



ENVIRONMENTAL IMPACT STUDY

**PORT CREDIT WEST VILLAGE
70 MISSISSAUGA ROAD SOUTH AND
181 LAKESHORE ROAD WEST
MISSISSAUGA, ON**

AUGUST 2017



Environmental Impact Study

**Port Credit West Village
Mississauga, ON**

Report Prepared for:

Port Credit West Village Partners

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Executive Summary

Port Credit West Village Partners Inc. is proposing to redevelop the former Imperial Oil refinery lands at 70 Mississauga Road South and 181 Lakeshore Road West (referred to as the Subject Lands), in the City of Mississauga. The Subject Lands are bound by Mississauga Road to the east, Lakeshore Road West to the north and private residences to the west. To the south, a strip of land owned by others (and not included within the proposed development) separates the Subject Lands from Lake Ontario. The proposed development, referred to as the Port Credit West Village, will be mixed-use with a variety of residential, commercial, institutional and open space land uses. The Subject Lands are a brownfield with a long history of heavy industrial use. They were formerly occupied by a brickwork manufacturing facility from the late 1800s until the 1930s, following by an oil refinery, which operated from 1932 to 1985, before being decommissioned in 1987 by Imperial Oil. Currently, the site is vacant with some remnant refinery infrastructure (e.g., internal facility roads, one building, water management infrastructure and an oil-water separator) and open space areas, dominated by cultural meadows and thickets, undergoing vegetation succession. Prior to commencement of development on the Subject Lands, an extensive environmental remediation program will be completed to ensure the Subject Lands meet the applicable Ministry of the Environment and Climate Change standards for the proposed land uses.

This 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 EIS addresses the City of Mississauga Natural Heritage System, as outlined in the City's Official Plan (City of Mississauga 2011). It also addresses Significant natural features and associated functions defined by the Provincial Policy Statement (PPS) (MAH 2014) and supporting technical guidelines. Also addressed are other features defined in the City's Official Plan, including Natural Green Spaces, Special Management Areas, Residential Woodlands and Linkages.

Existing background information related to the natural heritage features on and adjacent to the Subject Lands was reviewed to identify known features, values and functions. An ecological field investigation program was developed in consultation with the City of Mississauga, Credit Valley Conservation (CVC) and the Ontario Ministry of Natural Resources and Forestry (MNR) to fill data gaps related to natural heritage features and functions on the Subject Lands. Ecological investigations completed on the Subject Lands in 2017 included:

- Bird surveys (wintering waterfowl, general spring migration, spring shorebird surveys and breeding bird surveys);
- Insect surveys (random areas searches, Monarch habitat assessment and incidental observations during other studies);
- Amphibian surveys (amphibian call surveys, egg mass surveys);
- Reptile surveys (snake transect surveys, turtle basking and nesting surveys);
- Bat surveys (habitat assessment and acoustic monitoring);
- Fish and fish habitat assessments (fish community studies, visual spawning surveys, habitat assessment);

- Vegetation assessment (botanical inventory and Ecological Land Classification mapping); and
- Incidental wildlife observations.

A site visit was undertaken with staff from the City of Mississauga, CVC and the MNRF in August 2017 to review site conditions and discuss the findings of the ecological investigations on the Subject Lands.

The results of the background studies and ecological surveys were analyzed to determine if any of the components of the City of Mississauga Natural Heritage System (Significant Natural Areas, Natural Green Spaces, Special Management Areas, Residential Woodlots or Linkages) were present on or adjacent to the Subject Lands. This analysis concluded that the following features were present on or adjacent to the Subject Lands:

- Fish Habitat – within the Shale Pond (on the Subject Lands) and Lake Ontario (within 120 m of the Subject Lands);
- Natural Green Spaces – small, isolated wetlands not considered Significant Natural Features; and
- Linkage – along the Lake Ontario shoreline, which includes adjacent aquatic and terrestrial areas and a portion of the Subject Lands.

