawrence forest region southwards into the Carolinian forest. It is a habitat generalist, but it is typically found in open habitats, such as mixed farmland, savannah, marshes, sand dunes, urban and lightly wooded areas. It is cold –tolerant and can be found at high elevations. Most recent sightings in Ontario have been in oak savannah habitat with well-drained, sandy soils and moderately open canopy. It requires an abundance of flowering plants for forage. This species most often builds nests underground in old rodent burrows, but also in hollow tree stumps and fallen dead wood (Colla and Taylor-Pindar 2011). The only recent sightings in Ontario are from the Pinery Provincial Park.	Low - Moderate	This species is only historically known from the area, but suitable habitat may occur in the study area. The cemetery and associated landscaped areas west of Ninth Line may provide foraging habitat. This species was not observed during field surveys.
	West Virginia white	*Pieris virginiensis*		SC		S3	In Ontario, West Virginia white is found primarily in the central and southern regions of the province. This butterfly lives in moist, mature, deciduous and mixed woodlands, and the caterpillars feed only on the leaves of toothwort (Cardamine spp), which are small, spring-blooming plants of the forest floor. These woodland habitats are typically maple-beech-birch dominated. This species is associated with woodlands growing on calcaerous bedrock or thin soils over bedrock (Burke 2013).	Low-Moderate	Although some deciduous woodland occurs in the study area, is it unlikely to be of large enough or of a suitable composition to support this species. This species was not observed during field surveys.
Bird	Acadian flycatcher	*Empidonax virescens*	END	END	END	S2S3B	In Ontario, the Acadian flycatcher breeds in the understory of large, mature, closed-canopy forests, swamps and forested ravines. This bird prefers forests greater than 40 ha in size, and exhibits edge sensitivity preferring the deep interior of the forest. Its nest is loosely woven and placed near the tip of branch in a small tree or shrub often, but not always, near water (Whitehead and Taylor 2002).	Low	There are no large forests in the study area to support this species. This species was not observed during breeding bird surveys.
	Bank swallow	*Riparia riparia*	THR	THR	THR	S4B	In Ontario, the bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and river banks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999).	Moderate	Although this species was observed during breeding bird surveys. There are no steep slopes or valleys to provide suitable nesting habitat.

Taxon	Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
	Barn swallow	*Hirundo rustica*	THR	THR	THR	S4B	In Ontario, barn swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared right-of-ways, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused (Brown and Brown 1999).	High	Active nests have been observed in a culvert on Ninth Line within the study area. In addition, there is abundant foraging habitat within and immediately adjacent to the study area. Although outside of the study area, an old barn structure occurs near station Ln9-02 (east of Ninth Line) that may provide additional nesting habitat.
	Black tern	*Chlidonias niger*	—	SC	NAR	S3B	In Ontario, black tern breeds in freshwater marshlands where it forms small colonies. It prefers marshes or marsh complexes greater than 20 ha in area and which are not surrounded by wooded area. Black terns are sensitive to the presence of agricultural activities. The black tern nests in wetlands with an even combination of open water and emergent vegetation, and still waters of 0.5-1.2 m deep. Preferred nest sites have short dense vegetation or tall sparse vegetation often consisting of cattails, bulrushes and occasionally burreed or other marshland plants. Black terns also require posts or snags for perching (Weseloh 2007).	Low	There are no large marshes in the study area to provide suitable habitat. This species was not observed during field surveys.
	Bobolink	*Dolichonyx oryzivorus*	THR	THR	THR	S4B	In Ontario, bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation (Gabhauer 2007). Bobolink prefers grassland habitat with a forb component and a moderate litter layer. They have low tolerance for presence of woody vegetation and are sensitive to frequent mowing within the breeding season. They are most abundant in established, but regularly maintained, hayfields, but also breed in lightly grazed pastures, old or fallow fields, cultural meadows and newly planted hayfields. Their nest is woven from grasses and forbs. It is built on the ground, in dense vegetation, usually under the cover of one or more forbs (Martin and Gavin 1995).	High	Suitable habitat is present within the Study Area in two places west of Ninth Line. Pairs of bobolink were observed both areas of suitable habitat during breeding bird surveys.

