SAVANTA
A GEI Company

Scoped Environmental Impact Study

Southern Parcel, Ninth Line Lands

OCTOBER 2019

SAVANTA
A GEI Company

Scoped Environmental Impact Study
Southern Parcel, Ninth Line Lands
Mississauga, ON

REPORT PREPARED FOR
Mattamy Development Corporation
7880 Keele Street, Unit 3, Suite 400
Vaughan, ON
L4K 4G7

REPORT PREPARED BY
Savanta Inc. – A GEI Company
118-450 Bronte Street South
Milton, ON
L9T 8T2

OCTOBER 2019

SAVANTA FILE: 1902542

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Mattamy Development Corporation (Mattamy) is proposing to develop the Southern Parcel of their Ninth Line land holdings located at 5150 Ninth Line (herein referred to as the Subject Lands), in the City of Mississauga. The proposed residential development will include a variety of townhome units and amenity space located northeast of a future Ministry of Transportation (MTO) transitway corridor. Existing conditions on the Subject Lands reflect historic and ongoing anthropogenic land uses (i.e., agriculture, livestock, residential and commercial). Natural features are localized and are largely confined to woodland fragments scattered throughout the urban landscape of the City of Mississauga.

This Scoped Environmental Impact Study (EIS) has been prepared to assess the potential impacts of the proposed development on the natural heritage features and associated functions on, and adjacent to, the Subject Lands. This Scoped EIS was prepared to characterize natural features, functions and linkages, assess impacts, determine appropriate mitigation measures and summarize monitoring requirements based on data gaps identified within the Ninth Line Scoped Subwatershed Study (SWS; Amec Foster Wheeler 2015). The Subject Lands occur outside of the City of Mississauga Natural Heritage System (NHS; City of Mississauga 2011), however, other significant natural features, as defined by the Provincial Policy Statement (PPS; MMAH 2014) and supporting technical guidelines, occur within 120 m of the Subject Lands.

Ecological field studies conducted in 2019 on the Subject Lands identified wetland vegetation communities associated with three online farm ponds, headwater drainage features and habitat of a threatened species (i.e., Barn Swallow; *Hirundo rustica*) on the Subject Lands, as well as a significant woodland located on adjacent lands to the northwest. The three wetland communities are small, isolated features that are not considered significant natural heritage features and do not support locally rare vegetation communities or species. The wetlands are less than 0.05 ha in size, are low functioning and are of cultural origin. These wetlands meet the definition of "other wetlands" under the City of Mississauga Official Plan (City of Mississauga 2011) and are therefore defined by the City as Natural Green Space. These wetland communities were not identified for retention within the Ninth Line Phase 3 SWS (Wood Environment & Infrastructure Solutions 2018) and are proposed for removal as they do not provide significant ecological functions. All headwater drainage features, with the exception of H1S1, received a final management recommendation of Mitigation based on their cultural origin, lack of important wildlife habitat and limited hydrological connectivity within the watershed (H1 features drain to an existing storm sewer along Ninth Line, H2 drains to a ditch along Highway 407 and H3 does not support a downstream hydrologic connection). Drainage features identified for Mitigation will be directed to an infiltration gallery within the 2 m landscape buffer (H1S2 and H1S3) or conveyed to SWM storage tanks beneath the amenity space for treatment (H2 and H3). H1S1 received a final management recommendation of Conservation, in recognition of the feature's location within and immediately adjacent to the City woodlot and will be retained and/or realigned within the woodland's Vegetation Protection Zone (VPZ). Barn Swallow breeding habitat will be registered through the Ministry of Environment, Conservation and Parks (MECP) online Barn Swallow Notice of Activity Form (NAF) under the *Endangered Species Act* (ESA; 2007). No direct impacts to the adjacent woodland or its associated functions are anticipated, as this feature occurs outside of the proposed development footprint and will be protected through the application of an average 10 m VPZ along the dripline of the City woodlot.

The development limits of the proposed Conceptual Plan (2019) are defined based on constraints associated with significant natural heritage features and functions located on, and adjacent to, the Subject Lands. Direct impacts on the Subject Lands will include the removal of 0.05 ha of wetland habitat and Barn Swallow nesting habitat. No compensation will be provided for wetland removals as no negative impacts to the City of Mississauga NHS are expected. Removal of Barn Swallow habitat

will be compensated through the creation of artificial habitat (e.g., replacement habitat structures) within 1 km of the Subject Lands. Indirect effects are discussed in the context of the adjacent woodland, while recognizing existing impacts associated with anthropogenic land use. The development limit will minimize impacts to adjacent natural heritage features through the application of an average 10 m VPZ applied along the dripline of the woodland and an additional 2 m landscape buffer adjacent to the VPZ.

A construction and post-construction monitoring program is recommended to verify that mitigation is having the intended effects (e.g., erosion and sediment control measures during construction) and that ecological enhancement measures (e.g., native vegetation plantings within the VPZ) have established successfully.

In summary, the proposed development is not expected to have a negative impact on natural heritage features and their associated functions provided that the identified mitigation strategies are undertaken to maintain and enhance existing conditions.

1.0 INTRODUCTION

Savanta Inc. (Savanta) was retained by Mattamy Development Corporation (Mattamy) to complete a Scoped Environmental Impact Study (EIS) for the Southern Parcel of their land holdings on the Ninth Line Lands (herein referred to as the Subject Lands), legally described as Lot 1, Concession 9, within the City of Mississauga, Ontario (**Figure 1**, **Appendix A**). The property is approximately 5.67 ha in area and is generally bounded by a woodlot owned by the City of Mississauga to the northwest, Ninth Line to the northeast, private property to the southeast and Highway 407 Express Toll Route to the southwest. As per the Ninth Line Scoped Subwatershed Study (SWS) Phase 1: Background Report Study Area Characterization (Amec Foster Wheeler 2015), the Subject Lands are characterized by anthropogenic features (i.e., one residential building, one barn, a veterinary clinic and manicured lawn), a naturalized mixed meadow community previously maintained as an agricultural field and three farm ponds (**Figure 3**, **Appendix A**).

In 2014, the City of Mississauga initiated the Ninth Line Lands Planning Study to develop a land use framework to guide future development of the Ninth Line lands. A three phase SWS was completed to define constraints and opportunities within the Study Area. The Ninth Line lands occur within a highly altered urban landscape and support limited natural heritage features and ecological functions. The Phase 2 SWS (Amec Foster Wheeler 2017) identified three existing natural features for retention within the overall SWS Study Area: the Lisgar Creek riparian corridor and two woodland features, one located south of Derry Road and one owned by the City of Mississauga that occurs immediately northwest of the Subject Lands. As part of the Phase 3 SWS (Wood Environment & Infrastructure Solutions 2018), wetland creation was proposed within the Lisgar Creek corridor to compensate for the removal of tableland wetlands from the overall Ninth Line Study Area that provide significant ecological functions (i.e., migratory stop-over habitat, amphibian breeding habitat, stepping stone habitat between adjacent wetlands offsite) and to enhance the ecological integrity of the landscape. At the time of this Scoped EIS submission, the Phase 3 SWS was under review by Conservation Halton, with comments expected in early fall 2019.

Mattamy is proposing to develop a mix of residential units on the Subject Lands. On August 1, 2018, By-law 0167-2018 came into effect, which specifies land use designations across the entire Ninth Line Lands. Through this by-law, the Subject Lands were designated as Residential Medium Density (per. Map M-1, Part of Schedule 10; Appendix A).

The Ninth Line Phase 1 SWS (Amec Foster Wheeler 2015) was reviewed in the context of the Subject Lands and multiple data gaps were identified regarding the ecological field studies completed on the property in support of the SWS. As the proposed development occurs within 120 m of a natural heritage feature identified by the Phase 3 SWS, a site-specific Scoped EIS is required to address potential indirect impacts associated with the City woodlot identified on the adjacent lands.

This Scoped EIS provides an assessment of the development limits of the proposed residential development on the Subject Lands in support of the municipal planning process. An analysis of the ecological constraints and development opportunities for the property, based on data collected as part of the Ninth Line SWS (Amec Foster Wheeler 2015) and through additional field studies completed by Savanta in 2019, has been completed and potential impacts affecting ecological features or functions on, or adjacent to, the Subject Lands are discussed.

1.1 Purpose of the Report

A Scoped EIS is required to characterize the existing environment, provide an overview of the landscape context, consider the significance and sensitivity of natural heritage features and functions, provide an assessment of potential impacts, and recommend mitigation strategies associated with the proposed residential development. This EIS has been scoped based on data gaps identified within the Ninth Line SWS (Amec Foster Wheeler 2015). This work considers applicable provincial and municipal requirements, and policies including reference to the natural heritage policies of the Province of Ontario's PPS (MMAH 2014), associated provincial implementation guidance contained in the Natural Heritage Reference Manual (NHRM; MNR 2010), the City of Mississauga Official Plan (2011) and the Region of Peel Official Plan (2006).

This Scoped EIS is a requirement of the municipal planning process and is intended to address the environmental policies of Peel Region, the City of Mississauga and Credit Valley Conservation (CVC).

The Scoped EIS components include:

- A review of existing background information, policies and legislation applicable to the Subject Lands in its regional context;
- A field review of the natural environmental features on, and immediately adjacent to, the Subject Lands through the completion of various ecological surveys and inventories;
- An evaluation of the sensitivity of the natural heritage features and their functions on the Subject Lands;
- An assessment of constraints to development and whether any of the existing natural heritage features within the Subject Lands meet the test of 'significance' as identified by the PPS (MMAH 2014), or the requirements to be part of the City's Natural Heritage System (NHS);
- A description of the proposed undertaking and development proposal;
- Identification and discussion of the potential impacts that could occur to natural heritage features as a result of the proposed development;
- Recommendations for mitigation to avoid or minimize impacts; and
- Opportunities for enhancement or restoration of natural features.

The Terms of Reference (ToR; **Appendix D**) for this Scoped EIS was submitted to the City of Mississauga and CVC on July 3, 2019. At the time of the Scoped EIS submission, comments on the ToR had not been received from either party.

2.0 NATURAL HERITAGE PLANNING CONSIDERATIONS

An assessment of the quality and extent of natural heritage features found on, and adjacent to, the Subject Lands and the potential impacts to these features from the proposed development application was completed to address the natural heritage components of the following regulatory agencies, local and regional municipalities, and/or legislation:

- City of Mississauga Official Plan, 2011 (Consolidated 2019);
- Region of Peel Official Plan, 2006 (Consolidated 2018);
- O. Reg. 160/06: Credit Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses;
- Credit Valley Conservation Watershed Planning and Regulation Policies (CVC 2010);
- Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study (Region of Peel 2009);
- Federal *Fisheries Act* (R.S.C., 1985, c. F-14);
- Provincial Policy Statement (MMAH 2014); and
- Provincial *Endangered Species Act*, 2007 (*ESA*; Consolidated 2019).

The relevant aspects of existing and amended environmental legislation are discussed in the following.

2.1 Region of Peel Official Plan (2006)

The Region of Peel Official Plan (Region of Peel 2006) identifies a Greenlands System, made up of Core Areas, Natural Areas and Corridors and Potential Natural Areas and Corridors. The Greenlands system generally consists of the following types of features:

- Areas of Natural and Scientific Interest (ANSIs);
- Environmentally Sensitive or Significant Areas;
- Escarpment Natural Areas;
- Escarpment Protection Areas;
- Fish and wildlife habitat;
- Habitats of threatened and endangered species;
- Wetlands;
- Woodlands, valley and stream corridors;
- Shorelines;
- Natural lakes;
- Natural corridors;
- Groundwater recharge and discharge areas;
- Open space portions of the Parkway Belt West Plan; and
- Other natural features and functional areas.

The Region of Peel Official Plan (Region of Peel 2006) indicates that "core areas represent provincially and regionally significant features and areas and are considered a subset of what would be significant under the PPS" and includes:

- Significant Wetlands;

- Significant Coastal Wetlands;
- Core Woodlands;
- Environmentally Sensitive or Significant Areas;
- Provincial Life Science ANSIs;
- Significant habitats of Threatened or Endangered Species;
- Escarpment Natural Areas of the Niagara Escarpment Plan; and
- Core Valley and Stream Corridors, which includes major watercourses such as the Credit River as well as other tributaries that contain habitat of endangered or threatened aquatic species.

Section 2.3.2.6 of the Region of Peel Official Plan (2006) prohibits development and site alteration within Core Areas of the Greenlands System with the exception of forest, fish and wildlife management, conservation and flood or erosion control projects, essential infrastructure, passive recreation, minor development and minor site alteration, existing uses, buildings or structures, expansions to existing buildings or structures, accessory uses, building or structures or new single family residential dwellings on an existing lot of record. Minor development and minor site alteration are defined as development or site alteration, "which due to its scale or intensity, can demonstrate no significant incremental or cumulative impacts on the landform, features or ecological functions of the Greenlands System in Peel."

A Draft ROPA (2017) for the Ninth Line lands that identifies "Proposed Core Areas of the Greenlands System" including the adjacent woodlands to be included in Schedule A (Core Areas of the Greenlands System in Peel) of the Region of Peel Official Plan (Region of Peel 2006). It is the intent of Regional Council for the policies in the Region of Peel Official Plan Section 2.3.2.6 to apply to these lands.

As per Region of Peel Official Plan (2006) Schedule D (Regional Structure), the Subject Lands occur within the Ninth Line Corridor Policy Area identified by the Region of Halton Official Plan (1994). On January 1, 2010, these lands came under the jurisdiction of the City of Mississauga and the Region of Peel. As per the Region of Peel, "currently, the policies of the Region of Halton and the Town of Milton official plans apply to these lands. A future amendment will bring these lands into conformity with the Region of Peel Official Plan." However, no designations are applied to the Ninth Line Lands in the Region of Halton Official Plan (2006) or the Town of Milton Official Plan (1997).

2.2 City of Mississauga Official Plan (2011)

The City of Mississauga Official Plan (2011) was officially adopted by City Council on September 29, 2010. The Region of Peel granted partial approval on September 22, 2011 and the Official Plan came into partial effect on November 14, 2012. Further amendments have been made to the City of Mississauga Official Plan to reflect Council-approved Official Plan amendments, with the most recent office consolidation released on March 13, 2019.

Schedule 10 (Land Use Designations) of the Official Plan identifies the Subject Lands as a Residential Medium Density area in which all forms of townhouse dwellings are permitted. The adjacent woodlot owned by the City of Mississauga is illustrated as Greenland (Schedule 10; Section 6.3.27) and as part of the Green System (Schedule 1a). Lands designated as Greenlands are generally associated with natural areas where development is restricted to provide protection to the NHS. As per Schedule 3 (Natural Heritage System), no components of the currently mapped NHS overlap with the Subject Lands. Although lands designated as Significant Natural Areas and Natural Green Spaces of the NHS

occur within 120 m of the Subject Lands, these features are located northeast of Ninth Line and are separated from the Subject Lands by a residential development.

Section 6.3.9 of the City of Mississauga Official Plan (City of Mississauga 2011) identifies the following natural heritage features as being part of the NHS:

- Significant Natural Areas;
- Natural Green Spaces;
- Special Management Areas;
- Residential Woodlands; and
- Linkages.

The extent of the NHS within an area is identified through completion of a site-specific EIS.

The Official Plan (City of Mississauga 2011) identifies Significant Natural Areas as areas that meet one or more of the following criteria:

- Provincially or regionally significant ANSIs;
- Environmentally sensitive or significant areas;
- Habitat of endangered or threatened species;
- Fish habitat;
- Significant wildlife habitat;
- Significant woodlands;
- Significant wetlands; and
- Significant valleylands.

Section 6.3.29 of the Official Plan (City of Mississauga 2011) states that an EIS will be required should any development or site alteration occur adjacent to provincially significant wetlands, provincially significant coastal wetlands, habitats of endangered or threatened species, or other Significant Natural Areas to demonstrate no negative impact to the features and their associated functions. Should they be required, setbacks and vegetated buffer zones from these natural heritage features will be determined at the EIS planning stage.

Natural Green Spaces are identified based on criteria that do not fulfil the requirements of significance (i.e., should a wetland not be deemed significant, it is still considered a Natural Green Space). Special Management Areas are lands adjacent to, or within close proximity to, Significant Natural Areas or Natural Green Spaces. The purpose of these areas is to enhance and restore natural functions in support of the Significant Natural Area or Natural Green Space. Residential Woodlands are described as plots of land containing mature trees that form a "continuous canopy and minimal native understory due to maintenance of lawns and landscaping"; these are usually found within older residential neighbourhoods. Finally, Linkages are defined as areas that maintain the biodiversity and ecological functions of Significant Natural Areas and Natural Green Spaces but are not defined as one of these features.

Section 6.3.32 of the Official Plan (City of Mississauga 2011) notes that development and site alteration "will not be permitted within or adjacent to Natural Green Spaces, Linkages and Special Management Areas" unless demonstration of no negative impact to the features have been identified through an EIS.

The Natural Environment Policies within the City of Mississauga Official Plan (2011) have been reviewed to determine which policies, if any, are triggered by the proposed development. Further implications of these policies will be discussed in the following sections.

2.3 Credit Valley Conservation (CVC)

CVC conducts reviews of planning processes associated with future development of properties within its jurisdictional boundaries. In addition, the CVC provides planning and technical advice to planning authorities to assist them in fulfilling their responsibilities regarding natural hazards, natural heritage and other relevant policy areas pursuant to the *Planning Act*, as both a watershed-based resource management agency and through planning advisory services, in addition to their regulatory responsibilities.

CVC administers the Development, Interference with Wetlands, Alterations to Shorelines and Watercourses Permit process, under Ontario Regulation (O. Reg.) 160/06. This Regulation defines the areas of interest that allow CVC to:

- Prohibit, regulate, or provide permission for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, watercourse or changing or interfering with a wetland; and
- Prohibit, regulate, or provide permission for development if the control of flooding, erosion, dynamic beaches, pollution or the conservation of land may be affected by the development.

The CVC also provides guidance for development through their Watershed Planning and Regulation Policies (2010). This document outlines restrictions to development in order to protect natural areas and features. Review of this document has occurred and was taken into consideration in the preparation of the Scoped EIS.

2.4 Provincial Policy Statement (MMAH 2014)

The PPS (MMAH 2014) provides direction on matters of provincial interest related to land use planning and development. It "supports a comprehensive, integrated and long-term approach to planning." The PPS is to be read in its entirety and land use planners and decision-makers need to consider all relevant policies and how they work together.

This report addresses those policies that are specific to Natural Heritage (section 2.1) with some reference to other policies relevant to natural heritage and impact assessment considerations and areas of overlap (e.g., those related to Efficient and Resilient Development and Land Use Patterns, section 1.1; Sewage, Water and Stormwater, section 1.6.6; Water, section 2.2; Natural Hazards, section 3.1).

Eight types of significant natural heritage features are defined in the PPS, as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat (SWH);
- Fish habitat;

- Habitat of endangered and threatened species; and
- Significant areas of natural and scientific interest.

Development and site alteration shall not be permitted in significant wetlands, or in significant coastal wetlands in Ecoregions 5E, 6E and 7E. The Subject Lands are located within Ecoregion 7E. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, SWH or significant ANSIs, unless it is 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 the habitat of endangered and threatened species or in fish habitat, except in accordance with provincial and federal requirements. Development and site alteration may be permitted on lands adjacent to fish habitat provided it has been demonstrated that there will be no negative impacts on the natural feature or its ecological functions.

2.5 Ontario Endangered Species Act (*ESA*), 2007

The provincial ESA, 2007 was developed to:

- Identify Species at Risk (SAR), based upon best available science;
- Protect SAR and their habitats and to promote the recovery of SAR; and
- Promote stewardship activities that would support those protection and recovery efforts.

The ESA (2007) protects all threatened, endangered and extirpated species on the Species at Risk in Ontario (SARO) list. These species are legally protected from harm or harassment and their associated habitats are legally protected from damage or destruction, as defined under the ESA (2007).

2.6 Migratory Birds Convention Act

This federal legislation protects the nests and individuals of listed migratory bird species from destruction or disturbance. In its application, it requires best management practices to avoid incidental take of listed species, including detection and avoidance of disturbance to active nests during development activities.

2.7 The Fisheries Act

The Department of Fisheries and Oceans Canada (DFO) administers the federal *Fisheries Act,* which defines fish habitat as "spawning grounds and other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes" [subsection (2)1]. The *Fisheries Act* prohibits the death of fish by means other than fishing [subsection 34.4 (1)] and the harmful alteration, disruption or destruction of fish habitat [HADD; subsection 35. (1)]. A HADD is defined as "any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes" (DFO 2019a).

Some projects may be eligible for exemption from the DFO review process, as specified under Step 3 of the DFO Fish and Fish Habitat Protection Program review process (DFO 2019b; e.g., clear-span bridges and bridge maintenance projects where DFO mitigation measures are applied, artificial waterbodies with no hydrological connection to occupied fish habitat, and projects that follow the Standards and Codes of Practice defined by DFO). All other projects or activities that have the

potential to impact fish or fish habitat should be submitted to DFO through the "Request for Review" process. DFO will review the proposed project to determine whether there is potential to (1) impact an aquatic species at risk, (2) cause the death of fish or (3) result in HADD of fish habitat. The death of fish by means other than fishing or a HADD of fish habitat can be authorized by DFO under paragraphs 34.4(2)(b) or 35(2)(b) of the *Fisheries Act*. Authorizations require the preparation and submission of an application package identifying the impacts on fish and fish habitat as well as the avoidance, mitigation and offsetting measures that will be implemented as well as any monitoring that is proposed.

3.0 DATA COLLECTION APPROACH & METHODS

3.1 Background References

Savanta has relied, in part, upon supporting background information and previous site investigations to provide additional insight into the overall character of the Subject Lands. Examples of these resources include:

- Ninth Line Lands Scoped SWS Phase 1: Background Report Study Area Characterization (Amec Foster Wheeler 2015);
- Ninth Line Lands Scoped SWS Phase 2: Impact Assessment and Management Strategy (Amec Foster Wheeler 2017);
- Ninth Line Lands Scoped SWS Phase 3: Implementation and Monitoring Plan (Wood Environment & Infrastructure Solutions 2018);
- Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario (LIO) Natural Features Mapping;
- Natural Heritage Information Centre (NHIC) database (MNRF 2019);
- Provincial wildlife atlases (i.e., Ontario Breeding Bird Atlas, etc.);
- Information on potential SAR provided by the Ministry of Environment, Conservation and Parks (MECP); and
- DFO Aquatic Species at Risk Distribution Mapping.

The results of these background reviews are discussed in the following sections.

3.1.1 Land Information Ontario Natural Features Summary

Based on the MNRF LIO geographic database, there are no natural features present on the Subject Lands and a woodland occurs within 120 m of the Subject Lands, as shown on **Figure 2** (**Appendix A**). The woodland was identified by the Phase 2 SWS (Amec Foster Wheeler 2017) as an existing natural feature designated for retention within the overall SWS Study Area. This feature occurs immediately adjacent to the northwestern property boundary and may be affected by potential indirect impacts associated with the proposed development. An unevaluated wetland is located southwest of Highway 407, approximately 125 m from the boundary of the Subject Lands.

3.1.2 Natural Heritage Information Centre

The NHIC database (MNRF 2019) was searched for records of provincially significant plants, vegetation communities and wildlife on, and in the vicinity of, the Subject Lands. The database provides occurrence data by 1 km^2 area squares, with one square overlapping at least a portion of the Subject Lands (17PJ0221). Within this square, the search revealed one record, which had an element occurrence rank considered to be 'Historical' (greater than 50 years old) and this is not addressed as a current occurrence in this reporting (**Table 1**, **Appendix B**). No species listed as threatened or endangered on the SARO list were recorded on or in the vicinity of the Subject Lands and no Species of Conservation Concern (i.e., listed as Special Concern on the SARO list or identified as an S1-S3 species) were identified.

3.1.3 Ontario Breeding Bird Atlas

The Ontario Breeding Bird Atlas contains detailed information on the population and distribution status of Ontario birds (BSC et al. 2006). The data is presented on 100 km^2 area squares with one square overlapping a portion of the Subject Lands (17PJ02). It should be noted that the Subject Lands are a small component of the overall bird atlas square, and therefore it is unlikely that all bird species previously recorded within the atlas square are found within the Subject Lands. Habitat type, availability and size are all contributing factors in bird species presence and use.

A total of 84 species were recorded in the atlas square that overlaps with the Subject Lands, with the following species of interest noted (as summarized in **Table 2**, **Appendix B**):

Species listed as Threatened on the SARO list:

- Bank Swallow (*Riparia riparia*);
- Barn Swallow (*Hirundo rustica*);
- Bobolink (*Dolichonyx oryzivorus*);
- Chimney Swift (*Chaetura pelagica*); and
- Eastern Meadowlark (*Sturnella magna*).

Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species):

- Common Nighthawk (*Chordeiles minor*);
- Eastern Wood-Pewee (*Contopus virens*);
- Peregrine Falcon (*Falco peregrinus*); and
- Wood Thrush (*Hylocichla mustelina*).

3.1.4 Ontario Reptile and Amphibian Atlas

The Ontario Reptile and Amphibian Atlas contains detailed information on the population and distribution status of Ontario herpetofauna (Ontario Nature 2018). The data is presented on 100 km^2 area squares with one square overlapping a portion of the Subject Lands (17PJ02). It should be noted that the Subject Lands are a small component of the overall atlas square, and therefore it is unlikely that all herpetofauna species previously recorded within the atlas square are found within the Subject Lands. Habitat type, availability and size are all contributing factors in herpetofauna species presence and use.

A total of 27 species were recorded in the atlas square that overlaps the Subject Lands, of which seven are salamander species, eight are frog and toad species, one is a newt species, five are turtle species and six are snake species. Of these species, the following species of interest are noted (as summarized in **Table 3**, **Appendix B**):

- Species listed as Threatened or Endangered on the SARO list:
    - Jefferson Salamander (*Ambystoma jeffersonianum*), listed as Endangered in Ontario; and
    - Blanding's Turtle (*Emydoidea blandingi*), listed as Threatened in Ontario.

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list or identified as an S1-S3 species):
    - Eastern Ribbonsnake (*Thamnophis sauritus*), listed as Special Concern in Ontario;

- Northern Map Turtle (*Graptemys geographica*), listed as Special Concern in Ontario;
- Western Chorus Frog (*Pseudacris triseriata*), provincially ranked S3 (vulnerable); and
- Snapping Turtle (*Chelydra serpentine*), listed as Special Concern in Ontario.

Eastern Ribbonsnake had an element occurrence rank considered to be 'Historical' (greater than 50 years old) and is not further addressed as current occurrences in this reporting.

3.1.5 Ontario Butterfly and Moth Atlases

The Ontario Butterfly and Moth Atlases (Toronto Entomologists' Association 2018a, 2018b) contain detailed information on the population and distribution status of Ontario butterflies and moths. The data is presented on 100 km^2 area squares with one square overlapping a portion of the Subject Lands (17PJ02). It should be noted that the Subject Lands are a small component of the overall atlas square, and therefore it is unlikely that all butterfly and moth species previously recorded in the atlas square are found within the Subject Lands. Habitat type, availability and size are all contributing factors in butterfly and moth species presence and use.

A total of 97 species were recorded in the atlas square that overlaps with the Subject Lands, of which 61 are butterfly species and 36 are moth species. Of these species, one Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species) was noted: Monarch (*Danaus plexippus*) ranked Special Concern in Ontario and Endangered in Canada (**Table 4**, **Appendix B**).

3.1.6 Aquatic Species at Risk Distribution Mapping

Aquatic species at risk distribution mapping (DFO 2019c) was reviewed to identify any known occurrences of aquatic SAR, including fish and mussels, within the subwatershed where the Subject Lands are located. No aquatic SAR were identified on or within 120 m of the Subject Lands.

3.2 Technical Methods and Field Studies

Background information available through previous fieldwork conducted on the Subject Lands as part of the Ninth Line SWS (Amec Foster Wheeler 2015) was supplemented with targeted field investigations conducted by Savanta in 2019 to verify the current ecological conditions on the Subject Lands. Supplementary field investigations included headwater drainage feature assessment (HDFA), a summer/fall botanical inventory, Ecological Land Classification (ELC), a bat habitat assessment, snake visual encounter surveys, turtle basking surveys, breeding amphibian surveys, breeding bird surveys, nest search and incidental wildlife observations.

Surveys conducted by Savanta ecologists through the course of this work are presented in the following sections and summarized in **Table 5** (**Appendix B**). Dates and purposes of the fieldwork, as well as surveyor and protocol information, are summarized in **Table 6** (**Appendix B**). The sampling locations associated with these field studies are shown on **Figure 4** (**Appendix A**).

4.0 BIOPHYSICAL CHARACTERIZATION

Figure 2 (**Appendix A**) depicts the larger local landscape setting around the Subject Lands. Natural features within the landscape are localized and largely confined to woodland and wetland fragments as a reflection of the urban nature of the City of Mississauga. The dominant features in terms of the potential movement of organisms, matter and energy across the landscape are associated with the NHS located southwest of the Subject Lands (north of Highway 407) and the Lisgar Creek corridor located 0.89 km northwest of the Subject Lands on the opposite side of Highway 407. The Subject Lands occur within a Settlement Area of the City of Mississauga and are greater than 120 m from Provincially Significant Wetlands (PSWs) and ANSIs.

Natural features within the Ninth Line lands are highly disturbed by adjacent land uses and occur in close proximity to congested road networks. Wildlife movement in the vicinity of the Subject Lands is largely restricted by Highway 407 to the southwest, Highway 403 to the southeast, Ninth Line to the east and associated development northwest of the Subject Lands.

Based on review of MNRF, CVC, Region of Peel and City of Mississauga mapping, no natural feature designations are present on the Subject Lands (**Figure 2**, **Appendix A**). However, the City woodlot (approximately 5 ha in size) occurs immediately adjacent to the northeastern property boundary, within 120 m of the Subject Lands.

4.1 Physiography

The Subject Lands are situated within the South Slope physiographic region of southern Ontario. The South Slope is a transitional zone between the Oak Ridges Moraine and the Peel Plain physiographic regions. The area is characterized by bedrock parent material overlain by sandy silt or silty sand till deposits associated with the Halton Till formation. Soils are relatively impermeable, and runoff is conveyed quickly to local waterbodies (Chapman and Putnam 1984).

The site occurs within the southwestern extent of the Sawmill Creek Subwatershed associated with the Credit River and is located in close proximity to the Lisgar Creek corridor of Sixteen Mile Creek to the northwest. The Sawmill Creek Subwatershed is highly urbanized and contains fragmented patches of wetland and forest habitat (CVC 2009).

4.2 Landscape Ecology

The Subject Lands occur within Lake Erie-Lake Ontario Ecoregion 7E, which extends from Windsor and Sarnia east to the Niagara Peninsula and Toronto, and includes areas of the Lake Huron, Lake Erie and Lake Ontario shorelines. Ecoregion 7E falls within the Niagara Deciduous Forest Region, an area of mild climate containing large remnants of Carolinian forests and tall-grass prairie habitat.

Consideration of the larger ecological matrix or landscape contributes to a better understanding of potential interactions between abiotic and biotic flows and exchanges. As depicted on **Figure 3** (**Appendix A**), the landscape surrounding the Subject Lands is a mixture of agricultural and open space land uses, as well as residential communities located northeast of Ninth Line. The surrounding road networks serve as a considerable barrier to wildlife movement and include busy roads such as Highway 407, Ninth Line and Eglinton Avenue. The Subject Lands are within the Sawmill Creek subwatershed, although functional habitat is largely limited as a result of historic and ongoing impacts associated with livestock and anthropogenic use.

4.3 Vegetation

Baseline conditions within the Ninth Line Lands Study Area were characterized through the Phase 1 SWS (Amec Foster Wheeler 2015). The vegetation communities and associated wildlife present reflect, in part, the urbanized nature of the surrounding landscape and are largely impacted by adjacent land uses. Vegetation communities are predominantly mixed meadow, woodland and anthropogenic habitats influenced by various stormwater management (SWM) facilities.

Existing conditions defined through the Ninth Line SWS provide an overview of the landscape context and were used to guide site-specific investigations conducted on the Subject Lands. Detailed ecological work completed during 2019 as part of this Scoped EIS considered the significance and sensitivity of natural heritage features and functions located on, and adjacent to, the Subject Lands in order to provide an assessment of potential impacts and recommended mitigation strategies.

4.3.1 Ecological Land Classification

Survey Methodology

Vegetation communities were first identified on aerial imagery and then verified in the field. Vegetation community types were confirmed, sampled and revised, if necessary, using the sampling protocol of the ELC for Southern Ontario (Lee et al. 1998). ELC was completed to the finest level of resolution (Vegetation Type) where feasible. Meadow community classifications were further refined based on the Southern Ontario Ecological Land Classification guide (Lee 2008). Species names generally follow nomenclature from the Flora Ontario – Integrated Botanical Information System (FOIBIS; Newmaster and Ragupathy 2012).

The provincial status of all plant species and vegetation communities is based on NHIC (2013). Identification of potentially sensitive native plant species is based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters. Results were also compared against lists of the local rarity of species in Peel (Varga 2005) and the Credit River watershed (CVC 2002).

Survey Results

The vegetation communities present on, and adjacent to, the Subject Lands have been classified through summer and fall botanical inventories and targeted ELC. Vegetation communities present on the Subject Lands consist of three vegetation cover types: 1) anthropogenic areas including a residence, barn, commercial building, lawns and landscaped areas, 2) mixed meadow and agricultural areas associated with livestock pasture and 3) three farm ponds. Meadow, anthropogenic and open aquatic feature types are the result of historical and ongoing disturbances (i.e., farming practises). Community types are listed in **Table 7** (**Appendix B**) and are depicted in **Figure 3** (**Appendix A**).

The majority of the Subject Lands are composed of agricultural fields and anthropogenic mixed meadows. The only locations where natural vegetation cover is present are three very small farm ponds where wetland vegetation has developed in the form of cattail marsh or open water covered by duckweed.

Adjacent natural vegetation communities reflect the urbanized nature of the surrounding landscape and include a Dry-Fresh Sugar Maple Deciduous Forest (FOD5) with two Green Ash Mineral Deciduous Swamp (SWD2-2) inclusions within the City woodlot abutting the northwestern property boundary. Although the FOD5 vegetation community does not overlap the Subject Lands, the ELC boundary of the City woodlot has been extended to reflect the location of the staked dripline. Several dead Ash trees and invasive plant species were noted within the City woodlot from the property boundary.

ELC mapping of the Subject Lands is shown on **Figure 3** (**Appendix A**). A detailed list and description of ELC units on the Subject Lands is provided in **Table 7** (**Appendix B**). No provincially rare vegetation communities were present on the Subject Lands (NHIC 2013).

4.3.2 Vascular Plants

Survey Methodology

Existing ELC mapping was used to develop a strategic approach for compiling a list of vascular plants. ELC polygons were walked through and all species observed were documented. Vegetation types were modified from those in the first approximation of the ELC manual to account for variations in species dominance and to better reflect the variability of the site.