The proposed development will result in the removal of the fish habitat associated with the isolated Shale Pond (former brick extraction pit, then used as a storm water management pond during occupation by the oil refinery) on the Subject Lands. The pond, which is impacted with hydrocarbons (with an oily sheen visible on the water's surface) is not directly hydraulically connected to Lake Ontario, and will be dewatered to enable the excavation of impacted sediments. Fish in the pond, which consists of a population of tolerant common Fathead Minnow (*Pimephales promelas*) will be removed in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF. As a man-made, isolated feature, activities associated with the Shale Pond are not subject to review under the federal *Fisheries Act*.

Lake Ontario south of the Subject Lands provides habitat for a wide range of resident and transient fish species. Much of the habitat along the Lake Ontario shoreline is an open-coast environment, with limited habitat diversity associated with the armoured shoreline (rip rap and armour stone). No direct in-water work within fish habitat in Lake Ontario will be conducted, since Port Credit West Village Partners Inc. does not own the immediate shoreline area. The proposed development is located outside of the Erosion Hazard line (confirmed by Shoreplan Engineering Limited, provided under separate cover) and is also set back a minimum of 15 m from this line). However, site alteration activities, including grading and filling, installation of public use trails and landscaping, will be conducted on the Subject Lands, within 120 m of Lake Ontario. With appropriate mitigation (e.g., sediment and erosion control measures, spill prevention and response measures), no negative impacts on fish habitat in Lake Ontario are anticipated as a result of the proposed development.

Eighteen small, isolated, non-significant wetland communities on the Subject Lands, ranging in size from 50 m² to 0.10 ha (for a total wetland area of 0.80 ha) will be removed to facilitate the

proposed environmental remediation process and/or the proposed development. These wetlands are of cultural origin (created by the removal of site infrastructure and grading during the oil refinery decommissioning process or within the man-made shale pond) and they provide limited ecological function, due to their small size, isolated nature, lack of hydrological connection to watercourses, lack of floristic diversity and dominance by invasive species including European Reed (*Phragmites australis* ssp. *australis*). Removal of these small, isolated, will result in the loss of 0.80 ha of low functioning wetland habitat. Their removal will not negatively impact the City's Natural Heritage System, given that these wetlands:

- Are of cultural origin;
- Were created through infrastructure removal, compaction and grading of the decommissioned oil refinery;
- Do not meet the requirements of any significant natural features under the PPS; and
- Occur in contaminated soil conditions.

Removal of the wetlands will remove a source of contamination and invasive species. The proposed water feature that may be created within the development open space system may develop wetland characteristics over time and may provide similar wildlife habitat functions with improved environmental quality due to site remediation.

The Lake Ontario shoreline corridor, including the lake and adjacent terrestrial lands on and adjacent to the Subject Lands boundary has been identified as an important Linkage habitat, primarily for migratory birds and butterflies migrating along the north shore of Lake Ontario. A temporary and localized decrease in the function of the migratory linkage will occur as the development is constructed. To maintain the linkage function post-development, a vegetated corridor will be maintained as part of the open space/public park at the southern end of the Subject Lands and the area will be planted with a variety of trees, shrubs and meadow species to provide beneficial stopover and foraging functions for migratory species, and therefore, no net negative impacts on the Linkage function of the shoreline are predicted to occur. Additionally, maintenance of the linkage function does not require the applicant to incorporate the southern waterfront lands, which are not part of this application, into the development in order to satisfy the linkage use.

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., vegetation plantings within the portion of the linkage corridor on the Subject Lands) have successfully established.

In summary, this EIS concludes that the development on the Subject Lands can be completed without net negative impacts on the identified natural heritage features and associated functions. Further, remediation of the existing contamination on the property (occurring through decades of heavy industrial use), is anticipated to result in substantial improvements to the overall environmental quality in the Subject Lands and neighbouring areas.