Taxon	Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
	Cerulean warbler	*Setophaga cerulea*	END	THR	END	S3B	In Ontario, breeding habitat of cerulean warbler consists of second-growth or mature deciduous forest with a tall canopy of uneven vertical structure and a sparse understory. This habitat occurs in both wet bottomland forests and upland areas, and often contains large hickory and oak trees. This species may be attracted to gaps or openings in the upper canopy. The cerulean warbler is associated with large forest tracks, but may occur in woodlots as small as 10 ha (COSEWIC 2010). Nests are usually built on a horizontal limb in the mid-story or canopy of a large deciduous tree (Buehler et al. 2013).	Low	The deciduous woodlands adjacent to Ninth Line are too small to support this species. In addition, there are no recent occurrence records in the area and this species was not observed during field surveys.
	Chimney swift	*Chaetura pelagica*	THR	THR	THR	S4B, S4N	In Ontario, chimney swift breeding habitat is varied and includes urban, suburban, rural and wooded sites. They are most commonly associated with towns and cities with large concentrations of chimneys. Preferred nesting sites are dark, sheltered spots with a vertical surface to which the bird can grip. Unused chimneys are the primary nesting and roosting structure, but other anthropogenic structures and large diameter cavity trees are also used (COSEWIC 2007).	Low - Moderate	No suitable chimney structures were observed in the Study Area, and this species was not observed during field surveys.
	Common nighthawk	*Chordeiles minor*	THR	SC	SC	S4B	These aerial foragers require areas with large open habitat. This includes farmland, open woodlands, clearcuts, burns, rock outcrops, alvars, bog ferns, prairies, gravel pits and gravel rooftops in cities (Sandilands 2007)	Low-Moderate	Although the cemetery may provide suitable nesting habitat, there are no recent occurrence records in the area, and this species was not observed during field surveys.
	Eastern meadowlark	*Sturnella magna*	THR	THR	THR	S4B	In Ontario, the eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2003). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970)	Low-moderate	Although suitable habitat is present in the Study Area this species was not observed during field surveys.

Taxon	Common Name	Scientific Name	Species At Risk Act (Sch 1)[1]	Endangered Species Act[2]	COSEWIC[3]	Provincial (SRank)[4]	Habitat Requirements[5]	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
	Eastern wood-pewee	*Contopus virens*	SC	SC	SC	S4B	In Ontario, the eastern wood-pewee inhabits a wide variety of wooded upland and lowland habitats, including deciduous, coniferous, or mixed forests. It occurs most frequently in forests with some degree of openness. Intermediate-aged forests with a relatively sparse midstory are preferred.Tends to inhabit edges of In younger forests having a relatively dense midstory, it tends to inhabitat the edges . Also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighborhoods. Nest is constructed atop a horizontal branch, 1-2 m above the ground, in a wide variety of deciduous and coniferous trees.	Low-moderate	Although the deciduous woodland west of Ninth Line may provide suitable habitat, there are no recent occurrence records in the area and it was not observed during field surveys.
	Grasshopper sparrow *pratensis* subspecies	*Ammodramus savannarum* (*pratensis* subspecies)	SC	SC	SC	S4B	In Ontario, grasshopper sparrow is found in medium to large grasslands with low herbaceous cover and few shrubs. It also uses a wide variety of agricultural fields, including cereal crops and pastures. Close-grazed pastures and limestone plains (e.g. Carden and Napanee Plains) support highest density of this bird in the province (COSEWIC 2013).	Low-moderate	This species was not observed during field surveys.
	Henslow's sparrow	*Ammodramus henslowii*	END	END	END	SHB	In Ontario, Henslow's sparrow breeds in large grasslands with low disturbance, such as lightly grazed and ungrazed pastures, fallow hayfields, grassy swales in open farmland, and wet meadows. Preferred habitat contains tall, dense grass cover, typically over 30 cm high, with a high percentage of ground cover, and a thick mat of dead plant material. Henslow's sparrow generally avoids areas with emergent woody shrubs or trees, and fence lines. Areas of standing water or ephemerally wet patches appear to be important. This species breeds more frequently in patches of habitat greater than 30 ha and preferably greater than 100 ha (COSEWIC 2011).	Low	No suitable habitat is present in the Study Area and there are no recent occurrence records. This species was not observed during field surveys.
	Hooded warbler	*Setophaga citrina*	THR	NAR	NAR	S4B	In Ontario, the hooded warbler breeds in large, mature, mixed hardwood forests, usually dominated by maple, beech, and oak with canopy gaps. They are most often found in forests greater than 100 ha, but may breed in smaller woodlands that are part of a region of high overall forest cover (Environment Canada 2012). The nest is built in a dense shrub patch in a forest opening, and is often along the edge of the forest or of the shrub patch (Badzinski 2007).	Low	The deciduous woodlands adjacent to Ninth Line are too small and immature to provide suitable habitat. In addition, there are no recent occurrence records in the Study Area. This species was not observed during field surveys.