The provincial status of all plant species and vegetation communities is based on the NHIC (2018 and 2013, respectively). Identification of potentially sensitive native plant species is based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

Potential sensitivity of natural heritage features, ecosystem attributes, and communities was evaluated through an assessment of vegetation communities (age, habitat quality, degree of disturbance, weediness) and sensitive species (plants with a high CC value, area-sensitive bird species).

Survey Results

The botanical inventory (summer and fall) completed on the Subject Lands identified a total of 95 species of vascular plants. Of that number, 42 (or 44%) are native and 53 (or 56%) are exotic. A full species list is included in **Table 8** (**Appendix B**). The majority of the native species (98%) observed on the Subject Lands are ranked S5 (secure in Ontario). One species (2%), a planted Black Walnut (*Juglans nigra*), is ranked S4? (apparently secure in Ontario; NHIC 2018).

None of the species observed on the Subject Lands are listed as SAR, and none had a co-efficient of conservation value of 9 or 10. Four locally uncommon or rare plants were observed, as per the Peel Region rarity rankings (Varga 2005):

- Red Cedar (*Juniperus virginiana var. virginiana*; R5) – Planted in pasture field;
- White Spruce (*Picea glauca*; R3) - Planted;
- Blunt Spike-rush (*Eleocharis obtuse*; U) – Common around edges of cattail marsh; and
- Northern Manna Grass (*Glyceria borealis*; R4) – Common within cattail marsh.

Both Red Cedar and White Spruce are cultivars and do not naturally occur within the landscape. None of these species are considered rare in Ontario and Canada.

4.3.3 Dripline Staking

As part of the Scoped EIS process, the consulting team attended a site visit with Mattamy, CVC, the City and J.D. Barnes on August 7, 2019 to conduct dripline boundary field staking of the City woodlot located along the northwestern boundary of the Subject Lands. The extent of the dripline is depicted on **Figure 6** (**Appendix A**) and encroaches on the northwestern boundary of the Subject Lands.

4.4 Terrestrial Ecology: Wildlife Habitat Assessment and Species Occurrences

Terrestrial field studies were completed in 2014 as part of the Ninth Line Scoped SWS Phase 1: Background Report Study Area Characterization (Amec Foster Wheeler 2015). Data greater than five years old is considered historic, therefore additional field studies were warranted to ensure that potential impacts and SWH were assessed appropriately. Furthermore, the Phase 1 report sought to characterize existing conditions across the entire Ninth Line Lands Study Area, therefore site-specific field data with regards to the Subject Lands was limited within the report.

Ecological investigations were completed in 2019 as part of the Scoped EIS to assist in understanding the baseline conditions and constraints present on the Subject Lands in support of the proposed Conceptual Plan. The survey methodologies and results of wildlife field studies completed on, and adjacent to, the Subject Lands are discussed in the following sections. A list of all wildlife species recorded during the site investigations is provided in **Table 9** (**Appendix B**).

4.4.1 Bat Habitat Assessment

Previous field studies conducted as part of the Phase 1 Ninth Line Scoped SWS (Amec Foster Wheeler 2015) in 2014 were not in compliance with the standards outlined by the MNRF's "Survey Protocols for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis, and Tri- Coloured Bat" (MNRF 2017). Provincial standards for the designation of bat SWH had not been established prior to the completion of the 2014 field program; therefore, a provincially mandated methodology and level of effort could not be applied. As a result, additional bat habitat surveys were warranted as part of the Scoped EIS to confirm and update the assessment of potential bat maternity roosting sites on, and adjacent to, the Subject Lands.

Survey Methodology

Bat habitat assessments are used to determine whether identified features are to be considered candidate SWH, or whether the habitat is potentially suitable for SAR bats.

The Subject Lands were assessed through aerial interpretation and ELC to determine whether any forested communities were present that would provide suitable habitat for bat maternity roosts. The bat habitat assessment was completed on the Subject Lands and in the adjacent City woodlot on May 3, 2019, using survey methods developed based on a combination of professional experience and a modified application of the MNRF survey guidelines for "Bats and Bat Habitats: Guidelines for Wind Power Projects" (MNR 2011) and "MNRF Survey Protocol for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis and Tri-Coloured Bat" (MNRF 2017). The adjacent City woodlot was assessed from the fence line to a depth of approximately 6 m.

The Significant Wildlife Habitat Criteria Schedules (MNRF 2015) consider deciduous forests, mixed forests and swamps (i.e., ELC communities: FOD, FOM, SWD, SWM), which include trees at least 25 cm diameter-at-breast-height (DBH), suitable bat maternity colony habitat. The Survey Protocol for

Species at Risk Bats (MNRF 2017) states that any coniferous, deciduous or mixed wooded ecosites, including treed swamps, that includes trees at least 10 cm DBH should be considered suitable maternity roost habitat for SAR. Cultural treed areas with trees at least 10 cm DBH are generally considered suitable SAR habitat by some MNRF Districts.

Survey Results

The adjacent City woodlot was determined to contain candidate bat maternity roost habitat. The woodland is owned by the City of Mississauga and will be retained and protected post-development, therefore targeted acoustic surveys to confirm the presence of bats are not required.

Two snag trees were identified within hedgerow features on the Subject Lands; however, isolated trees such as these do not represent either SWH or habitat for SAR bats (**Table 10**, **Appendix B**). The locations of all snag trees identified on the Subject Lands are shown on **Figure 4** (**Appendix B**).

4.4.2 Breeding Birds

One breeding bird station (BMB-017) was surveyed in the City woodlot adjacent to the Subject Lands on June 4, June 20 and July 2, 2014 as part of the Phase 1 SWS (Amec Foster Wheeler 2015); no stations were surveyed on the Subject Lands. Two species listed as Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species) were identified within the woodland: Eastern Wood-Pewee and Wood Thrush. Eastern Wood-Pewee was heard calling from suitable breeding habitat during the first and third round surveys and one territorial male Wood Thrush was documented during the first and second round surveys suggesting that suitable breeding habitat for both of these species is present within the City woodlot.

Following a review of breeding bird surveys conducted as part of the SWS (Amec Foster Wheeler 2015), it was determined that 2019 studies were required to confirm and update existing breeding bird data for the Subject Lands as part of the Scoped EIS.

Survey Methodology

The breeding bird surveys were conducted following protocols set forth by the Ontario Breeding Bird Atlas (Cadman et al. 2007) and the Ontario Forest Bird Monitoring Program (Cadman et al. 1998).

Surveys completed in 2019 were conducted between dawn and five hours after dawn with suitable wind conditions, no thick fog or precipitation. One point count station was surveyed within the Subject Lands (**Figure 4**, **Appendix A**). The point count station was located to best represent the various habitat types within the Subject Lands and combined with area searches to help determine the presence, variety and abundance of bird species. The point count station was surveyed for 10 minutes for birds within 100 m and outside 100 m. All species recorded at the point count were mapped to provide specific spatial information and were observed for signs of breeding behaviour. Surveys were conducted on June 11 and June 19, 2019. No third-round survey was required given that no suitable habitat for grassland breeding birds was present on the Subject Lands.

Both the NHIC (2018) database and the SARO list (O. Reg. 230/08) were reviewed to determine the current provincial status for each bird species observed.

Survey Results

A total of 22 bird species were observed on, and adjacent to, the Subject Lands. Of this total, five species are confirmed, five are probable and nine are possible breeders on the Subject Lands. The remaining three bird species are considered non-breeders, flyovers or migrants. All species observed on the Subject Lands in 2019 are listed in **Table 11** (**Appendix B**).

All of the confirmed, probable or possible breeders are provincially ranked S5 (common and secure), S4 (apparently common and secure) or SNA (species not native to Ontario). No bird species breeding on the Subject Lands are considered provincially rare (S1-S3; NHIC 2018).

Two SAR were observed on, or adjacent to, the Subject Lands: Barn Swallow, and Eastern Wood-Pewee, ranked Special Concern in Ontario and Canada.

Probable breeding evidence for Barn Swallow, listed as Threatened in Ontario and Canada was identified during ecological field investigations conducted in 2019. Small numbers of adults were observed on, and in the vicinity of, the Subject Lands exiting a barn structure. The results of a Barn Swallow nest search conducted in August 2019 are discussed in section 4.4.3.

Eastern Wood-Pewee (one male) was heard calling from suitable breeding habitat within the City woodlot during both survey rounds. This species inhabits lowland mature forest in riparian areas. Eastern Wood-Pewee was not directly observed within the Subject Lands or using potential foraging habitat on the property.

4.4.3 Barn Swallow Nesting Search

Survey Methodology

A Barn Swallow nest search was conducted on August 30, 2019 within the barn located on the Subject Lands. The structure was mapped, and the location and condition of nests were documented.

Survey Results

A total of 11 nests were observed within the barn located on the Subject Lands. Of this total, two Barn Swallow nests were intact with evidence of use in 2019, seven were remnant Barn Swallow nests and two were intact American Robin (*Turdus migratorius*) nests.

4.4.4 Snake Visual Encounter Surveys

Visual encounter surveys for snakes were conducted on May 12, June 4 and August 29, 2014 in support of the Phase 1 Ninth Line Scoped SWS (Amec Foster Wheeler 2015). Within the Ninth Line Lands Study Area, one Eastern Gartersnake (*Thamnophis sirtalis*) was observed within a cultural meadow, although no candidate overwintering sites were present on the Subject Lands. No snake species were reported in the Ninth Line Corridor Study (NSEI 2012).

Given the older nature of the data from the Phase 1 SWS, additional field investigations were required to confirm the presence or absence of snake species on the Subject Lands.

Survey Methodology

Snake surveys were conducted on the Subject Lands on April 25 and May 24, 2019 to capture the spring emergence period (i.e., late-April to mid-May). During these periods, the probability of observing these elusive species is generally higher.

Area searches were conducted in two polygons on the Subject Lands, along with scanning rocks/debris piles for basking snakes and wildlife road crossing surveys. Reptile survey locations are shown on **Figure 4** (**Appendix A**). Snake surveys were conducted on mild spring mornings (minimum 10°C) between 8:00 and 14:00 hours, with sunny or partly overcast conditions. A minimum temperature of 15°C was required for overcast conditions. Data recorded during snake surveys included: species observed and locations (UTM coordinates), air temperature, start and end time, and weather conditions. Survey methods are based on MNR SAR protocols (2012) and Toronto Zoo snake survey protocols (Caverhill et al. 2011).

Survey Results

No snakes were recorded during the 2019 surveys on the Subject Lands (**Table 12**, **Appendix B**).

4.4.5 Turtle Basking

Visual encounter surveys for turtles were conducted on the Ninth Line Lands Study Area on May 12, June 4 and August 29, 2014 (Amec Foster Wheeler 2015). Northwest of the Subject Lands, Midland Painted Turtle (*Chrysemys picta marginata*) was observed within SWM ponds located adjacent to Highway 407. No turtle species were observed throughout field investigations carried out as part of the Ninth Line Corridor Study (NSEI 2012).

Site-specific surveys were required within the three open aquatic features located on the Subject Lands to confirm the presence or absence of turtles.

Survey Methodology

Potentially suitable aquatic habitat for turtles was identified using aerial photography (i.e., three farm ponds). Spring turtle basking surveys were conducted on April 25 and May 24, 2019 to search for basking turtles and identify potential nesting areas. The surveys were conducted on sunny mornings between 12:55 PM and 3:29 PM with low/no wind and with air temperatures of 12°C to 21°C.

Binoculars were used to scan from a distance the edge and surface of each waterbody for basking turtles for 30 minutes. Data recorded included: water and air temperatures, water depth (measured arm's length from shoreline), vegetation composition around the water body, % slope leading to water edge, % of pond containing basking features (e.g., logs, floating vegetation mats, floating/emergent debris like tires), and % canopy cover overhanging the pond.

Survey Results

No turtles were observed and no evidence of turtle nesting was recorded on the Subject Lands (**Table 13**, **Appendix B**).

4.4.6 Amphibians

Ecological studies conducted for the Phase 1 Ninth Line Scoped SWS (Amec Foster Wheeler 2015) included evening amphibian call surveys conducted on April 24, May 22 and June 26, 2014. Northern Green Frog (*Lithobates clamitans*), Spring Peeper (*Pseudacris crucifer*) and Gray Treefrog (*Hyla versicolor*) were heard calling from a station located within the City woodlot (ANR-008) located northwest of the Subject Lands. Overall, numbers of calling amphibians were observed to be low (Call Code 1) with no more than three amphibians heard calling simultaneously. American Bullfrog (*Lithobates catesbeiana*) and Northern Leopard Frog (*Lithobates pipiens*) were also observed incidentally by NRSI within the Ninth Line SWS Study Area, however, the locations of these observations was not specified (Amec Foster Wheeler 2015).

Additional evening amphibian call-count surveys (AMC) were required as part of the Scoped EIS to refine the Phase 1 Ninth Line Scoped SWS (Amec Foster Wheeler 2015) results for the aquatic habitats identified on the Subject Lands.

Survey Methodology

Three rounds of evening AMC surveys were conducted on April 25, May 15 and June 18, 2019. AMC surveys were conducted at four stations on the Subject Lands, including one station (AMC13) targeting the City woodlot, as illustrated on **Figure 4** (**Appendix A**). Survey stations were first identified based on a preliminary review of aerial photography and were verified in the field to confirm the presence of suitable breeding habitat prior to the completion of surveys.

These surveys followed standard protocols outlined in the Great Lakes Marsh Monitoring Program (BSC 2003). Surveys were conducted on warm nights with little wind. Surveys commenced one half hour before dusk and ended before midnight. Visits were 15 days apart and, as per protocols, the first occurred with a minimum nighttime air temperature of 5°C, the second visit with a minimum of 10°C and the third visit with a minimum of 17°C. If noise from plane, road traffic and/or trains was present, monitoring was delayed and began during a quiet period.

Each station was surveyed for three minutes and a three-level call category system was used to identify the level and type of frog activity.

The standard call levels are:

1) Individual calls do not overlap and calling individuals can be discreetly counted;
2) Calls of individuals sometimes overlap but number of individuals can still be estimated; and
3) Overlap among calls seems continuous (full chorus) and a count estimate is impossible.

Anurans were recorded as within the station if they were within 100 m. All other species were recorded as incidental records heard outside of the station.

Survey Results

A cumulative total of two amphibian species were recorded during the AMC assessments: Northern Green Frog and Gray Treefrog. Detailed results of the AMC surveys are provided in **Table 14** (**Appendix B**). All of the amphibian species recorded on the Subject Lands are provincially ranked S5 (common and secure) or S4 (apparently common and secure).

Although American Bullfrog was heard calling within the Ninth Line Study Area (Amec Foster Wheeler 2015), suitable habitat for this species was not detected during site-specific assessments conducted on the Subject Lands. Open aquatic features on the Subject Lands are small and contain sparse aquatic vegetation. Furthermore, the two northernmost ponds contain predatory fish species and therefore do not support suitable amphibian breeding habitat. Wetlands (deciduous swamps) within the City woodlot do not support the preferred habitat of this species.

4.4.7 Incidental Wildlife Observations

Incidental wildlife observations (mammals, insects, amphibians, etc.) were recorded during surveys conducted by Savanta in 2019. Direct observations, calls, tracks, scats and runways were used to record wildlife present within the Subject Lands. These observations were used to document wildlife and wildlife habitat, and to characterize the nature, extent and significance of animal usage within the Subject Lands.

Incidental wildlife species observations are summarized in **Table 9** (**Appendix B**). One Odonata, one butterfly, two amphibian, two mammal and four bird species were recorded incidentally during surveys conducted on the Subject Lands. All incidental species observed are provincially ranked S5 (common and secure), S4 (apparently common and secure) or SNA (species not native to Ontario).

One Species of Conservation Concern was identified incidentally through surveys conducted on the Subject Lands: Monarch, ranked Special Concern in Ontario and Endangered in Canada. Two Monarchs were observed in association with the MEMM3/AG at the western extent of the property. Satellite populations of Common Milkweed (*Asclepias syriaca*), which functions as a host breeding plant for Monarch, were observed within the MEMM3/AG community during botanical surveys. Given that Monarchs were only observed on the Subject Lands during the primary migration season (August to early November), these observations suggest that the site is predominantly used as a resting/feeding area for migrant Monarchs.

4.5 Aquatic Resources

4.5.1 Headwater Drainage Feature Assessment

Survey Methodology

Potential headwater drainage features on the Subject Lands were assessed using the Credit Valley Conservation/Toronto Region and Conservation Authority (CVC/TRCA) 2014 "Evaluation, Classification and Management of Headwater Drainage Features Guidelines" (herein referred to as the HDFA Guidelines). These guidelines provide a standardized means of identifying and assessing the value of headwater drainage features and identifying long-term management recommendations to protect or maintain the important ecological or biophysical functions provided by headwater drainage features in a developing landscape.

Per the requirements of the HDFA Guidelines, Savanta completed three site visits to assess headwater drainage features on the Subject Lands as follows:

- Round 1 – May 3, 2019;
- Round 2 – June 19, 2019; and
- Round 3 – August 30, 2019.

The round 1 assessment was completed immediately following the standard round 1 window (March–mid-April) as a result of late project initiation. To mitigate the timing of round 1, the assessment was timed to occur after a significant rainfall event (10 mm) to simulate spring runoff conditions. During the first site visit, all areas of the Subject Lands were walked to identify potential headwater drainage features. Each headwater drainage feature observed was separated into specific reaches, per the guidance on reach delineation in the HDFA Guidelines. Data collection was completed for each reach based on Ontario Stream Assessment Protocols (OSAP; Gorenz and Stanfield 2017), Section 4: Module 11 (Unconstrained Headwater Sampling). A photographic record of each headwater drainage feature reach was collected during each survey event.

The second and third round surveys occurred at least 48 hours following a precipitation event so that drainage features would be at baseflow condition, per the OSAP requirements (Gorenz and Stanfield 2017). In order to accommodate these conditions, (i.e., 48 hours without rainfall), the second-round assessment was completed outside of the standard assessment period window (i.e., late April-May) due to a substantial amount of precipitation in late spring 2019, creating unseasonably wet conditions and causing difficulty in satisfying the OSAP standard assessment period window. The delayed timing of this survey is thought to still be representative of late spring hydrological conditions as the survey was completed after 48 hours with no precipitation.

Following completion of the three survey rounds, the collected data was used to classify each headwater drainage feature, based on the HDFA Guideline hierarchy.

Survey Results

Ten headwater drainage features were observed on and immediately adjacent to the Subject Lands, as shown on **Figure 5** (**Appendix A**). These features and the resulting HDFA management recommendations, are discussed in the following sections. A summary of the HDFA classifications and management recommendations for each reach is provided on **Table 15** (**Appendix B**).

Drainage Feature H1

H1 originates in the City woodlot located northwest of the Subject Lands. The drainage feature receives inputs from areas of vernal pooling and overland flow within the City woodlot. Surface water runoff accumulates within a fence line ditch adjacent to the northwestern property boundary, which conveys flows onto the Subject Lands. The drainage feature then flows southeast through two online ponds and a grassed swale before being conveyed offsite via a storm sewer culvert beneath Ninth Line. On the Subject Lands, the feature was divided into three distinct reaches (i.e., H1S1, H1S2 and H1S3) with four associated tributary drainage features (i.e., H1S3a, H1S3b, H1S3c and H1S3d).

H1S1 was identified as a natural defined feature that conveys flows from the fence line ditch associated with the City woodlot into the online farm ponds (H1S2). The feature then discharges through the pasture into H1S3 before flowing off-site. H1S1 was flowing during the first-round assessment under spate conditions and contained isolated pockets of standing water during the second-round survey but was dry during the summer survey (third round). Hydrophilic emergent vegetation (e.g., Cattails) was observed within the feature. No fish or fish habitat were identified. Sediment deposition within the reach was minimal (<5 mm), with no valley sediment transport or substrate sorting recorded. Feature width and wetted width measurements during the first-round assessment were 2.17 m and 1.40 m, respectively. Water depth was measured at 15 cm.

H1S2 consists of two online ponds that provide a source for irrigation or water for livestock. The ponds were discharging water downstream in May 2019 and held standing water during the second and

third round assessments. Outside of the spring freshet and large precipitation events, the online ponds function primarily as isolated pools with no downstream connection. Vegetation within the riparian corridor consists of predominantly pasture and agricultural land uses, however the City woodlot is located within 30 m of the ponds. Hydrophilic vegetation was dominated by Cattails and Jewelweed (*Impatiens capensis*) around the periphery of the online ponds with a dense layer of Duckweed (*Lemna minor*) covering the pond during the third-round assessment. The two ponds are hydraulically connected via a 5 m long culvert. Non-native fish species (i.e., Goldfish; *Carassius auratus*) were observed moving between the ponds in the spring and are likely present throughout the year. Based on a lack of fish habitat observed upstream and downstream of H1S2, it is likely that this species was artificially stocked. Northern Green Frog was observed in both ponds in June 2019, however, H1S2 does not support suitable amphibian breeding habitat given the presence of predatory fish species. Water depths during the first-round assessment varied between 52 cm and 63 cm. Water temperature during the second-round assessment was 21°C, suggesting that the feature could only support warm-water tolerant fish species.

H1S3 was defined as an ephemeral swale feature that receives flows from H1S2 (through a culvert) and ultimately flows into the storm sewer system via a drain beneath Ninth Line. The feature was flowing during the first-round assessment, under spate conditions. Isolated pockets of standing water covered in filamentous algae were documented throughout the feature during the second-round assessment. The reach was dry in August 2019. H1S3 supports approximately 30 m of Cattails within the upper extent of the reach. The grassed swale characterizing the downstream portion of the reach (i.e., south of the culvert beneath the access path) is associated with primarily mixed meadow vegetation communities. Generally, there was no discernable difference between vegetation within the reach and the adjacent riparian areas. Feature and wetted widths were both measured at 4.20 m during first round assessment. H1S3 does not support fish or direct fish habitat, based on a lack of suitable habitat (including a defined channel) and the presence of downstream barriers to movement (i.e., culverts).

Poorly defined swales were also identified in association with the H1 drainage feature and originate north (i.e., H1S3d) and south (i.e., H1S3a, H1S3b, and H1S3c) of the main reach. All features were flowing into H1 during the first-round assessment. Although these reaches may contain water under spate conditions (first round assessment), all features were dry during subsequent rounds indicating that they only flow ephemerally during and immediately following precipitation events. The primary function of these reaches is to convey these ephemeral flows to H1 and off of the Subject Lands. The southern reaches flow through pasture and agricultural areas on the Subject Lands, while H1S3d receives inputs from the access path and increased topographic relief. Given the poorly defined nature of these drainage features and their tenuous hydrological connection, they do not appear to provide direct fish habitat, amphibian breeding habitat or a terrestrial linkage function.

Drainage Feature H2

H2S1 originates near the southwestern extent of the property. The feature consists of a narrow swale vegetated with meadow species that discharges into the roadside ditch along Highway 407 to the southwest. H2S1 contained a series of discontinuous standing pools (10 cm deep) in May 2019 under spate conditions and was dry during the second and third round assessments. The reach receives inputs from overland flow associated with the adjacent mixed meadow community to the southeast. Minimal sediment deposition was recorded within the feature. Feature and wetted widths during the first-round assessment were measured at 0.99 m and 0.49 m, respectively. Due to the ephemeral nature of this feature, it does not support direct fish habitat. No amphibian breeding habitat is present within the feature and it does not appear to provide a terrestrial linkage function.

Drainage Feature H3

Drainage feature H3 flows in a northwesterly direction across the Subject Lands and has been divided into two distinct reaches (i.e., H3S1 and H3S2).

H3S1 is a poorly defined swale feature with no discernable difference observed between instream and riparian vegetation. Minimal flow was documented within this reach during May 2019 under spate conditions. The feature was dry during the second and third round assessments suggesting that this reach only conveys ephemeral flows during and immediately following precipitation events. The access path and fence line along the left bank constrain overland flow inputs to the western portion of the property. Feature width and wetted width measurements during the first-round assessment were 2.21 m and 0.74 m, respectively. Water depth was measured at 10 cm. Given the ephemeral nature of H3S1, direct fish habitat, amphibian breeding habitat and terrestrial linkage functions are not supported.

H3S2 functions as an online holding pond. The pond was discharging via spillage to the adjacent City woodlot during the round 1 assessment due to very high flow conditions (i.e., 10 mm of precipitation within 12 hours of the first-round assessment). Under normal spring conditions, this feature appears to be a sink for upstream flow with no headwater drainage functions supporting downstream reaches. It is expected that H3S2 does not provide a hydraulic connection to the woodland under typical freshet conditions. During the second and third round assessments, standing water was observed within this pond, however no outflow or inflow was documented. The periphery of the pond is dominated by hydrophilic vegetation (i.e., Cattails and Purple Loosestrife; *Lythrum salicaria*) and contains open aquatic habitat that was covered in filamentous algae during the third-round survey. This feature does not provide direct fish habitat or a terrestrial linkage function as a result of the limited hydrological connectivity to downstream features. Habitat within H3S2 supports amphibian breeding based on the presence of Green Frog, Gray Treefrog and tadpoles within the feature, however levels of breeding within the feature do not meet SWH criteria (**Table 16a**, **Appendix B**). H3S2 does not provide stepping-stone habitat, nor any corridor function.

Classification and Management Recommendations

Part 2 of the HDFA Guidelines (CVC/TRCA 2014) provides an approach to classify headwater drainage features by providing a step-by-step characterization of specific functions that may be associated with the features assessed, including hydrology, riparian function and provision of fish or terrestrial habitat. **Table 15** (**Appendix B**) highlights the key components of this analysis based on the three rounds of HDFA completed in 2019.

Part 3 of the HDFA Guidelines (CVC/TRCA 2014) provides guidance on linking the characteristics and functions of features to specific management recommendations that may be applied to those features. To assist, the HDFA Guidelines include Figure 2: "Flowing Chart Providing Direction on Management Options". The flow chart depicts various decision points associated with hydrology, fish habitat, riparian vegetation and terrestrial habitat, and ultimately leads the user to an appropriate management recommendation for each headwater drainage feature segment. Management recommendations can include the following:

- Protection;
- Conservation;
- Mitigation;
- Maintain Recharge;

- Maintain/Replicate Terrestrial Linkage; or
- No Management Required.

The flow chart was used to determine the management recommendation for the headwater drainage features on the Subject Lands (as identified in the second last column of **Table 15**, **Appendix B**). However, in some instances the management recommendations resulting from the HDFA Guidelines are not always warranted, given that the HDFA Guidelines do not cover every possible scenario, and in these instances, the guidelines permit flexibility to suggest alternate management recommendations. Therefore, a final management recommendation column has been added to identify the long-term recommendation from the Project Team.

The resulting final management recommendations for each reach, as depicted in **Figure 5** (**Appendix A**), along with the recommended management approaches for each management classification (from the HDFA Guidelines) are as follows:

Conservation

The H1S1 drainage feature on the Subject Lands received a final management recommendation of Conservation in recognition of the feature's proximity to the adjacent City woodlot. This management recommendation requires that the drainage feature and associated spring conveyance functions (i.e., woodland drainage) be maintained post-development, but permits realignment of the feature (e.g., conveyance swale), if necessary. The recommended management measures for Conservation reaches from the HDFA Guidelines (TRCA and CVC 2014) include:

- Maintain, relocate and/or enhance drainage feature and its riparian corridor zone;
- If catchment drainage had been previously removed or will be removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e., restore original catchment using clean roof drainage), where feasible;
- Maintain or replace on-site flows using mitigation measures and/or wetland creation, if necessary;
- Maintain or replace external flows;
- Use natural channel design techniques to maintain or enhance overall productivity of the reach; and/or
- Drainage feature must connect to downstream.

The reach will be maintained, and all flows will be directed to an infiltration gallery. This will ensure that existing woodlot drainage is maintained, and flows are managed to promote groundwater infiltration with overflow directed to the SWM facility beneath the amenity space.

Mitigation

H1S2 received a final management recommendation of Mitigation. This feature is of cultural origin and conveys flows to a storm sewer at Ninth Line. Due to the limited hydrological connectivity of this feature within the watershed, it does not function as direct fish habitat or provide important wildlife habitat. Although this feature occurs in close proximity to the City woodlot, the dominant vegetation type in the riparian zone is anthropogenic (i.e., pasture and agriculture) and does not provide a valued function. H1S3 was also assigned a final management recommendation of Mitigation given the classification of the upstream reach.

Tributaries associated with the main reach of H1 (i.e., H1S3a, H1S3b, H1S3c and H1S3d) also received a management recommendation of Mitigation. These reaches were flowing in early spring under spate conditions but were dry during the later assessment periods. Therefore, they provide downstream hydrological contributions in early spring and likely during other precipitation events, but provide minimal ecological and biophysical functions overall. This management recommendation is appropriate since stormwater from the Subject Lands ultimately discharges to the natural environment. However, given that stormwater from these features eventually enters the downstream storm sewer network under existing conditions, the only Mitigation for this feature is the eventual conveyance of stormwater from the developed Subject Lands to a SWM facility. No open channel conveyance system is considered necessary to mitigate any particular functions.

The recommended management measures for Mitigation reaches from the HDFA Guidelines (CVC/TRCA 2014) include:

- Replicate or enhance functions through enhanced lot level conveyance measures, such as well-vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets or replicate through constructed wetland features connected to downstream;
- Replicate on-site flow and outlet flows at the top end of system to maintain feature functions with vegetated swales, bioswales etc. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e., restore original catchment using clean roof drainage); and
- Replication functions by lot level conveyance measures (e.g., vegetated swales) connected to the natural heritage system, as feasible and/or Low Impact Development (LID) stormwater options.

No Management Required

Feature H2S1 consists of an ephemeral swale discharging into a roadside ditch adjacent Highway 407. Isolated pockets of standing water were observed within this feature during the first-round survey, however, the feature was dry during all subsequent assessments. Water appears to be present within this feature on a highly ephemeral basis (i.e., during precipitation events), which is not considered to be an important biophysical or ecological function in a developed landscape, such as the Subject Lands. Therefore, no management recommendations are required, and this feature can be removed with no long-term ecological or biophysical impact.

Drainage feature H3 (i.e., H3S1 and H3S2) also received a final management recommendation of No Management Required given the lack of downstream connectivity. Although H3S2 was observed overflowing into the City woodlot due to very high flow conditions (i.e., 10 mm of precipitation within 12 hours of the first-round assessment), under normal spring conditions no outflow from this feature occurs and therefore no headwater drainage functions are present. No management is considered appropriate, since the downstream woodland does not rely on drainage from this feature to maintain woodland form or function. Ultimately, drainage from the sub-catchment of this reach will be directed to a SWM facility. Furthermore, H3S2 is not a wetland and although it was noted as providing some amphibian breeding habitat, it does not meet SWH criteria, and as such, does not meet any other criteria for significance that would preclude the removal of this feature.

4.5.2 Wetland Water Balance Risk Evaluation and Analysis

The SWS (2019) identified two internal Green Ash Mineral Deciduous treed swamp wetland polygons within the City woodlot, immediately northwest of the Subject Lands. As part of the Scoped EIS, the

surface water engineer (i.e., Urbantech) delineated the existing and post-development catchment mapping for these two wetland features. The existing catchment for these wetlands is located entirely northwest of the City Woodlot, therefore no impacts to these wetland catchments will occur as a result of the proposed development and a wetland water balance analysis is not required as part of this Scoped EIS.

5.0 ANALYSIS OF ECOLOGICAL AND NATURAL HERITAGE SIGNIFICANCE

The City of Mississauga Official Plan (City of Mississauga 2011) identifies the natural heritage features that form a component of the City's Natural Heritage System, including the following:

- Significant Natural Areas;
  - Provincial or regionally significant ANSIs;
  - Environmentally Sensitive or Significant Areas;
  - Habitat of endangered and threatened species;
  - Fish habitat;
  - Significant wildlife habitat;
  - Significant woodlands;
  - Significant wetlands;
  - Significant valleylands;
- Natural Green Spaces;
  - Woodlands >0.5 ha not meeting requirements for significance;
  - Wetlands not meeting requirements for significance;
  - Watercourses that are not part of a significant valleyland;
  - Natural Areas >0.5 ha with vegetation that is uncommon in the city;
- Special Management Areas;
- Residential woodlands; and
- Linkages.

The Significant Natural Areas defined in the City of Mississauga Official Plan (2011) include the eight types of significant natural heritage features defined in the PPS, as identified in section 2.4 of this EIS. In addition to the guidance provided in the City of Mississauga Official Plan (2011), the MNRF's NHRM (MNR 2010) provides technical guidance on the identification and definition of the significant natural heritage features defined in the PPS.

The following sections provide a detailed discussion regarding the designation of features as defined by the NHRM and City of Mississauga Official Plan, and whether any of the above noted features are present on the Subject Lands. This section also includes an assessment of the other features identified by the City of Mississauga Official Plan as being part of the NHS that are not covered by the PPS (i.e., Natural Green Spaces, Special Management Areas, Residential Woodlands and Linkages).

5.1 Significant Wetlands

Within Ontario, significant wetlands are identified by the MNRF or by their designates. Other evaluated or unevaluated wetlands may be identified for conservation by the municipality or the conservation authority. MNRF's database was consulted and natural heritage features on and in the vicinity of the Subject Lands are depicted on **Figure 2** (**Appendix A**).

No significant wetlands occur on or within 120 m of the Subject Lands.

5.2 Significant Woodlands

The PPS notes that significant woodlands should be defined and designated by the planning authority using criteria established by the MNRF. The City of Mississauga Official Plan (2011) indicates that significant woodlands are those that meet one or more of the following criteria:

- "*woodlands, excluding cultural savannahs, greater than or equal to four hectares;*
- *woodlands, excluding cultural woodlands and cultural savannahs, greater than or equal to two hectares and less than four hectares;*
- *any woodland greater than 0.5 hectares that:*
    - *supports old growth trees (greater than or equal to 100 years old);*
    - *supports a significant linkage function as determined through an Environmental Impact Study approved by the City in consultation with the appropriate conservation authority;*
    - *is located within 100 meters of another Significant Natural Area supporting a significant relationship between the two features; or*
    - *supports significant species or communities*."

In accordance with the NHRM (MNR 2010), natural treed communities (FOC, FOD, FOM, SWC, SWD, SWM) and cultural forest/plantation communities (CUW, CUP) are considered woodlands (i.e., meet the *Forestry Act* woodland density requirements). Woodland patches are considered part of the same continuous woodland if they are within 20 m of each other. With respect to the Subject Lands, the City woodlot located northwest of the property is approximately 5 ha in size and satisfies the minimum size threshold for significance, as defined by the City of Mississauga Official Plan (2011). The landscape surrounding the Subject Lands is largely fragmented, therefore the City woodlot is not contiguous with any other features in the vicinity of the Subject Lands. Therefore, the City woodlot is identified as a significant woodland.

5.3 Significant Valleylands

Significant valleylands are defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the NHRM (MNR 2010) for Policy 2.1 of the PPS (MMAH 2014). Recommended criteria for designating significant valleylands include prominence as a distinctive landform, degree of naturalness, and importance of its ecological functions, restoration potential, and historical and cultural values.

No valleyland features occur on, or within 120 m of, the Subject Lands.