1.0 INTRODUCTION

Savanta Inc. (Savanta) was retained by Port Credit West Village Partners Inc. (PCWVP) to complete an Environmental Impact Study (EIS) for their lands at 70 Mississauga Road South and 181 Lakeshore Road West (herein referred to as the Subject Lands), within the City of Mississauga, Ontario (**Figure 1, Appendix A**). The proposed mixed-use development, referred to as the Port Credit West Village, is generally bound by Mississauga Road South to the east, Lakeshore Road to the north, a strip of waterfront shoreline not subject to this application to the south and private residential properties to the west. The Subject Lands are approximately 29.2 ha (72.04 acres) in area and are legally described as Lot 10 and Part of Lots 9 and 11, Broken Front Range, Credit Indian Reserve.

The Subject Lands were formerly occupied by a brickwork manufacturing facility from the late 1800s until the 1930s, following by an oil refinery, which operated from 1932 to 1985, before being decommissioned in 1987 by Imperial Oil. Currently, the site is a vacant brownfield with some remnant infrastructure (e.g., internal facility roads, one small building and an oil-water separator) and open space areas undergoing vegetation succession. The open spaces are dominated by cultural meadow and cultural thicket communities. There is an isolated man-made pond on the Subject Lands (referred to as the Shale Pond) which was originally created by the excavation of shale for brickmaking prior to 1932 and was later used as a stormwater management pond for the refinery.

1.1 Land Ownership

The Subject Lands at 70 Mississauga Road South and 181 Lakeshore Road West, as shown in **Figure 7 (Appendix A)** are owned by PCWVP. This includes a narrow water lot extending out into Lake Ontario. The narrow strip of land between the Subject Lands and Lake Ontario is not owned by PCWVP and is not part of this application. No development or site alteration activities will occur outside the Subject Lands.

1.2 Purpose of the Report

An EIS is required to assess the potential impacts of the proposed development on the natural heritage features and associated functions on the Subject Lands. This work considers applicable provincial and municipal requirements and policies including reference to the natural heritage policies of the Province of Ontario's Provincial Policy Statement (PPS; MMAH, 2014), associated provincial implementation guidance contained in the Natural Heritage Reference Manual (NHRM; MNR 2010), and the City of Mississauga's Official Plan (City of Mississauga 2011).

The EIS is a requirement of the municipal planning process and is intended to address the policies of the Regional Municipality of Peel, the City of Mississauga and Credit Valley Conservation (CVC).

The study components included:

- A review of existing natural heritage background information, policies and legislation applicable to the Subject Lands in its regional context;

- A field review of the natural heritage 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 whether any of the existing natural heritage features within the Subject Lands meet the test of 'significance' as identified by the PPS, or the requirements to be part of the City's Natural Heritage System, as identified in the Official Plan (City of Mississauga 2011);
- A description of the proposed undertaking and development proposal;
- Identification and discussion of the potential impacts that could occur to the natural heritage features as a result of the proposed development;
- Recommendations for mitigation to avoid or minimize impacts; and,
- Opportunities for the enhancement or restoration of natural features.

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:

- Region of Peel Official Plan (2016);
- City of Mississauga Official Plan (2011);
- Credit Valley Conservation policies;
- Provincial Policy Statement (PPS) 2014;
- Provincial *Endangered Species Act, 2007* (ESA); and
- Federal *Fisheries Act*.

The relevant portions of each of these, as they apply to the Subject Lands and the proposed development, are discussed in the following sections.

2.1 Region of Peel Official Plan

The Region of Peel Official Plan (Region of Peel 2014) identifies a Greenlands System, which is 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:

- 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 2014) indicates that “core areas represent provincially and regionally significant features and areas and are considered a sub-set 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 aquatic endangered or threatened species.

Section 2.3.2.6 of the Region of Peel Official Plan 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”.

The Region of Peel Official Plan (Region of Peel 2014), Schedule A (Core Areas of the Greenlands System in Peel) does not identify any Core Areas of the Peel Greenlands System on or immediately adjacent to the Subject Lands, although a site-specific EIS is required to confirm if any of the features making up Core Areas are present.

2.2 City of Mississauga Official Plan

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 Natural Heritage System (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.