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	Least bittern	*Ixobrychus exilis*	THR	THR	THR	S4B	In Ontario, the least bittern breeds in marshes, usually greater than 5 ha, with emergent vegetation, relatively stable water levels and areas of open water. Preferred habitat has water less than 1 m deep (usually 10 – 50 cm). Nests are built in tall stands of dense emergent or woody vegetation (Woodliffe 2007). Clarity of water is important as siltation, turbidity, or excessive eutrophication hinders foraging efficiency (COSEWIC 2009).	Low	There are no suitable large marshes with open water component in the Study Area. This species was not observed during field surveys.
	Louisiana waterthrush	*Parkesia motacilla (formerly Seiurus motacilla)*	THR	THR	THR	S3B	The Louisiana waterthrush inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps. Trees, bushes, exposed roots, cliffs, banks and mossy logs are favoured nesting spots. Riparian woodlands are preferred stopover sites during migration. Nests are concealed from view at the base of uprooted trees, among mosses, or under logs and in cavities along the stream bank (COSEWIC 2006).	Low	There are no steeply sloped ravines in the Study Area. In addition, there are no recent occurrence records. This species was not observed during field surveys.
	Northern bobwhite	*Colinus virginianus*	END	END	END	S1	In Ontario, the northern bobwhite breeds in early successional habitats. This species requires a combination of three habitat types: woody cover, cropland and grassland. Croplands provide foraging habitat, grassland and fields are used for nesting, and dense brush provides both winter forage and year round cover. These birds nest on the ground in a shallow depression lined with grasses and other dead vegetation (Brennan 1999).	Low	This species is only historically known from the region (i.e. 1904). In addition, there is no successional habitat or suitable large grasslands in the Study Area. This species was not observed during field surveys.
	Peregrine falcon (anatum subspecies)	*Falco peregrinus anatum*	SC	SC	Not at Risk	S3B	In Ontario, peregrine falcon breeds in areas containing suitable nesting locations and sufficient prey resources. Such habitat includes both natural locations containing cliff faces (heights of 50 - 200 m preferred) and also anthropogenic landscapes including urban centres containing tall buildings, open pit mines and quarries, and road cuts. Peregrine falcons nest on cliff ledges and crevices and building ledges. Nests consist of a simple scrape in the substrate (COSEWIC 2007).	Low	Although this species has been recently observed near the Hwy 403/407 junction and it may use the fields in the Study Area for foraging, there are no tall skyscrapers, steep valley slopes or large cliffs to provide nesting habitat in the study area. This species was not observed during field surveys.

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	Red-headed woodpecker	*Melanerpes erythrocephalus*	THR	SC	END	S4B	In Ontario, the red-headed woodpecker breeds in open, deciduous woodlands or woodland edges and are often found in parks, cemeteries, golf courses, orchards and savannahs (Woodliffe 2007). They may also breed in forest clearings or open agricultural areas provided that large trees are available for nesting. They prefer forests with little or no understory vegetation. They are often associated with beech or oak forests, beaver ponds and swamp forests where snags are numerous. Nests are excavated in the trunks of large dead trees (Smith et al. 2000).	Low-moderate	Although potentially suitable habitat is present located in the swamp adjacent to Ninth Line near Ln9-03, this species was not observed during field surveys.
	Short-eared owl	*Asio flammeus*	SC	SC	SC	S2N,S4B	In Ontario, the short-eared owl breeds in a variety of open habitats including grasslands, tundra, bogs, marshes, clearcuts, burns, pastures and occasionally agricultural fields. The primary factor in determining breeding habitat is proximity to small mammal prey resources (COSEWIC 2008). Nests are built on the ground at a dry site and usually adjacent to a clump of tall vegetation used for cover and concealment (Gahbauer 2007).	Low	This species is only historically known from the region, and the grasslands in the Study Area are likely too small for nesting. This species was not observed during field surveys.
	Eastern whip-poor-will	*Antrostomus vociferus*	THR	THR	THR	S4B	In Ontario, the whip-poor-will breeds in semi-open forests with little ground cover. Breeding habitat is dependent on forest structure rather than species composition, and is found on rock and sand barrens, open conifer plantations and post-disturbance regenerating forest. Territory size ranges from 3 to 11 ha (COSEWIC 2009). No nest is constructed and eggs are laid directly on the leaf litter (Mills 2007).	Low	The deciduous woodlands adjacent to Ninth Line do not have the preferred composition or structure to support whip-poor-will. In addition, there are no recent occurrence records in the Study Area and this species was not observed during field surveys.
	Wood thrush	*Hylocichla mustelina*	—	SC	THR	S4B	In Ontario, wood thrush breeds in moist, deciduous hardwood or mixed stands that are often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches. This species selects nesting sites with the following characteristics: lower elevations with trees less than16 m in height, a closed canopy cover (>70 %), a high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter (COSEWIC 2012).	Low	The deciduous woodlands adjacent to Ninth Line are not likely to have the preferred composition and structure, and this species was not observed during field surveys.