5.4 Significant Wildlife Habitat

SWH is one of the more complex natural heritage features to identify and evaluate. There are several provincial documents that provide guidance for identifying and evaluating SWH including the NHRM (MNR 2010), the Significant Wildlife Habitat Technical Guide (MNR 2000) and the SWH Ecoregion 7E Criterion Schedule (MNRF 2015).

There are four general types of SWH: seasonal concentration areas, rare or specialized habitat, habitat for species of conservation concern and animal movement corridors. A detailed screening assessment of all SWH types was completed based on the Ecoregional criteria for 7E and the Peel-Caledon SWH Study (Region of Peel 2009) to support the assessment of potential SWH on the Subject Lands; results are provided in **Table 16a** and **Table 16b** (**Appendix B**), respectively. SWH types that contained candidate habitat within the Subject Lands (based on habitat criteria being met) or within 120 m of the Subject Lands are discussed in the following sections.

5.4.1 Seasonal Concentration Areas of Animals

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. Seasonal concentration areas include:

deer yards, wintering sites for snakes, bats, raptors and turtles, waterfowl staging and molting areas, bird nesting colonies, shorebird staging areas, and migratory stopover areas for passerines or butterflies. Only the best examples of these concentration areas are usually designated as SWH. Areas that support Special Concern species or provincially vulnerable to imperiled species (S1-S3), or if a large proportion of the population may be lost if the habitat is destroyed, are examples of seasonal concentration areas which should be designated as significant.

No seasonal concentration areas were identified on the Subject Lands. As per the Ecoregion 7E SWH Criterion Schedule (MNRF 2015), candidate bat maternity colonies have the potential to occur within the City woodlot.

The existence of key features was not confirmed beyond the Subject Lands boundary. Habitat occurring on adjacent lands (i.e., City woodlot) will not be directly affected by the proposed development.

5.4.2 Rare Vegetation Communities or Specialized Habitat for Wildlife

Rare or specialized habitat are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the 'state', or in Canada at the provincial level, and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with SRANKS of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the NHIC (2013), could qualify. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

No rare vegetation communities were identified on, or adjacent to, the Subject Lands (NHIC 2013).

Specialized habitats are microhabitats that are critical to some wildlife species. The NHRM (MNR 2010) defines specialized habitats as those that provide for species with highly specific habitat requirements; areas with exceptionally high species diversity or community diversity; and areas that provide habitat that greatly enhances species' survival. Similar to seasonal concentration areas, these are typically identified as exceptional examples of, or support significant numbers and/or diversity within them.

No specialized wildlife habitat was identified on the Subject Lands. Due to the scoped nature of this EIS, the presence of key features was not confirmed beyond the property boundary; therefore, it is assumed that candidate seeps and springs may occur within the adjacent woodland. However, given that flows from the Subject Lands are directed away from the woodland under existing conditions, no impacts to candidate seeps and springs habitat on the adjacent lands are expected.

5.4.3 Habitat for Species of Conservation Concern

Species of conservation concern include those that are provincially rare (S1 to S3), provincially historic records (SH) and Special Concern species. Several specialized wildlife habitats are also included in this SWH category, i.e., Terrestrial Crayfish (*Fallicambarus fodiens*) habitat and significant breeding bird habitats for marsh, open country and early successional bird species.
Habitats of species of conservation concern do not include habitats of Endangered or Threatened species as identified by the ESA (2007). Endangered and Threatened species are discussed below in section 5.6.

No habitat for species of conservation concern was identified on the Subject Lands. Based on the presence of suitable ELC ecosites on adjacent lands (i.e., FOD5), SWH habitat criteria were met for two Special Concern species (i.e., Eastern Wood-Pewee and Wood Thrush) within the City woodlot based on the results of the 2019 ecological field program and the Phase 1 SWS (Amec Foster Wheeler 2015). The Phase 1 SWS (Amec Foster Wheeler 2015) documented one territorial male Wood Thrush within suitable breeding habitat in 2014 (BMB-017 within the City woodlot). Wood Thrush was also observed as part of the Ninth Line Corridor Study (NSEI 2012). Given the limited range of breeding bird surveys conducted on the Subject Lands by Savanta, it is considered probable that this species is present within the woodland despite not being detected during 2019.

Candidate habitat for Terrestrial Crayfish may also occur within the City woodlot, however, the presence of this species was not confirmed due to property access restrictions and the scoped nature of this EIS.

5.4.4 Animal Movement Corridors

Animal movement corridors are areas that are traditionally used by wildlife to move from one habitat to another. This is usually in response to different seasonal habitat requirements. Some examples are trails used by deer to move to wintering areas and areas used by amphibians between breeding and summering habitat.

As neither deer wintering areas nor significant amphibian breeding habitats were identified on the Subject Lands, this SWH type is not present.

5.5 Fish Habitat

Fish habitat, as defined in the federal *Fisheries Act*, c. F-14, means, "spawning grounds and any other areas including nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes". Fish, as defined in S.2 of the *Fisheries Act*, c. F-14, includes "parts of fish, shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals".

Headwater drainage features on the Subject Lands do not provide direct fish habitat given that features ultimately flow into the storm sewer system (and are therefore not connected to downstream direct fish habitat), are largely supplied by overland flow, have tenuous hydrological connectivity and/or contain barriers to upstream movement (i.e., culverts, storm sewer pipes). Although non-native fish species (i.e., Goldfish) were observed in two of the artificial ponds on the Subject Lands, this species is considered to be artificially stocked within the ponds and not a naturally occurring fish population. Furthermore, the ponds are not connected to downstream fish habitat, given that the headwater drainage feature flows into the storm sewer network.

Given the lack of fish habitat located downstream of the Subject Lands, headwater drainage features, including ponds (**Figure 5**, **Appendix A)** are not considered to be fish habitat.

5.6 Habitat of Endangered and Threatened Species

SAR and their habitats are considered provincially sensitive information. The survey methods, results and potential impacts to SAR species and their habitats will be submitted to the MECP through the

Information Gathering Form (IGF) process. Due to the sensitive nature of this information, all correspondence and outcomes will remain with the MECP.

One threatened species was identified on the Subject Lands and is discussed below.

Barn Swallow

Several adult Barn Swallows were observed exiting a barn structure located along the northwestern boundary of the Subject Lands. A nest search conducted in August 2019 identified two confirmed (i.e., intact) nesting locations. Therefore, this barn is considered to be habitat for the species and is protected under the ESA (2007).

Bats

Ecological investigations conducted on the Ninth Line Lands Study Area in April 2014 confirmed the presence of candidate bat maternity colony habitat within the FOD5 (City woodlot) adjacent to the Subject Lands. Furthermore, the 2019 bat habitat assessment confirmed that suitable cavity trees occur within the City woodlot that may provide potentially suitable roosting habitat for SAR bats. Acoustic monitoring surveys for bats were not conducted given that no direct impacts (i.e., tree removals) to the woodland are proposed.

5.7 Natural Green Spaces

Wetlands not deemed to be significant (i.e., provincially significant, coastal or wetlands >0.5 ha) are considered Natural Green Spaces of the NHS under the City of Mississauga Official Plan (City of Mississauga 2011). As per Section 6.3.32 of the Official Plan (City of Mississauga 2011), development and site alteration shall not be permitted within or adjacent to Natural Green Spaces unless it can be demonstrated that no negative impacts will occur.

Three wetland vegetation communities associated with the online farm ponds were identified on the Subject Lands. These vegetation communities are small, isolated features that are not considered Significant Natural Features and do not support provincially rare vegetation species, turtle basking/overwintering habitat or significant amphibian breeding habitat. All three of these features are less than 0.05 ha in size, provide limited ecological functions and are of cultural origin. Furthermore, these features convey flows to a downstream storm sewer and therefore, do not provide a hydraulic function within the watershed. Due to the anthropogenic nature of these features, the lack of predominant emergent hydrophytic vegetation and the non-native species present, these wetlands are not considered sensitive features and are therefore not proposed for retention within the NHS.

As per the City of Mississauga Official Plan (2011), areas connecting wetlands will also be considered for inclusion within the Natural Green Space designation. Small wetland communities are supported by the adjacent lands, which provide functions associated with hydrological inputs (e.g., overland flow during precipitation events) and water quality buffering, which may support each wetland community. CVC's Regulation (O. Reg. 160/06) applies to areas within 30 m of non-provincially significant wetlands, therefore, this distance around each wetland community may also be considered part of the Natural Green Space associated with wetlands on the Subject Lands. However, given that the wetland communities on the Subject Lands are the product of anthropogenic land use, are generally small (<0.05 ha), and are largely isolated within the landscape, they do not currently function as a complex. Further, there is no obvious vegetation community connection between the wetland units (e.g., forested corridors). Therefore, inclusion of connections between these wetland communities

as Natural Green Space is not warranted, given that these communities are not proposed to be retained within the NHS.

One unevaluated wetland is located approximately 125 m southwest of the property and is largely fragmented from the Subject Lands by Highway 407. This wetland will not be addressed further by this reporting.

Two additional wetland communities (SWD2-2; 0.61 ha and 0.10 ha) occur within the significant woodland (City woodlot) adjacent to the northwestern property boundary of the Subject Lands (**Figure 3**, **Appendix A**). These swamp communities are small, isolated features with no downstream or upstream connection to hydrological features within the landscape. Small features generally have more limited ecological features and functions, and no SAR or provincially rare species were documented within these features. However, as per the Ninth Line Phase 1 Study (Amec Foster Wheeler 2015), all wetlands internal to woodlands within the Study Area are to be retained.

5.8 Special Management Areas

The City of Mississauga Official Plan (2011) identifies Special Management Areas as lands adjacent to or near Significant Natural Areas or Natural Green Spaces that would be managed or restored to enhance and support the Significant Natural Area or Natural Green Space with which they are associated. Special Management Areas are identified in Schedule 3 of the City of the Mississauga Official Plan. No such areas are identified on or within 120 m of the Subject Lands. Further, given the limited presence of Significant Natural Areas, the isolated nature of existing Significant Natural Areas and the limited number, size and quality of wetlands being considered as Natural Green Spaces, no Special Management Areas are defined for the Subject Lands.

5.9 Residential Woodlands

These are defined by the City of Mississauga Official Plan (2011) as areas, generally in older residential areas, with large lots and mature trees forming a generally continuous canopy with minimal native understory due to lawn maintenance and landscaping. No Residential Woodlands are identified as being present on, or adjacent to, the Subject Lands on Schedule 3 of the City of the Mississauga Official Plan. Therefore, this component of the City's NHS is considered to be absent from the Subject Lands.

5.10 Linkages

Linkages are defined by the City of Mississauga Official Plan (2011) as areas necessary to maintain biodiversity and support the ecological functions of Significant Natural Areas and Natural Green Spaces, but that do not fulfil any other criteria themselves. No Linkage areas are identified as being present on, or adjacent to, the Subject Lands in Schedule 3 of the City of the Mississauga Official Plan.

5.11 Summary of Ecological Components Subject to Impact Assessment

An analysis of existing natural heritage features on and adjacent to the Subject Lands was completed, followed by an evaluation of their significance against criteria in the City of Mississauga Official Plan (2011), the NHRM (MNR 2010), SWH Ecoregion 7E Criteria Schedule (MNRF 2015) and the Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study (Town of Caledon and Region of Peel 2009).

The results of this analysis determined that per the requirements of the City of Mississauga Official Plan (2011) and the PPS (MMAH 2014), the following significant natural features (as defined in the PPS and City of Mississauga Official Plan) are present and will require assessment in section 7.0:

- Significant Woodland (adjacent lands, City woodlot);
- Significant Wildlife Habitat (adjacent lands, City woodlot);
    - Candidate Bat Maternity Colonies;
    - Candidate Terrestrial Crayfish habitat;
    - Candidate Seeps and Springs; and
    - Habitat of Species of Conservation Concern (i.e., Eastern Wood-Pewee and Wood Thrush);
- Habitat of Endangered and Threatened Species (Bats and Barn Swallow); and
- Natural Green Spaces (wetlands not meeting the requirements for significance; MAS2-1 and SAF1-3).

6.0 PROPOSED DEVELOPMENT

The proposed development, as depicted on the Conceptual Site Plan prepared by Mattamy (October 2019), proposes a total of 164 townhome units (including rear lane towns, towns and back to backs), 0.08 ha of central amenity space, an average 10 m vegetation protection zone (VPZ) from the dripline of the City woodlot, a 2 m landscape buffer from the VPZ, and a Ministry of Transportation (MTO) transitway corridor including a 14 m setback abutting the southwestern property boundary. The proposed development limit and preliminary configuration of major roads are illustrated on **Figure 6** (**Appendix A**). On August 1, 2018, By-law 0167-2018 came into effect; this by-law specifies land use designations across the entire Ninth Line Lands. Through this by-law, the Subject Lands were designated as Residential Medium Density (per. Map M-1, Part of Schedule 10; Appendix A) proposed for mixed use development.

Development of residential units within the Phase 1 lands is proposed for 2020. Approval of the Conceptual Site Plan (2019) will be subject to ongoing discussions with the planning authority regarding the designation of public and private roadways within the proposed development footprint. It is expected that development of the Phase 2 lands, associated with the transitway corridor, will be delayed approximately 1 to 1.5 years, subject to the completion of the MTO Transitway Corridor Environmental Assessment.

The Functional Servicing and Stormwater Management Plan (Urbantech 2019) for the Subject Lands will provide quality control for all stormwater and replicate existing conditions from a land-volume perspective. Existing headwater drainage features will be directed to an infiltration gallery within the landscape buffer (H1S1) or removed and surface flows that may have otherwise been directed to these features will be directed towards the SWM storage tanks beneath the amenity space for treatment (H1S2, H1S3, H1S3a, H1S3b, H1S3c, H1S3d, H2 and H3). To facilitate 5 mm of infiltration on site, as per the requirements stipulated by the City of Mississauga Development Requirements (2016; Section 2.01.03.02), a 1.5 m swale with an infiltration gallery trench will be incorporated into the 2 m landscape buffer to capture drainage from the City woodlot. Woodlot overflow in excess of the infiltration trench will be conveyed to onsite sewers during spring freshet or large precipitation events. No grading is proposed within the 5 m of the City woodlot. Within the 2 m landscape buffer, grading for the infiltration gallery will occur.

In 2019, LGL Limited completed an Arborist Report and Tree Management Plan for the Subject Lands. As per the City of Mississauga ToR for Arborist Reports (2019), a Tree Permit/Permission for the removal of trees for land development is required for trees greater than 10 cm DBH on private property and trees greater than 6 cm DBH on municipal lands within 6 m of the subject property.

7.0 IMPACT ASSESSMENT, MITIGATION & ENHANCEMENT OPPORTUNITIES

This section of the Scoped EIS assesses the impacts, predicted effects, mitigation and enhancement measures associated with the proposed development. Potential effects to the natural heritage features and environmental functions that exist on and adjacent to the Subject Lands are evaluated over the short and long term, with consideration given to measures to avoid and/or mitigate negative impacts, where appropriate.

The predominant features on the Subject Lands are pasture and agricultural areas to north, and mixed meadow to the south with scattered trees and drainage features throughout the property (**Figure 3**, **Appendix A**). A significant woodland on land owned by the City of Mississauga abuts the northwestern property boundary of the Subject Lands (within 120 m) and supports other wetlands, candidate SWH for bat maternity colonies, candidate seeps and springs, and confirmed Eastern Wood-Pewee and Wood Thrush habitat.

The range of potential impacts from proposed development can generally be divided into these two categories: direct impacts are normally associated with the physical removal or alteration of natural features that could occur based upon a land use application, and indirect impacts may be changes or impacts (these could be minor or major) to less visible functions or avenues that could cause negative impacts to natural heritage features over time.

The impact assessment outlined in **Table 17** (**Appendix B**) examines the predicted effects of development on the natural heritage features and associated functions present on, and adjacent to, the Subject Lands with recommendations for proposed mitigation. This evaluation was formulated based on the limits of the proposed development. The potential direct and indirect effects of development, and a summary of recommended mitigation and restoration strategies are provided below. Detailed ecological enhancement and restoration opportunities will be determined during the detailed design phase pending approval of the proposed Draft Plan (2019).

7.1 Significant Woodlands

As described in section 5.2, the City woodlot located within 120 m of the Subject Lands (**Figure 3**, **Appendix A**) meets the criteria for significance under the City of Mississauga Official Plan (2011). The woodland is a deciduous forest community with inclusions of deciduous swamp located immediately adjacent to the northwestern property boundary of the Subject Lands. No direct impacts on the City woodlot are anticipated, as the woodland occurs on adjacent lands outside of the proposed development footprint. The portion of the dripline overhanging the Subject Lands along the northwestern fence line will be retained within the proposed VPZ.

The City of Mississauga and Region of Peel Official Plans do not stipulate a minimum VPZ for significant woodlands. As per the Ninth Line SWS Phase 3 report (Wood Environment & Infrastructure Solutions 2018), Conservation Halton policies and guidelines recommend a minimum 30 m VPZ for significant woodlands. However, the City woodlot is under the jurisdiction of CVC and was identified as a candidate for a reduced VPZ (i.e., 10 m from the dripline) by the Ninth Line SWS Phase 3 report (Wood Environment & Infrastructure Solutions 2018) based on the existing quality of the feature and surrounding land uses. The proposed Draft Plan will apply an average 10 m VPZ adjacent the staked dripline and an adjacent 2 m landscape buffer (that will contain an infiltration gallery) to provide a safety zone for tree fall, to protect the tree rooting zone and to enhance edge habitat, in compliance with Section 6.3.7 of the City of Mississauga Official Plan (2011) and CVC Watershed Planning and Regulation Policies (CVC 2010). It is expected that native tree and shrub plantings within the VPZ will

mitigate potential indirect impacts associated with the proposed development and allow for a net ecological gain in the quality and function of the significant woodland.

Potential indirect impacts to the City woodlot include damage or stress to tree rooting zones; increased noise, and intrusion by pets and the public (e.g., ad-hoc recreation and trails). The proposed development also has the potential to cause a minor increase in ambient lighting penetrating into the woodland, which could disturb any light-sensitive wildlife species. It is recommended that any substantial new lighting should be directed away from the City Woodland and outdoor light standards should utilize downward-facing fixtures.

Potential improvements to ecological functions within the retained City woodlot may occur as a result of buffer plantings. The proposed planting plan should provide tailored native planting prescriptions within the VPZ that will support the retained woodland habitat.

Tree protection fencing and/or erosion and sediment control (ESC) measures should be installed adjacent to retained City woodlot to aid in reducing excess disturbance caused by vegetation removals, ground disturbance and dislodging of sediment. Heavy equipment use should be managed to prevent inadvertent damage to the retained woodland, and transportation of non-native and invasive species. No grading will occur within 5 m of the significant woodland.

With the implementation of these mitigation measures, no negative impacts to the form and functions of the significant woodland are expected.

7.2 Significant Wildlife Habitat

As discussed in section 5.4, the following SWH types are present on the Subject Lands or within the City woodlot adjacent to the Subject Lands (within 120 m):

- Habitat for Species of Conservation Concern: Eastern Wood-Pewee and Wood Thrush;
- Candidate Terrestrial Crayfish habitat;
- Candidate Bat Maternity Colony; and
- Candidate Seeps and Springs.

Candidate SWH was identified in association with the significant woodland (City woodlot) located adjacent to the Subject Lands. Due to the scoped nature of this EIS, the presence of key features was not confirmed beyond the property boundary; therefore, it is assumed that candidate SWH occurs within the adjacent woodland.

The natural feature (City woodlot) occurring adjacent to the Subject Lands will not be directly affected by the proposed development and will be protected through the implementation of a 10 m VPZ from the staked dripline, and other mitigation, as discussed in section 7.1. These mitigation measures are anticipated to be sufficient to prevent negative impacts on candidate SWH types associated with the City woodlot.

7.3 Habitat of Endangered and Threatened Species

<u>Bats</u>

Two potential snag trees located within hedgerow features on the Subject Lands are proposed for removal to permit the proposed development. Given that a large area of potentially suitable habitat

to support SAR bats will be retained within the adjacent City woodlot, no compensation for the proposed removals is required. As a precautionary measure, any tree removals should not occur between April 1 and September 30 to prevent disruption to bats during critical reproductive and juvenile growth periods. If tree removal is required during this period, bat surveys will be completed by a qualified biologist. If no SAR bats are observed, the tree(s) can be removed within 24 hours. Net effects will be determined after the IGF is reviewed by MECP. Consultation will occur with MECP to identify potential monitoring or management measures with respect to SAR bats.

Barn Swallow

Activities that may result in the damage, destruction or removal of habitat occupied by threatened or endangered species require an authorization or a 'rules in regulation' confirmation from the MECP. As per the amended O. Reg. 242/08, impacts to Barn Swallow (listed as threatened in Ontario and Canada) habitat must be registered using the MECP online Barn Swallow Notice of Activity Form (NAF) under the ESA (2007) before any work commences that will damage, destroy or modify a structure used for nesting by Barn Swallows.

Two intact Barn Swallow nests (in use) and seven remnant nests were identified within the barn structure located along the northwestern boundary of the Subject Lands. The MECP requires that Barn Swallow habitat is registered through a NAF under the ESA (2007) for any work that will damage, destroy or modify a structure used for nesting by Barn Swallows. A NAF will be prepared and submitted to the MECP to register proposed removal of the barn structure in fall/winter 2019.

A Replacement Habitat Structure (RHS) will be erected within 1 km of the original structure and within 200 m of suitable foraging habitat before the beginning of the next breeding season (i.e., May 1, 2020) to satisfy O. Reg 242/08, Section 23.5, Subsection 6. Required conditions provided by the MECP regarding impacts to Barn Swallow habitat are prescriptive and include recommended guidelines regarding the construction, installation and location of the RHS, required timing windows to complete the installation of the RHS, required RHS ratios, required annual monitoring for three consecutive years and the maintenance of a Barn Swallow mitigation record.

The proposed building site for the RHS is located on City-owned lands located south of 5368 Ninth Line, subject to approval from the City of Mississauga (**Figure 7**, **Appendix A**). This location is within 1 km of the original structure and occurs within 200 m of suitable foraging habitat. The RHS will provide 1:1 habitat compensation for the proposed removal of the suitable nesting structures on the Subject Lands. The RHS structure will be built to MNRF standards using MNRF drawings (April 2016), with additional refinements (e.g., extra ledge for natural nest construction) based upon Savanta's experience with these structures and current RHS design literature.

No other habitat of endangered or threatened species is expected to occur within the Subject Lands.

7.4 Natural Green Spaces

This section discusses the potential impacts of the proposed development on the non-significant wetlands that are present on, and adjacent to, the Subject Lands that meet the requirements to be considered Natural Green Spaces under the City of Mississauga Official Plan (2011).

The three small, isolated wetland communities on the Subject Lands are proposed for removal to facilitate the proposed development. These features are of cultural origin (i.e., man-made farm/agricultural ponds) and provide limited ecological functions due to their small size, lack of hydrological connectivity within the landscape, poor floristic diversity and the presence of invasive

species (e.g., Purple Loosestrife and Goldfish). The ponds do not meet the requirements of any significant natural features under the PPS (MMAH 2014). These ponds do not provide any critical supporting functions to the adjacent City woodlot and do not support SWH, rare vegetation communities, provincially rare flora or fauna. Wetland removal will result in a net loss of 0.05 ha of low functioning habitat. Wetlands on the Subject Lands were not identified for retention within the Ninth Line SWS (Wood Environment & Infrastructure Solutions 2018) and the proposed removals are not expected to result in negative impacts to the City's NHS.

In addition, a total of 0.71 ha of other (non-PSW) wetlands occur adjacent to the Subject Lands within the City woodlot. The proposed Draft Plan (2019) will retain the wetlands within the significant woodland and protect these features through the application of a 10 m VPZ (average) along the dripline of the woodland. The proposed woodland VPZ will provide a minimum 15 m buffer between the development boundary and the easternmost wetland, in compliance with Policy 6.2.1 (b) of the CVC Watershed Planning and Regulation Policies (2010), which recommends a minimum buffer of 10 m for other wetlands.

7.5 Potential Indirect Effects

Indirect effects are those potential effects on the biophysical environment. This could potentially include erosion from the work area with associated sedimentation in drainage features, accidental spills, impacts to migratory birds, the introduction of exotic and/or invasive plant species, light and noise effects, and disturbance from domestic pets and the public. Each of these are discussed in the following sections.

7.5.1 Erosion and Sedimentation

Erosion and sedimentation from the disturbed work area associated with the proposed development could potentially result in adverse effects to natural heritage features (e.g., increased turbidity) or sedimentation and associated effects on retained wetlands and drainage features within the City woodlot (e.g., smothering of aquatic vegetation).

It is recommended that the contractor prepare and implement an ESC Plan to minimize the potential for erosion and sedimentation from the construction site. The ESC Plan should be developed based on the guidance provided in the *Erosion and Sediment Control Guideline for Urban Construction* (GGHCA 2006). Basic elements of the plan should include consideration of:

- Construction phasing to minimize the amount of time soils are barren and therefore, more susceptible to erosion;
- Requirements and timing for rehabilitation of disturbed areas;
- SWM strategies during construction;
- Grading during periods when features are dry, to minimize potential for adverse effects on water quality;
- Erosion prevention measures (e.g., hydroseeding, sodding, erosion control matting, tarping of stockpiles);
- Sedimentation control measures (e.g., silt fences); and
- Inspection and performance monitoring requirements and adaptive management considerations.

Implementation of an effective ESC Plan, incorporating both erosion and sediment controls, coupled

with regular inspection and performance monitoring and implementation of any remedial actions necessary to ensure effective performance, is anticipated to be largely effective in preventing the movement of eroded soil particles towards the significant woodland and associated wetlands.

Overall, no adverse effects are predicted to occur as a result of erosion and sedimentation during construction, provided an effective ESC Plan, including monitoring and adaptive management, is implemented.

7.5.2 Accidental Spills

Accidental spills of potentially hazardous materials (e.g., fuel and oil from heavy equipment), if transported to the significant woodland or associated wetlands, could cause stress or injury to biota.

In order to mitigate the potential for adverse effects due to potential accidental spills during construction, it is recommended that the contractor prepare a spill prevention and response plan to outline the material handling and storage protocols, mitigation measures (e.g., spill kits on-site), monitoring measures and spill response plans (i.e., emergency contact procedures, including Spills Action Centre, and response measures including containment and clean-up). Implementation of an effective spill prevention and response plan is anticipated to be largely effective in preventing adverse effects on natural heritage features.

7.5.3 Impacts on Migratory Birds

The federal *Migratory Birds Convention Act* (MBCA; 1994) prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests. During construction, particularly during activities that may result in tree removals, migratory birds and eggs and nests of these birds could be harmed inadvertently.

As per the MBCA (1994), it is recommended that any tree removals occur prior to, or after, the migratory breeding bird season (April 1 to August 31). If this window cannot be avoided, nest searches are necessary to determine the presence/absence of nesting birds or breeding habitat every 72 hours until clearing is complete, or until August 31, whichever comes first. If an active nest is observed, a designated setback will be identified within which no construction activity will be allowed while the nest remains active. The setback distance ranges from 5 m to 60 m from the nest, depending on the species and its sensitivity to adjacent activities. These distances have been reviewed and approved by Environment Canada.

With the implementation of the above stated mitigation measures, no net effect on migratory birds is anticipated.

7.5.4 Introduction of Exotic and Invasive Plant Species

The introduction of invasive and non-native plant species along the disturbed margins of the development footprint may displace some native flora, particularly in areas where vegetation removals disturb existing invasive species seedbanks. In order to reduce opportunities for the colonization of invasive and non-native species, areas where disturbance has exposed bare soils should be seeded with a cover crop and native species seed mix.

7.5.5 Light and Noise Effects on Wildlife

Light can be a concern where it is directed towards a variety of natural features and functions.

Primary sources for "new light" will be from exterior lighting on the residential dwellings. To minimize light being directed into the adjacent ecological features, outdoor lighting should be located and directed away from the retained features. In addition, to minimize potential impacts, direct upward light should be eliminated, spill light should be minimized, and all lighting sources should illuminate only non-reflective surfaces (e.g., as per City of Toronto Green Development Standard 2007). Given that the existing land uses are primarily anthropogenic, disturbance to adjacent vegetation communities is expected to be minimal.

Noise associated with heavy equipment movement may provide some temporary disturbance to wildlife. However, given the existing traffic noise along Ninth Line and Highway 407, it is expected that local wildlife communities are at least somewhat tolerant of anthropogenic noise sources. Given the vicinity of the development envelope to the existing road, the relatively short time period associated with construction and existing disturbances in the area, it is not expected that the additional noise generated from construction would have a measurable effect on the local distribution of wildlife.

7.5.6 Domestic Pets

Domestic cats are known to prey on small mammals and birds, in that order of preference. It is recommended that the homeowners ensure that any domestic cats are kept out of the adjacent natural areas to prevent wildlife mortality.

7.6 Recommended Measures to Avoid and Mitigate Potential Construction Effects

The extent to which construction will affect retained features adjacent to the Subject Lands can be limited by the implementation of the following measures:

- Locate and flag development limits prior to construction;
- Pre-construction erection of tree protection fencing along confirmed protection edges and specific trees (at outer limit of the dripline) for proposed retention along the woodland edge closest to the development; and
- Appropriate pre-construction briefing of site workers to advise regarding the sensitivity of the development edge conditions (i.e., specialized wildlife habitat, species of conservation concern, etc.).

7.6.1 Tree Protection Zone (TPZ)

LGL Limited outlined recommendations for the preservation of trees within Section 8.0 of the Tree Management Plan (2019). As per these requirements, disturbance limits shall be delineated prior to the commencement of construction activities and no trees shall be pruned, removed or impacted without prior approval from the City. Delineation methods for the TPZ will be established in consultation with CVC and the City of Mississauga. The use of heavy machinery shall not be permitted within the TPZ. Vegetation removals are preferred between November and March in order to minimize potential impacts to wildlife.

The TPZ shall occur within the proposed VPZ and construction activities shall not be permitted within 5 m of the City woodlot. The preservation of trees will be achieved either by complete avoidance, or through the use of appropriate tree protection measures, which should be established prior to any construction or grading activity. The area of protection is referred to as the TPZ and is measured outward from the trunk. The TPZ may be applied along the dripline or calculated based on the DBH of each tree, where 12 cm of protection is provided for every 1 cm of DBH. This modified approach (as opposed to dripline) may be more appropriate as it accounts for the size of the tree, rather than species-variable crown widths (Matheny and Clark 1998; Johnson 1999).

Existing ground levels will be retained within the TPZ to reduce impacts to the rooting zone of retained vegetation communities. For the protection of woodland features, the TPZ should include a linear fence extending the length of the woodland VPZ to prevent physical damage to the trees and compaction of the soil, as detailed in Appendix B of the Tree Protection Plan (LGL Limited 2019).

The TPZ must remain fully intact and cannot be used for the temporary storage of fill, topsoil, building materials, equipment storage, washing of equipment, or dumping of any construction debris. Signage must be posted in visible locations around the perimeter of each TPZ fence and should clearly state restrictions within the TPZ.

Any areas intended for stockpiling of excavated soil must be enclosed with sediment control fencing to further safeguard the TPZ. The sediment control fencing must be installed to Ontario Provincial Standards 219.130 and to the satisfaction of the Project Arborist. Where practical, the sediment control fencing can be attached to the tree protection barrier.

The objective of the TPZ is to maximize the protection of trees to ensure their long-term survival. It is recognized, however, that encroachment into a TPZ is sometimes necessary to facilitate certain construction requirements. Some healthy trees can survive after losing up to 50% of their roots, while other species are known to be extremely sensitive to root cutting (Johnson 1999). In instances where the construction footprint encroaches into the TPZ, the severity of the potential impacts will be determined on a tree-by-tree basis. Factors considered will include area and type of disturbance to TPZ, species, health, maturity, tree structure, and adjacent land use.

Where grading is proposed, impacts to the rooting area will be addressed on-site by means of careful root exposure to assess existing root girth and density within the TPZ to be disturbed. Depending on the outcome of this assessment, these trees may be given a modified TPZ prior to construction (likely to follow the limit of grading activity). These trees will require compensation if they cannot be adequately protected during construction or exhibit canopy dieback post-construction. Grading in the vicinity of the TPZ should be further reviewed by the Project Engineer to determine if alterations can be made that will result in the least impact to retained trees.

Monitoring of the TPZs should be conducted by or supervised by the Project Arborist prior to and during construction to ensure compliance with tree protection guidelines, monitor the health and structure of the trees, identify changes to environmental conditions, and respond appropriately where necessary. The Project Arborist should be on site prior to and during any construction activity occurring within the TPZ to monitor root exposure, identify root disturbance, and propose site-specific mitigation, where appropriate.

Following complete build-out of the development, post-construction monitoring should occur once per year over a two-year period. This monitoring will be completed in conjunction with monitoring of vegetation survival and growth to ensure that the construction activity did not significantly impact the health of the trees. Each assessment will occur during the summer and will document percentage of

live canopy, as well as any other apparent structural or biological impacts. Canopy dieback of 50% or greater will be deemed significant and trigger a requirement for removal. At the end of the two-year monitoring period, a post-construction monitoring report will be prepared and submitted to the client and the City.

7.6.2 Vegetation Protection Zone

A naturally vegetated, normalized 10 m VPZ and an adjacent 2 m landscape buffer will be applied adjacent the dripline of the City woodlot. Within the 2 m landscape buffer, an infiltration trench is proposed to ensure that the first 5 mm of runoff is retained on-site and managed through infiltration. The overall City woodlot buffer zone (VPZ plus landscape buffer) will result in a net gain of 165 m^2 as compared to a standard 10 m VPZ (provided that the proposed infiltration gallery will be fully vegetated). Based on CVC's recommended minimum buffer width, it is expected that the proposed buffer zone will sufficiently protect the retained City woodlot.

The VPZ will be naturally vegetated/restored with native groundcover, shrub and tree plantings to appropriately protect the ecological sensitivity of the features. All proposed restoration plant materials (Seed Zone 33) will be derived from locally propagated plant materials, where available, that are suited to the local climate, soil types and soil moisture. Native thorny shrubs will be installed throughout the VPZ to deter public access to the retained community. Available technical reference guidelines (e.g., Society for Ecological Restoration publications) will be referenced regarding technical approaches to restoration.

Native tree, shrub and herbaceous species plantings, that reflect the composition of the existing woodland community, may be considered within the VPZ to establish robust woodland edge habitat and promote a self-sustaining vegetation community where natural vegetation is currently lacking. Deep rooting species tolerant of edge conditions and anthropogenic impacts (e.g., salt and drought) are preferred in buffer applications. The existing woodland community is dominated by Sugar Maple (*Acer saccharum*). Native species to be incorporated into the planting plan may include Sugar Maple, Northern Red Oak (*Quercus rubra*) and American Basswood (*Tilia americana*). Native thorny shrub species (e.g., North American Red Raspberry; *Rubus idaeus ssp. strigosus*) should be installed throughout the planting area to deter public access to the woodland.

Nodal tree plantings, in groupings of three to five (mixed species), are recommended to occur every 3 m on center. Where applicable, mulch and rodent guards may be applied to larger planted stock (i.e., deciduous trees) to prevent stem damage and desiccation. Nodal shrub plantings, in groupings of five to 10 (mixed species), should be planted at 1 m on center densities to promote species viability.