As presented on Schedule 3 (Natural System) within the Official Plan (City of Mississauga 2011), no Natural Heritage System components are currently identified on or adjacent to the Subject Lands. Directly south of the Subject Lands, along the Lake Ontario shoreline, a Natural Hazard has been identified. Development is prohibited within these natural hazard areas due to naturally occurring processes (flooding, erosion). Hazard mapping prepared by Shoreplan Engineering Limited is provided under separate cover.

2.3 Credit Valley Conservation

CVC conducts reviews of planning processes associated with future development of properties within its jurisdictional boundaries. In addition, 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*. In addition to their regulatory responsibilities, CVC provides advice as both a watershed-based resource management agency and through planning advisory services.

CVC administers the *Development, Interference with Wetlands, Alterations to Shorelines and Watercourses Regulation*, (O. Reg.) 160/06, which 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.

CVC implements its authority under O.Reg. 160/06 in accordance with the Watershed Planning and Regulation Policies (CVC 2010).

2.4 Provincial Policy Statement and Associated Guideline Documents

The PPS 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 reference to other policies with relevance 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;
- Fish habitat;
- Habitat of endangered and threatened species; and,

- Significant areas of natural and scientific interest (ANSIs).

Development and site alteration shall not be permitted in significant wetlands or significant coastal wetlands. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, significant wildlife habitat 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 significant natural heritage features (i.e., within 120 m of the Subject Lands, as identified in the Natural Heritage Reference Manual; MNR 2010) provided it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

2.5 Ontario Endangered Species Act (ESA), 2007

The provincial ESA was developed to:

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

The ESA protects all threatened, endangered and extirpated species listed 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.

2.6 Federal *Fisheries Act*

Fisheries and Oceans Canada (DFO) administers the federal *Fisheries Act* which defines fish habitat as “spawning grounds and any other areas including nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes”. Section 35.1 of the *Fisheries Act* prohibits serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.

Serious harm to fish is defined as:

- the death of fish;
- a permanent alteration to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;
- the destruction of fish habitat of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one

or more of their life processes.” (DFO 2013).

In terms of potential involvement of the DFO, the amended federal *Fisheries Act*, (November 25th, 2013) shifted the onus to the proponent to ensure that a project is in compliance with the federal *Fisheries Act*. The DFO website page “Self-Assessment: Does DFO need to review my project”, lists project activities and criteria where DFO review is not required [<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>]. Projects not qualifying for self-assessment should be reviewed by DFO to determine if they have potential to cause serious harm to fish. Serious harm can be authorized by DFO under Paragraph 35(2)(b) of the *Fisheries Act*.

Given that the Shale Pond, which does provide fish habitat for an isolated population of Fathead Minnow, is man-made and not hydraulically connected to any other fisheries waters, activities associated with remediation of the pond are not subject to review by DFO under the *Fisheries Act*.

Further, given that no in-water work will be conducted in Lake Ontario, and all development and site alteration activities will be set back from the high-water mark, and standard construction site mitigation measures will be used to prevent negative effects (e.g., erosion and sedimentation controls, spill prevention and response plans), the self-assessment concluded that DFO review of the project as currently proposed is not required.

3.0 DATA COLLECTION APPROACH & METHODS

3.1 Background References

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

- Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario (LIO) Natural Features Mapping;
- Natural Heritage Information Centre (NHIC) database;
- Provincial wildlife atlases (i.e., Ontario Breeding Bird Atlas, etc.); 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 a search of the MNRF LIO geographic database, the only mapped feature on or adjacent to the Subject Lands is an isolated pond (the former Shale Pond originally excavated to obtain shale for brickmaking and later used as a stormwater management pond for the Imperial Oil refinery), as shown in **Figure 2 (Appendix A)**. There are no mapped woodlands on the Subject Lands. The closest woodland is approximately 600 m northwest. There are no mapped wetlands on the Subject Lands. The closest wetland is the Credit River Marshes Wetland Complex, a Provincially Significant Wetland (PSW), located approximately 550 m north of the Subject Lands, along the Credit River. The Credit River Marshes are also part of an Environmentally Sensitive Area (ESA) and the Credit River Coastal Marsh regionally significant ANSI. The Lorne Park Prairie regionally significant ANSI is located approximately 450 m northwest of the Subject Lands.