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	Yellow-breasted chat	*Icteria virens virens*	END	END	END	S2B	In Ontario, yellow-breasted chat breeds in early successional, shrub-thicket habitats including woodland edges, regenerating old fields, railway and hydro right-of-ways, young coniferous reforestations, and wet thickets bordering wetlands. Tangles of grape (Vitisspp.) and raspberry (Rubusspp.) vines are features of most breeding sites. There is some evidence that the yellow-breasted chat is an area sensitive species. Nests are located in dense shrubbery near to the ground (COSEWIC 2011).	Low	There is no successional or shrub habitat in the Study Area to support this species, and this species was not observed during field surveys.
Fish	American eel	*Anguilla rostrata*	—	END	THR	S1?	In Ontario, the American eel is native to the Lake Ontario, St. Lawrence River and Ottawa River watersheds. Their current distribution includes lakes Huron, Erie, and Superior and their tributaries. The Ottawa River population is considered extirpated. The preferred habitat of the American eel is cool water of lakes and streams with muddy or silty substrates in water temperatures between 16 and 19°C. The American eel is a catadromous fish that lives in fresh water until sexual maturity then migrates to the Sargasso Sea to spawn (Eakins 2012; Burridge et al. 2010).	Low	Watercourses in Study Area likely too small to support American eel.
	Lake sturgeon - Great Lakes / upper St.Lawrence Population	*Acipenser fulvescens*	—	END	THR	S2	In Ontario, the lake sturgeon, a large prehistoric freshwater fish, is found in all the Great Lakes and in all drainages of the Great Lakes and of Hudson Bay. This species typically inhabits highly productive shoal areas of large lakes and rivers. They are bottom dwellers, and prefer depths between 5-10 m and mud or gravel substrates. Small sturgeons are often found on gravelly shoals near the mouths of rivers. They spawn in depths of 0.5 to 4.5 metres in areas of swift water or rapids. Where suitable spawning rivers are not available, such as in the lower Great Lakes, they are known to spawn in wave action over rocky ledges or around rocky islands (Golder Associates Ltd. 2011).	Low	Watercourses in Study Area likely too small to support lake sturgeon.
	Redside dace	*Clinostomus elongatus*	END	END	END	S2	In Ontario, the redside dace, a small coolwater species common in the USA but less so in Canada, is found in tributaries of western Lake Ontario, Lake Erie, Lake Huron and Lake Simcoe. They are found in pools and slow-moving areas of small headwater streams with clear to turbid water. Overhanging grasses, shrubs, and undercut banks, are an important part of their habitat, as are instream boulders and large woody debris. Preferred substrates are variable and include silt, sand, gravel and boulders. Spawning occurs in shallow riffle areas (Redside Dace Recovery Team 2010).	Low	Redside dace is known from Sixteen Mile Creek subwatershed, but not Oakville East Urban Creeks or Joshua's Creek.
	Silver shiner	*Notropis photogenis*	THR	THR	THR	S2S3	In Ontario, the silver shiner is found in the Thames and Grand Rivers, and it has been recently reported in Bronte Creek and Sixteen Mile Creek which flow into Lake Ontario. They prefer moderately-flowing sections of larger streams with clear water and moderate currents. Usual	Low	Silver shiner is known from Bronte Creek subwatershed, but not Oakville East Urban

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							substrates include gravel, rubble, boulder, and sand. Aquatic vegetation may be present or absent. The silver shiner most frequently occurs in deep, swift riffles and faster currents of pools below riffles. Spawning habitat is suggested to occur in relatively deep riffles (COSEWIC 2011).		Creeks or Joshua's Creek.
Mammal	Eastern cougar	*Puma concolor couguar*	—	END	DD	SU	This species historically inhabited extensive forested areas in Ontario. It is found in habitats suitable for white-tailed deer and mule deer, which are the preferred prey of the cougar. Dense cover is considered the key habitat feature for cougar. An average home range for males is 300 square kilometers, and for females, 150 square kilometers (Environment Canada and Canadian Wildlife Federation 2013).	Low	The Study Area is too developed and fragmented from a larger overall region of forest cover to provide suitable habitat.
	Grey fox	*Urocyon cinereoargenteus*	THR	THR	THR	S1	While the Ontario range of this species extends across much of southern and southeastern Ontario, the only known population in the province is on Pelee Island, with very rare sightings elsewhere in the province at points close to the border with the United States. This species inhabits deciduous forests and marshes, and will den in a variety of features including rock outcroppings, hollow trees, burrows or brush piles, usually where dense brush provides cover and in close proximity to water. This species is considered a habitat generalist (COSEWIC 2002).	Low	This species is only currently known to occur on Pelee Island.
	Eastern small-footed myotis	*Myotis leibii*	—	END	—	S2S3	This species is not known to roost within trees, but there is very little known about its roosting habits. The species generally roosts on the ground under rocks, in rock crevices, talus slopes and rock piles. It occasionally inhabits buildings. Areas near the entrances of caves or abandoned mines may be used for hibernaculum, where the conditions are drafty with low humidity, and may be subfreezing.	Low	No suitable roosting habitat for this species was observed in the Study Area.
	Little brown myotis	*Myotis lucifugus*	END	END	END	S4	In Ontario, this species range is extensive and covers much of the province. It will roost in both natural and man-made structures. They require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. May form nursery colonies in the attics of buildings within 1 km of water. Caves or abandoned mines may be used for hibernaculum, but high humidity and stable above freezing temperatures are required.	Low-moderate	No large diameter cavity trees were observed during the surveys. Deciduous Forest and Swamp habitat outside of the Ninth Line right-of-way may provide habitat in areas of the Study Area that were not visible from the road.