Recommended plantings are intended to help mitigate potential indirect impacts and to ensure that the integrity of the City woodlot is maintained. Plantings may also help to improve biodiversity and promote wildlife habitat opportunities within this feature. The final planting plan for the proposed VPZ will be prepared during the detailed design stage.

7.6.3 Tree Removals

The City of Mississauga regulates the removal of all trees greater than 15 cm DBH. Issuance of a Tree Permit/Permission (required prior to site alteration) will be subject to the review and acceptance of the Tree Management Plan (LGL Ltd. 2019). Under the *Forestry Act*, written consent must be obtained from neighbouring landowners as a condition of the permit application. Following tree removals, trees may be planted within the boundary between the two lands provided that consent of the owner of

the adjoining land is obtained.

The Arborist Report (LGL 2019) and Tree Management Plan (2019) documented a total of 152 trees proposed for removal by the Conceptual Site Plan (2019), while trees within the City woodlot were identified for preservation. Of the 17 species identified on the Subject Lands, planted species included White Spruce (*Pinus glauca*), Eastern White Cedar (*Thuja occidentalis*), Eastern Red Cedar, as well as a hedgerow dominated by Silver Maple and Red Ash (*Fraxinus pennsylvanica*). Ash species had been severely impacted by Emerald Ash Borer (*Agrilus planipennis*) with tree mortality considered imminent. No SAR were identified on, or adjacent to, the Subject Lands.

No Municipal tree removals are proposed by the Conceptual Site Plan (2019). Private tree removals (152) will be compensated at a 1:1 replication ratio for all trees in good condition between 15 cm DBH and 49 cm DBH, and coniferous hedgerows. Trees ≥50 cm DBH that are in good condition shall be compensated at a 2:1 compensation ratio. It is recommended that vegetation removals occur between November 2019 and March 2020 to minimize impacts to wildlife.

A total of 210 replacement trees are required for compensation of tree removals within the Subject Lands, as per the City of Mississauga tree replacement criteria. If adequate compensation for tree removals cannot be provided within the Subject Lands, monies or a letter of credit in a form satisfactory to the City of Mississauga may be required as compensation for the replacement of these trees on City lands and tree maintenance for a period of up to two years. LGL Ltd. has submitted a landscape plan detailing proposed planting areas as part of the draft plan of subdivision submission.

7.6.4 Locally Rare Vegetation Species

Locally rare or uncommon vegetation species in Peel Region and/or the CVC watershed were observed in association with wetland vegetation communities within the online farm ponds on the Subject Lands (i.e., Blunt Spike-rush and Northern Manna Grass). These features are proposed for removal by the Conceptual Site Plan (2019).

In order to mitigate impacts on locally rare and uncommon vegetation species, a vegetation salvage program will be implemented. Salvaged species (e.g., seed) will be planted within portions of the Lisgar Creek Corridor that will not be altered or lowered by the proposed restoration plan, subject to landowner permissions through coordination with the City. Opportunities for transplanting of individuals of locally rare and uncommon species will also be considered, where such transplants have potential for success (based on species and available habitat types) and where suitable transplant locations are available.

In addition, post-construction landscaping within the Lisgar Creek corridor will incorporate native seed and/or individuals of these locally rare and uncommon species, where such seed or planting stock are available from area nurseries.

Therefore, it is anticipated that the locally rare and uncommon species observed on the Subject Lands will be able to persist in the post-construction environment through salvage and/or planting of native stock.

7.7 Monitoring

A monitoring program will be developed following and refining the requirements defined by the Ninth Line SWS (Wood Environmental & Infrastructure Solutions 2018) and based on impact validation

indicators (e.g., reliable, cost-effective, accurate, efficient, etc.). The proposed monitoring program will ensure that protective mitigation strategies (i.e., normalized 10 m VPZ from significant woodland dripline) are effectively implemented.

A variety of construction and post-construction monitoring programs may be recommended to ensure that construction mitigation and post-construction enhancements have been installed and are functioning as designed and that no unanticipated impacts are occurring.

The Barn Swallow RHS must be maintained for a period of three years post habitat disturbance. Monitoring will begin in summer 2020 and be completed in summer 2022. Mattamy will complete the three-year monitoring program and associated reporting for MECP. A Barn Swallow Mitigation and Restoration Record will be prepared, as per conditions outlined under O. Reg 242/08 Section 23.5 Subsection 4. This record will be updated annually after monitoring each year. This record documents the contact information of the proponent (Mattamy), original nesting habitat, proposed development activity including start and end dates, and efforts taken to minimize the effects of the development activity on Barn Swallow. It also summarizes RHS monitoring efforts and results completed during each of the first three years following the disturbance of the original nesting habitat.

8.0 CONCLUSIONS AND RECOMMENDATIONS

This Scoped EIS was developed as part of the municipal planning process for the Southern Parcel of the Ninth Line Lands in Mississauga, Ontario. An assessment of the natural heritage features and their associated functions on, and adjacent to, the Subject Lands has been conducted and discussed in relation to the PPS (MMAH 2014), related guidance documents, and the regional and municipal Official Plans. The objectives of the Scoped EIS were to delineate the boundaries of significant natural features, provide an analysis of potential impacts to natural heritage features and associated ecological functions, and identify appropriate compensation measures (i.e., area and/or functional compensation).

Various natural heritage features were identified on and adjacent to the Subject Lands, including Natural Green Space wetland communities. Of these, significant woodlands, other wetlands, candidate bat maternity colonies, potential SAR bat habitat, candidate terrestrial crayfish habitat, candidate seeps and springs, and habitat for Species of Conservation Concern (i.e., Eastern Wood-Pewee and Wood Thrush) are associated with the offsite City woodlot. Due to the scoped nature of this EIS, the presence of natural heritage features on adjacent lands was not confirmed, however, indirect impacts to these features were considered.

Within the Subject Lands boundary, confirmed nesting habitat for Barn Swallow (listed as threatened in Ontario and Canada) was identified. Proposed Barn Swallow habitat removals will be registered through a NAF under the ESA (2007) for activities that may result in the damage, destruction or removal of habitat occupied by threatened or endangered species, as per the amended O. Reg. 242/08.

The development boundary of the proposed Concept Plan has been designed in a manner that minimizes indirect impacts to adjacent natural heritage features and their associated functions to the maximum extent possible through the application of an average 10 m VPZ, and 2 m landscape buffer and infiltration gallery (**Figure 6**, **Appendix A**). Direct impacts will be limited to the removal of 0.05 ha of low-functioning other (non-PSW) wetlands, two snag tree removals outside of candidate SWH, as well as the removal of Barn Swallow nesting habitat, which will be compensated through the erection of a RHS within 1 km of the original nesting site. Proposed Barn Swallow habitat removals will be registered through a NAF under the ESA (2007) for activities that may result in the damage, destruction or removal of habitat occupied by threatened or endangered species, as per the amended O. Reg. 242/08. Given the availability of woodland habitat in the vicinity of the Subject Lands (City woodlot), compensation for the removal of snag trees within hedgerow features is not required. Furthermore, compensation will not be provided for the removal of other wetlands given their limited hydrological connectivity within the watershed (i.e., drain to storm sewer), lack of important wildlife habitat and the anthropogenic origin of these features.

Indirect effects are discussed in the context of the adjacent significant woodland, recognizing the potential impacts of existing, anthropogenic land uses (i.e. residence, livestock, agriculture, parking area and veterinary clinic).

Under existing conditions, the anthropogenic vegetation adjacent to the woodland boundary (i.e., manicured lawn, pasture and agriculture) does not provide an effective minimum VPZ, as evidenced by the disturbed nature of the City woodlot (i.e., poor tree health, presence of invasive species). Furthermore, the anthropogenic vegetation communities and the edge habitat of the woodland provide limited support of confirmed and candidate natural heritage features and SWH. It is expected that impacts to the woodland will primarily result from indirect disturbance associated with vectors similar to those present on the existing residential and commercial lots adjacent to the Subject Lands. Potential impacts may be primarily mitigated through the implementation of a normalized 10 m VPZ,

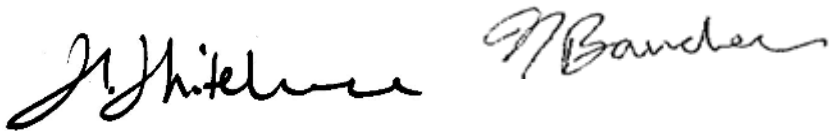
which will replace the existing hard fence line with a stratified vegetation community designed to provide robust protection to the City woodlot and its associated ecological functions. The proposed VPZ in conjunction with strategic mitigation techniques (including an additional 2 m landscape buffer) will aim to improve the resiliency and structural integrity of woodland habitat.

A construction and post-construction monitoring program is recommended to verify that mitigation is having the intended effects (e.g., erosion and sediment control measures during construction) and that ecological enhancements measures (e.g., native vegetation plantings within the VPZ) have established successfully.

Overall, the proposed development is not expected to have a negative impact on natural features and their ecological functions provided that appropriate mitigation and/or restoration strategies are implemented to maintain and enhance existing conditions.

Report Prepared by:

SAVANTA INC.
A GEI Company



Heather Whitehouse
Project Manager
1-800-810-3281 Ext 1040
hwhitehouse@savanta.ca

Noel Boucher
Project Director
1-800-810-3281 Ext 1250
nboucher@savanta.ca

REFERENCES AND BACKGROUND MATERIALS

Amec Foster Wheeler 2015. Ninth Line Lands Scoped Subwatershed Study Phase 1: Background Report Study Area Characterization. City of Mississauga. Region of Peel.

Amec Foster Wheeler 2017. Ninth Line Lands Scoped Subwatershed Study Phase 2: Impact Assessment and Management Strategy. City of Mississauga.

Bird Studies Canada (BSC) 2003. The Marsh Monitoring Program 1995-2004. A Decade of Marsh Monitoring in the Great Lakes Region. Available at: http://www.birdscanada.org/volunteer/glmmp/

BSC, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources 2006. Ontario Breeding Bird Atlas Database. Available online at http://www.birdsontario.org/atlas/aboutdata.jsp?lang=en.

Cadman, M.D., H.J. Dewar, and D.A. Welsh 1998. The Ontario Forest Bird Monitoring Program (1987-1997): Goals, methods and species trends observed. Technical Report Series No. 325, Canadian Wildlife Service.

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Courturier (eds.) 2007. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp.

Caverhill, B., Johnson, B., Phillips, J., & Nadeau, E. 2011. Blanding's Turtle (*Emydoidea landingii*) and Snapping Turtle (*Chelydra serpentina*) Habitat Use and Movement in the Oakland Swamp Wetland Complex, and Their Response to the Provincial Highway 24 Exclusion Fence and Aquatic Culvert Ecopassage. Toronto Zoo Adopt-a-Pond-Programme.

Chapman, L.J. and D.F. Putnam 1984. The physiography of southern Ontario, 3rd Edition. Ontario Geological Survey, Special Volume 2. Accompanied by Map P. 2715 (coloured), scale 1:600,000.

City of Mississauga 2011. Mississauga Official Plan. Office Consolidation 2019. Available online at http://www.mississauga.ca/portal/residents/mississaugaofficialplan

City of Mississauga 2016. Development Requirements: Section 2 – Design Requirements. Available online at
http://www.mississauga.ca/file/COM/TW%20Development%20Requirements%20Section%202.pdf

City of Mississauga 2019. Terms of Reference: Arborist Reports, Tree Inventory/Survey & Tree Preservation Plans. Available online at https://www7.mississauga.ca/documents/Business/Arborist_Report_Tree_Inventory__Tree_Preservation_Plans_-_Terms_of_Reference.pdf

City of Toronto 2007. Green Development Standard. Version 2.1. Available online: https://web.toronto.ca/wp-content/uploads/2017/08/8cd7-Bird-Friendly-Development-Guidelines.pdf

Credit Valley Conservation (CVC) 2002. Plants of the Credit River Watershed.

CVC 2009. Loyalist, Carolyn, Sawmill and Mullet Creek Subwatersheds. Available online at https://cvc.ca/wp-content/uploads/2012/06/Sub1234_Final-_20120604.pdf

CVC 2010. Watershed Planning and Regulation Policies. Available online at https://cvc.ca/wp-content/uploads/2011/01/004-CVC-WPR-Policies_APR-2010.pdf

Credit Valley Conservation and Toronto and Region Conservation Authority (CVC/TRCA) 2014. Evaluation, Classification and Management of Headwater Drainage Features Guidelines. January 2014. 26 pp.

Department of Fisheries and Oceans Canada (DFO) 2019a. Fish and Fish Habitat Protection Policy Statement, August 2019. 36 pp.

DFO 2019b. Fish and Fish Habitat Protection Program, August 2019. Request a Review of Your Project Near Water: Step 3. Check if Your Project Needs A Review. Available online at: http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/request-review-demande-d-examen-003-eng.html

DFO 2019c. Aquatic Species at Risk Distribution 2018, Open Maps Data Viewer. Available online at http://open.canada.ca/data/en/fgpv_vpgf/e0fabad5-9379-4077-87b9-5705f28c490b.

Gorenz, S. and L. Stanfield 2017. Ontario Stream Assessment Protocol Section 4: Module 11. Unconstrained Headwater Sampling. Added March 2017. Fisheries Policy Section. Ontario Ministry of Natural Resources. Peterborough, Ontario. 26 pp. + Appendix.

Government of Canada 1994. Migratory Birds Convention Act (MBCA). Amended December 2017. Available online: https://laws-lois.justice.gc.ca/eng/acts/m-7.01/

Government of Ontario 2007. *Endangered Species Act* (*ESA*). Consolidated 2019. Available online: https://www.ontario.ca/laws/statute/07e06

Greater Golden Horseshoe Area Conservations Authorities (GGHCA) 2006. Erosion and Sediment Control Guideline for Urban Construction.

Johnson, G. R. 1999. Protecting Trees from Construction Damage: A Homeowner's Guide. University of Minnesota Extension, Department of Forest Resources. https://www.extension.umn.edu/garden/yard-garden/trees-shrubs/protecting-trees-from-construction-damage/

Lee, H.T., Bakowsky, W.D., Riley, J., Bowles, J., Puddister, M., Uhlig, P. and S. McMurray 1998. Ecological land classification for Southwestern Ontario: first approximation and its application.

Lee, H. 2008. Southern Ontario Ecological Land Classification. Ontario Ministry of Natural Resources. London, ON.

LGL Limited (Ltd.) 2019. Tree Management Plan: 5150 Ninth Line. August 2019.

Matheny, N. and J.R. Clark. 1998. Trees and Development – A Technical Guide to Preservation of Trees During Land Development. International Society of Arboriculture, Champaign, IL 61826-3129. 184 p.

Ministry of Municipal Affairs and Housing (MMAH) 2014. Provincial Policy Statement. Ontario Ministry of Municipal Affairs and Housing. Toronto: Queens Printer for Ontario 37 pp.

Ministry of Natural Resources (MNR) 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section, Science Development and Transfer Branch, Southcentral Sciences Section. 151 pp.

MNR 2010. Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement.

MNR 2011. Bats and Bat Habitats: Guidelines for Wind Power Projects. Second Edition. Ontario. 24 pp.

Ministry of Natural Resources and Forestry (MNRF) 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. Available online at https://dr6j45jk9xcmk.cloudfront.net/documents/4776/schedule-7e-jan-2015-access-vers-final-s.pdf

MNRF April 2016. Creating Nesting Habitat for Barn Swallows. Available online at https://files.ontario.ca/creatingbarsnestinghabitatenfinal17mar09_0.pdf

MNRF 2016. Land Information Ontario (LIO). Available online:
https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home

MNRF 2017. Survey Protocols for Species at Risks Bats within Treed Habitats: Little Brown Myotis, Northern Myotis, and Tri-Coloured Bat.

MNRF 2019. Natural Heritage Information Centre database. Available online at https://www.ontario.ca/page/get-natural-heritage-information.

Natural Heritage Information Centre (NHIC) 2013. Provincial status of plants, wildlife and vegetation communities database. OMNR, Peterborough.

NHIC 2018. Element summary for plants, wildlife and vegetation communities. OMNR, Peterborough.

Newmaster, S.G., and S. Ragupathy. 2012. Flora Ontario – Integrated Botanical Information System (FOIBIS). Phase 1. University of Guelph. Canada. Available at: http://www.uoguelph.ca/foibis/

North-South Environmental Inc. (NSEI) 2012. Ninth Line Corridor Study. March 2012.

Oldham, M. J., Bakowsky, W. D. and D. A. Sutherland 1995. Floristic quality assessment for southern Ontario. Natural Heritage Information Centre, Peterborough. 68 pp.

Ontario Nature 2018. Ontario Reptile and Amphibian Atlas. Available online at https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/.

Region of Halton 2006. The Halton Region Official Plan. Office Consolidation 2018. Available online at http://72.38.83.2/cms/One06db.html?portalId=8310&pageId=115808

Region of Peel 2006. Region of Peel Official Plan. Office Consolidation December 2018. Available online at https://www.peelregion.ca/planning/officialplan/pdfs/ropdec18/ROPConsolidationDec2018_TextSchedules_Final_TEXT.pdf

Region of Peel 2009. Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study. Available online at https://www.peelregion.ca/planning/officialplan/pdfs/Peel-CaledonSW-SWH-Study-Report-Part4.pdf

Toronto Entomologists' Association 2018a. Ontario Butterfly Atlas Online. Available online at http://www.ontarioinsects.org/atlas/index.html.

Toronto Entomologists' Association 2018b. Ontario Moth Atlas Online. Available online at http://www.ontarioinsects.org/moth/.

Town of Milton 1997. Town of Milton Official Plan. Consolidated August 2008. Available online at https://www.milton.ca/en/build/resources/officialplan-text.pdf

Urbantech 2019. Functional Servicing and Stormwater Management Plan. Markham, ON,

Varga, S., editor. 2005. Distribution and status of the vascular plants of the Greater Toronto Area. Ontario Ministry of Natural Resources, Aurora District. 96 pp.

Wood Environment & Infrastructure Solutions 2018. Ninth Line Lands Scoped Subwatershed Study Phase 3: Implementation and Monitoring Plan. City of Mississauga.

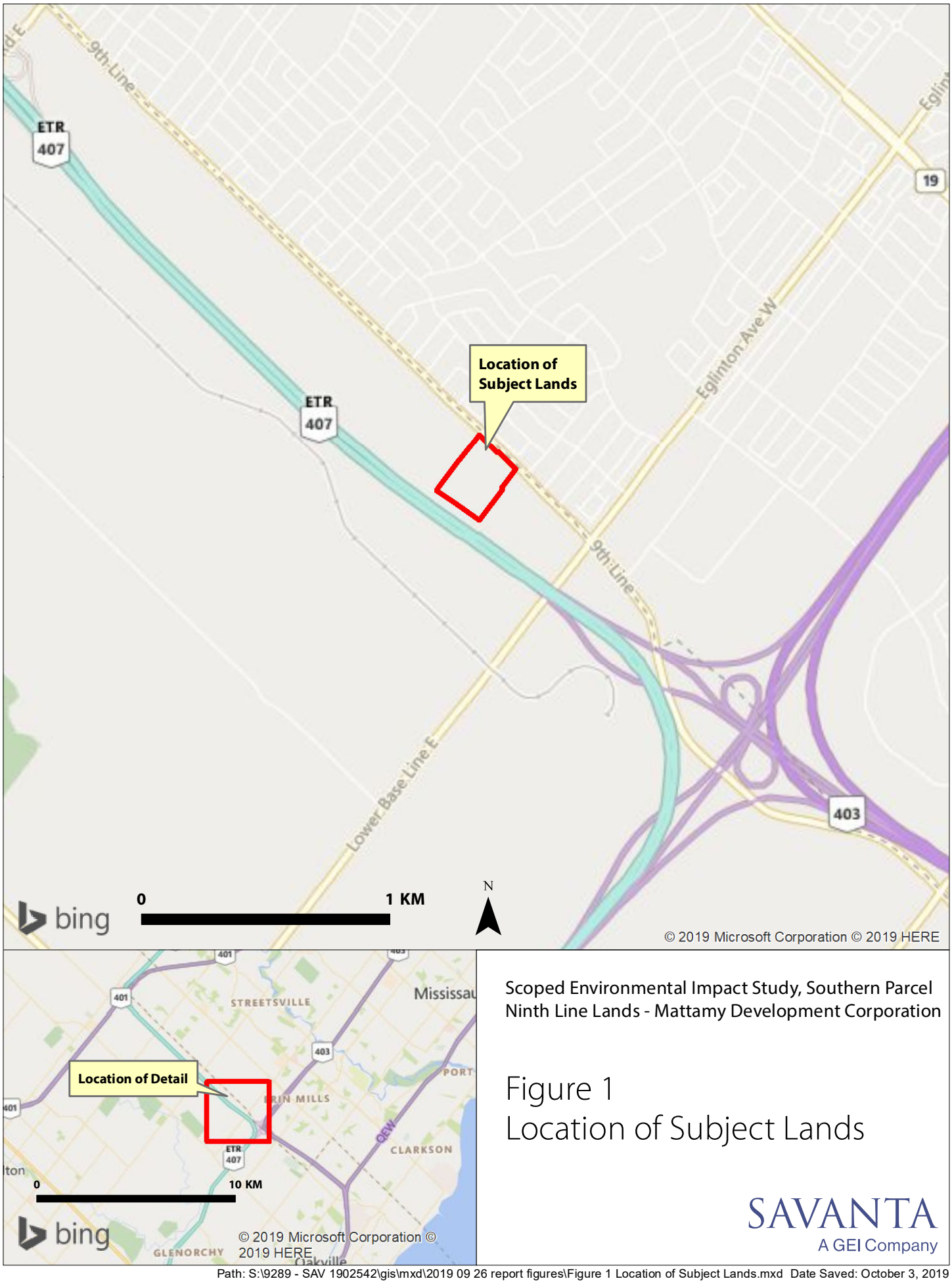
APPENDICES

Appendix A: Figures

Appendix B: Tables

Appendix C: Scoped EIS Terms of Reference (July 2019)

Appendix A – Figures

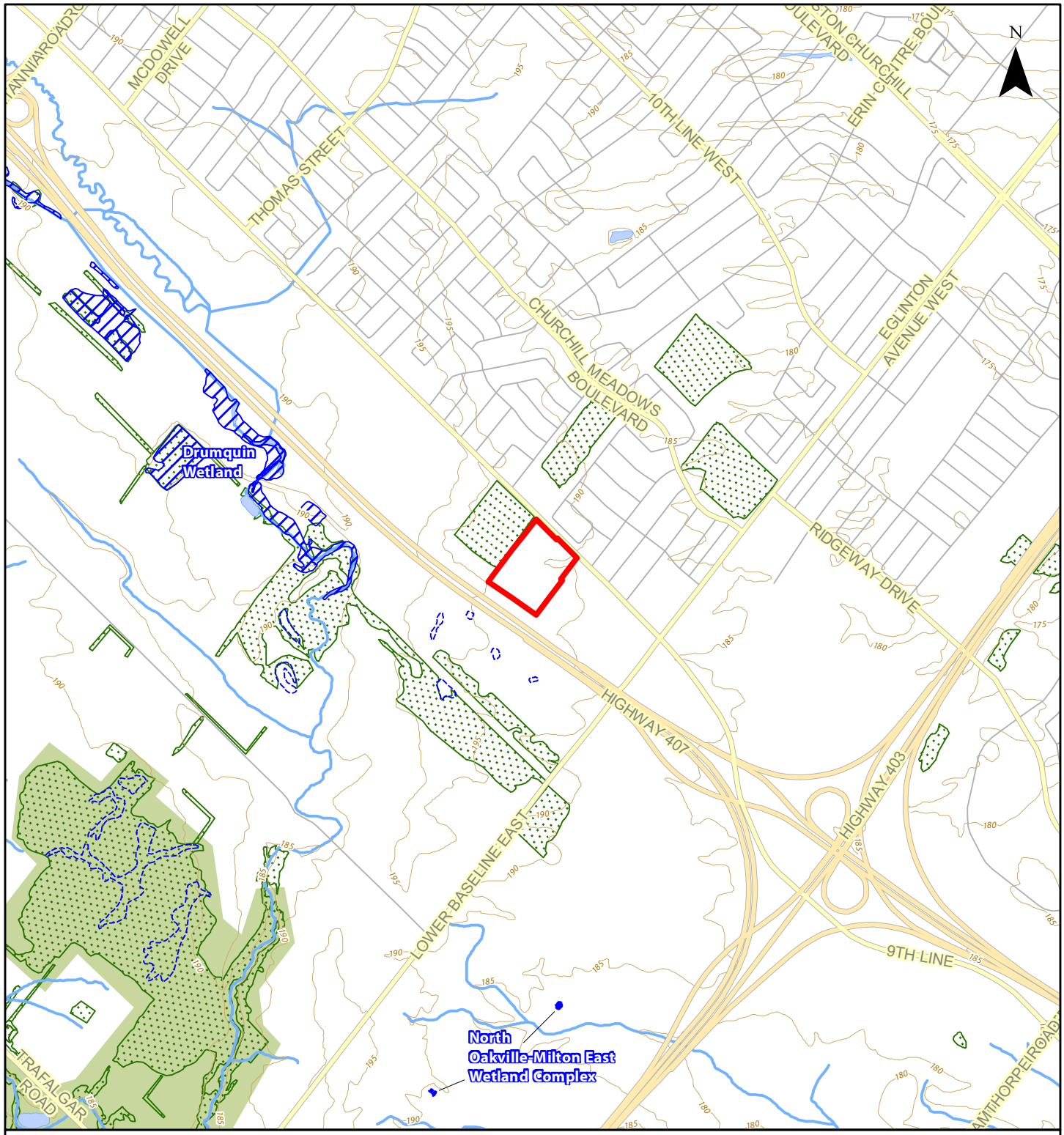


Scoped Environmental Impact Study, Southern Parcel
Ninth Line Lands - Mattamy Development Corporation

Figure 1
Location of Subject Lands

SAVANTA
A GEI Company

Path: S:\9289 - SAV 1902542\gis\mxd\2019 09 26 report figures\Figure 1 Location of Subject Lands.mxd Date Saved: October 3, 2019



Scoped Environmental Impact Study, Southern Parcel
Ninth Line Lands - Mattamy Development Corporation

Figure 2
Designated Natural Heritage Features

SAVANTA
A GEI Company

0 0.5 KM
1:20,000

- Subject Lands
- Waterbody (MNRF LIO)
- Watercourse (MNRF LIO)
- Woodland (MNRF LIO)
- Provincially Significant Wetland (MNRF)
- Wetland Evaluated-Other (MNRF)
- Wetland Not Evaluated per OWES (MNRF)
- Greenbelt Protected Countryside

Path: S:\9289 - SAV 1902542\gis\mxd\2019 09 26 report figures\Figure 2 Designated Natural Heritage Features.mxd REVISED: October 3, 2019

Scoped Environmental Impact Study, Southern Parcel
Ninth Line Lands - Mattamy Development Corporation

Figure 3
Ecological Land Classification

Subject Lands
Ecological Land Classification (Savanta 2019)
Ecological Land Classification (SWS; Amec Foster Wheeler 2015)

SAVANTA
A GEI Company

0 100 Meters
1:3,000

Path: S:\9289 - SAV 1902542\gis\mxd\2019 09 26 report figures\Figure 3 Ecological Land Classification.mxd REVISED: October 3, 2019

Scoped Environmental Impact Study, Southern Parcel
Ninth Line Lands - Mattamy Development Corporation

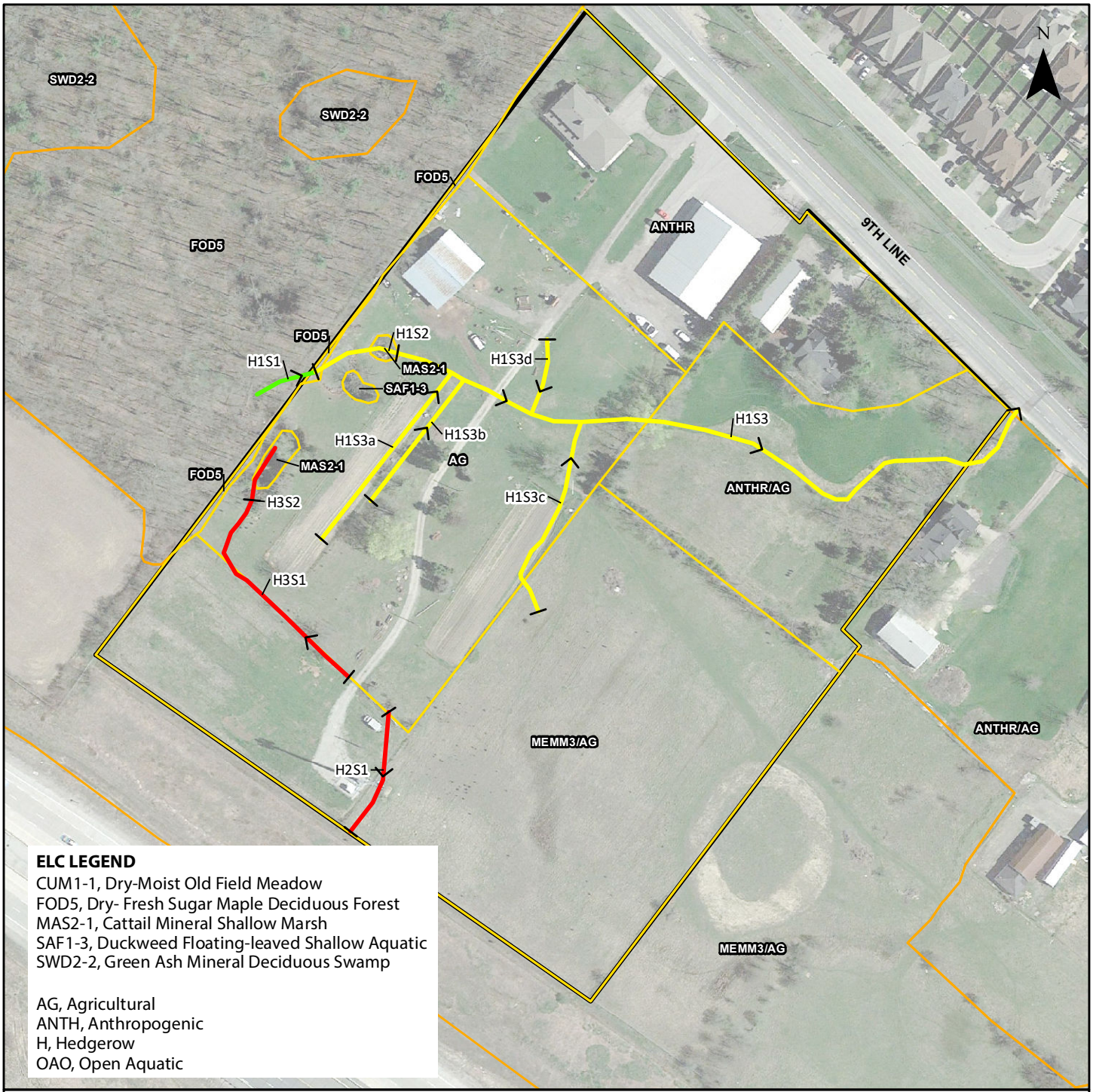
Figure 4
Ecological Monitoring Station Locations

- Subject Lands
- Ecological Land Classification (Savanta 2019)
- Ecological Land Classification (SWS; Amec Foster Wheeler 2015)
- Amphibian Call Count Survey Station
- Bat Habitat Assessment Polygon
- Bat Snags
- Breeding Bird Point Count Station
- Snake Visual Encounter Survey Area
- Turtle Basking Survey Station

SAVANTA
A GEI Company

0 50 Meters
1:3,000

Path: S:\9289 - SAV 1902542\gis\mxd\2019 09 26 report figures\Figure 4 Ecological Monitoring Station Locations.mxd REVISED: October 3, 2019



Scoped Environmental Impact Study, Southern Parcel
Ninth Line Lands - Mattamy Development Corporation

Figure 5
Headwater Drainage Features

Subject Lands
Ecological Land Classification (Savanta 2019)
Ecological Land Classification (SWS; Amec Foster Wheeler 2015)
Flow Direction

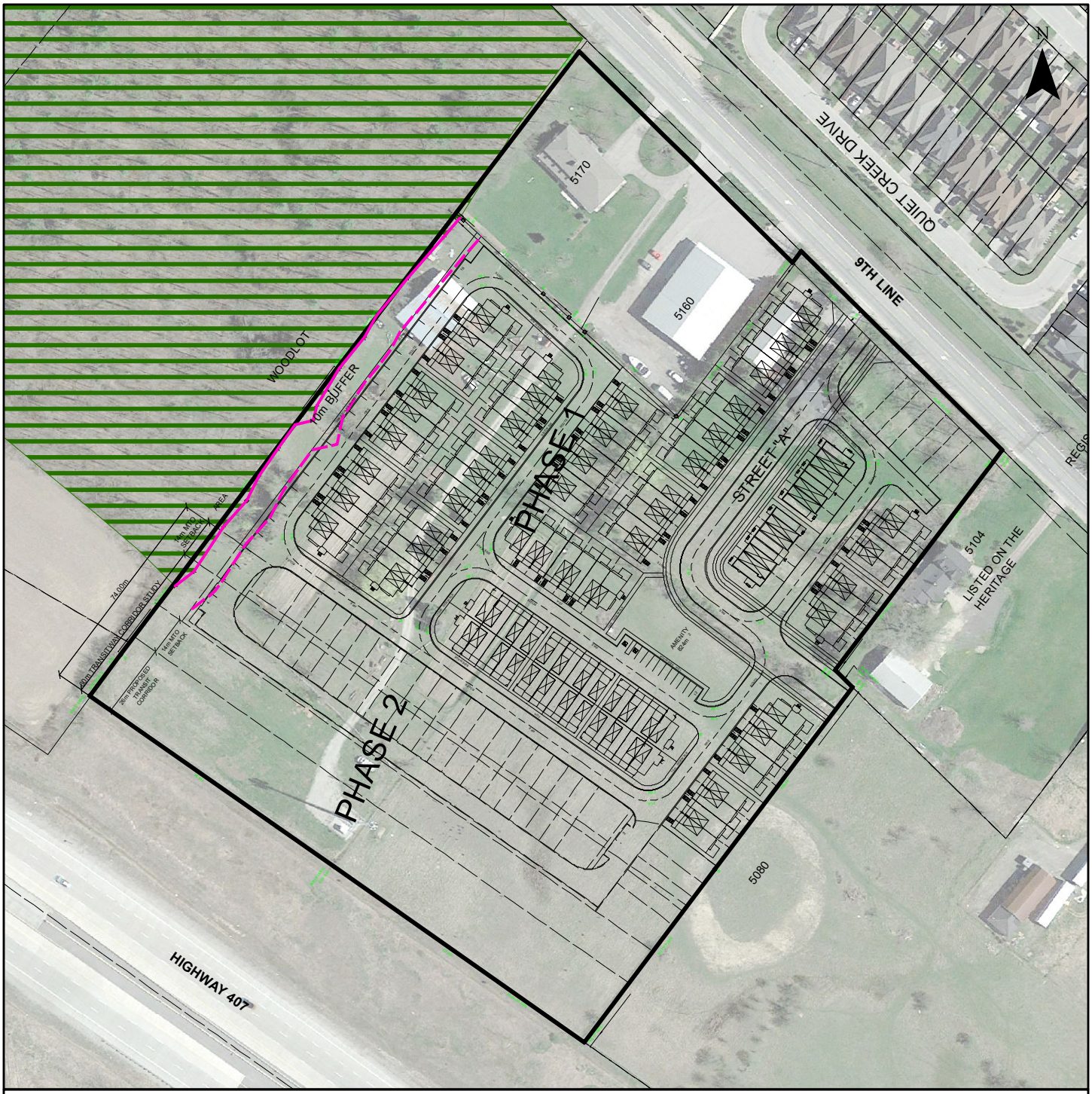
HDF Management Recommendation

Conservation
Mitigation
No Management Required

SAVANTA
A GEI Company

0 50 Meters
1:2,000

Path: S:\9289 - SAV 1902542\gis\mxd\2019 09 26 report figures\Figure 5 Headwater Drainage Features.mxd REVISED: October 3, 2019



Scoped Environmental Impact Study, Southern Parcel
Ninth Line Lands - Mattamy Development Corporation

Figure 6
Significant Natural Heritage Features and Proposed Site Plan

Concept Plan File: Concept Plan 7 - Ocotber 30 2019_ec.dwg

- Subject Lands
- Staked Dripline (August 7, 2019)
- Staked Dripline 10 m Buffer
- Significant Woodland

SAVANTA
A GEI Company

0 50 Meters

1:2,000

Path: S:\9289 - SAV 1902542\gis\mxd\2019 09 26 report figures\Figure 6 Significant NHF and Proposed Site Plan.mxd REVISED: October 31, 2019

Scoped Environmental Impact Study, Southern Parcel
Ninth Line Lands - Mattamy Development Corporation

Figure 7
Breeding Barn Swallow Habitat

Subject Lands

Breeding Barn Swallow Habitat

Breeding Barn Swallow Habitat 1 km Radius

Proposed Replacement Habitat Structure Location

SAVANTA
A GEI Company

0 100 Meters

Path: S:\9289 - SAV 1902542\gis\mxd\2019 09 19 BARS\2019 Breeding Barn Swallow Habitat.mxd REVISED: September 19, 2019

Appendix B – Tables

Table 1: Natural Heritage Information Centre (NHIC) Data

Common Name	Scientific Name	S-Rank	G-Rank	COSSARO	COSEWIC	Last Observed	Extirpated
Henslow's Sparrow	*Ammodramus henslowii*	SHB	G4	END	END	1932-07-11	N

Table 2: Ontario Breeding Bird Atlas (OBBA) Data

Common Name	Scientific Name	S-Rank	G-Rank	COSSARO	COSEWIC	Last Observed	Extirpated
Bank Swallow	*Riparia riparia*	S4B	G5	THR	THR		N
Barn Swallow	*Hirundo rustica*	S4B	G5	THR	THR		N
Bobolink	*Dolichonyx oryzivorus*	S4B	G5	THR	THR		N
Chimney Swift	*Chaetura pelagica*	S4B, S4N	G5	THR	THR		N
Eastern Meadowlark	*Sturnella magna*	S4B	G5	THR	THR		N
Common Nighthawk	*Chordeiles minor*	S4B	G5	SC	THR		N
Eastern Wood-Pewee	*Contopus virens*	S4B	G5	SC	SC		N
Peregrine Falcon	*Falco peregrinus*	S3B	G4	SC	SC		N
Wood Thrush	*Hylocichla mustelina*	S4B	G4	SC	THR		N

Note: A "Last Observed" date is not provided in the OBBA database search.