3.1.2 Natural Heritage Information Centre Database

The NHIC database, maintained by the MNRF, was searched for records of provincially significant plants, vegetation communities and all forms of wildlife on, and in the vicinity of the Subject Lands. The database provides occurrence data by 1 km² area blocks, which overlap with areas outside of the Subject Lands. Four blocks contain information pertaining to the Subject Lands: 17PJ1422, 17PJ1322, 17PJ1221 and 17PJ1421. Within these blocks, the search revealed 26 records (**Table 1, Appendix B**), 20 of which had an element occurrence rank of 'Historical' (greater than 50 years old) or not ranked as Species of Conservation Concern or Species at Risk. These species are not addressed as current occurrences in this reporting.

Two species at risk were identified in the NHIC database as being previously observed within the general vicinity of the Subject Lands: Eastern Musk Turtle (*Sternotherus odoratus*) and Common Snapping Turtle (*Chelydra serpentina*). Both are both listed as Special Concern in Ontario. Additionally, four vegetation species were documented in the NHIC database as being previously observed within the general vicinity of the Subject Lands that are Species of

Conservation Concern: Cleland's Evening Primrose (*Oenothera clelandii*) and Fall Crabgrass (*Digitaria cognata*), which are both S1 ranked species in Ontario, Kansas Hawthorn (*Crataegus coccinioides*), which has a S2 rank in Ontario, and Sundial Lupine (*Lupinus perennis*), which has a S2S3 ranking in Ontario. This information assisted in defining the search effort and target species for studies on and immediately adjacent to the Subject Lands.

3.1.3 Ontario Breeding Bird Atlas

The Ontario Breeding Bird Atlas (OBBA) contains detailed information on the population and distribution status of Ontario birds (2005). The data is presented on 10 km x 10 km squares. The data square that overlaps with the Subject Lands was used to determine the potential bird species list for that area. 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 are found within the Subject Lands. Habitat type, availability and size are all contributing factors in bird species presence and use.

A total of 102 bird species were recorded in the OBBA in the atlas square (17PJ12) that overlaps with the Subject Lands. Of the species reported in the OBBA in the atlas square, five are Threatened in Ontario: Chimney Swift (*Chaetura pelagica*), Barn Swallow (*Hirundo rustica*), Bank Swallow (*Riparia riparia*), Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*); and four are Special Concern in Ontario: Peregrine Falcon (*Falco peregrinus*), Common Nighthawk (*Chordeiles minor*), Eastern Wood-Pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*). This information assisted in defining the search effort and target species for studies on, and immediately adjacent to, the Subject Lands.

3.1.4 Ontario Reptile and Amphibian Atlas

The Ontario Herpetology Atlas contains detailed information on the population and distribution status of Ontario reptiles and amphibians (Ontario Nature 2016). The data are presented on 10 km x 10 km squares. The data square that overlaps with the Subject Lands was used to determine the potential herpetofauna species list for that area. It should be noted that the Subject Lands are a small component of the overall herpetofauna atlas square, and therefore it is unlikely that all herpetofauna species are found within the Subject Lands. Habitat type, availability and size are all contributing factors in herpetofauna species presence and use.

A total of 24 species were recorded in the Ontario Herpetology Atlas in the atlas square (17PJ12) that overlaps with the Subject Lands. Of the 24 herpetofauna species reported in the Ontario Herpetology Atlas as being previously observed within the atlas square, six are turtle species, six are snake species, five are salamander species and seven are frog and toad species. The atlas square search results show one is Endangered in Ontario: Jefferson Salamander (*Ambystoma jeffersonianum*); one is Threatened in Ontario: Blanding's Turtle (*Emydoidea blandingii*); two are Special Concern in Ontario: Snapping Turtle (*Chelydra serpentina*) and Northern Map Turtle (*Graptemys geographica*); and one is Special Concern in Canada: Milksnake (*Lampropeltis Triangulum*).