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	Tri-colored bat	*Perimyotis subflavus*	END	END	END	S3?	In Ontario, tri-colored bat may roost in foliage, in clumps of old leaves, hanging moss or squirrel nests. They are occasionally found in buildings although there are no records of this in Canada. They typically feed over aquatic areas with an affinity to large-bodied water and will likely roost in close proximity to these. Hibernation sites are found deep within caves or mines in areas of relatively warm temperatures. These bats have strong roost fidelity to their winter hibernation sites and may choose the exact same spot in a cave or mine from year to year.	Low-moderate	No large diameter cavity trees were observed during the surveys. Deciduous Forest and Swamp habitat outside of the Ninth Line right-of-way may provide habitat in areas of the Study Area that were not visible from the road.
	Northern myotis	*Myotis septentrionalis*	END	END	END	S3	In Ontario, this species range is extensive and covers much of the province. It will usually roost in hollows, crevices, and under loose bark of mature trees. Roosts may be established in the main trunk or a large branch of either living or dead trees. Caves or abandoned mines may be used for hibernaculum, but high humidity and stable above freezing temperatures are required.	Low-moderate	No large diameter cavity trees were observed during the surveys. Deciduous Forest and Swamp habitat outside of the Ninth Line right-of-way may provide habitat in areas of the Study Area that were not visible from the road.
Reptile	Blanding's turtle - Great Lakes/St.Lawrence population	*Emydoidea blandingii*	THR	THR	END	S3	In Ontario, Blanding's turtle will use a range of aquatic habitats, but favor those with shallow, standing or slow-moving water, rich nutrient levels, organic substrates and abundant aquatic vegetation. They will use rivers, but prefer slow-moving currents and are likely only transients in this type of habitat. This species is known to travel great distances over land in the spring in order to reach nesting sites, which can include dry conifer or mixed forests, partially vegetated fields, and roadsides. Suitable nesting substrates include organic soils, sands, gravel and cobble. They hibernate underwater and infrequently under debris close to water bodies (COSEWIC 2005).	Low	The wetland habitat is choked with vegetation and does not provide suitable open water habitat that is preferred by Blanding's turtle. This species was not observed during field surveys.
	Eastern ribbonsnake - (Great Lakes population)	*Thamnophis sauritius*	SC	SC	SC	S4	In Ontario, eastern ribbonsnake is semi-aquatic, and is rarely found far from shallow ponds, marshes, bogs, streams or swamps bordered by dense vegetation. They prefer sunny locations and bask in low shrub branches. Hibernation occurs in mammal burrows, rock fissures or even ant mounds (COSEWIC 2012).	Moderate	Wetland habitat occurs in the study area and is surrounded by forest in some locations. However, these habitats are highly disturbed, and the study area is mainly developed. This species was not observed during field surveys.