Table 3: Ontario Nature Reptile and Amphibian Atlas Data

Common Name	Scientific Name	S-Rank	G-Rank	COSSARO	COSEWIC	Last Observed	Extirpated
Blanding's Turtle	*Emydoidea blandingi*	S3	G4	THR	END	2015-07-21	N
Eastern Milksnake	*Lampropeltis triangulum*	S4	G5	NAR	SC	2018-05-27	N
Eastern Ribbonsnake	*Thamnophis sauritus*	S4	G5	SC	SC	1952-07-01	N
Jefferson Salamander	*Ambystoma jeffersonianum*	S2	G5	END	END	2004-05-16	N
Northern Map Turtle	*Graptemys geographica*	S3	G5	SC	SC	2015-07-27	N
Snapping Turtle	*Chelydra serpentina*	S3	G5	SC	SC	2018-06-04	N
Western Chorus Frog (Great Lakes / St. Lawrence - Canadian Shield population)	*Pseudacris triseriata*	S3	G5	NAR	THR	2012-03-21	N

Table 4: Ontario Butterfly and Moth Atlas Data

Common Name	Scientific Name	S-Rank	G-Rank	COSSARO	COSEWIC	Last Observed	Extirpated
Monarch	*Danaus plexippus*	S4B, S2N	G4	SC	END	2018-10-24	N
Giant Swallowtail	*Papilio cresphontes*	S4	G5			2016-08-07	N
Zebra Swallowtail	*Eurytides marcellus*	SNA	G5			1904-07-25	N

Table 5: Field Studies and Natural Inventories (2019)

FIELD DATE	NATURE OF INVESTIGATION	SUVERYOR(S)
April 25	Snake Visual Encounter Survey Round 1 Turtle Basking Survey Round 1 Amphibian Call Count Survey Round 1	M. Green, R. Lee
May 3	Headwater Drainage Feature Assessment Round 1 Bat Habitat Assessment	M. Green, A. McLaren
May 15	Amphibian Call Count Survey Round 2	M. Green, A. McLaren
May 24	Snake Visual Encounter Survey Round 2 Turtle Basking Survey Round 2	M. Green, R. Lee
June 11	Breeding Bird Survey Round 1	B. Charlton
June 12	Ecological Land Classification and Summer Botanical Inventory	C. Zoladeski
June 18	Amphibian Call Count Survey Round 3	M. Green, L. Williamson
June 19	Breeding Bird Survey Round 2	B. Charlton
June 19	Headwater Drainage Feature Assessment Round 2	M. Green, O. Park, A. McLaren
June 27	Ecological Land Classification and Summer Botanical Inventory	C. Zoladeski
July 31	Woodland Dripline Staking	M. Green, C. Zoladeski, Mattamy, J.D. Barnes
August 7	Woodland Dripline Staking	H. Whitehouse, M. Green, Mattamy, J.D. Barnes Ltd., CVC, City of Mississauga
August 20	Ecological Land Classification and Fall Botanical Inventory	C. Zoladeski
August 30	Headwater Drainage Feature Assessment Round 3	M. Green, O. Park

Table 6: Savanta Ecological Survey Personnel, Timing and Conditions (2019)

SURVEY ROUND	SURVEY TYPE	DATE (2019)	TIME		AIR TEMP (°C)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
			START	END					
1	Snake Visual Encounter Survey and Turtle Basking Survey	25-AP	14:28	15:29	12	50	89	2	None
1	Amphibian Call Count Survey	25-AP	22:41	22:56	7	72	100	1	None
1	Headwater Drainage Feature Assessment and Bat Habitat Assessment	03-MA	09:21	11:11	9	89	80	3	10 mm in last 12 hours
2	Amphibian Call Count Survey	15-MA	23:17	23:32	11	78	16	0	None
2	Snake Visual Encounter Survey and Turtle Basking Survey	24-MA	12:55	13:56	21	56	80	0	None
1	Breeding Bird Survey	11-JU	07:00	08:30	14	83	0	3	None
1	Ecological Land Classification and Summer Botanical Inventory	12-JU	09:00	15:00	20	51	85	4	None
3	Amphibian Call Count Survey	18-JU	23:07	23:20	17	61	18	0	None
2	Breeding Bird Survey	19-JU	09:53	10:30	21	76	40	2	None
2	Headwater Drainage Feature Assessment	19-JU	12:23	13:18	22	55	60	3	None
2	Ecological Land Classification and Summer Botanical Inventory	27-JU	09:00	15:00	27	43	15	3	None

Table 6: Savanta Ecological Survey Personnel, Timing and Conditions (2019)

SURVEY ROUND	SURVEY TYPE	DATE (2019)	TIME		AIR TEMP (°C)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
			START	END					
1	Woodland Dripline Staking	31-JL	09:00	10:35	20	70	30	2	None
2	Woodland Dripline Staking	07-AU	15:00	14:00	26	65	80	1	None
1	Ecological Land Classification and Fall Botanical Inventory	20-AU	09:00	15:00	25	69	80	2	None
3	Headwater Drainage Feature Assessment	30-AU	09:26	09:40	20	62	20	2	None

LEGEND:

BEAUFORT WIND SPEED SCALE	
1	Calm (<1 km/hr)
2	Light Air (1-5 km/hr)
3	Light Breeze (6-11 km/hr)
4	Gentle Breeze (12-19 km/hr)
5	Moderate Breeze (20-28 km/hr)

MONTH (CODE)	
JA	January
FB	February
MR	March
AP	April
MA	May
JU	June
JL	July
AU	August
SE	September
OC	October
NO	November
DE	December

Table 7: Ecological Land Classification

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK / G-RANK (NHIC 2013)
CULTURAL		
Graminoid Meadow		
MEMM3	• A regenerating community of native species and exotics. • The main species are Meadow Fescue (*Schenodorus pratensis*), Kentucky Bluegrass (*Poa pratensis*), Bird's-foot Trefoil (*Lotus corniculatus*), Red Clover (*Trifolium pratense*) and Timothy (*Phleum pratense*).	N/A
MARSH		
Shallow Marsh		
MAS2-1 Cattail Mineral Shallow Marsh	• Broad-leaved Cattail (*Typha latifolia*) forms narrow zones at edges of dug ponds. • Associates include Soft-stem Rush (*Schoenoplectus tabernaemontani*), Fox Sedge (*Carex vulpinoidea*), Northern Manna Grass (*Glyceria borealis*) and Northern Water-plantain (*Alisma triviale*).	S5
SHALLOW WATER		
SAF1-3 Duckweed Floating-leaved Shallow Aquatic	• Lesser Duckweed (*Lemna minor*) almost entirely covered the surface of the water. • Surrounded by a narrow ring of cattail at the edges of the pond.	S5

Latin Name	Latin Synonym	Common Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Peel	Local Staus CVC/Peel	Local Status Peel	Authority
										Varga 2005	CVC 2002		
Cupressaceae		**Cedar Family**											
Juniperus virginiana var. virginiana		Red Cedar	4	3		S5			G5T5	R5	L	L	L.
Thuja occidentalis		Eastern White Cedar	4	-3		S5			G5	X	X	X	L.
Pinaceae		**Pine Family**											
Picea glauca		White Spruce	6	3		S5			G5	R3	L	L	(Moench) Voss
Pinus strobus		Eastern White Pine	4	3		S5			G5	X	X	X	L.
Pinus sylvestris		Scots Pine		5	-3	SNA			GNA	X	I	I	L.
Aceraceae		**Maple Family**											
Acer saccharinum		Silver Maple	5	-3		S5			G5	X	X	X	L.
Daucus carota		Wild Carrot		5	-2	SNA			GNR	X	X	I	L.
Asclepiadaceae		**Milkweed Family**											
Asclepias syriaca		Common Milkweed	0	5		S5			G5	X	X	X	L.
Asteraceae		**Composite or Aster Family**											
Ambrosia artemisiifolia		Annual Ragweed	0	3		S5			G5	X	X	X	L.
Anthemis cotula		Mayweed		3	-1	SNA			G5	X	X	I	L.
Arctium minus		Common Burdock		5	-2	SNA			GNR	X	X	I	(Hill) Bernh.
Bidens frondosa		Devil's Beggaticks	3	-3		S5			G5	X	X	X	L.
Cirsium arvense		Canada Thistle		3	-1	SNA			GNR	X	X	I	(L.) Scop.
Cirsium vulgare		Bull Thistle		4	-1	SNA			GNR	X	X	I	(Savi) Ten.
Conyza canadensis	*Erigeron canadensis*	Horseweed	0	1		S5			G5	X	X	X	(L.) Cronquist
Erigeron annuus		Annual Fleabane				S5			G5	X	X		(L.) Pers.
Inula helenium		Elecampane Flower		5	-2	SNA			GNR	X	I	I	L.
Leucanthemum vulgare	*Chrysanthemum leucanthemum*	Oxeye Daisy		5	-1	SNA			GNR	X	X	I	L.
Solidago altissima		Tall Goldenrod	1	3		S5			G5	X	X	X	L.
Sonchus arvensis ssp. *arvensis*		Field Sow-thistle				SNA			GNRTNR	X	I	I	L.
Symphyotrichum lanceolatum var. lanceolatum	*Aster lanceolatus ssp. lanceolatus*	White Panicled Aster	3	-3		S5			G5T5	X	X	X	Willd.
Symphyotrichum lateriflorum	*Aster lateriflorus*	Starved Aster	3	-2		S5			G5	X	X	X	(L.) Britton
Symphyotrichum novae-angliae	*Aster novae-angliae*	New England Aster	2	-3		S5			G5	X	X	X	L.
Taraxacum officinale		Common Dandelion		3	-2	SNA			G5	X	I	I	G. Weber
Balsaminaceae		**Touch-me-not Family**											
Impatiens capensis		Spotted Jewelweed	4	-3		S5			G5	X	X	X	Meerb.
Boraginaceae		**Borage Family**											
Myosotis laxa		Small Forget-me-not	6	-5		S5			G5	X	X	X	Lehm.
Brassicaceae		**Mustard Family**											
Barbarea vulgaris		Yellow Rocket		0	-1	SNA			GNR	X	X	I	R. Br.
Caprifoliaceae		**Honeysuckle Family**											
Lonicera maackii		Amur Honeysuckle		5	-2	SNA			GNR				(Rupr.) Maxim.
Caryophyllaceae		**Pink Family**											
Arenaria serpyllifolia		Thyme-leaf Sandwort		0	-2	SNA			GNR	X	X	X	L.

Latin Name	Latin Synonym	Common Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Peel Varga 2005	Local Staus CVC/Peel CVC 2002	Local Status Peel	Authority
Dianthus armeria		Deptford-pink		5	-1	SNA			GNR	X	X	I	L.
Stellaria graminea		Little Starwort		5	-2	SNA			GNR	X	I	I	L.
Convolvulaceae		**Morning-glory Family**											
Convolvulus arvensis		Field Bindweed		5	-1	SNA			GNR	X	X	I	L.
Fabaceae		**Pea Family**											
Lotus corniculatus		Bird's-foot Trefoil		1	-2	SNA			GNR	X	I	I	L.
Medicago lupulina		Black Medic		1	-1	SNA			GNR	X	I	I	L.
Securigera varia	*Coronilla varia*	Common Crown-vetch		5	-2	SNA			GNR	X	X	I	L.
Trifolium hybridum		Alsike Clover		1	-1	SNA			GNR	X	I	I	L.
Trifolium pratense		Red Clover		2	-2	SNA			GNR	X	I	I	L.
Trifolium repens		White Clover		2	-1	SNA			GNR	X	I	I	L.
Vicia cracca		Tufted Vetch		5	-1	SNA			GNR	X	I	I	L.
Fagaceae		**Beech Family**											
Quercus rubra		Northern Red Oak	6	3		S5			G5	X	X	X	L.
Juglandaceae		**Walnut Family**											
Juglans nigra		Black Walnut	5	3		S4?			G5	X	X	X	L.
Lamiaceae		**Mint Family**											
Glechoma hederacea		Ground Ivy		5	-2	SNA			GNR	X	I	I	L.
Lycopus americanus		American Bugleweed	4	-5		S5			G5	X	X	X	Muhlenb. ex Bartram
Mentha arvensis		Corn Mint	3	-3		S5			G5	X	X	X	L.
Nepeta cataria		Catnip		1	-2	SNA			GNR	X	I	I	L.
Prunella vulgaris ssp. *vulgaris*		Self-heal		0	-1	SNA			G5TU	X			L.
Lythraceae		**Loosestrife Family**											
Lythrum salicaria		Purple Loosestrife		-5	-3	SNA			G5	X	I	I	L.
Malvaceae		**Mallow Family**											
Malva neglecta		Dwarf Cheeseweed		5	-1	SNA			GNR	X	I	I	Wallr.
Moraceae		**Mulberry Family**											
Morus alba		White Mulberry		0	-3	SNA			GNR	X	I	I	L.
Oleaceae		**Olive Family**											
Fraxinus pennsylvanica		Red Ash	3	-3		S5			G5	X	X	X	Marshall
Oxalidaceae		**Wood Sorrel Family**											
Oxalis stricta		Upright Yellow Wood-sorrel	0	3		S5			G5	X	X	X	L.
Papaveraceae		**Poppy Family**											
Chelidonium majus		Greater Celandine		5	-3	SNA			GNR	X	X	I	L.
Plantaginaceae		**Plantain Family**											
Plantago lanceolata		English Plantain		0	-1	SNA			G5	X	I	I	L.
Plantago major		Common Plantain		-1	-1	SNA			G5	X	I	I	L.

Latin Name	Latin Synonym	Common Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Peel	Local Staus CVC/Peel	Local Status Peel	Authority
										Varga 2005	CVC 2002		
Polygonaceae		**Smartweed Family**											
Rumex crispus		Curly Dock		-1	-2	SNA			GNR	X	I	I	L.
Ranunculaceae		**Buttercup Family**											
Ranunculus acris		Tall Buttercup			-2	SNA			G5	X	I	I	L.
Rhamnaceae		**Buckthorn Family**											
Rhamnus cathartica		Common Buckthorn		3	-3	SNA			GNR	X	I	I	L.
Rosaceae		**Rose Family**											
Crataegus species		Hawthorn species											
Fragaria virginiana		Virginia Strawberry	2	1		S5			G5	X	X	X	Miller
Geum aleppicum		Yellow Avens	2	-1		S5			G5	X	X	X	Jacq.
Potentilla norvegica ssp. *norvegica*	*Potentilla norvegica*	Norwegian Cinquefoil				S5			G5	X	I	I	L.
Potentilla recta		Sulphur Cinquefoil		5	-2	SNA			GNR	X	I	I	L.
Rubus allegheniensis		Alleghany Blackberry	2	2		S5			G5	X	X	X	Porter
Rubus idaeus ssp. *strigosus*	*Rubus idaeus* ssp. *melanolasius*	Red Raspberry	0	-2		S5			G5T5	X	X	X	L.
Rubiaceae		**Madder Family**											
Galium mollugo		White Bedstraw		5	-2	SNA			GNR	X		I	L.
Salicaceae		**Willow Family**											
Salix x rubens		Reddish Willow		-4	-3	SNA			GNA	XSR			Schrank
Scrophulariaceae		**Figwort Family**											
Verbascum thapsus		Common Mullein		5	-2	SNA			GNR	X	I	I	L.
Veronica serpyllifolia	*Veronica serpyllifolia ssp. Serpyllifolia*	Thyme-leaved Speedwell	0	-3		SNA			G5TNR	X	I	I	L.
Solanaceae		**Nightshade Family**											
Solanum dulcamara		Climbing Nightshade		0	-2	SNA			GNR	X	I	I	L.
Tiliaceae		**Linden Family**											
Tilia americana		American Basswood	4	3		S5			G5	X	X	X	L.
Ulmaceae		**Elm Family**											
Ulmus americana		White Elm	3	-2		S5			G5	X	X	X	L.
Vitaceae		**Grape Family**											
Vitis riparia		Riverbank Grape	0	-2		S5			G5	X	X	X	Michx.
Alismataceae		**Water-plantain Family**											
Alisma triviale	*Alisma plantago-aquatica*	Northern Water-plantain	3	-5		S5			G5	X	X	X	Pursh
Cyperaceae		**Sedge Family**											
Carex cristatella		Crested Sedge	3	-4		S5			G5	X	X	X	Britton
Carex spicata		Spiked Sedge		5	-1	SNA			GNR	X	X	X	Hudson

Latin Name	Latin Synonym	Common Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Provincial Status S-Rank	OMNR Status	COSEWIC Status	Global Status G-Rank	Local Status Peel	Local Staus CVC/Peel	Local Status Peel	Authority
										Varga 2005	CVC 2002		
Carex vulpinoidea		Fox Sedge	3	-5		S5			G5	X	X	X	Michx.
Eleocharis obtusa		Blunt Spike-rush	5	-5		S5			G5	U	X	X	(Willd.) Schult.
Schoenoplectus tabernaemontani	*Scirpus validus*	American Great Bulrush	5	-5		S5			G5	X	X	X	L.
Juncaceae		**Rush Family**											
Juncus dudleyi		Dudley's Rush	1	0		S5			G5	X	X	X	Wiegelb
Juncus effusus var. effusus	*Juncus effusus* var. *solutus, Juncus effusus*	Soft Rush	4	-5		SNA			GNR	X	X	X	L.
Lemnaceae		**Duckweed Family**											
Lemna minor		Lesser Duckweed	2	-5		S5			G5	X	X	X	L.
Poaceae		**Grass Family**											
Agrostis gigantea		Redtop		0	-2	SNA			G4G5	X	I	I	Roth
Agrostis stolonifera		Redtop		-3		S5			G5	X	X	X	L.
Alopecurus geniculatus		Marsh Foxtail		-5	-1	SNA			GU	X	I	I	L.
Bromus tectorum		Downy Chess		5	-2	SNA			GNR	X	I	I	L.
Dactylis glomerata		Orchard Grass		3	-1	SNA			GNR	X	I	I	L.
Elymus repens		Quack Grass		3	-3	SNA			GNR	X	I	I	(L.) Gould
Festuca rubra ssp. *rubra*		Red Fescue		1	-1	SNA			G5T5	X	X	X	L.
Glyceria borealis		Northern Manna Grass	8	-5		S5			G5	R4	RL	RL	(Nash) Batch.
Glyceria grandis		Tall Mannagrass	5	-5		S5			G5	X	X	X	S. Watson
Phalaris arundinacea var. arundinacea	*Phalaris arundinacea*	Reed Canary Grass	0	-4		S5			GNR	X	X	X	L.
Phleum pratense		Timothy		3	-1	SNA			GNR	X	I	I	L.
Poa pratensis ssp. pratensis		Kentucky Bluegrass	0	1		SNA			G5T5	X	X	X	L.
Schedonorus pratensis	*Festuca pratensis, Loliur*	Meadow Fescue		4	-1	SNA			G5	X	I	I	Hudson
Typhaceae		**Cattail Family**											
Typha latifolia		Broad-leaved Cattail	3	-5		S5			G5	X	X	X	L.
Typha x glauca		Glaucous Cattail	3	-5		SNA			GNA	X	X	X	Godron
STATISTICS													
Species Richness													
Total Number of Species:		95											
Native Species:		42	44%										
Exotic Species:		53	56%										
S1-S3 Species:		0	0%										
S4 Species:		1	2%										
S5 Species:		41	98%										
Floristic Quality Indices													
Mean Co-efficient of Conservatism (CC)		2.9											
CC 0 - 3 = lowest sensitivity		27	66%										
CC 4 - 6 = moderate sensitivity		15	37%										
CC 7 - 8 = high sensitivity		1	2%										
CC 9 - 10 = highest sensitivity		0	0%										
Floristic Quality Index (FQI)		19											
Weedy and Invasive Species													
Mean Weediness Index:		-1.7											

-1 = low potential invasiveness		21	44%										
-2 = moderate potential invasiveness		20	42%										
-3 = high potential invasivenss		7	15%										
Wetland Species													
Mean Wetness Index		0.5											
upland		20	22%										
facultative upland		21	24%										
facultative		19	21%										
facultative wetland		17	19%										
obligate wetland		14	16%										

COMMON NAME	SCIENTIFIC NAME	Provincial Status (S RANK)	Global Status (G RANK)	COSSARO (MNRF)	COSEWIC (Federal)	Local Status Halton	SWH Indicator Species 7E
ODONATA							
Common Green Darner	*Anax junius*	S5	G5				
BUTTERFLIES							
Monarch	*Danaus plexippus*	S4B, S2N	G4	SC	END		X
AMPHIBIANS							
Gray Treefrog	*Hyla versicolor*	S5	G5				X
Northern Green Frog	*Lithobates clamitans*	S5	G5				X
Northern Leopard Frog	*Lithobates pipiens*	S5	G5		NAR		X
BIRDS							
Mallard	*Anas platyrhynchos*	S5	G5				X
Rock Pigeon	*Columba livia*	SNA	G5				
Mourning Dove	*Zenaida macroura*	S5	G5				
Great Blue Heron	*Ardea herodias*	S4	G5				X
Turkey Vulture	*Cathartes aura*	S5B	G5				
Cooper's Hawk	*Accipiter cooperii*	S4	G5			HU	X
Downy Woodpecker	*Picoides pubescens*	S5	G5				
Northern Flicker	*Colaptes auratus*	S4B	G5				
Eastern Wood-Pewee	*Contopus virens*	S4B	G5	SC	SC		
Eastern Kingbird	*Tyrannus tyrannus*	S4B	G5				
Warbling Vireo	*Vireo gilvus*	S5B	G5				
Red-eyed Vireo	*Vireo olivaceus*	S5B	G5				
Tree Swallow	*Tachycineta bicolor*	S4B	G5				
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	S4B	G5			HU	X
Barn Swallow	*Hirundo rustica*	S4B	G5	THR	THR		
Black-capped Chickadee	*Poecile atricapillus*	S5	G5				
American Robin	*Turdus migratorius*	S5B	G5				
European Starling	*Sturnus vulgaris*	SNA	G5				
Cedar Waxwing	*Bombycilla cedrorum*	S5B	G5				
House Finch	*Carpodacus mexicanus*	SNA	G5				
American Goldfinch	*Spinus tristis*	S5B	G5				
Savannah Sparrow	*Passerculus sandwichensis*	S4B	G5				X
Song Sparrow	*Melospiza melodia*	S5B	G5				
Red-winged Blackbird	*Agelaius phoeniceus*	S4	G5				

COMMON NAME	SCIENTIFIC NAME	Provincial Status (S RANK)	Global Status (G RANK)	COSSARO (MNRF)	COSEWIC (Federal)	Local Status Halton	SWH Indicator Species 7E
Common Grackle	*Quiscalus quiscula*	S5B	G5				
Baltimore Oriole	*Icterus galbula*	S4B	G5				
MAMMALS							
Eastern Cottontail	*Sylvilagus floridanus*	S5	G5				
Eastern Chipmunk	*Tamias striatus*	S5	G5				

SUMMARY

Total Odonata:	*1*
Total Butterflies:	*1*
Total Other Arthropods	*0*
Total Amphibians:	*3*
Total Reptiles:	*0*
Total Birds:	*26*
Total Breeding Birds:	*19*
Total Mammals:	*2*

SIGNIFICANT SPECIES

Global:	*0*
National:	*3*
Provincial:	*0*
Regional:	*3*
Local:	*2*

Explanation of Status and Acronymns

COSSARO: Committee on the Status of Species at Risk in Ontario
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)
S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer),
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S5: Secure—Common, widespread, and abundant in the province
SX: Presumed extirpated
SH: Possibly Extirpated (Historical)
SNR: Unranked

SU: Unrankable—Currently unrankable due to lack of information
SNA: Not applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species
S#B- Breeding status rank
S#N- Non Breeding status rank
?: Indicates uncertainty in the assigned rank
G1: Extremely rare globally; usually fewer than 5 occurrences in the overall range
G1G2: Extremely rare to very rare globally
G2: Very rare globally; usually between 5-10 occurrences in the overall range
G2G3: Very rare to uncommon globally
G3: Rare to uncommon globally; usually between 20-100 occurrences
G3G4: Rare to common globally
G4: Common globally; usually more than 100 occurrences in the overall range
G4G5: Common to very common globally
G5: Very common globally; demonstrably secure
GU: Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.
T: Denotes that the rank applies to a subspecies or variety
Q: Denotes that the taxonomic status of the species, subspecies, or variety is questionable.
END: Endangered
THR: Threatened
SC: Special Concern
NAR: Not At Risk
IND: Indeterminant, insufficient information to assign status
DD: Data Deficient
6: Rare in Site Region 6
7: Rare in Site Region 7
Area: Minimum patch size for area-sensitive species (ha)
H- highly significant in Hamilton Region (i.e. rare)
m- moderately significant in Hamilton Region (i.e. uncommon)
L1- extremely rare locally (Toronto Region)
L2- very rare locally (Toronto Region)
L3- rare to uncommon locally (Toronto Region)
HR- rare in Halton Region, highly significant
HU- uncommon in Halton Region, moderately significant

REFERENCES

COSSARO Status

Endangered Species Act, 2007 (Bill 184). Species at Risk in Ontario List (O. Reg. 230/08). Accessed October 7, 2016.

COSEWIC Status

COSEWIC. 2016. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada.

Local Status

Dwyer, Jill K. 2003. Nature Counts Project Hamilton Natural Areas Inventory 2003. Species Checklists. Hamilton Naturalists Club.

Halton Natural Areas Inventory. 2006. Volume 2 Species Checklists (ISBN 0-9732488-7-4).

Region of Waterloo. 1996. Regionally Significant Breeding Birds.

Toronto and Region Conservation Authority (TRCA). 2016. Revised Fauna Scores and Ranks, February 2016

Hamilton Conservation Authority (HCA). 2014. Hamilton Natural Areas Inventory Project (3rd Edition).

Significant Wildlife Habitat (SWH) Indicator Species

Ministry of Natural Resources and Forestry (MNRF). 2015. Significant wildlife habitat criteria schedules for ecoregion 6E. Available at: https://dr6j45jk9xcmk.cloudfront.net/documents/4775/schedule-6e-jan-2015-access-ver-final-s.pdf.

Ministry of Natural Resources and Forestry (MNRF). 2015. Significant wildlife habitat criteria schedules for ecoregion 7E. Available at: https://dr6j45jk9xcmk.cloudfront.net/documents/4776/schedule-7e-jan-2015-access-vers-final-s.pdf.

Natural Heritage Information Center (NHIC). 2016. Onatrio Species List: All Species.

Table 10: Bat Habitat Assessment Survey Results (2019)

AREA IDENTIFICATION	COMMUNITY TYPE	SEARCH AREA SIZE (ha)	# OF CAVITY TREES OBSERVED	# OF CAVITY TREES / HECTARE
Polygon 1	ANTHR/AG	2.44	2	8.20
Polygon 2	FOD5	0.17	3	17.65

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence		Round 1 PC 1	Incidental Round 1	Off Site Round 1	Round 2 PC 1	Off Site Round 2
									Date:	11-Jun-19	11-Jun-19	11-Jun-19	19-Jun-19	19-Jun-19
									Time:	0732-0742	0700-0830	0700-0830	0953-1003	0953-1003
Columbiformes														
Columbidae														
Rock Pigeon	ROPI	*Columba livia*	SNA	G5				PO-H		4			1	
Mourning Dove	MODO	*Zenaida macroura*	S5	G5				PO-S		2			2	
Pelecaniformes														
Ardeidae														
Great Blue Heron	GBHE	*Ardea herodias*	S4	G5			X	OB-X		1				
Accipitriformes														
Accipitridae														
Cooper's Hawk	COHA	*Accipiter cooperii*	S4	G5			X	PO-H		1	1			
Piciformes														
Picidae														
Downy Woodpecker	DOWO	*Picoides pubescens*	S5	G5				PO-H					1	
Falconiformes														
Passeriformes														
Tyrannidae														
Eastern Wood-Pewee	EAWP	*Contopus virens*	S4B	G5	SC	SC	X	PO-S				1		1
Eastern Kingbird	EAKI	*Tyrannus tyrannus*	S4B	G5				PO-H		1				
Vireonidae														
Warbling Vireo	WAVI	*Vireo gilvus*	S5B	G5				PR-T		2			1	
Red-eyed Vireo	REVI	*Vireo olivaceus*	S5B	G5				PO-S				1		1
Hirundinidae														
Northern Rough-winged Swallow	NRWS	*Stelgidopteryx serripennis*	S4B	G5			X	OB-X		2				
Barn Swallow	BARS	*Hirundo rustica*	S4B	G5	THR	THR		OB-X		10	7		8	
Paridae														
Black-capped Chickadee	BCCH	*Poecile atricapillus*	S5	G5				PO-H			1			
Turdidae														
American Robin	AMRO	*Turdus migratorius*	S5B	G5				CO-CF		5	2		3	
Sturnidae														
European Starling	EUST	*Sturnus vulgaris*	SNA	G5				PO-H		9	2		9	
Bombycillidae														
Cedar Waxwing	CEDW	*Bombycilla cedrorum*	S5B	G5				PR-P		2	2			
Fringillidae														
House Finch	HOFI	*Carpodacus mexicanus*	SNA	G5				CO-FY		8			1	
American Goldfinch	AMGO	*Spinus tristis*	S5B	G5				PR-T		2			1	
Emberizidae														
Savannah Sparrow	SAVS	*Passerculus sandwichensis*	S4B	G5			X	CO-CF		4			3	

Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence		Round 1 PC 1	Incidental Round 1	Off Site Round 1	Round 2 PC 1	Off Site Round 2
									Date:	11-Jun-19	11-Jun-19	11-Jun-19	19-Jun-19	19-Jun-19
									Time:	0732-0742	0700-0830	0700-0830	0953-1003	0953-1003
Song Sparrow	SOSP	*Melospiza melodia*	S5B	G5				CO-CF		4	1		3	
Icteridae														
Red-winged Blackbird	RWBL	*Agelaius phoeniceus*	S4	G5				PR-T		3			1	
Common Grackle	COGR	*Quiscalus quiscula*	S5B	G5				CO-CF		7			1	
Baltimore Oriole	BAOR	*Icterus galbula*	S4B	G5				PR-P		3	1		1	

Species Common Name and Scientific Name: Consistent with the American Ornithologists' Union. 2016. 57th Check-list Supplement of North American Birds. Accessed November 30, 2016. Available online: http://americanornithology.org/content/aou-checklist-north-and-middle-american-birds-7th-edition-and-supplements/

Species Code: Consistent with the American Ornithologists' Union. 2016. Species 4-Letter-Codes. Accessed May 25, 2012. Available online: www.birdsontario.org/atlas/codes.jsp?lang=en&pg=species/

Highest Breeding Evidence: Codes assigned for breeding evidence are consistent with the Ontario Breeding Bird Atlas (OBBA). 2012. Breeding Evidence Codes. Accessed January 25, 2014. Available online: http://www.birdsontario.org/dataentry/codes.jsp?page=breeding/. Several different types of breeding evidence are often recorded for any given species over the course of surveys - this table reports only the highest level of breeding evidence

S ranks: Provincial ranks are from the Natural Heritage Information Centre; S1 (critically imperiled), S2 (imperlied), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list October 2013

G ranks: Global ranks are from the Natural Heritage Information Centre; G1 (extremely rare), G2 (very rare), G3 (rare to uncommon), G4 (common), G5 (very common); ranks were updated using NHIC species list October 2013

COSSARO (MNRF): Ontario Species at Risk as listed by the Committee on the Status of Species at Risk in Ontario (from NHIC Table October 2013 and updates posted on Ontario Regulation 230/08 Species at Risk in Ontario website as of September 19, 2016: https://www.ontario.ca/laws/regulation/080230/); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk

COSEWIC: Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from COSEWIC September 19, 2016: http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm/); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk

SWH Indicator Species: SWH refers to Significant Wildlife Habitat as defined by the MNRF (2015) Significant Wildlife Habitat Criteria Schedules for Ecoregions 7E and 6E (as appropriate for the Subject Lands). SWH indicator species are identified in this table and any potential SWH is discussed in the text of this report.