This information assisted in defining the search effort and target species for studies on and immediately adjacent to the Subject Lands.

3.1.5 Ontario Insect Atlas

The Ontario Insect Atlas contains detailed information on the population and distribution status of Ontario insects. The data is presented on 10 km x 10 km squares. The data square that overlaps with the Subject Lands was used to determine the potential insect species list for that area. Habitat type, availability and size are all contributing factors in insect species presence and use.

A total of 42 species and 351 records were recorded in the Ontario Insect Atlas as previously being observed within the atlas square (17PJ12) that overlaps with the Subject Lands. Of the 42 species, one is considered Species at Risk: Monarch (*Danaus plexippus*), listed as a Special Concern species in Ontario.

3.1.6 Fisheries and Oceans Canada Aquatic Species at Risk Distribution Mapping

A review was conducted of the DFO aquatic species at risk distribution mapping that illustrates the distribution and population status of Species at Risk fish and mussels in Ontario. The Subject Lands are located on Ontario South West, Map 11 (DFO 2017).

While no aquatic species at risk were identified on the mapping as being present within the Subject Lands, two species ranked as Special Concern on the federal *Species at Risk Act* were identified in Lake Ontario adjacent to the Subject Lands: Deepwater Sculpin (*Myoxocephalus thompsonii*) and Upper Great Lakes Kiyi (*Coregonus kiyi*). Deepwater Sculpin are most often present between 60 m and 150 m deep (COSEWIC 2006) and would therefore not be expected to be present in the Lake Ontario shoreline area, adjacent to the Subject Lands. The Lake Ontario population of Upper Great Lakes Kiyi is considered to have gone extinct in 1964 (DFO 2016) and therefore, is not expected to occur in Lake Ontario adjacent to the Subject Lands.

Additionally, the aquatic species at risk distribution mapping also identified three species that are identified as Extirpated, Endangered or Threatened on the federal *Species at Risk Act* as being potentially present in the Credit River north and east of the Subject Lands, although the mapping does not distinguish if all of these species were present in this area, or if they were present within other areas of the map space. Eastern Pondmussel (*Ligumia nasuta*) was noted on the DFO mapping (2017) as being present on the map space, but mapping prepared by NHIC (2012) does not indicate that this species is present in Lake Ontario or the Credit River, and therefore, this species is not anticipated to be present on or adjacent to the Subject Lands.

Shortnose Cisco (*Coregonus reighardi*), which is also identified as Endangered on the ESA, 2007, is known to be present in Lake Ontario, but typically at depths between 22 m to 110 m, and was last seen in Lake Ontario in 1964 (MNR 2017). Therefore, this species is not likely present in the portion of Lake Ontario adjacent to the Subject Lands. The DFO mapping also identified Redside Dace (*Clinostomus elongatus*) as being potentially present in the Credit River. This species was also identified during the NHIC review (Section 3.1.2), but the observation was greater than 50 years old and therefore, considered to be an historical observation. Based on existing habitat conditions, it appears unlikely that this species remains present in the lower Credit River.

3.2 Technical Methods and Field Studies

Savanta completed field surveys and natural environment inventories on and adjacent to the Subject Lands over several months in 2017. The field investigations included seasonal botanical inventories (late spring and early summer), Ecological Land Classification (ELC) of vegetation communities, wintering waterfowl surveys, spring bird migration surveys, spring shorebird surveys, breeding bird surveys, targeted grassland SAR bird surveys, breeding amphibian surveys, reptile surveys, insect surveys, bat surveys, fish community surveys, fish habitat assessment and incidental wildlife observations. Some additional commentary regarding ecological field methods are presented in the following sections, and **Table 2 (Appendix B)** lists field dates and personnel engaged. Sampling locations associated with the field studies discussed below are shown in **Figure 3 (Appendix A)**. In addition to the studies noted below, ecological investigations will continue along the shoreline through late summer, fall and winter 2018 to assess migratory butterfly and wintering waterfowl use of the area.