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	Midland painted turtle	*Chrysemys picta marginata*	—	—	SC	S4	In Ontario, painted turtles use waterbodies, such as ponds, marshes, lakes and slow-moving creeks, with a soft bottom and abundant basking sites and aquatic vegetation. This species hibernates on the bottom of waterbodies (Ontario Nature 2018).	Low-moderate	The wetland habitat is choked with vegetation and does not provide suitable open water habitat that is preferred by Blanding's turtle. This species was not observed during field surveys.
	Milksnake	*Lampropeltis triangulum*	SC	NAR	SC	S4	In Ontario, milksnake uses a wide range of habitats including prairies, pastures, hayfields, wetlands and various forest types, and is well-known in rural areas where it frequents older buildings. Proximity to water and cover enhances habitat suitability. Hibernation takes place in mammal burrows, hollow logs, gravel or soil banks, and old foundations (COSEWIC 2014).	Moderate	Potential to occur along roadsides, and in the wetland and deciduous woodland. Adjacent agricultural operations may also provide suitable habitat. This species was not observed during field surveys.
	Northern map turtle	*Graptemys geographica*	SC	SC	SC	S3	In Ontario, the northern map turtle prefers large waterbodies with slow-moving currents, soft substrates, and abundant aquatic vegetation. Ideal stretches of shoreline contain suitable basking sites, such as rocks and logs. Along Lakes Erie and Ontario, this species occurs in marsh habitat and undeveloped shorelines. It is also found in small to large rivers with slow to moderate flow. Hibernation takes place in soft substrates under deep water (COSEWIC 2012).	Low	The wetland habitat is choked with vegetation and does not provide suitable open water habitat that is preferred by northern map turtle. This species was not observed during field surveys.
	Snapping turtle	*Chelydra serpentina*	SC	SC	SC	S3	In Ontario, snapping turtle utilizes a wide range of waterbodies, but shows preference for areas with shallow, slow-moving water, soft substrates and dense aquatic vegetation. Hibernation takes place in soft substrates under water. Nesting sites consist of sand or gravel banks along waterways or roadways (COSEWIC 2008).	Low	The wetland habitat is choked with vegetation and does not provide suitable open water habitat that is preferred by snapping turtle. This species was not observed during field surveys.
	Stinkpot or Eastern musk turtle	*Sternotherus odoratus*	THR	SC	SC	S3	In Ontario, eastern musk turtle is very rarely out of water and prefers permanent bodies of water that are shallow and clear, with little or no current and soft substrates with abundant organic materials. Abundant floating and submerged vegetation is preferred. Hibernation occurs in soft substrates under water. Eggs are sometimes laid on open ground, or in shallow nests in decaying vegetation, shallow gravel or rock crevices (COSEWIC 2012).	Low	Wetland habitat is choked with vegetation and unlikely to provide suitable open water habitat preferred by eastern musk turtle

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	American columbo	*Frasera caroliniensis*	END	END	END	S2	In Ontario, American columbo is most commonly associated with open deciduous forested slopes, but it can also be found in thickets, swamps and clearings. It is often associated with oak, hickory and sassafras trees. American columbo grows on a wide variety of soils, particularly dry mesic to mesic clay and clay loam soils (Environment Canada 2016).	Low	There are no occurrence records in the vicinity of the Study Area.
Vascular Plant	American ginseng	*Panax quinquefolius*	END	END	END	S2	In Ontario, American ginseng is found in moist, undisturbed and relatively mature deciduous woods often dominated by sugar maple. It is commonly found on well-drained, south-facing slopes. American ginseng grows under closed canopies in neutral, loamy soils (COSEWIC 2000).	Low	Although deciduous woodland occurs adjacent to Ninth Line, it is unlikely to be suitable due to the high level of anthropogenic disturbance and development.
	American hart's-tongue fern	*Asplenium scolopendrium*	SC	SC	SC	S3	In Ontario, hart's-tongue fern grows on thin calcareous soils on or near dolomitic limestone of the Niagara Escarpment, and occasionally on open talus/scree slopes. Most populations are found on steep, moderately moist slopes that face north to northeast and are under a hardwood canopy cover (Environment Canada 2013).	Low	The Study Area is primarily flat and there is no exposed limestone/bedrock.
	Broad beech fern	*Phegopteris hexagonoptera*		SC	SC	S3	In Ontario, broad beech fern inhabits rich, undisturbed mature deciduous forest dominated by beech and maple. It typically grows in moist to wet, sandy soils of lower valley slopes and occasionally swamps (van Overbeeke et al. 2013).	Low	Although deciduous woodland occurs adjacent to Ninth Line, it is unlikely to be suitable due to the high level of anthropogenic disturbance and development.
	Butternut	*Juglans cinerea*	END	END	END	S2?	In Ontario, butternut is found along stream banks, on wooded valley slopes, and in deciduous and mixed forests. It is commonly associated with beech, maple, oak and hickory (Voss and Reznicek 2012). Butternut prefers moist, fertile, well-drained soils, but can also be found in rocky limestone soils. This species is shade intolerant (Farrar 1995).	Low-moderate	Although there is potential for this species to occur in parts of the Study Area that were not visible from roadside, it was not observed during field surveys conducted from roadside.
	Cleland's evening-primrose	*Oenothera clelandii*				S1	Cleland's evening-primose is found in prairie habitat and on dry, open ground.	Low	There is no prairie habitat and much of the land adjacent to Ninth Line is agricultural fields.