Table 12: Snake Survey Results

DATE (2019)	SURVEY ROUND	TRANSECT OR STATION NUMBER	SPECIES CODE														
			NOSN	EAGA	MISN	BRSN	RBSN	NWSN	RISN	BLRA	BUGA	FOSN	HOSN	MASS	RNSN	SGSN	QUSN
25-AP	1	AS11	X														
25-AP	1	AS12	X														
24-MA	2	AS11	X														
24-MA	2	AS12	X														

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOSN	No Snakes	No snakes despite survey effort
EAGA	Eastern Gartersnake	*Thamnophis sirtalis sirtalis*
MISN	Eastern Milksnake	*Lampropeltis triangulum*
BRSN	DeKay's Brownsnake	*Storeria dekayi*
RBSN	Northern Red-bellied Snake	*Storeria occipitomaculata occipitomaculata*
NWSN	Northern Watersnake	*Nerodia sipedon sipedon*
RASN	Gray Ratsnake	*Pantherophis spiloides*
RISN	Eastern Ribbonsnake	*Thamnophis sauritus*
BLRA	Blue Racer	*Coluber constrictor foxii*
BUGA	Butler's Gartersnake	*Thamnophis butleri*
FOSN	Eastern Foxsnake	*Pantherophis gloyd*
HOSN	Eastern Hog-nosed Snake	*Heterodon platirhinos*
MASS	Massassauga	*Sistrusus catenatus catenatus*
RNSN	Ring-necked Snake	*Diadophis punctatus*
SGSN	Smooth Greensnake	*Opheodrys vernalis*
QUSN	Queensnake	*Regina septemvittata*

DATE	
MONTH	CODE
January	JA
February	FE
March	MR
April	AP
May	MA
June	JN
July	JL
August	AU
September	SE
October	OC
November	NO
December	DE

Table 13: Turtle Basking Survey Results

DATE (2019)	SURVEY ROUND	TRANSECT OR STATION NUMBER	SPECIES CODE								
			NOTU	MPTU	SNTU	MATU	BLTU	SSTU	WOTU	STIN	SPTU
25-AP	1	TBS6	X								
25-AP	1	TBS7	X								
25-AP	1	TBS8	X								
24-MA	2	TBS6	X								
24-MA	2	TBS7	X								
24-MA	2	TBS8	X								

- No suitable nesting sites were observed.
- No nesting evidence (i.e., test digs, claw marks, predated nests) was observed on site.

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOTU	No Turtles	No turtles despite survey effort
MPTU	Midland Painted Turtle	*Chrysemys picta marginata*
SNTU	Snapping Turtle	*Chelydra serpentina*
MATU	Northern Map Turtle	*Graptemys geographica*
BLTU	Blanding's Turtle	*Emydoidea blandingii*
SSTU	Spiny Soft-shelled Turtle	*Apalone spinifera*
WOTU	Wood Turtle	*Glyptemys insculpta*
STIN	Stinkpot Turtle	*Stemotherus odoratus*
SPTU	Spotted Turtle	*Clemmys guttata*

DATE	
MONTH	CODE
January	JA
February	FE
March	MR
April	AP
May	MA
June	JN
July	JL
August	AU
September	SE
October	OC
November	NO
December	DE

Table 14: Amphibian Call Count Survey Station Results (2019)

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Y/N	DEPTH (CM)
1	AMC13	X												N/A	
2	AMC13				1(8)									N/A	
3	AMC13				1(1)									N/A	
1	AMC14	X												Y	40
2	AMC14	X												Y	50
3	AMC14										1(5)			Y	60
1	AMC15	X												Y	40
2	AMC15	X												Y	50
3	AMC15										1(3)			Y	70
1	AMC16	X												Y	40
2	AMC16	X												Y	50
3	AMC16				2(5)						1(4)			Y	60

Note: For each species, the first number is the call code and the second number, which is in brackets, is the number of individuals of that species heard calling.

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOAM	No Amphibians	No amphibians despite survey effort
AMTO	American Toad	*Anaxyrus americanus*
FOTO	Fowlers Toad	*Anaxyrus fowleri*
GRTR	Gray Tree Frog	*Hyla versicolor*
CHFR	Chorus Frog	*Pseudacris triseriata*
WOFR	Wood Frog	*Lithobates sylvatica*
NLRF	Northern Leopard Frog	*Lithobates pipiens*
PIFR	Pickerel Frog	*Lithobates palustris*
GRFR	Green Frog	*Lithobates clamitans*
BULL	Bullfrog	*Lithobates catesbeiana*
MIFR	Mink Frog	*Lithobates septentrionalis*

CALL CODES	
X	No amphibians heard
1	Calls can be counted without error
2	Calls overlap but can be reliably estimated
3	Calls overlap too much to estimate number

Table 15: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES (CVC AND TRCA 2014)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
H1S1	FT – 1 FC – 5 (Round 1) FC – 2 (Round 2) FC – 1 (Round 3) **Valued** - Natural defined channel was flowing within the woodland during first round assessment under spate conditions and was holding water during second round survey, but was dry during the summer (third round) survey.	None	**Important** – Forest	**Contributing** – No direct fish habitat present and no fish observed. Overall HDF (H1) ultimately flows into the storm sewer system.	**Limited** – Defined channel provides limited habitat functions.	**Conservation** – Recommendation results from important riparian habitat.	**Conservation** – Woodlands occur off-site on lands owned by the City of Mississauga and will be protected with a 10 m buffer through the planning process. The reach will be maintained and directed into an infiltration gallery.
H1S2	FT – 9 FC – 4 (Round 1) FC – 2 (Round 2) FC – 2 (Round 3) **Valued** - Online pond with flow at the pond outlet during first round assessment and holding water during second and third round surveys.	Artificial farm ponds modify drainage within and downstream from this reach.	**Important** – Forest (located within 30 m of the farm ponds).	**Important** – Non-native Goldfish observed in ponds in the spring, likely present throughout the year. Fish were likely stocked into the ponds.	**Limited** – Although amphibians were observed within the feature, the pond does not provide suitable breeding habitat given the presence of predatory fish species. The pond is not identified as a wetland and no terrestrial habitat is present	**Protection** – Recommendation based on important fish habitat (fish species present in summer).	**Mitigation** – The presence of non-native fish species that have likely been artificially stocked within the feature does not constitute valued fish habitat. Outside of the spring freshet and large precipitation events, the online ponds function primarily as isolated pools with no downstream connection and do not provide direct fish habitat.

Table 15: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES (CVC AND TRCA 2014)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
					downstream that would function as a stepping-stone in conjunction with this pond.		This feature should be considered to be contributing fish habitat. In the absence of Valued Fish Habitat, the management recommendation for this reach would be Conservation. However, given that the ponds are of cultural origin, small and isolated, that the dominant vegetation type in the riparian zone is anthropogenic (i.e., pasture and agriculture), and that the wetlands do not provide a hydraulic function within the watershed (i.e., drain to storm sewer) the final management recommendation for this reach is Mitigation. This is an appropriate management recommendation to maintain associated spring flow conveyance functions (i.e., woodland drainage), but permit removal of the reach itself. The

Table 15: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES (CVC AND TRCA 2014)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
							hydrological function of the reach will be mitigated through the proposed SWM plan on the Subject Lands.
H1S3	FT – 7 FC – 5 (Round 1) FC – 2 (Round 2) FC – 1 (Round 3) **Contributing** – Swale was flowing during first round assessment under spate conditions and was holding water during second round surveys. The feature was dry during the third round assessment and no sediment sorting was observed.	Flow supplied by drainage from agricultural farm ponds.	**Contributing** – Lawn	**Contributing** – No direct fish habitat.	**Limited** – Swale does not provide a terrestrial connection to downstream features (forest or wetland). No amphibian habitat present.	**Protection** – Given that the upstream reach has an HDFA Guideline recommendation of Protection, this downstream reach cannot receive a lower management recommendation. However, when the upstream reach is not considered, the HDFA Guideline management recommendation for this reach, based on reach-specific values, would be Mitigation, on the basis of early spring hydrological conveyance functions.	**Mitigation** – Given that the final management recommendation for the upstream reach is Mitigation, this has been applied to this reach as well. This is an appropriate management recommendation to maintain spring flow conveyance functions (i.e., woodland drainage), but permit removal of the reach itself. The hydrological function of the reach will be mitigated through the proposed SWM plan on the Subject Lands.
H1S3a	FT – 7 FC – 4 (Round 1) FC – 1 (Round 2) FC – 1 (Round 3)	Adjacent agricultural land use results in	**Contributing** – Lawn	**Contributing** – No direct fish habitat.	**Limited** – Swale does not provide a terrestrial connection to	**Mitigation**	**Mitigation** – This recommendation is appropriate since stormwater from the

Table 15: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES (CVC AND TRCA 2014)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	Contributing – Swale was flowing during first round assessment under spate conditions and was dry during second and third round assessments.	altered runoff patterns.			downstream features (forest or wetland). No amphibian habitat present.		Subject Lands ultimately discharges to the natural environment. However, given that stormwater from this particular feature eventually enters the downstream storm sewer network under existing conditions, the only Mitigation for this feature is the eventual conveyance of stormwater from the developed Subject Lands into a SWM pond. No open channel conveyance system is considered necessary to mitigate any particular functions.
H1S3b	FT – 7 FC – 4 (Round 1) FC – 1 (Round 2) FC – 1 (Round 3) **Contributing** – Swale was flowing during first round assessment under spate conditions and was dry during second and third round assessments.	Adjacent agricultural land use results in altered runoff patterns.	**Contributing** – Lawn	**Contributing** – No direct fish habitat,	**Limited** – Swale does not provide a terrestrial connection to downstream features (forest or wetland). No amphibian habitat present.	**Mitigation**	**Mitigation** – See discussion provided for H1S3a.

Table 15: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES (CVC AND TRCA 2014)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
H1S3c	FT – 7 FC – 5 (Round 1) FC – 1 (Round 2) FC – 1 (Round 3) **Contributing** – swale was flowing during first round assessment under spate conditions and was dry during second and third round assessments.	Adjacent agricultural land use results in altered runoff patterns.	**Valued** – Meadow and cropped land.	**Contributing** – No direct fish habitat.	**Limited** – Swale does not provide a terrestrial connection to downstream features (forest or wetland). No amphibian habitat present.	**Mitigation**	**Mitigation -** See discussion provided for H1S3a.
H1S3d	FT – 7 FC – 4 (Round 1) FC – 1 (Round 2) FC – 1 (Round 3) **Contributing** – swale was flowing during first round assessments under spate conditions and was dry during second and third round assessments.	None	**Contributing** – Lawn	**Contributing** – No direct fish habitat	**Limited** – swale does not provide a terrestrial connection to downstream features (forest or wetland). No amphibian habitat present.	**Mitigation**	**Mitigation -** see discussion provided for H1S3a
H2S1	FT – 7 FC – 2 (Round 1) FC – 1 (Round 2) FC – 1 (Round 3)	None	**Contributing** – Lawn	**Contributing** – No direct fish habitat.	**Limited** – Feature flows through agricultural field. No amphibian habitat present.	**No Management Required**	**No Management Required** – Feature can be removed with no long-term ecological or biophysical impact.

Table 15: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES (CVC AND TRCA 2014)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	Limited – Swale was holding standing water during first round assessment under spate conditions and was dry during second and third round assessments. Feature discharges to ditch along Highway 407.						
H3S1	FT – 7 FC – 4 (Round 1) FC – 1 (Round 2) FC – 1 (Round 3) **Contributing** – Swale was flowing during first round assessment under spate conditions and was dry during second and third round assessments.	Access path constrains flow to the northwest. Flows to the southeast are captured by H2S1.	**Contributing** – Lawn	**Contributing** – No direct fish habitat.	**Limited** – Feature flows through lawn/pasture and does not provide a terrestrial connection to downstream features (forest or wetland).	**Mitigation** – On the basis of downstream flow contributions during early spring period.	**No Management Required** – Flow from this feature was ultimately entering an online, artificially constructed farm pond (H3S2), which was only overflowing into the adjacent woodland due to very high flow conditions (i.e., 10 mm of precipitation within 12-hours of the first round assessment). Under, normal spring conditions, this feature appears to only flow into the farm pond, with no outflow and therefore, no headwater drainage functions. Therefore, no management is considered appropriate,

Table 15: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES (CVC AND TRCA 2014)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
							since the downstream woodland does not rely on drainage from this feature to maintain woodland form or function. Ultimately, drainage from the sub-catchment of this reach will be directed to a SWM Pond and then back to the natural environment.
H3S2	FT – 9 FC – 4 (Round 1) FC – 2 (Round 2) FC – 2 (Round 3) **Valued** – Pond was discharging via spillage to adjacent woodland during round 1 assessment (spate conditions) due to the high water level in the pond. The pond was holding standing water with no outflow or inflow observed during second and third round surveys.	None	**Important** – Forest located within 30 m of the reach.	**Contributing** – No fish observed in pond.	**Limited** – Feature functions as an online farm pond. Evidence of amphibian breeding was observed, but feature is not considered to be a wetland and levels of breeding do not meet Significant Wildlife Habitat criteria. Feature does not provide stepping-stone habitat, nor any corridor function. Therefore, based on Table 7 in the HDFA Guideline (CVC and TRCA 2014), online pond	**Conservation** – On the basis of Valued hydrology (early spring discharge) and Important Riparian Habitat (forest) within 30 m of the reach.	**No Management Required** – Flow from this feature was only overflowing into the adjacent woodland due to very high flow conditions (i.e., 10 mm of precipitation within 12-hours of the first round assessment). Under, normal spring conditions, this feature appears to be a sink for upstream flow with no headwater drainage functions supporting any downstream areas. No management is considered appropriate, since the downstream woodland does not appear to rely on drainage from this feature to maintain woodland form or function. Cathchment

Table 15: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES (CVC AND TRCA 2014)	FINAL MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
					has limited terrestrial functions.		mapping from UrbanTech will be reviewed to confirm the catchment area of the woodland and that this feature does not support any contributing functions. Ultimately, drainage from the sub-catchment of this reach will be directed to a SWM Pond and then back to the natural environment. Although the feature was noted as providing some amphibian breeding habitat, it does not meet Significant Wildlife Habitat criteria, and as such, does not meet any other criteria for significance that would preclude removal of the feature.

LEGEND:

FT	Feature Types (1-defined natural channel, 2-channelized, 3-multi-thread, 4-no defined feature, 5-tiled drainage, 6-wetland, 7-swale, 8-roadside ditch, 9-online pond outlet)
FC	Flow Conditions (1-no surface water, 2-standing water, 3-interstitial flow, 4-surface flow minimal, 5-surface flow substantial)

Note: Codes correspond with Ontario Stream Assessment Protocol (OSAP) guidelines

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
1. SEASONAL CONCENTRATION AREAS					
Waterfowl Stopover and Staging Areas (terrestrial)	Yes – CUM1 vegetation communities are present on the Subject Lands	No – No evidence of sheet water during spring surveys	No	N/A	Not Present
Waterfowl Stopover and Staging Areas (aquatic)	Yes – SWD2 vegetation communities present within 120 m of the Subject Lands	No – These isolated features are predominately ephemeral with small pockets persisting throughout the year. They are small and would not attract or support significant numbers of waterfowl	No	N/A	Not Present
Shorebird Migratory Stopover Areas	No – Eligible vegetation communities are absent from the Subject Lands	No	No	N/A	Not Present
Raptor Wintering Areas	Yes – FOD and CUM vegetation communities are present on, and adjacent to, the Subject Lands.	No – Minimum size criteria (>20 ha) are not met	No	N/A	Not Present

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Bat Hibernacula	No – Eligible vegetation communities are absent from the Subject Lands	No	No	N/A	Not Present
Bat Maternity Colonies	Yes – FOD vegetation communities are present within 120 m of the Subject Lands.	Yes – Based on an assessment from the property line, it was determined that the woodland contains snag trees at sufficient density to meet habitat criteria	No – All candidate habitat under this SWH type is located outside of the proposed development area (i.e., City of Mississauga lands)	N/A	Candidate Habitat Present in Adjacent City Woodlot
Turtle Wintering Areas	Yes – OA vegetation communities present on the Subject Lands	Yes – OA feature hydroperiod would support suitable overwintering conditions (i.e., ice-free conditions in winter, deep muck layer)	Yes – Targeted ecological investigations were conducted in 2019	Two rounds of turtle basking surveys were completed by Savanta in 2019. No turtle species or evidence of turtle nesting were observed and no suitable nesting substrate was found throughout the Subject Lands	Not Present

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Reptile Hibernacula	Yes – Ecosites are present on the Subject Lands	Yes – Small mammal burrows, potentially suitable for overwintering conditions, may be present along treed edges of the northwestern property boundary; no rock outcrop features were identified on the Subject Lands	Yes – Targeted ecological investigations were conducted in 2019	Two rounds of visual encounter surveys were completed by Savanta in 2019. No snake species were observed	Not Present
Colonial Bird Nesting Sites (bank/cliff)	No – While meadow vegetation communities are present on the Subject Lands, no eroding sandy slopes or cliff faces are present	No	No	N/A	Not Present
Colonial Bird Nesting Sites (tree/shrubs)	Yes – SWD2 vegetation communities are present within 120 m of the Subject Lands	No – SWD2-2 communities are not large enough to provide suitable colonization area for	No	N/A	Not Present

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
		local bird populations			
Colonial Bird Nesting Sites (ground)	No – No rocky islands or peninsulas are present on the Subject Lands Brewer's Blackbird is not known in southwestern Ontario, therefore it is not addressed as a potential occurrence	No	No	N/A	Not Present
Migratory Butterfly Stopover Areas	Yes – FOD and CUM vegetation communities are present on the Subject Lands	No – Subject Lands are greater than 5 km from Lake Erie and Lake Ontario	No	N/A	Not Present
Migratory Landbird Stopover Areas	Yes – FOD and SWD vegetation communities are present on the Subject Lands	No – Subject Lands are greater than 5 km from Lake Erie and Lake Ontario	No	N/A	Not Present
Deer Winter Congregation Areas	No – MNRF has not identified the Subject Lands as having deer winter congregation areas	No	No	N/A	Not Present

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
2. RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITAT FOR WILDLIFE					
2a. Rare Vegetation Communities					
Rare Vegetation Types (cliffs, talus slopes, sand barrens, alvars, old-growth forests, savannahs, and tallgrass prairies)	No – Eligible vegetation communities are absent from the Subject Lands	No	No	N/A	Not Present
Other Rare Vegetation Types (S1 to S3 communities)	No – Eligible vegetation communities are absent from the Subject Lands	No	No	N/A	Not Present
2b. Specialized Wildlife Habitat					
Waterfowl Nesting Area	Yes – SWD2 vegetation communities are present within 120 m of the Subject Lands	No – Wetlands do not meet criteria (i.e., cluster of 3 or more wetlands <0.5 ha) (>120 m wide).	No	N/A	Not Present
Bald Eagle and Osprey Habitats	Yes – FOD and SWD vegetation communities are present within 120 m of the Subject Lands	No – Ponds found adjacent the Subject Lands are not large enough to support	No	N/A	Not Present

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
		these species and their life cycles. Therefore, habitat criteria is not met			
Woodland Raptor Nesting Habitat	Yes – FOD and SWD vegetation communities are present within 120 m of the Subject Lands	No – Minimum size criteria (>30 ha with >4 ha interior habitat) were not met	No	N/A	Not Present
Turtle Nesting Areas	No – Eligible vegetation communities are absent from the Subject Lands	No	No	N/A	Not Present
Seeps and Springs	Yes – Forested vegetation communities are present on the Subject Lands	Yes – Forested vegetation communities on the Subject Lands are associated with headwater drainage features	No – All candidate habitat under this SWH type is located outside of the proposed development area (i.e., City of Mississauga lands)	N/A	Candidate Habitat Present in Adjacent City Woodlot

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Woodland Amphibian Breeding Habitats (within or < 120m from woodland)	Yes – FOD and SWD vegetation communities are present within 120 m of the Subject Lands	Yes – Presence of wetland communities within FOD community. Online ponds do not candidate habitat criteria	Yes – Targeted ecological investigations were conducted in 2019	Three rounds of amphibian call count surveys were completed on the Subject Lands. Abundance criteria were not met (**Table 14**, **Appendix B**)	Not Present
Wetland Amphibian Breeding Habitats (wetland >120m from woodland)	No – Wetland vegetation communities do not occur >120 m from woodland ecosites on the Subject Lands	No	No	N/A	Not Present
Woodland Area-Sensitive Bird Breeding Habitat	Yes – SWD and FOD vegetation communities present within 120 m of the Subject Lands	No – Minimum size criteria (>30 ha) are not met	No	N/A	Not Present
3. SPECIES OF CONSERVATION CONCERN					
Marsh Bird Breeding Habitat	Yes – SW and CUM1 vegetation communities preferred by Green Heron are present on, and	Yes – all wetlands that contain shallow water and emergent aquatic vegetation	Yea	Two rounds of breeding bird surveys were completed on the Subject Lands. Abundance criteria for marsh bird	Not Present

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
	adjacent to, the Subject Lands	should be considered		species were not met (**Table 11**, **Appendix B**)	
Open Country Bird Breeding Habitat	Yes – CUM1 vegetation community is present on the Subject Lands	No – Minimum size criteria (>30 ha) are not met	No	N/A	Not Present
Shrub/Early Successional Bird Breeding Habitat	No – Eligible vegetation communities are absent from the Subject Lands	No	No	N/A	Not Present
Terrestrial Crayfish	Yes – MAS vegetation communities present on the Subject Lands. SWD vegetation communities present within 120 m of the Subject Lands	Yes – No minimum size requirement	Yes	No evidence of terrestrial crayfish chimneys was identified on the Subject Lands. Terrestrial crayfish habitat may occur on adjacent lands, however, these features were not evaluated due to limited property access and the scoped nature of this EIS.	Candidate
3a. Special Concern and Rare Wildlife Species					
(i) Eastern Wood-Pewee (*Contopus virens*)	N/A	Yes – Forested vegetation community present	Yes	One individual was heard calling during the round 1 and round 2 breeding bird surveys.	Confirmed Habitat Present in Adjacent City Woodlot

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
		within 120 m of the Subject Lands		Suitable breeding habitat for Eastern Wood-Pewee was recorded off-site within the City woodland. This species inhabits lowland mature forest in riparian areas, including cultural woodland. The habitat found adjacent to the Subject Lands meets defining habitat criteria and has the potential to support breeding habitat	
(ii) Wood Thrush (*Hylocichla mustelina*)	N/A	Yes – Mature deciduous forest community present within 120 m of the Subject Lands	Yes	A territorial male Wood Thrush was documented within suitable breeding habitat during surveys conducted in 2014 as part of the Phase 1 SWS (Amec Foster Wheeler 2015). This species was not detected during two rounds of breeding bird surveys conducted in 2019, however this may	Confirmed Habitat Present in Adjacent City Woodlot

Table 16a: Significant Wildlife Habitat Assessment (7E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
				be attributed to the limited range of these surveys.	
(iii)Monarch (*Danaus plexippus*)	N/A	No – Although CUM and FOD communities are present, the Subject Lands are highly disturbed by livestock and agricultural land uses, and therefore do not satisfy candidate SWH criteria.	No	N/A	Not Present
4. ANIMAL MOVEMENT CORRIDORS					
Amphibian Movement Corridors	N/A	No – No amphibian breeding SWH types present on the Subject Lands, therefore, no SWH present.	No	N/A	Not Present

Table 16b: Significant Wildlife Habitat Review (Peel ROP Peel-Caledon Significant Wildlife Habitat Study 2009; MNRF Ecoregional Criteria for 7E 2015)

SWH Type	SWH Analysis based on the most recent year of Savanta Inc. data
Seasonal Concentrations of Animals	
A1. Deer Wintering Area	**None detected.**
A2. Colonial Bird Nesting Sites	**Barn Swallow detected.** Two intact Barn Swallow nests with evidence of use in 2019 were observed within a barn structure on the Subject Lands. Recommended thresholds for Barn Swallow (3 nests/pairs) were not met, and lands or infrastructure permanently transformed for human services (i.e., buildings) are excluded from candidate habitat areas.
A3. Waterfowl Nesting Habitat	**None detected.** None of the indicator species listed were observed on the Subject Lands.
A4i. Migratory Landbird Stopover Areas	**Not applicable.** Subject Lands occur greater than 5 km from the Lake Ontario shoreline.
A4ii. Migratory Bat Stopover Areas	**Not applicable.** This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
A4iii. Migratory Butterfly Stopover Areas	**Not applicable.** Subject Lands occur greater than 5 km from the Lake Ontario shoreline.
A4iv. Migratory Waterfowl Stopover and/or Staging (Terrestrial)	**None detected.** No evidence of flooded fields were identified during spring headwater drainage feature investigations in 2019. No aggregations of indicator species were observed on, or in the vicinity of, the Subject Lands.
A4v. Migratory Waterfowl Stopover and/or Staging (Aquatic)	**None detected.** No aquatic habitat was identified that is considered suitable to support large numbers of migratory waterfowl. Furthermore, there are no records of migratory stopover areas on the Subject Lands.
A4vi. Migratory Shorebird Stopover Areas	**None detected.** No suitable areas for shorebird migratory stopover areas were identified on the Subject Lands.
A5. Raptor Wintering Areas	**None detected.** Open field habitat and abandoned agricultural fields on and in the vicinity of the Subject Lands, do not meet minimum size criteria (>20 ha). Furthermore, indicator species were not observed in sufficient numbers to warrant SWH.

Table 16b: Significant Wildlife Habitat Review (Peel ROP Peel-Caledon Significant Wildlife Habitat Study 2009; MNRF Ecoregional Criteria for 7E 2015)

SWH Type	SWH Analysis based on the most recent year of Savanta Inc. data
A6. Snake Hibernacula	**None detected.** None of the indicator species listed were observed on the Subject Lands.
A7. Bat Maternal Roosts and Hibernacula	**Candidate (City woodlot).** Suitable roosting sites for bat maternal colonies do not occur on the Subject Lands. Candidate bat maternity colonies have the potential to occur within the City woodlot where habitat assessments conducted from the woodland boundary identified sufficient snag densities (>10 snags/ha) to warrant SWH.
A8. Bullfrog Concentration Areas	**Not applicable.** The Peel-Caledon SWH Study (2009) incorporated this SWH type into criterion B8ii. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
A9. Wild Turkey Winter Range	**Not applicable.** No threshold recommended, as Wild Turkey is no longer of conservation concern in Ontario, the Region of Peel or Town of Caledon. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
A10. Turkey Vulture Summer Roosting Areas	**None detected.** Insufficient information to suggest specific threshold for this criterion; most preferred roosting areas would be protected through SWH Criteria B1 (rare vegetation communities) and B6 (cliffs and caves). This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
Rare vegetation communities or specialized habitat for wildlife	
B1. Rare Vegetation Communities	**None detected.**
B2. Forests Providing a High Diversity of Habitats	**Not applicable.** It is assumed that all forests providing a high diversity of habitats will be captured by the suite of significant woodland criteria. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
B3. Old-Growth or Mature Forest Stands	**Not applicable.** It is assumed that all old-growth and mature forests will be captured by the significant woodlands criteria.
B4. Foraging Areas with Abundant Mast	**None detected.** This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).

Table 16b: Significant Wildlife Habitat Review (Peel ROP Peel-Caledon Significant Wildlife Habitat Study 2009; MNRF Ecoregional Criteria for 7E 2015)

SWH Type	SWH Analysis based on the most recent year of Savanta Inc. data
B5. Highly Diverse Areas	**Not applicable.** The Caledon-Peel SWH study consultant team provided a map to the Town for review regarding the most diverse patches in Caledon / the Region. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
B6. Cliffs and Caves	**None detected.**
B7. Seeps and Springs	**None detected.** Candidate seeps and springs may occur on adjacent lands within the City woodlot and will be retained by the proposed Conceptual Plan (2019).
B8i. Amphibian Breeding Habitat (Forested Sites)	**None detected.** Woodland ecosites are absent from the Subject Lands. The City woodlot located northwest of the Subject Lands was surveyed for calling amphibians from the property boundary. Breeding populations did not occur in sufficient numbers to warrant SWH.
B8ii. Amphibian Breeding Habitat (Non-Forested Sites)	**Amphibians present within AMC14, AMC15 and AMC16. No breeding habitat detected** To meet the Peel-Caledon (2009) threshold for this SWH type, at least two of the listed calling amphibian species must be recorded with a combined total of 20 calling individuals. This SWH type is also triggered by the presence of Bullfrog regardless of the number of individuals. Due to the low abundance of calling amphibians on the Subject Lands, the Peel-Caledon (2009) SWH threshold was not met by any of the wetland features present on the property. Wetlands do not provide viable amphibian breeding habitat and does not meet this SWH type.
B9. Turtle Nesting Habitat and Turtle Overwintering Areas	**None detected.** No turtle species were detected on the Subject Lands during two rounds of basking surveys conducted in 2019.
B10. Habitat for Area-Sensitive Forest Interior Breeding Bird Species	**None detected.** Woodland ecosites are absent from the Subject Lands. The City woodlot located northwest of the Subject Lands does not meet interior patch size thresholds to be considered SWH.
B11. Habitat for Open Country and Early Successional Breeding Bird Species	**None detected.** Open fields that are > 10 ha occur on and adjacent to the Subject Lands, however, farming practices have occurred within the past 5 years including during recent years. As such habitat criteria are not met for this SWH type.
B12. Habitat for Wetland Breeding Bird Species	**None detected.** None of the indicator species listed were observed on the Subject Lands.

Table 16b: Significant Wildlife Habitat Review (Peel ROP Peel-Caledon Significant Wildlife Habitat Study 2009; MNRF Ecoregional Criteria for 7E 2015)

SWH Type	SWH Analysis based on the most recent year of Savanta Inc. data
B13i. Raptor Nesting Habitat (Raptors associated with wetlands, ponds, and rivers)	**None detected.** No Northern Harrier or Osprey nests were detected on the Subject Lands (indicator species from the Peel-Caledon study). The habitat size criteria (MNRF 2015) are also not met (i.e., woodland > 30 ha with > 10 ha interior that is 200m from the woodland edge).
B13ii. Raptor Nesting Habitat (Raptors associated with woodland habitats)	**None detected.** Woodland ecosites are absent from the Subject Lands. Cooper's Hawk was observed in association with the adjacent City woodlot, however, habitat size criteria (MNRF 2015) were not met (i.e., woodland > 30 ha with > 10 ha interior that is 200m from the woodland edge).
B14. Mink, River Otter, Marten and Fisher Denning Sites	**None detected.** Suitable habitat for these species is not present on the Subject Lands. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
B15. Mineral Licks	**Not applicable.** Mineral licks are not recommended as an SWH type for the Region of Peel or the Town of Caledon. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
Species of Conservation Concern	
C1. Species Identified as Nationally Endangered or Threatened by COSEWIC which are not listed as Endangered or Threatened under Ontario's *Endangered Species Act*	**Two species detected.** Monarch was observed (2 individuals) on the Subject Lands, which is listed as Special Concern in Ontario and Endangered in Canada. This species is addressed further under C2. Northern Rough-winged Swallow (2 individuals) were observed as a flyover during breeding bird surveys. Due to the anthropogenic nature of the Subject Lands, it is expected that this was an incidental observation and that this species does not occupy habitat on the Subject Lands. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
C2. Species Identified as Special Concern based on Species at Risk in Ontario List that is Periodically updated by OMNR	**One Special Concern species was recorded on the Subject Lands:** Monarch Butterfly (2 individuals) was recorded on the Subject Lands. Although satellite populations of Milkweed (*Asclepias syriaca*) were identified within a mixed meadow habitat on the Subject Lands, based on the low abundance of Monarchs observed, it is considered likely that the site is predominantly used as a resting/feeding area for migrant Monarchs and does not support candidate SWH. Furthermore, the Subject Lands are located greater than 5 km from Lake Ontario.

Table 16b: Significant Wildlife Habitat Review (Peel ROP Peel-Caledon Significant Wildlife Habitat Study 2009; MNRF Ecoregional Criteria for 7E 2015)

SWH Type	SWH Analysis based on the most recent year of Savanta Inc. data
C3. Species that are listed as Rare (S1-S3) or Historical in Ontario based NHIC	**None detected.**
C4. Species whose populations appear to be experiencing substantial declines in Ontario	**Not applicable.** The Peel-Caledon SWH Study (2009) does not provide a threshold for this criterion due to insufficient information. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
C5. Species that have a high percentage of their global population in Ontario and are Rare or Uncommon in the Region of Peel/ Town of Caledon	**Not applicable.** The Peel-Caledon SWH Study (2009) does not provide a threshold for this criterion due to insufficient information. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
C6. Species that are Rare within the Region of Peel or Town of Caledon, even though they may not be Provincially Rare	**Four locally rare or uncommon species, as per the Peel Region rarity ranking (Varga 2005) recorded on the Subject Lands.** • Red Cedar (*Juniperus virginiana var. virginiana*; R5) – Planted in pasture field; • White Spruce (*Picea glauca*; R3) - Planted; • Blunt Spike-rush (*Eleocharis obtuse*; U) – Common around edges of cattail marsh; and • Northern Manna Grass (*Glyceria borealis*; R4) – Common within cattail marsh. Both Red Cedar and White Spruce are cultivars and do not naturally occur within the landscape. None of these species are considered rare in Ontario and Canada.
C7. Species that are subjects of Recovery Programs	**Final Recovery Strategies are available for two species recorded on the Subject Lands:** Species listed as Threatened, Endangered or Extirpated by COSEWIC that were observed on the Subject Lands include: Barn Swallow and Monarch. These species are addressed separately from SWH under the PPS. According to this SWH criterion, habitat identified for SAR with final Recovery Strategies is also cross-designated as Regional SWH. This is not considered an SWH type under the Province's ecoregional criteria (MNRF 2015).
C8. Species considered important to the Region of Peel/ Town of	**Not applicable.** No Conservation Advisory Committee currently exists in the Region or the Town of Caledon. This is not considered an SWH type under the Province's

Table 16b: Significant Wildlife Habitat Review (Peel ROP Peel-Caledon Significant Wildlife Habitat Study 2009; MNRF Ecoregional Criteria for 7E 2015)

SWH Type	SWH Analysis based on the most recent year of Savanta Inc. data
Caledon, based on recommendations from a Local Conservation Advisory Committee	ecoregional criteria (MNRF 2015).
Animal Movement Corridors	
D. Animal Movement Corridors	**None detected.** Due to the limited abundance of species habitats present on the Subject Lands, no animal movement corridors were identified on the Subject Lands.