3.2.1 Vegetation and ELC Methods

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. 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).

3.2.2 Wildlife Survey Methods

Bird Surveys

a) Wintering Waterfowl Surveys

All of the adjacent Lake Ontario shoreline to the south of the Subject Lands (**Figure 3, Appendix A**) was walked slowly with regular stops approximately every 50 m. Waterfowl and other waterbird species were recorded, avoiding double counting whenever possible. Observations were made with Ziess 10X50 Trinovid binoculars and a Swarovski HD 81 mm telescope. Individual birds were typically categorized as either within or beyond 250 m of the shoreline. This delineation was used to approximate near-shore use by the species recorded. Maximum distance of observation was used on every visit, and fly-past birds were also tallied. Four surveys were completed between March 2 to March 31, 2017. Wintering waterfowl surveys will continue in winter 2017/2018.

b) General Spring Migration Surveys

Area searches that covered the entire Subject Lands were employed during all surveys. This included walking the Winter Waterfowl Survey route. While no two surveys followed the same route, complete coverage was ensured during all visits. Observations were made with Ziess 10X50 Trinovid binoculars. All species of birds observed and heard were recorded, making an effort to avoid double counting (LPBO 2005). When visible diurnal migration was observed over the Subject Lands, it was noted for the particular species. Any evidence of breeding, if observed, was recorded during site visits. Each survey required 3 hrs to 3.5 hrs; surveys were conducted from March 21 to May 29, 2017, occurring approximately every 10 days.

c) Shorebird Surveys

One location was chosen to observe shorebird migration (**Figure 3, Appendix A**) along the Lake Ontario shoreline adjacent to the Subject Lands. Maximum field of view and proximity to flypast birds was best from this location, similar to protocols used at Col. Sam Smith Park in Etobicoke. Observations were made with Ziess 10X50 Trinovid binoculars and a Swarovski HD 81 mm telescope. Maximum distance of observation was used on every visit. Observations began on 21 April and continued through May, roughly every 10 days. A total of four surveys were completed, with one every 2 days to 3 days from May 22 to May 29, 2017, to capture the main window of shorebird passage through the area.

d) Breeding Bird Surveys

Breeding bird surveys were conducted following protocols 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).

Surveys were conducted between dawn and five hours after dawn with suitable wind conditions, no thick fog or precipitation (Cadman et al. 2007). Four point-count stations, shown in **Figure 3 (Appendix A)** were 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 was surveyed for 10 minutes for birds within 100 m and outside 100 m. All species recorded on a point-count were mapped to provide specific spatial information and were observed for signs of breeding behaviour. Surveys were conducted on May 26, June 15 and July 4, 2017, meeting the criteria for surveys to be at least 10 days apart.

During breeding bird surveys, vegetation was assessed for potential presence of Species at Risk habitat. If suitable habitat was encountered or individuals were observed standard protocols were utilized.

Open grassland habitat was surveyed according to the MNR (2012) Guidelines for Bobolink and Eastern Meadowlark. Point count stations (discussed above) were located within open cultural meadows on the Subject Lands. Area searches were also conducted between the 10-minute point count stations.

Both the Natural Heritage Information Centre (NHIC 2016) database and the Species at Risk in Ontario (SARO) list (Ontario Regulation 230/08) were reviewed to determine the current provincial status for each bird species.

Amphibian Surveys

Four rounds of evening amphibian call-count surveys (AMC) and one round of daytime amphibian egg mass surveys (EMS) were conducted. Survey stations were identified using a preliminary review of aerial photography and/or during earlier site reconnaissance surveys. Stations were verified in the field to confirm the presence of suitable breeding habitat.

a) Amphibian Call-count Surveys (AMC)

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 at least 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. A fourth visit was conducted to confirm if Bullfrog (*Lithobates catesbeianus*) were present, after a surveyor thought they incidentally heard Bullfrog calling from the Subject Lands during completion of a breeding bird survey.