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	Dense blazing star	*Liatris spicata*	THR	THR	THR	S2	In Ontario, dense blazing star is found mainly in moist tall-grass prairies, oak savannahs, wet meadows and along roadsides in full sun in open areas (COSEWIC 2010). It grows in moist to wet, sandy calcareous soils (WDNR 2013). It is primarily restricted to southwestern Ontario.	Low	No tall-grass prairie, oak savannah, or suitable wet meadow habitat is present in the Study Area and this species was not observed during field surveys.
	Downy yellow false foxglove	*Aureolaria virginica*	—	—	END	S1	In Ontario, downy yellow false foxglove grows in dry open woods and savannahs (Oldham and Brinker 2009).	Low-moderate	Suitable dry open woods or savannah habitat is not present in the Study Area and this species was not observed during field surveys.
	Eastern flowering dogwood	*Cornus florida*	END	END	END	S2?	In Ontario, eastern flowernig dogwood grows in the understory of dry to rich deciduous forests, especially on hillsides and riverbanks. It prefers sandy acidic soils but occasionally is found in loams, clays and organic soils (Waldron 2003). This species is restricted to the Carolinian zone of southern Ontario.	Low	Although deciduous woodland occurs adjacent to Ninth Line, it is unlikely to be suitable.
	Hoary mountain-mint	*Pycnanthemum incanum*	END	END	END	S1	In Ontario, hoary mountain-mint is found in open, dry, sandy-clay habitats in open-canopied deciduous woods of dry black oak and white oak, on relatively warm slopes (Hoary Mountain-Mint Recovery Team 2011).	Moderate	Potential in habitat in woodlands within the Study Area.
	Northern hawthorn	*Crataegus dissona*	—	—	—	S3	Northern hawthorn grows in old fields and neglected pastures and along fencelines and roadsides. It is mainly found in the Niagara Peninsula.	Low	The land adjacent to Ninth Line is primarily agricultural fields. There is no successional habitat.
	Schreber's wood Aster	*Eurybia schreberi*	—	—	—	S2	Schreber's wood Aster grows in woodland habitat.	Moderate	Deciduous woodland and swamp adjacent to Ninth Line may provide habitat.
	Smooth yellow false foxglove	*Aureolaria flava*	—	—	THR	S2?	Smooth yellow false foxglove is generally found in dry upland oak savannas and woodlands	Moderate	Potential in habitat in woodlands within the site and Study Area.

NOTES:

1 Species at Risk Act (SARA), 2002. Schedule 1 (Last amended 8 March 2013); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)

2 Endangered Species Act (ESA), 2007 (O.Reg 242/08 last amended 10 Dec 2015 as O.Reg 387/15). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 31 Mar 2015 as O.Reg 66/15, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

3 Committee on the Status of Endangered Wildlife in Canada (COSEWIC) http://www.cosewic.gc.ca/

4 Global Ranks (GRANK) are Rarity Ranks assigned to a species based on their range-wide status. GRANKS are assigned by a group of consensus of Conservation Data Centres (CDCs), scientific experts and the Nature Conservancy. These ranks are not legal designations. G1 (Extreemly Rare), G2 (Very Rare), G3 (Rare to uncommon), G4 (Common), G5 (Very Common), GH (Historic, no record in last 20yrs), GU (Status uncertain), GX (Globally extinct), ? (Inexact number rank), G? (Unranked), Q (Questionable), T (rank applies to subspecies or variety). Last assessed August 2011

5 Provincial Ranks (SRANK) are Rarity Ranks assigned to a species or ecological communities, by the Natural Heritage Information Centre (NHIC). These ranks are not legal designations. SRANKS are evaluated by NHIC on a continual basis and updated lists produced annually. SX (Presumed Extirpated), SH (Possibly Extirpated - Historical), S1 (Critacally Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not Applicable), S#S# (Range Rank), S? (Not ranked yet), SAB (Breeding Accident), SAN (Non-breeding Accident), SX (Apparently Extirpated). Last assessed August 2011.
5 References:

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APPENDIX C

Watercourse Assessment Photo Record

WC1

Photo 1: Facing upstream on WC1 at location 604609E 4818806N

Photo 2: Facing downstream on WC1 at location 604609E 4818806N

WC2

Photo 1: WC2 facing east from Ninth Line at location 604297E 4819074N

Photo 2: WC2 facing west from Ninth Line at location 604297E 4819074N

WC3

Photo 1: WC3 facing northwest along Ninth Line at location 604411E 4818945N

Photo 2: WC3 facing southeast along Ninth Line at location 604411E 4818945N

WC4

Photo 1: WC4 facing upstream from Ninth Line at location 604764E 4818651N

Photo 2: WC4 facing downstream from Ninth Line at location 604776E 4818632N

Photo 3: Box culvert on the east (upstream) side of Ninth Line at location 604764E 4818651N

APPENDIX D

Watercourse Assessment Field Records

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Ninth Line

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Field Crew: Jamie Weir and Alex Loveridge