Table 17: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
PPS NATURAL HERITAGE FEATURES						
1. Significant Wetlands	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
2. Significant Coastal Wetlands	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
3. Significant Woodlands	Significant woodlands (City Woodlot) located within 120 m of the Subject Lands are approximately 5 ha in size and satisfy the minimum size threshold for significance defined under the City of Mississauga Official Plan (2019) (i.e., >4 ha within a settlement area). This feature is not contiguous with woodlands within the surrounding landscape. No woodland communities occur on the Subject Lands.	• Development adjacent to significant woodlands. • Potential disturbance due to increased presence of people, pets, lighting and noise.	• Damage to the rooting zone of retained vegetation adjacent to the proposed development area. • Wildlife disturbance due to increased presence of people, pets and lighting. • Potential construction-related impacts from onsite grading and other machinery include soil compaction, changes to micro-drainage resulting in localized ponding and inundation of root systems, introduction of invasive species, and displacement or dieback of native flora.	• A 10 m woodland buffer and 2 m landscape buffer will be established adjacent the staked dripline of the significant woodland. • No grading will occur within 5 m of the significant woodland. • Tree protection fencing, and erosion and sediment control (ESC) measures will be installed adjacent to retained features to aide in reducing excess disturbance caused by vegetation removals, ground disturbance and dislodging of sediment. • Heavy equipment use will be managed to prevent inadvertent damage to woodlot features and transportation of non-native and invasive species. • Native groundcover, shrub and tree plantings will be installed within the vegetated buffer zone. • LID measures (i.e., infiltration gallery) will be installed within the 2 m landscape buffer adjacent to the 10 m significant woodland buffer. • Low radiance exterior lighting will be directed away from retained woodlands to limit impacts to vegetation communities and wildlife activity.	• No negative impacts to the form and functions of the significant woodland is expected. • Potential improvements to ecological functions within retained woodland due to buffer plantings.	• Construction monitoring to ensure that woodland setbacks are maintained, and that tree protection fencing and ESC measures are functioning. • Monitoring of vegetation survival and growth within retained vegetation communities is recommended to confirm targets for survival, vegetation species and form are met. • Monitor health of any proposed tree plantings and plant additional trees if mortality observed.

Table 17: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
4. Significant Valleylands	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
5. Significant Wildlife Habitat	The following candidate SWH types have the potential to occur within the significant woodland (City woodland) located northwest of the Subject Lands: • Bat Maternity Colony; • Seeps and Springs; • Special Concern and Rare Wildlife Species: Eastern Wood-Pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*); and • Terrestrial Crayfish habitat. Due to the scoped nature of this EIS, the presence of key features was not confirmed beyond the property boundary. Therefore, it is assumed that candidate SWH occurs within the adjacent City woodland. No SWH was identified on the Subject Lands.	• Impactors would be as identified with respect to Significant Woodlands.	Potential indirect effects and short-term impacts include: (1) Increased soil disturbance: • Soil compaction reduces the pore space within the soils, limiting what plant species are able to root in the substrate; and • Colonization of invasive species on disturbed soils. (2) Noise disturbance: • Disturbance of wildlife patterns and behaviours (i.e., interfere with breeding calls from amphibians and birds); and • Temporarily vacate habitats near construction. Potential long-term impacts (i.e., related to residential development) include: (1) Increased pedestrian usage: • Increased invasive species transport; and • Degradation of surrounding vegetation. (2) Introduction of pets: • Predation of wildlife (e.g., bird nests). (3) Increased lighting: • Disrupt wildlife behaviours (i.e., disturb migration of food sources); and • Shade tolerant vegetation unable to prosper where future urban lighting is directed into the woodland	• Avoidance, mitigation and/or restoration measures would be similar to those identified with respect to Significant Woodlands. • Noise associated with construction is only temporary and will have short-term impacts on wildlife behaviour. Wildlife in this area are tolerant of anthropogenic disturbance due to the proximity of Highway 407, Ninth Line and the existing adjacent residential dwellings. • Any tree or vegetation removals on the Subject Lands should occur outside of the migratory bird-nesting window from April 1 – August 31 (approximate) as a precautionary measure. Where this window cannot be avoided, a nest search is recommended and a buffer will be marked off surrounding any active nests that must be maintained until activity in the nest has ceased. • Tree removals should not occur between April 1 and September 30 to prevent disruption to bats during critical reproductive and juvenile growth periods. If tree removal is required during this period, bat surveys will be completed by a qualified biologist. If no SAR bats are observed, the tree(s) can be removed within 24 hours.	• No long-term negative effects to candidate SWH are expected. • Temporary disturbance during construction may still occur despite implemented mitigation measures. Disturbance effects would no longer be present following the completion of construction. • The proposed woodland buffer may result in improvements to the ecological functions within the retained woodland.	• Monitoring and management strategies would be similar to those identified with respect to Significant Woodlands.

Table 17: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
6. Fish Habitat	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
7. Habitat of Endangered and Threatened Species	One Threatened species in Ontario and Canada was observed within the Subject Lands : Barn Swallow (*Hirundo rustica*). Several adult Barn Swallow and two confirmed nesting locations were identified in association with a barn structure located along the northwestern boundary of the Subject Lands in 2019. Potential impacts to Barn Swallow will be addressed directly with the MECP through the NAF process under the *ESA* (2007). Candidate habitat for SAR bats may occur within the significant woodland located adjacent to the Subject Lands as suitable cavity trees with the potential to provide suitable bat maternity colony habitat were identified. Due to the scoped nature of this EIS, the presence of SAR was not confirmed beyond the bounds of the Subject Lands; therefore it is assumed that candidate habitat for SAR bats occurs within the adjacent woodland. The two snag trees were identified on the Subject Lands were isolated trees and do not represent either significant wildlife habitat or habitat for SAR bats.	• Removal of one barn structure containing two confirmed Barn Swallow nesting locations. • Impactors with regards to SAR bats would be as identified with respect to Significant Woodlands.	• Loss of nesting habitat for Barn Swallow on the Subject Lands. • Predicted effects with regards to SAR bats would be similar to those identified with respect to Significant Woodlands.	• A Barn Swallow Replacement Habitat Structure (RHS) will be erected within 1 km of the original structure and within 200 m of suitable foraging habitat before the beginning of the next breeding season (i.e., May 1, 2020) to satisfy O. Reg. 242/08, Section 23.5, Subsection 6. • A 10 m woodland buffer and 2 m landscape buffer will be established adjacent the staked dripline of the significant woodland to provide protection to candidate habitat for SAR bats. • Tree removal should not occur between April 1 and September 30 to prevent disruption to bats during critical reproductive and juvenile growth periods. If tree removal is required during this period, bat surveys will be completed by a qualified biologist. If no SAR bats are observed, the tree(s) can be removed within 24 hours.	• Barn Swallow habitat removal will be registered using the MECP Notice of Activity Form (NAF) under the *ESA* (2007) before work commences and MECP will be consulted to understand net effects of Barn Swallow habitat removal. • The installation of the proposed RHS will compensate the removal of Barn Swallow habitat. • Temporary disturbance to SAR bats may still during construction occur despite implemented mitigation measures. Disturbance effects would no longer be present following the completion of construction. • No long-term negative effects are anticipated given the availability of suitable habitat adjacent to the Subject Lands.	• The RHS must be maintained for a period of three years post habitat disturbance. Monitoring will be conducted annually for three years beginning in summer 2020. Any Barn Swallow observations will be reported to the Natural Heritage Information Centre (NHIC) within three months of the monitoring date each year through the completion of the NHIC rare species online form. • A Barn Swallow Mitigation and Restoration Record will be prepared and submitted to MECP each year following monitoring of the RHS as per conditions outlined under O. Reg 242/08 Section 23.5 Subsection 4. • Monitoring and management strategies pertaining to bat SAR would be similar to those identified with respect to significant woodlands.
8. Significant Areas of Natural and Scientific Interest	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A

Table 17: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
OTHER PROVINCIAL PLANS						
1. Greenbelt Plan	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
2. Oak Ridges Moraine	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
OTHER FEATURES AND FUNCTIONS						
1. Natural Green Space (Other Wetlands)	Three small, isolated wetland vegetation communities were identified on the Subject Lands: - MAS2-1 (0.01 ha); - SAF1-3 (0.01 ha); and - MAS2-1 (0.03 ha). Wetlands on the Subject Lands do not meet the minimum size requirement (2 ha) for evaluation as a Provincially Significant Wetland (PSW). No PSWs occur on or within 120 m of the wetlands present on the Subject Lands. These wetlands provide limited hydraulic connectivity within the landscape (i.e.., drain to storm sewer) and are generally low functioning (i.e., no turtle habitat, no amphibian SWH, invasive fish species present in 0.01 ha MAS2-1 and SAF1-3). There are no provincially or regionally rare flora or fauna present within any of the wetlands on the Subject Lands. Three locally rare species were identified on the Subject Lands. Red Cedar and White Spruce specimens are cultivars and do not naturally occur within the landscape. Northern Manna Grass was common within the Cattail marsh.	• Direct removal of 0.05 ha of wetland communities present on the Subject Lands, and associated rare vegetation, to facilitate the proposed development. • Impactors to offsite wetlands would be as identified with respect to Significant Woodlands.	• Loss of 0.05 ha of wetland habitat. Wetland communities are predominantly composed of common vegetation species and provide limited ecological functions. However, one locally rare species, Northern Manna Grass, will be removed by the proposed development. • Isolated wetland features on the Subject Lands do not provide a hydraulic function within the watershed. • Loss of minor, non-significant wildlife habitat (e.g., amphibian habitat). • Predicted effects to offsite wetlands would be similar to those identified with respect to Significant Woodlands.	• Compensation for wetland removals will not be required given that existing wetland communities are of anthropogenic origin, and do not support SWH, rare vegetation communities, rare flora or fauna. Furthermore ,wetlands on the Subject Lands were not identified for retention within the Ninth Line SWS (Wood Environment & Infrastructure Solutions 2018). • Locally rare vegetation species removals will be mitigated through a vegetation salvage program. Salvages species (e.g., seed) will be planted within portions of the Lisgar Creek corridor that will not be altered or lowered by the proposed restoration plan, subject to landowner permissions through coordination with the City. • Avoidance, mitigation and/or restoration measures with respect to offsite wetlands would be as identified with respect to Significant Woodlands. • The 10 m vegetation protection zone applied to the significant woodland will provide a minimum 15 m buffer zone between the	• Removal of 0.05 ha of generally low-functioning wetland habitat from the Subject Lands, resulting in minor loss of non-significant wildlife habitat. No net negative impacts are expected as a result of the proposed development. • No negative impacts to other (non-PSW), offsite wetlands are expected. • Locally rare vegetation communities are expected to benefit from the expansion of wetland habitat within the Lisgar Creek corridor.	• Monitoring and management strategies for offsite wetlands would be similar to those identified with respect to Significant Woodlands.

Table 17: Predicted Effects, Mitigation, Enhancement and Net Effects

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
	Two other (non-PSW) wetlands, totaling 0.71 ha in size, occur within 120 m of the Subject Lands. These SWD2-2 communities occur within the significant woodland owned by the City of Mississauga and will be retained post-development.			wetlands and the proposed development boundary.		
2. Regionally and Locally Important Species	Two regionally uncommon species were identified through breeding bird surveys adjacent to the Subject Lands (Varga 2005) within the City woodland: • Cooper's Hawk (*Accipiter cooperii*; U); and • Northern Rough-winged Swallow (*Stelgidopteryx serripennis*; U). Two regionally rare or uncommon species occur on the Subject Lands: • Blunt Spike-rush (*Eleocharis obtuse*; U); and • Northern Manna Grass (*Glyceris borealis*; R4).	• Impactors would be as identified with respect to Significant Woodlands and Natural Green Space.	• Predicted effects would be similar to those identified with respect to Significant Woodlands and Natural Green Space.	• Avoidance, mitigation and/or restoration measures would be as identified with respect to Significant Woodlands and Natural Green Space.	• No negative impacts to regionally rare and uncommon species are expected.	• Monitoring and management strategies would be similar to those identified with respect to Significant Woodlands and Natural Green Space.
3. Environmentally Significant Areas	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
4. Other – Greenbelt	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
5. Other – Presence of Species under the ESA	• Not Present/Not Applicable	N/A	N/A	N/A	N/A	N/A
6. Other - Presence of Species Under the *Migratory Birds Convention Act*	The federal *Migratory Birds Convention Act* (MBCA) prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests.	During construction, in particular tree removal associated with the Arborist Report/ Tree Management Plan (LGL 2019), migratory birds, and eggs and nests of these birds could inadvertently be harmed.	Inadvertent harm to migratory birds or their eggs or nests.	Any tree or vegetation removal should occur outside of the migratory bird-nesting window of April 1 – August 31 (approximate). In rare circumstances where this window cannot be avoided, a nest search is recommended and a buffer will be marked off surrounding any active nests that must be maintained until activity in the nest has ceased.	With the implementation of the mitigation measures, no net effect is anticipated.	N/A

Appendix C – Scoped EIS Terms of Reference (July 2019)

SAVANTA
A GEI Company

July 3, 2019

Ms. Ashlee Rivet
Development Planner, South
City of Mississauga
Planning and Building Department, 6th Floor
300 City Centre Drive
Mississauga, ON
L5B 3C1
mailto:ashleerivet@mississauga.ca

Ms. Maricris Marinas
Planner, Planning and Development Services Credit Valley Conservation
1255 Old Derry Road
Mississauga, ON
L5N 6R4
maricris.marinas@cvc.ca

Dear Ms. Rivet and Ms. Marinas:

RE: Scoped EIS Ninth Line – Southern Parcel
Proposed Terms of Reference

Please find attached the Scoped Environmental Impact Study (EIS) Terms of Reference (ToR) for Mattamy Development Corporation (Mattamy) for the proposed development for their southern parcel within the Ninth Line Lands, in Mississauga, Ontario (hereafter referred to as the Subject Lands). The Subject Lands are generally bound by a woodlot owned by the City of Mississauga to the northwest, Ninth Line to the northeast, private property to the southeast and Highway 407 to the southwest. The Subject Lands presently host one residential building, one larger barn structure and a veterinary clinic. The southern portion of the Subject Lands contains a cultural meadow community that has been left to naturalize overtime; it was previously maintained as an agricultural field.

This ToR has been designed to consider the relevant municipal and regional official plan policies and, the Endangered Species Act, 2007 and associated permitting requirements. This ToR has been developed in accordance with the City of Mississauga's Environmental Impact Studies Terms of Reference (2002) and the CVC's Environmental Impact Study Terms of Reference (2008).

We look forward to your endorsement of these ToR.

Yours truly,
SAVANTA INC.
A GEI Company

Heather Whitehouse
Project Manager
1-800-810-3281 Ext 1040
hwhitehouse@savanta.ca

Noel Boucher
Project Director
1-800-810-3281 Ext 1250
nboucher@savanta.ca

Attachments (1)

- Terms of Reference

C: Craig Scarlett, Mattamy Development Corporation
David Hegarty, Mattamy Development Corporation

SCOPED ENVIRONMENTAL IMPACT STUDY: REPORT OUTLINE AND TERMS OF REFERENCE

Ninth Line Lands – Southern Parcel, Mississauga, ON
Mattamy Development Corporation

INTRODUCTION

This Report Outline and Terms of Reference for a Scoped Environmental Impact Study (EIS) provides an overview of the work to be completed on behalf of Mattamy Development Corporation (Mattamy) for the proposed development for their southern parcel within the Ninth Line Lands, in Mississauga, Ontario (hereafter referred to as the Subject Lands). The Subject Lands (as shown in **Figure 1**, **Appendix A**) are generally bound by a woodlot owned by the City of Mississauga to the northwest, Ninth Line to the northeast, private property to the southeast and Highway 407 to the southwest. The Subject Lands presently host one residential building, one larger barn structure and a veterinary clinic. The southern portion of the Subject Lands contains a cultural meadow community that has been left to naturalize overtime; it was previously maintained as an agricultural field.

Mattamy is proposing to develop a mix of residential units on the Subject Lands. On August 1, 2018 By-law 0167-2018 came into effect; this by-law specifies zoning across the entire Ninth Line Lands. Through this by-law, the Subject Lands were re-zoned as residential lands (per. Map M-2, Part of Schedule 10; Appendix A).

The Ninth Line Subwatershed Study (SWS) (Wood Environment & Infrastructure Solutions 2019) was reviewed and data gaps from the SWS fieldwork identified for the Subject Lands. The 2019 Scoped EIS field program will address the data gaps from the SWS (2019). Generally, the Ninth Line Study Area possesses limited natural heritage features as it is located within a highly altered landscape. The SWS acknowledged the limited ecological function of the existing tableland wetlands within the Subwatershed Study area which includes the Subject Lands and proposed their removal, with wetland creation along the Lisgar Creek corridor to improve the ecological integrity of this corridor and further enhance the ecological landscape. The Phase 2 SWS identified three existing natural features for retention within the overall SWS Study Area: the Lisgar Creek riparian corridor, a woodland south of Derry Road and the city woodland immediately north of the Subject Lands.

This Report Outline establishes the process and content of the Scoped EIS to be developed in response to the proposed residential development for the Subject Lands. Ecological investigations are currently underway during the 2019 field season. The field program was scoped using a variety of information obtained from background wildlife resources (discussed further in section 2.1) and aerial photograph interpretation. The Scoped EIS will provide an analysis of potential impacts on natural heritage features and associated ecological functions, based upon detailed site observations. The Scoped EIS will also address potential indirect impacts associated with natural heritage features identified on adjacent lands (within 120 m of the Subject Lands).

This Report Outline summarizes technical methods and activities that are currently underway and will be completed during the 2019 field season. It also identifies the proposed outline and content of the Scoped EIS report that will be prepared in response to the proposed development. The Report Outline has been developed in accordance with the City of Mississauga's Environmental Impact Studies Terms of Reference (2002) and the CVC's Environmental Impact Study Terms of Reference (2008).

1. NATURAL HERITAGE PLANNING CONSIDERATIONS

The Scoped EIS report will assess the quality and extent of natural heritage features found on and adjacent to the Subject Lands as related to the following legislation, policies and agencies:

- Provincial Policy Statement (PPS; MMAH 2014);
- Provincial *Endangered Species Act* (ESA) (2007);
- Region of Peel Official Plan (2016 Office Consolidation);
- City of Mississauga Official Plan (2019 Office Consolidation);
- Municipal By-laws that may be applicable;
- Credit Valley Conservation Regulation (O.Reg. 160/06) and Watershed Planning and Regulation Policies (2010); and
- Federal *Fisheries Act* (R.S.C., 1985, c. F-14).

The Scoped EIS will provide an outline of the relevant requirements of these planning considerations as they relate to the Subject Lands.

As per discussions with Credit Valley Conservation, in preparation of this Scoped EIS Terms of Reference, a site visit will be held in summer 2019 with the relevant City of Mississauga and Credit Valley Conservation staff. During this site visit, the southern dripline boundary of the City Woodland, where it is within the Subject Lands, will be staked.

2. DATA COLLECTION AND ANALYSES

2.1 Desktop Data Collection

The Scoped EIS report will include a review of available background references, including, but not limited to the following:

- Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario database;
- Natural Heritage Information Centre database (MNRF 2018);
- Information on potential Species at Risk (SAR) provided by the Ministry of Environment, Conservation and Parks (MECP);
- Ontario Breeding Bird Atlas (2006);
- Ninth Line Lands Scoped Subwatershed Study (Wood Environment & Infrastructure Solutions 2019); and
- Other historical reports and data for the Subject Lands completed by others.

2.2 Field Data Collection (2019)

Following a preliminary review of existing background information regarding the natural heritage features of the Subject Lands, a field program was prepared for the 2019 season to include the following ecological inventories:

- Headwater Drainage Feature Assessment;
- Bat Habitat Assessment;
- Amphibian Call Count Surveys;
- Snake Surveys;
- Turtle Basking Surveys;
- Breeding Bird Surveys, including grassland breeding birds;
- Ecological Land Classification and Botanical Inventory; and
- Dripline staking of adjacent woodland where southern dripline extends onto Subject Lands.

The proposed technical methods are discussed briefly below. Curriculum Vitae for the study team members leading the ecological field investigations are provided in **Appendix B**.

2.2.1 Headwater Drainage Feature Assessment

Three rounds of Headwater Drainage Feature Assessment (HDFA) surveys will be completed during the spring and summer months to understand the nature of hydrologic features on the Subject Lands. The HDFA will identify ephemeral, intermittent and permanent features on the landscape. Headwater drainage features will be divided into reaches as appropriate and will be subject to a HDFA utilizing the *Evaluation, Classification and Management of Headwater Drainage Feature Guidelines* (The Guideline: CVC/TRCA 2014). The guideline recommends three rounds of surveys to complete the HDFA. The first visit is to occur under spring freshet conditions. The second visit is to occur in late spring, allowing at least two days after a rainfall event. A third visit will be conducted if headwater drainage features are found to contain water during the second visit to verify the flow regime of the features as intermittent or permanent features on the landscape.

HDFA round 1 was completed on April 9 and HDFA round 2 was completed on June 19. A round 3 survey will be completed in July or August 2019.

2.2.2 Bat Habitat Assessment

A bat habitat assessment was completed on April 9, 2019 during leaf-off conditions to determine the presence of suitable habitat for SAR bats. There are four bat species in Ontario that are listed as Endangered, including Eastern Small-footed Myotis (*Myotis lieibii)*, Little Brown Myotis (*Myotis lucifugus)*, Tri-coloured Bat (*Perimyotis subflavus)* and Northern myotis (*Myotis septentrionalis)*. There are no woodlands on the Subject Lands, therefore no assessment for Bat Maternity Significant Wildlife Habitat (SWH) was required.

The survey targeted snag/cavity trees greater or equal to 10 cm diameter at breast height (DBH) that exhibited a great amount of peeling bark, early stages of decay, and cavities or crevices most often originating from cracks, knots holes or woodpecker cavities. The information collected for each snag/cavity tree included tree species, number of cavities, decay class and UTM coordinates, and representative photos. The field program was adapted from the MNRF Guelph District's Bat and Bat Habitat Surveys of Treed Habitats (2017).

No suitable bat habitat was observed and therefore no acoustic surveys are required.

2.2.3 Amphibian Call Count Surveys

Three rounds of amphibian call count surveys will be conducted in April, May and June. To date, amphibian call count surveys were completed on April 25 and May 15. A June call count is scheduled for the week of June 24. These surveys follow standard protocols outlined in the Great Lakes Marsh Monitoring Program (BSC 2003). Surveys are conducted on warm nights with little wind. Surveys commence one half hour before dusk and end before midnight. Visits are spaced 15 days apart and as per protocols. The first survey is conducted with a minimum nighttime air temperature of 5°C, the second visit with a minimum of 10°C and the third visit with a minimum of 17°C. If noise from plane, road traffic and/or trains is present, monitoring is delayed and started again during a quiet period.

Each station will be surveyed for a period of three minutes and a three-level category system will be used to identify the level and type of calling activity.

The standard call levels that will be used are:

1) Individual calls do not overlap and calling individuals can be discreetly counted;
2) Calls of individuals sometimes overlap but numbers of individuals can still be estimated; and
3) Overlap among calls seems continuous (full chorus) and a count estimate is impossible.

Anurans will be recorded as within the station if they are within 100 m of the feature. All other species will be recorded as incidental records heard outside the station.

2.2.4 Snake Surveys

Snake surveys were conducted on April 25 and May 24, 2019 during the spring emergence period to increase the probability of detecting snakes. Field staff used a visual encounter survey approach

where active searches were completed around natural materials and debris that could serve as refuge or basking sites. Surveys were conducted on mild spring days (minimum of 12°C) between 8:00 AM and 2:00 PM, with sunny or partly overcast conditions. Surveys were not conducted on days with rain or high winds. Data recorded during snake surveys included species observations and locations (UTM coordinates), air temperature, start and end time, and weather conditions. The survey method followed the MNRF SAR protocols (OMNRF 2016).

2.2.5 Turtle Basking Surveys

Two turtle basking surveys were conducted at the ponds on the Subject Lands on April 25 and May 24, 2019 during the spring emergence period (April-May) to search for basking turtles. Surveys were conducted on sunny days between 8:00 to 17:00 with low/no wind and temperatures over 6°C, or on overcast days with air temperatures over 15°C.

Binoculars were used to scan, from a distance, for thirty minutes, the edges and surface of each pond for basking turtles. Data recorded included: water and air temperatures (basking prevalent when air is warmer than water), vegetation composition around the water body, % slope leading to water's edge, % of pond containing basking features (logs, floating vegetation mats, floating/emergent debris), and % canopy cover overhanging the pond.

Both the Natural Heritage Information Centre (NHIC 2016) database and the Species at Risk in Ontario (SARO) list (Ontario Regulation 230/08) will be reviewed to determine the current provincial status for each amphibian species recorded on the Subject Lands.

2.2.6 Breeding Bird Surveys

Three Breeding Bird Surveys (area searches, point counts) will be conducted according to Ontario Breeding Bird Atlas Protocol (OBBA 2001-2005). The round 1 survey was conducted on June 11, 2019 and the round 2 survey was completed on June 19th. A third survey will be completed in early July.

Breeding bird surveys are conducted following the protocol set forth by the Ontario Breeding Bird Atlas (Cadman et al. 2007), the Ontario Forest Bird Monitoring Program (Cadman et al. 1998) and the Marsh Monitoring Program (Bird Studies Canada 2014 and 2006), as applicable. Surveys are conducted between dawn and five hours after dawn with suitable wind conditions, and no thick fog or precipitation (Cadman et al. 2007). Point count stations are located in various habitat types within the Subject Lands and combined with area searches to help determine the presence, variety and abundance of bird species. Each point count station is surveyed for 10 minutes for birds within 100 m and outside 100 m. All species recorded on a point-count are mapped to provide specific spatial information and are observed for signs of breeding behaviour.

SAR birds with potential habitat on the Subject Lands and/or noted by the MECP as occurring in the area will also be targeted during these surveys. There is potential for grassland SAR bird habitat to be present on the Subject Lands, therefore the third round of breeding bird surveys will be completed to identify if SAR grassland birds (e.g., Bobolink – *Dolichonyx oryzivorus* or Eastern Meadowlark – *Sturnella magna*) are present on the Subject Lands. Third round surveys will follow the MNR (2012) "Bobolink Survey Protocol".

Savanta will complete a full inspection of all safe and accessible portions of the structures found on the Subject Lands during the breeding season to assess the presence of any intact or remnant nests

of Barn Swallows (*Hirundo rustica)*, a threatened bird species. Should any Barn Swallow nests be observed, the location and associated activity (presence of eggs, nesting, feathers, adults) will be recorded.

2.2.7 Ecological Land Classification and Botanical Inventory

Two rounds of botanical inventories (summer and fall) and one Ecological Land Classification survey will be completed. A botanical inventory list will be compiled to understand the flora present within these lands. Flora nomenclature will be based on the Ontario Plant List (Newmaster et al. 2012) with updates from the Natural Heritage Information Centre (NHIC) database (2019). ELC surveys will follow the ELC for Southern Ontario Protocol (Lee at al. 1998).

Should any SAR vegetation species be identified (e.g., Butternut – *Juglans cinerea)*, intensive targeted SAR surveys will be completed.

2.2.8 Southern Boundary Dripline Staking of City Woodland

A City Woodland is located immediately north of the Subject Lands, and a portion of the southern dripline boundary may extend onto the Subject Lands. A summer 2019 site walk will be held with the City and Credit Valley Conservation to stake the southern boundary of this City Woodland, where it extends on the Subjects Lands.

2.2.9 Incidental Observations

Savanta will record all incidental observations of wildlife (i.e., insects, mammals) during each of the above noted surveys and will provide federal, provincial, regional and local rarity ranking, where present.

3. BIO-PHYSICAL CHARACTERIZATION

The Scoped EIS will include a bio-physical characterization section that will outline the methods used and the results of the desktop and field data collection efforts, including physical data collected by others (e.g., from geotechnical studies). Results will be discussed by topic, including, but not limited to the following:

- Earth Resources (i.e., landforms, soils, geology, topography, erosion sites);
- Water Resources (i.e., groundwater and surface water features, wetlands, drainage);
- Vegetation Resources (i.e., botanical inventory, ELC communities, rare or uncommon species, linkages);
- Wildlife Resources (i.e., birds, insects, amphibians, reptiles, mammals (including bats), incidental species); and
- Hazard Areas (i.e., erosion hazards).

This section of the Scoped EIS will include an assessment of the inter-relationship of biophysical features as well the biophysical characterization of the Subject Lands in the context of the broader local and regional ecosystem.

3.1 Wetland Water Balance Risk Evaluation and Analyses

The SWS (2019) identified internal wetlands within the City Woodland, immediately north of the Subject Lands. This Scoped EIS will determine whether any of the catchment area for these wetlands is located on the Subject Lands, or whether the wetland catchment area is entirely offsite. If it is determined that a portion of the wetland catchment area is on the Subject Lands, TRCA's "*Wetland Water Balance Risk Evaluation*" (November 2017) will be followed. This document provides protocol to assess the level of risk of each wetland internal to the City Woodland from the proposed development based on the sensitivity of the wetland and the magnitude of potential hydrologic changes to water inputs and outputs. This risk evaluation will determine the need for a wetland water balance analysis to address the impacts of the Subject Land's proposed development on the wetlands internal to the City Woodland.

4. ANALYSIS OF ECOLOGICAL AND NATURAL HERITAGE SIGNIFICANCE

The PPS (MMAH 2014), issued under Section 3 of the *Planning Act*, provides direction on matters of provincial interest related to land use planning and development. The PPS states that it "...supports a comprehensive, integrated and long-term approach to planning..." The PPS is to be read in its entirety and land use planners and decision-makers need to consider all relevant policies and how they work together.

Savanta's work will address those policies that are specific to natural heritage (section 2.1) with some reference to other policies with relevance to natural heritage and impact assessment considerations and areas of overlap.

The significant natural heritage features defined in the 2014 PPS, are:

- Significant Wetlands;
- Significant Coastal Wetlands;
- Fish Habitat;
- Significant Woodlands;
- Significant Valleylands;
- Habitat of Endangered and Threatened Species;
- Significant Wildlife Habitat; and
- Significant Areas of Natural and Scientific Interest ("ANSIs").

The Natural Heritage Reference Manual (NHRM) (MNR 2010) will be referred to for guidance regarding how these natural heritage features are to be addressed under the PPS (MMAH 2014).

The City of Mississauga's Official Plan (2019) criteria for defining Significant Valleyland, Significant Wetland and Significant Woodland will be followed. The Region of Peel's Official Plan (2018) criteria (Figure 5) for identifying Significant Wildlife Habitat will be followed. The MNRF's Ecoregion 7E SWH guidelines (2015) and mitigation tool (2014) will also be consulted.

The Scoped EIS will also assess and document conformance with relevant natural heritage related policies in provincial plans and municipal planning documents.

5. DESCRIPTION OF PROPOSED DEVELOPMENT

As previously discussed, Mattamy is proposing a mixture of residential units on the Subject Lands.

In relation to the proposed development, the Scoped EIS will:

- Indicate the purpose of the development;
- Provide a conceptual site plan identifying the location of proposed buildings, roads and services;
- Describe existing land use, zoning and ownership of the property and land use and zoning of adjacent properties;
- Describe historical land uses on the property and surrounding area;
- Identify activities associated with the proposed development that could potentially have direct or indirect, temporary or long-term effects on natural features during and following construction;
- Provide information regarding scheduling (including phasing of the development); and
- Discuss grading, filling and drainage (stormwater) management.

The natural heritage work will rely in part, upon a Functional Servicing Report, grading plans, geotechnical studies, Tree Preservation Plans and stormwater management plans that will be prepared by others on the proponent's consultant team.

The results of these studies and discussions will be incorporated into the Scoped EIS report describing the biophysical environment and any relevant linkages to the existing natural heritage features will be discussed in those sections.

6. IMPACT ASSESSMENT, MITIGATION IDENTIFICATION AND ENHANCEMENT/ RESTORATION CONSIDERATIONS

A Scoped EIS report will be prepared in the fall of 2019 complete with ecological characterization, significance assessment, impact assessment, proposed compensation measures and a conceptual compensation design (if required), monitoring and associated figures. As the SWS (Wood Environment & Infrastructure Solutions 2019) has indicated that there are no natural heritage features that will be retained on the Subject Lands, the Scoped EIS will primarily focus on identifying appropriate compensation measures (i.e., area and/or functional compensation) for natural features removed and will include a conceptual features compensation design within the enhanced Lisgar Creek corridor on Mattamy's land holdings to the north. See **Figure 2** for a map illustrating the location of Mattamy's northern land holdings. See **Figure 3** for the SWS (2019) Refined Natural Heritage System Concept for Mattamy's northern land holdings, conceptually illustrating wetland creation within the Lisgar Creek Corridor. Compensation measures as required under the City of Mississauga's tree removal requirements for hedgerows will also be provided. Should species at risk habitat, i.e., grassland breeding birds, be identified through our 2019 survey work, a scope change authorization will be prepared to address authorizations in accordance with provincial regulations.

The Scoped EIS will also identify environmental monitoring requirements, following and refining the requirements as per the Ninth Line SWS. Environmental monitoring will be identified, to the extent required, to assess the success (efficacy) of mitigation measures and/or compensation measures. Monitoring protocols will be identified for selected parameters where potential effects have been predicted, and where mitigation and/or restoration are recommended.

These are referred to as impact validation indicators. These parameters proposed for monitoring will be chosen based upon the following factors:

- Reliable and cost-effective indicator of environmental quality/health;
- Accepted monitoring protocol providing accurate, repeatable measure;
- Measure of efficacy of proposed mitigation; and
- Measure of success of proposed restoration.

The Scoped EIS will identify and outline responsibilities and timelines for mitigation, restoration and environmental monitoring, and ongoing reporting.

7. REPORTING

A Scoped EIS report will be prepared to document the results of the background review and field investigations, agency consultations, assessment of significance and sensitivity of natural features, impact assessment, mitigation and enhancement/restoration, and monitoring requirements.

The Scoped EIS will include the following key components:

- A biophysical inventory (desktop and field data) and analysis (including function assessment, significance determinations and identification of natural heritage areas);
- A description of the proposed development, including all activities that could result in effects to natural areas;
- Impact assessment of the proposed activities including direct/indirect and temporary/permanent potential effects;
- Identification of mitigation to address effects on natural heritage features and functions;
- Determination of net effects;
- Description of existing regulatory policies (federal, provincial, municipal, CVC);
-
- Identification of any monitoring requirements;
- A summary of all recommendations made with respect to maintenance or enhancement of ecological functions; and
- A table summarizing predicted impacts, mitigation, monitoring and residual effects.

An Executive Summary will be provided to outline the proposed development, potential effects on the natural heritage features on and adjacent to the Subject Lands and all recommendations. Appendices will be provided in the report to include background field data and curriculum vitae of study team members.

Heather Whitehouse
Project Manager
1-800-810-3281 ext. 1040
hwhitehouse@savanta.ca

Noel Boucher
Project Director
1-800-810-3281 ext. 1250
nboucher@savanta.ca

REFERENCES AND BACKGROUND MATERIALS

AMEC Foster Wheeler. 2019. Ninth Line Lands Scoped Subwatershed Study Phase 1: Background Report Study Area Characterization.

AMEC Foster Wheeler. 2019. Ninth Line Lands Scoped Subwatershed Study Phase 2: Impact Assessment and Management Strategy.

AMEC Foster Wheeler. 2019. Ninth Line Lands Scoped Subwatershed Study Phase 3: Implementation and Monitoring Plan.

Bird Studies Canada. 2006. Marsh habitat and vegetation guide.

BSC, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources (BSC et al.) 2006. Ontario Breeding Bird Atlas Database. Available online at http://www.birdsontario.org /atlas/aboutdata.jsp?lang=en

BSC 2014. Marsh monitoring bird surveys overview: http://www.bsc-eoc.org/ volunteer/glmmp/index.jsp?targetpg=glmmpbird&lang =EN /

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Courturier (eds.) 2007. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp.

Cadman, M.D., H.J. Dewar, and D.A. Welsh 1998. The Ontario Forest Bird Monitoring Program (1987-1997): Goals, methods and species trends observed. Technical Report Series No. 325, Canadian Wildlife Service.

City of Mississauga 2002. City of Mississauga Environmental Impact Studies Terms of Reference. Available online at http://www.mississauga.ca/file/COM/EIS_Tems_of_Ref2002_miss_plan.pdf

Credit Valley Conservation (CVC) 2008. Environmental Impact Study Terms of Reference. Available online at https://cvc.ca/wp-content/uploads/2011/01/005-EIS-TOR-2007.pdf

Credit Valley Conservation Authority. 2010. Watershed Planning and Regulation Policies. Available Online: http://www.creditvalleyca.ca/planning-permits/policies-guidelines/

Credit Valley Conservation and Toronto and Region Conservation Authority (CVC/TRCA) 2014. Evaluation, Classification and Management of Headwater Drainage Features Guidelines. January 2014. 26 pp.

Government of Ontario 2007. Endangered Species Act (ESA). Available online at https://www.ontario.ca/laws/statute/07e06

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray 1998. Ecological land classification for Southern Ontario: first approximation and its application. Ontario Ministry of Natural Resources, South Central Region, Science Development and Transfer Branch. Technical Manual ELC-005.

Natural Heritage Information Centre (NHIC) 2016. Element summary for plants, wildlife and vegetation communities. Ontario Ministry of Natural Resources and Forestry, Peterborough.

Natural Heritage Information Centre. 2019. Natural Heritage Viewer. Available Online: http://www.giscoeapp.lrc.gov.on.ca/web/MNR/NHLUPS/NaturalHeritage/Viewer/Viewer.html

Newmaster, S.G. and S. Ragupathy 2012. Flora Ontario – Integrated Botanical

Information System (FOIBIS), Phase I. University of Guelph, Canada. Available online at http://www.uoguelph.ca/foibis/

Ministry of Natural Resources (MNR) 2010. Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement.

Ministry of Natural Resources and Forestry (MNRF) 2014. Significant Wildlife Habitat Mitigation Support Tool. Available online: https:// dr6j45jk9xcmk. Cloudfront .net/documents/4773/mnr-swhmist-accessible-2015-03-10.pdf

MNRF 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. Available online at https:// www.ontario. ca/document/significant-wildlife-habitat-ecoregional-criteria-schedules-ecoregion-7e

MNRF 2016. Survey Protocol for Ontario's Species at Risk Snakes. Ontario Ministry of Natural Resources and Forestry, Species Conservation Policy Branch. Peterborough, Ontario. ii + 17 pp.

MNRF 2017. Survey Protocols for Species at Risks Bats within Treed Habitats: Little Brown Myotis, Northern Myotis, and Tri-Coloured Bat.

MNRF 2010. Natural Heritage Information Centre database. Available online at https://www.ontario.ca/page/get-natural-heritage-information

Mississauga 2019. Mississauga Official Plan Office Consolidation March 13, 2019. Available online at http://www.mississauga.ca/portal/residents/mississaugaofficialplan

Ontario Ministry of Natural Resources and Forestry (MNRF). 2012. Bobolink survey methodology.

Ontario Ministry of Municipal Affairs and Housing (MMAH) 2014. Provincial Policy Statement. Ontario Ministry of Municipal Affairs and Housing. Toronto: Queens Printer for Ontario 37 pp

OMNRF. 2016. Survey Protocol for Ontario's Species at Risk Snakes. Ontario Ministry of Natural Resources and Forestry, Species Conservation Policy Branch. Peterborough, Ontario. ii + 17 pp.

Peel Region 2018. Region of Peel Official Plan Office Consolidation December 2018. Available online at https://www.peelregion.ca/planning/officialplan/download.htm

Region of Peel. 2009. Peel – Caledon Significant Wildlife Habitat Study. Available Online: https://www.peelregion.ca/planning/officialplan/pdfs/Peel-CaledonSW-SWH-Study-Report-Part1.pdf

Toronto and Region Conservation Authority. 2016. Wetland Water Balance Monitoring Protocol

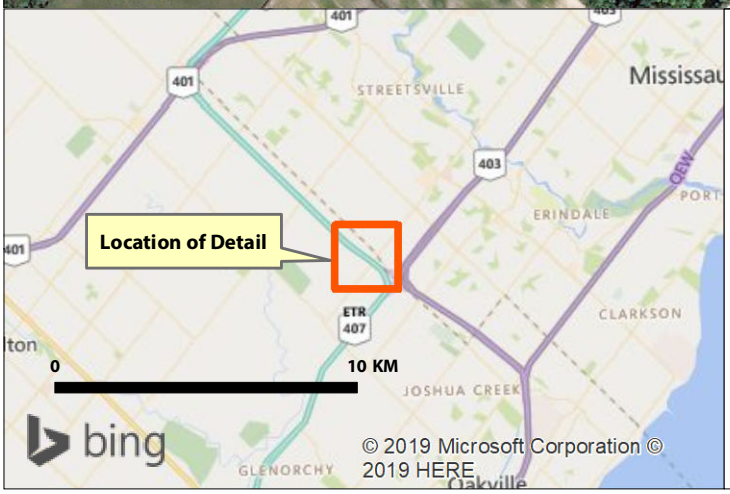
Toronto and Region Conservation Authority. 2017. Wetland Water Balance Risk Evaluation.

APPENDICES

Appendix A – Figures

Appendix B – CVs

Appendix A



Scoped Environmental Impact Study,
Southern Parcel, Ninth Line, Mississauga

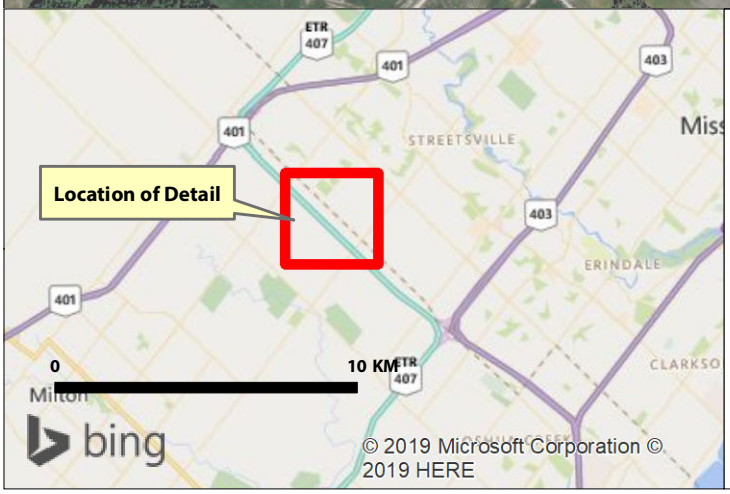
Figure 1
Location of Subject Lands

0 200 Meters

N

SAVANTA
A GEI Company

Path: S:\9289 - SAV 1902542\gis\mxd\2019 05 23\Figure 1 Location of Subject Lands.mxd Date Saved: May 23, 2019



Scoped Environmental Impact Study,
Northern Parcel, Ninth Line, Mississauga

Figure 2
Location of Subject Lands

0 500 M

N

SAVANTA
A GEI Company

Path: S:\9289 - SAV 1902542\gis\mxd\2019 06 26\Figure 2 Location of Subject Lands.mxd Date Saved: June 26, 2019

Path: X:\1464_MississaugaNinthLineCorridorReview\NRSI_1464_Map2a-2c_RefinedNHS_10K_2018_12_12_LEH.mxd

Map 2b

Ninth Line Lands

Refined Natural Heritage System Concept

Legend

- Study Area Boundary
- Utility Line
- Railway
- Existing Watercourse
- Conceptual Realigned Channel
- Proposed Transitway Alignment
- Natural Heritage System
- Existing Stormwater Management Pond

Restoration Plan

- Existing Wetland
- Meadow
- Wetland
- Wooded

Figure 3

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1464
Date: December 12, 2018

NAD83 - UTM Zone 17
Size: 11x17"
1:11,000

0 200 400 600 Meters

N

Appendix B

SAVANTA
A GEI Company

Noel Boucher **B.Sc. (Env)**

Senior Fisheries Biologist

nboucher@savanta.ca
1.800.810.3281 ext. 1250

Noel brings over 19 years of experience, primarily in environmental consulting, to his role at Savanta. He has extensive experience in the completion of fisheries studies, impact assessments and permitting and approval acquisitions for a wide range of project types in the land development, energy and infrastructure.

Noel has experience in the design and implementation of fisheries studies to support environmental assessments, environmental impact studies, watershed and subwatershed planning studies, permitting and approvals, constraints assessments and post-construction studies. Noel has broad knowledge of fisheries assessment protocols and techniques, as well as agency expectations regarding fisheries studies in various development sectors. Noel is experienced with the assessment and permitting requirements for aquatic species at risk in Ontario, including Redside Dace, Silver Shiner, American Eel and Lake Sturgeon.

Noel has successfully obtained *Fisheries Act* Authorizations and Letters of Advice for waterpower facilities, dams, road water crossings, infrastructure installations, restoration projects and shoreline developments. Noel has in-depth knowledge of fisheries impact assessment requirements and avoidance, mitigation and fish habitat offsetting and compensation measures and has designed fish habitat features including spawning beds and other riverine features, wetland spawning and nursery areas and complex shorelines.

Noel is very familiar with a wide range of federal and provincial Environmental Assessment (EA) protocols. Federally, he is experienced with EAs and Section 67 assessments under the *Canadian Environmental Assessment Act*. Provincially, his experience includes the Municipal Class EA, Conservation Ontario Class EA, Waterpower Class EA, Class EA for Minor Transmission Facilities, MNR Class EA, and Environmental Screening Process Requirements for Electricity Projects and Waste Management Projects.

Noel is also familiar with the completion of Environmental Impact Studies (EIS) to address the natural heritage policies of the Provincial Policy Statement (2014), requirements of municipal planning approvals and impact assessment requirements of other regulatory agencies (e.g., Conservation Authorities).

Noel has managed projects ranging from small studies to large, multi-disciplinary assessments for complex development projects. He has applied his strong project management skills to maintain team productivity and effectiveness and ensure that projects are delivered in accordance with high quality standards, on schedule and on budget.

Select Project Experinece

- Hunt Club Pond Decommissioning (Cambridge): Obtained Fisheries Act Authorization for decommissioning of an online man-made pond and restoration of a natural channel
- EISs for proposed residential developments in various locations in southern Ontario
- Block 51-1 post-construction aquatic monitoring and reporting, Brampton, Ontario
- Hilton Falls Diversion Dyke Upgrade Project: Conservation Ontario Class EA, Milton, Ontario
- Crooks Hollow Dam Decommissioning (Hamilton): Aquatic Biologist participating in the Class EA process for removal and restoration of Crooks Hollow Dam on Spencer Creek
- Shickluna Small Hydro Project (St. Catharines, Ontario): Environmental Screening Report, environmental permitting and baseline fisheries studies
- Streetsville Glen Golf Course (Brampton) - Completed EIS, DFO Request for Review and MNRF Species at Risk discussions for removal of an online pond
- Chaudière Hydro Project: Environmental Effects Determination and Fisheries Act Authorization
- Park Place Phase 2 (Waterdown): EIS for residential development, stormwater infrastructure and watercourse realignment
- Timiskaming Ontario Dam Replacement Project: Environmental Effects Determination and Fisheries Act Authorization
- Gull Bay Shoreline Stabilization Project: Environmental Permitting (Fisheries Act, Endangered Species Act, Navigation Protection Act, Aggregate Resources Act, Public Lands Act) and environmental specifications
- Kabinakagami River Project: Ontario Waterpower Association Class EA and baseline fisheries studies
- Riverfront Community (Niagara Falls): Project Manager and lead fisheries biologist for the EIS and permitting and approvals for residential development
- Shikwamkwa Dam Replacement Project: MNR Class EA, baseline fisheries studies and post-construction environmental monitoring.

Education

- B.Sc., Environmental Science, University of Guelph

Certifications and Training

- MTO/DFO/OMNRF Fisheries Protocol Training
- Ontario Class 2 Backpack Electrofishing Certification
- Ontario Wetland Evaluation System Certification

Employment History

- Savanta: April 2016 - present

- Hatch Ltd.: 2001 – 2015: Lead, Environmental Services Group, Niagara Falls Operations (2014 – 2016); Aquatic Biologist (2001 – 2016)
- Royal Botanical Gardens: 2000 – 2001, Fisheries Technician
- Hamilton Conservation Authority: 1999, Fisheries Technician

SAVANTA
A GEI Company

Barbara N. Charlton

Climate Change and Socio-Economic Ornithologist

bcharlton@savanta.ca

Barbara Charlton has been an avid birder and naturalist for over 30 years. She has volunteered countless weeks of fieldwork, conducting bird population censuses, and band re-sighting with the Western James Bay Shorebird Project, banding birds, and migration monitoring at the Long Point Bird Observatory, as well as surveying breeding birds with both of the Ontario Breeding Bird Atlas projects. She has extensive field experience identifying and inventorying birds, performing point counts, breeding bird, and nesting surveys.

Ornithology

During her three years with Savanta, Barbara has conducted Breeding Bird Surveys based on the protocol set forth by the Ontario Breeding Bird Atlas (OBBA, 2001), the Forest Bird Monitoring Program (CWS, 2005) and the Marsh Monitoring Program (BSC, 2003), which include point counts and area searches. Emphasis was placed on breeding evi-dence of Species at Risk, including Bobolink, Eastern Meadowlark and Barn Swallow. Additional work included Species at Risk habitat as-sessment and incidental wildlife observations.

Barbara currently serves as Assistant Secretary for the Ontario Bird Records Committee and has been a reviewer since 2011, for Hamilton and Halton regions, for Ebird Ontario. Barbara has served on several Boards of Directors, including Bird Studies Canada and for 2 years she coordinated Ontario volunteers for the Breeding Bird Survey.

Although Barbara did some bird banding in James Bay at the Hannah Bay field camp in 2013, the majority of her bird banding experience comes from spending many vacation weeks volunteering at the Long Point Bird Observatory. During this time she became experienced at banding birds, extracting birds from mist nets, ageing, sexing and weighing.

Barbara participated in both Breeding Birds Atlas Projects, working in her local area as well as assisting with squares requiring additional cov-erage, including the Bruce Peninsula. She continues to participate in various Christmas Bird Counts and NABA Butterfly Counts, as she has for decades.

In her leisure time Barbara has birded Canada from British Columbia to the Maritimes, many states in the U.S. including California, Arizona, Colorado, Florida and Texas, as well as the Caribbean.

Select Project Experience

- Ontario Bird Records Committee Assistant Secretary
- Ebird Ontario Reviewer, Hamilton and Halton
- Western James Bay Shorebird Project Volunteer, Shorebird census and band re-sighting: Hannah Bay, Londridge Point, Little Piskwamish, North Bluff Point
- Ontario Breeding Bird Atlas Participant
- Ontairo Breeding Bird Survey, Ontario Coordinator of BBS Volunteer Surveyors
- Christmas Bird Counts, Long Point, St. Catharines, Hamilton, Niagara, Kitchener, Cambridge
- NABA Butterfly Counts, Hamilton, Long Point, Point Pelee
- Bird Banding, Long Point Observatory: The Tip, Breakwater, Old Cut, Clear Creek Raptor Station
- Ottawa Banding Group: Andros Island, Bahamas
- Thunder Cape Bird Observatory: Sleeping Giant Provincial Park, Thunder Bay

Education

- B.A., Trent University

Certifications & Training

- Wilderness First Aid
- Basic Life Support CPR Provider A

Board of Directors

- Bird Studies Canada (1988 – 1993)
- Ontario Bird Banding Association (1988 – 1993)
- Kitchener Waterloo Field Naturalists – Board of Directors (1987 – 1992), Membership Director (1987 – 1989), President (1989 – 1990)

Employment History

- Savanta, Inc., 2011 - Present
- 604688 Ontario Inc., 2009 – Present
- Ontario Ministry of Transportation, 1984 - 2009

SAVANTA
A GEI Company

Megan Green **B.Sc.**

Ecologist

mgreen@savanta.ca
226.979.2079

Megan is an environmental professional specializing in ecosystem restoration and conservation biology. She has experience in the design and implementation of restoration initiatives using the most up to date guidelines outlined by local municipalities and conservation authorities. Megan has experience analyzing and applying natural heritage planning policies and ecological mitigation measures.

Since joining Savanta, Megan has been engaged in a range of natural heritage impact assessment activities including policy review/interpretation, and field data collection/analysis. Megan has strong oral and written communication skills and she regularly authors portions of impact assessment reports.

As an Ecologist, Megan is experienced in the identification of vegetation, reptiles, amphibians, mammals, and fishes. She has conducted surveys for various Species at Risk bats including Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, Tri-coloured Bat, as well as Barn Swallows. Her skills include researching natural heritage data and policies, querying key databases including provincial wildlife atlases and the Natural Heritage Information Centre, and reviewing conservation authority, municipal, and provincial policies and plans.

Megan is certified as an Ontario Benthos Bio-monitoring Network Practitioner, and she has gained both her Class 2 Electrofishing Backpack Crew Leader and her PADI Advanced Scuba Diving certifications.

Environmental Abatement Experience

As an Environmental Abatement Officer for the Henvey Inlet First Nation Wind Project in Pickerel Ontario, Megan actively facilitated the consistent implementation and oversight of Environmental Permit requirements. In this role, Megan promoted avoidance of adverse environmental effects and considered environmental protection laws and standards applicable to winter vegetation clearing activities. Megan prepared a daily environmental inspection report outlining the activities conducted, observations related to environmental protection and any non-conformance issues. Photographic records were completed daily to document compliance.

Select Project Experinece

- Henvey Inlet First Nation Wind Project, Pattern Energy and Nigig Power Corporation, Pickerel Ontario
- Patterson Creek Riparian Restoration Plan, Richmond Hill, Ontario
- Grand Niagara Ecological Restoration Plan, Niagara Falls, Ontario
- Wildlife Biologist for Bat Habitat Assessments, Various Projects, Ontario

- Sixteen Mile Creek Ecological Restoration Master Plan for Milton Phase 3, Milton, Ontario Bioacoustic Behavioural Monitoring of Coyote Populations, Niagara Falls, Ontario Heartland Forest Edge Habitat Restoration, Niagara Falls, Ontario
- Malcolmson Park Forest Habitat Restoration, St. Catharines, Ontario
- Biological and Oceanographic Baseline Studies in the Strait of Georgia, Victoria, British Columbia
- Coral Reef Surveyor for Marine Conservation Cambodia, Koh Rong Salomon, Cambodia

Education

- Graduate Certificate, Ecosystem Restoration, Niagara College
- B.Sc., Biology, University of Victoria

Professional and Other Affiliations

- Certified Environmental Professional in Training (EPt)
- Ontario Benthos Biomonitoring Network Practitioner

Certification and Training

- Ontario Stream Assessment Protocol (OSAP) Headwater Drainage Feature Technical Training
- Class 2 Backpack Electrofishing Crew Leader Certification

Employment History

- Savanta Inc., 2016 – Present: Ecologist
- Shaw Ocean Discovery Centre, 2014 – 2015: Aquarist Intern

SAVANTA
A GEI Company

Olivia Park **H.B.Sc.**

Ecologist

opark@savanta.ca
647.988.2849

Olivia is a trained environmental professional at Savanta who completed a Bachelor in Science (Honours) degree in Geological Sciences from Queen's University. After completing her degree at Queen's, she obtained a post graduate certificate in Ecosystem Restoration where she incorporated her geological knowledge into her environmental works. Olivia has a thorough understanding of earth system sciences including, but not limited to: sedimentology, rock stratigraphy, minerology, geochemistry, terrain evaluation, petrology, and hydrogeology.

While at Queen's University, she completed engineering courses focusing on carbon sequestration methods, with a portion of its focus on wetland systems. She also completed hydrogeology courses focusing on groundwater movement through diverse landscapes understanding sensitivity to subsurface complexities. She has also completed geochemistry courses here she completed a range of practical applications including isotopes and elemental tracers within soil and rock cores.

Following this, Olivia completed the Ecosystem Restoration post-graduate certificate at Niagara College, where she applied her hydrogeological and sedimentology knowledge to natural heritage features, including wetlands. She focused on understanding the importance of wetland function on the landscape for water storage and flood mitigation, and their ability improve water quality through the retention of sediment. Here, she developed an understanding of how fluvial and terrestrial systems interact, and how unstable fluvial systems benefit from increased wetland functions.

Since Olivia has joined Savanta, she has deepened her understanding of ecosystems and geological interactions within Southern Ontario. Through her field studies and research, she has contributed to many ecological reports, including Ecological Impact Studies (EIS) and Natural Heritage Studies (NHS). Olivia has worked to gather and synthesize background research information for clients at the onset of project commencement, including reviewing Ministry of Natural Resources and Forestry (MNRF) databases, Conservation Authority resources and mapping, and Non-Government Organizations references.

Select Project Experinece

Geological experience:

- Teaching Assistant for Dynamic Earth (GEOL 104)

Ecological Experience

- Grand Niagara Ecological Restoration Plan, Niagara Falls
- Patterson Creek Riparian Restoration Plan, Richmond Hill

- Twelve Mile Creek Aquatic Assessment and Gap Analysis, Trout Unlimited Canada, St. Catharines
- Malcomson Park Waterfowl Pond Restoration Plan, St. Catharines
- Niagara Escarpment Bat Hibernacula Monitoring, Niagara Region
- Milton Phase 4 Proposed Developments, South Milton
- Manchester Court Environmental Impact Statement, Caledon
- Solmar Bolton Comprehensive Environmental Impact Study and Management Plan, Bolton
- Port Credit West Village Environmental Impact Statement, Port Credit
- Shalem Property Environmental Impact Statement, Burlington
- Species at Risk and Woodland Assessment at 9000 Bathurst Street, Vaughan
- Aquatic Studies for Northwest Brampton Block 51-2 Pond Decommissioning, Brampton
- Mount Pleasant Natural Heritage System 2016 Monitoring Report for Ministry of Natural Resouces and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and Credit Valley Conservation (CVC)

Education

- Post Graduate Certificate Hons. Ecosystem Restoration, Niagara College (2016)
- B.Sc. (Hons.) Geological Sciences, minor in Environmental Studies, Queen's University (2015)

Professional and Other Affiliations

- Society for Ecological Restoration

Certification and Training

- Certified Ecological Restoration Practitioner in Training (CERPIT)
- Ontario Stream Assessment Protocol's Headwater Drainage Feature Assessment
- Ontario Stream Assessment Protocol's Level 2 Fish Identification
- Ontario Benthos Biomonitoring Network
- Class 2 Electrofishing Backpack Crew Leader
- Emergency First Aid with CPR "C" + AED
- Workplace Hazardous Materials Information System (WHMIS)

Employment History

- Savanta Inc. 2016 – Present: Ecologist
- Queen's University 2015: Teaching Assistant
- Savanta Inc. 2013 – 2015: Summer Intern

Heather Whitehouse **M.Sc.**

Senior Ecologist, Project Manager

hwhitehouse@savanta.ca
416.568.7284

Heather Whitehouse is a senior ecologist who manages and is lead advisor on terrestrial components of large scale multi-faceted projects, including: Official Plan appeals to natural heritage feature policies; Master Environmental Servicing Plans; Subwatershed Studies; Site Plan Approvals; Block Plans; and, Natural Heritage System visioning, design and implementation. Heather meets the needs of stakeholders by providing technical and professional leadership on projects of all sizes in order to satisfy regulatory requirements and develop collaborative implementation principles.

Heather has worked in both terrestrial and aquatic environments, and has expertise in wetland plant ecology. She has developed long-term ecological monitoring and annual field study programs, and is certified by the Ministry of Natural Resources to conduct Ecological Land Classification, wetland evaluations and Butternut Health Assessments.

Heather's clients cross a broad spectrum of industry sectors including urban development, sand and gravel quarries, mining, and municipal governments. Project work has taken her to central and northern Alberta, throughout Ontario to inland New Brunswick as well as rural Idaho.

Natural Heritage System Design & Ecological Restoration

Heather provided the vision and worked with engineers and landscape architects and developed the design for the terrestrial components of the 147 ha Mount Pleasant Natural Heritage System (NHS). Along and adjacent to the realigned East Huttonville Creek, new grassland and forested channels, an open water/ marsh wetland, tableland and slope forests were designed. She worked with the stakeholders to situate an ecologically appropriate trail route through the NHS and developed educational signs to engage and inform the local residents about the features and functions of the NHS.

Heather has collaborated with hydrologists, hydrogeologists and engineers to assess environmental sensitivities of a given wetland to future urban development, develop a suitable water balance model for palustrine wetlands, and determine water level inputs for low impact development technologies (i.e., roof drain collectors) for existing and new individual wetlands to persist post buildout.

Ecological Monitoring and Research

Heather has developed an Environmental Adaptive Monitoring Program for a golf course and hotel development, managed Species at Risk monitoring and permitting requirements for American Badger, Least Bittern, Bobolink, Barn Swallow and Eastern Meadowlark; and developed terrestrial baseline, and performance monitoring programs for new Natural Heritage Systems within future urban areas. As a wetland

ecologist Heather also evaluates wetlands for designation as provincially significant using the Ontario Wetland Evaluation System (MNRF 2014).

Heather evaluated Parks Canada's success in restoring hydrological connectivity between the Bow River and the Vermilion Lakes wetland complex. Through fieldwork, statistical analysis and report writing she examined whether the vegetation communities (i.e., open water, fen) changed in composition or diversity due to lowered water levels and also whether restoration work successfully reduced water impoundment. In her analysis of current and historical plant community and water level studies for the wetland complex, she recommended a reorientation of assessment criteria, and future vegetation and hydrological field studies.

In New Brunswick, Heather developed and conducted environmental monitoring programs for a mine closure plan. Two lakes, formerly used to generate electricity, were dewatered as part of the closure plans. Prior to dewatering Heather conducted a breeding bird survey in search of breeding pairs and nests and made mitigative recommendations based on legislation requirements including the Fisheries Act and the Migratory Bird Convention Act. Heather developed and implemented multiple years of a five-year wetland monitoring program for the natural lake whose water levels were restored to pre-mining times. Low-level aerial surveys followed by ground truthing occurred to capture the changes in vegetation communities and their succession over time. The amount and type of wetland communities that have established post dewatering was compared to pre-mining times and the need for a wetland compensation plan assessed.

Municipal/Regional Planning and Impact Assessment

Heather directs Environmental Impact Studies/Assessments, Natural Heritage Impact Studies, Natural Environmental Studies, and manages terrestrial components for Block Plan Environmental Implementation Reports and Subwatershed Studies. Her clients include large landowner groups and individual developers in both residential and commercial development, golf course developers, the aggregate industry, and municipalities.

Select Project Experience

- Northwest Brampton Landowner Group, Block 51-1 EIR, Mount Pleasant Natural Heritage System Design, and Environmental Monitoring Program, Brampton, ON.
- Official Plan Appeals on Natural Heritage Policies, York Region and Peel Region, ON
- Town of Richmond Hill, Bernard Key Development Area. Ecological conditions, constraints and restoration opportunities analysis, Richmond Hill, ON.
- Emery, Fieldgate Developments, Metrus Developments, and Trinson. Rouge Park boundary investigation and evaluation, Markham, ON.
- City of Brampton, Heritage Heights Subwatershed Study, Brampton, ON.
- Peel District School Board, Brittania Farm Master Plan Refresh, Mississauga, ON.

- Marsh, open water aquatic and riparian wetland design, various development areas across Ontario.
- Parks Canada, Vermilion Lake restoration program, Banff, AB.
- St. Marys Cement, Species at Risk Conservation and Management Plan, Presqu'ile Bay, ON. Block 51-1 Landowner Group, Trail alignment and design through significant woodland, Brampton, ON.
- SMC Bowmanville, Least Bittern Monitoring Program, Bowmanville, ON.
- Country Green Homes, American Badger Monitoring Program, Brantford, ON.
- DG Group, West Gormley, Richmond Hill. Environmental Monitoring Plan for external servicing in contributing Redside Dace habitat, Richmond Hill, ON.
- DG Group, West Gormley, Richmond Hill. Native Forest Planting Plan to provide overall benefit to Jefferson Salamander habitat, Richmond Hill, ON.
- Woodbine Entertainment Group, Site Plan Approval, including Environmental Adaptive Management Plan. Mohawk Racetrack Hotel and Golf Course Development, Campbellville, ON.
- Xtrata Gold. Heath Steele Mine Wetland Monitoring Program, Miramichi, NB.
- Metrus Development, Borer's Creek Dam Decommissioning and Fish and Wildlife Rescue Program, Waterdown, ON.
- St. Marys CBM, Level 2 Natural Environment Report, Proposed Eramosa Pit Extension, Eramosa, ON.
- Penn Energy Renewables, Ltd. Brantgate Solar Energy Facility, Natural Heritage Assessment: Records Review and Site Investigation Report, Brant County, ON.
- Easton's Group of Hotels, Natural Heritage Impact Study, 4050 Yonge Street, Toronto, ON.

Publications

- Nicholson, B.J., S.E. Bayley, and H.E. Whitehouse. 2006. Inferred history of a boreal pond from sediment and vegetation characteristics. Canadian Journal of Soil Science 86: 335-347.
- Whitehouse, H.E. and S.E. Bayley. 2005. Vegetation patterns and biodiversity of peatland plant communities surrounding mid-boreal wetland ponds in Alberta, Canada. Canadian Journal of Botany 83: 621-637.
- Whitehouse, H.E. 2005. An assessment of the community structure and diversity
- of the Vermilion Wetlands: Post restorative efforts to improve natural hydrologic connectivity. Parks Canada. Banff, Alberta, Canada.
- Whitehouse, H.E. 2004. Classification, diversity, and production of Alberta's boreal peatlands during a drought. M.Sc. Thesis. University of Alberta, Edmonton, Alberta, Canada.

Education

- M.Sc., Environmental Biology & Ecology, University of Alberta

- B.E.S., Environment and Resource Studies & Biology, University of Waterloo

Professional and Other Affiliations

- Society of Ecological Restoration
- Society of Wetland Scientists

Certifications and Training

- OMNR Ontario Wetland Evaluation System Certification
- OMNR Water Management & Wetland Restoration Certification
- OMNR Butternut Health Assessor (No.50) Certification
- Ecological Land Classification for southern Ontario Certification

Employment History

- Savanta Inc. 2007 – Current: Senior Ecologist, Project Manager
- EcoMetrix Inc. 2005 – 2007: Ecologist
- Independent Consultant: 2004 – 2005: Ecologist

SAVANTA
A GEI Company

Christopher Zoladeski **Ph.D**

Botanist, Senior Ecologist

czoladeski@savanta.ca
289.208.4150

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

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

Habitat Restoration

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

Impact Assessment

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

Wetland Delineation and Significant Woodlands

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

Select Publications

Books

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

- Zoladeski, C.A., Cowell, D.W. and Ecosystem Classification Advisory Committee. 1996. Ecosystem classification for the southeast Yukon: field guide, first approximation; Yukon Renewable Resources, Canadian Forest Service, Department of Indian and Northern Affairs and Northern Development, Whitehorse, Yukon, 409p.
- Zoladeski, C.A., Wickware, G.M., Delorme, R.J., Sims, R.A. and Corns, I.G.W. 1995. Forest ecosystem classification for Manitoba: field guide, special report 2; UBC Press, Vancouver, B.C., 205p.

Articles in Periodicals

- Zoladeski, C.A. 1991. Vegetation zonation in dune slacks on the Leba Bar, Polish Baltic Sea coast; Journal of Vegetation Science, v.2, p.255-258.
- Zoladeski, C.A. and Maycock, P.F. 1990. Dynamics of the boreal forest in northwestern Ontario; American Midland Naturalist, v.124, p.289-300.
- Zoladeski, C.A. 1989. Current status of rare vascular plants on Cape Enragé (Bic), Quebec; Le Naturaliste canadien, v.116, p.113-116.
- Zoladeski, C.A. 1988. New station for Malaxis paludosa, bog adder's-mouth orchid, in northwestern Ontario; The Canadian Field-Naturalist, v.102, p.548-549.
- Zoladeski, C.A. 1988. Classification and gradient analysis of forest vegetation of Cape Enragé, Bic Park, Quebec; Le Naturaliste canadien, v.115, p.9-11.

Select Project Experience

- Lead Botanist, Churchill Phase IV (Lands to the north) Environmental Impact Study, Orlando Corporation, Brampton
- Lead Botanist, Block 47-1 & 47-2 Environmental Impact Study for Block Plan, Brampton
- Lead Botanist, West Gormley Wetlands Construction Phase Monitoring as part of the Adaptive Management Plan, Richmond Hill
- Lead Botanist, Heritage Heights Secondary Plan Area, Northwest Brampton, Natural Heritage System Planning, Subwatershed Study and Impact Assessment
- Lead Botanist, Block 51-1 Mount Pleasant Community, Northwest Brampton, Environmental Implementation Report and Associated Vegetation Surveys, Multidisciplinary and Multi-Agency Analysis, Monitoring Natural Heritage System Implementation
- Lead Botanist, Boyne Secondary Plan Area, South Milton, Natural Heritage System Planning, Environmental Baseline and Species at Risk Studies, Subwatershed Impact Studies and Natural Heritage Feature Staking
- Environmental Impact Studies for golf course, aggregate and residential developments, Greater Toronto Area and Southern Ontario
- Pilot Grassland Restoration Project, The Ontario Aggregate Resources Corporation and Ontario Ministry of Natural Resources

- Lake Erie Sand Spit Savannas and Species at Risk: Invasive Species Inventory and Vegetation Restoration Strategy, Ontario Ministry of Natural Resources, Canadian Wildlife Service, Walker Industries, and LESSS Recovery Team
- Cherry Birch Recovery Strategy, Ontario Ministry of Natural Resources
- State of Aggregate Resources in Ontario Study: Paper 6 – Rehabilitation, Field Assessments, Ontario Ministry of Natural Resources
- Sustainable Forest Licence Audits, Ontario Ministry of Natural Resources

Education

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

Certifications and Training

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

Employment History

- Savanta Inc. 2009 – Current: Botanist, Senior Ecologist
- Stantec Consulting 2002 – 2009: Senior Scientist
- Toronto and Region Conservation Authority1999 - 2000: Co-ordinator, Natural Heritage Systems
- Geomatics International Inc. 1992 – 1999: Senior Ecologist
- Acres International Limited (1990-1992): Ecologist