Purpose Habitat surveys of watercourses

Weather: 20°C, sunny, wind SW 5km/h

0830-0930 meet at mississauga Lab, prep gear. Drive to site

0930-1020 meet in with Derek morningstar. survey at "WC1". Ditch in agricultural field on NE side of ninth Line. straight channel with defined banks. Flow is observable from culvert under ninth line. Surveyed to approximately 30m D/s to end of access area. no flow is observable at the extent of the survey area, although the channel is wetted and terrestrial vegetation is saturated. Bankfull width is 3.2m, bankfull depth 0.5m, wetted width 0.80m, wetted depth 0.05m Channel is choked with cattails and grasses. Culvert diamete 0.70m under 9th line. Substrate is fines. Riparian vegetation is agricultural soybean field.

1020-1040 survey "WC2". Culvert dry, no defined channel. Low lying area choked with cattails and phragmites. Likely only wetted seasonally and after rain events. Culvert diameter 0.30m.

1040-1050 survey "WC3". Roadside ditch along west side of ninth line. Ditch choked with

Ninth Line

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cattails and phragmites. no observable flow. substrate is saturated. BF width 3.8m BF depth 0.85m wetted depth 0.10m. wetted width 0.5m. Substrate is silt with trace gravel.

1050-1230 survey "WC4". This is the most defined watercourse in the study area. The stream is currently dry. Approximately 65m d/s of ninth line and 125m u/s of ninth line were surveyed, which is the area within the access area.

The D/s reach is dry with poorly defined channel / banks. Entire reach is choked with cattails and grasses. Substrate is silt throughout. Riparian consists of agricultural soybean fields. Currently no habitat for fish, but there is evidence of seasonal flow

The ~~downstream~~ upstream reach is channelized, but poorly defined in areas. The channel form is irregular meander, and high flows during freshet have carved out pools and caused bank scouring throughout the reach. Substrate is still predominantly silt, with sparse gravel / cobble. Riparian is a cemetery, with

Rite in the Rain

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manicured lawn right to the stream banks on both sides. Bank stability is poor throughout the reach due to scouring. Reach is currently dry, but there is evidence of flow during freshet / rain events.

Stream passes underneath Ninth Line through a concrete box culvert - culvert width 2.0m, ~~width~~ height 1.25m. Average bankfull width is 1.5m, average bankfull depth 0.30m. Instream cover for fish is low. Some overhanging grasses / undercutting along banks.

1730 - 1330 Return to office and de-mob

Jamie Austin


DRAFT
WC1
28.00m
53.00m
36.00m
34.00m
3300 Ninth Line Rd
3091 - 3611 Ninth Line
PROPERTY LINE
REQUIRED ACCESS AREA


3625 - 3995
Ninth Line
WC2
83
69
61
133
90
Hydro One
Hydro One
3300 Ninth Line
PROPERTY LINE
REQUIRED ACCESS AREA
DRAFT


Hydro One
195
19
3300 Ninth Line
3166 - 3298 Ninth Line
PROPERTY LINE
REQUIRED ACCESS AREA

11.50m
65.50m
30.00m
66.00m
3091 - 3611 Ninth Line
PROPERTY LINE
REQUIRED ACCESS AREA

14 JUN 2016 Luke Owens #1648031

Project: 9th Line

crew: Luke Owens

Purpose: To conduct breeding bird surveys, investigate culverts for barn swallow nesting. To investigate woodland from roadside.

weather: 11 - 15°C, cloud cover 10%, wind Bft 1 to Bft 3. No precipitation

0630 - Arrive on site, check-in with Derrick.

0640 - 0815 - Conduct breeding bird surveys as follows: Ln9-01, Ln9-02, Ln9-03, Ln9-04, Ln9-05.

0815 - 0850 - Investigate 2 box culverts. Culvert 2 is located at the north end of the site near Ln9-05. It was mostly obscured from view by cattails and phragmites. No barn swallow nests or evidence of former nest were observed. Photo # 4768.

Culvert 1 is located at the cemetery. Six nests or former nests were observed. Two of these were observed to be active at the time of this visit. Young observed in nests. Photos: 4769 - 4773.

0850 - 0905 - notes:

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0905 - 0932 Investigate woodland located at Ln9-04.

Red Oak, Am Elm, Ash sp., Freeman's maple, Bur Oak, ~~qo~~ European buckthorn, multiflora rose, goldenrod spp., riverbank grape, oxeye daisy, honeysuckle sp., chokecherry, Beech, Basswood, Alfalfa

Note: based on what I can see from roadside the majority of this woodland is upland. There may be a small area of wetland including deciduous swamp associated with the watercourse riparium, but this was not observable from roadside. Photos: 4775 - 4776

0935 - check out with Derrick and leave site.

golder.com