A total of five stations were selected for monitoring, as shown on **Figure 3 (Appendix A)**, based on the presence of potentially suitable habitat conditions during the first round. Each station was surveyed for six minutes and a three-level call category system was used to identify the level and type of frog activity. If noise from plane, road traffic and/or trains was present, monitoring was delayed and began during a quiet period.

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 the station.

b) Amphibian Egg Mass Surveys (EMS)

These surveys were conducted for salamanders, frogs and toads during daylight hours in April 2017. EMSs were conducted at all AMC stations, except for AMC2 which was fenced off and access was not possible (**Figure 3, Appendix A**) and were observational/qualitative in nature, focusing on visual searches for tadpoles and egg masses. Area searches were conducted at all stations; these included walking the perimeter of the Shale Pond while scanning for egg masses and tadpoles. Any submerged sticks or shrubs standing in the water, to which eggs might be attached, were carefully checked with minimal intrusion into the Shale Pond. For each station,

the survey was completed when a complete check of locations where egg masses or tadpoles may be attached had occurred, or within a 30-minute allotment, whichever was less.

If observed, the number of individuals of each amphibian species would have been recorded and the life stage would be noted (e.g., egg mass, tadpole or adult). Characteristics of the breeding habitat were also noted, including: pool shape, water depth, water temperature, canopy cover, in-feature vegetation, presence of suitable egg attachment sites, and observations of predatory fish. Also, logs or debris in the vicinity of each area were checked for presence of adult salamanders (all such items were returned to their original location/position to maintain microhabitat conditions).

Both the NHIC (2016) database and the SARO list (Ontario Regulation 230/08) were reviewed to determine the current provincial status for each amphibian species recorded on the Subject Lands.

Reptile Surveys

a) Turtle Surveys

These surveys identify the presence and abundance of turtle species in open water habitats, contributing to an understanding of habitat diversity and quality. Species at risk and/or significant wildlife habitat are also identified through these methods.

Potentially suitable aquatic habitat for turtles (e.g., ponds, open wetlands, and riparian/lacustrine areas) was identified using aerial photography. Four surveys were conducted in the spring to search for basking turtles and one search was undertaken to screen potential nesting areas for evidence of use. Surveys occurred in spring/early summer and were conducted between 8:00 AM and 2:00 PM on sunny days with temperatures between 10°C and 25°C, or after a day of rain. Survey stations are identified on **Figure 3 (Appendix A)**.

Binoculars were used to scan the edges and surface of the Shale Pond (the only suitable habitat on the Subject Lands) and the pond in JC Saddington Park, for basking turtles, from a distance, for a 10-minute period. Data recorded included: water and air temperatures (basking prevalent when air is warmer than water), vegetation composition around the water body, and presence of basking features (logs, floating vegetation mats, floating / emergent debris like tires).

Candidate nesting areas include: shores/beaches of wetlands, lakes or rivers; trails and driveways; and farm field margins, etc., so long as suitable substrate and sun exposure are present.

b) Snake Surveys

Preliminary aerial photography review was performed to identify suitable snake habitat (e.g. cultural meadow, disturbed meadow, wetland edges, cultural woodland, cultural savannah, remnant buildings). Transects, as shown on **Figure 3 (Appendix A)** were walked for basking snakes or snake mortalities. Surveys focused on searching natural cover, like logs and debris (boards). All objects were replaced as they were found, to reduce disturbance. Data recorded

during snake surveys included species observed and locations (UTM coordinates), air temperature, start and end time, and weather conditions.

Insect Surveys

Random area searches for insects, including Odonates (dragonflies and damselflies) and butterflies were conducted during the first and second round breeding bird surveys in mid-June and early July 2017. Incidental observations of insects were also noted during all general spring bird migration surveys conducted in March, April and May 2017.

The distribution and abundance of Milkweed (*Asclepias syriaca*), the host breeding plant for Monarch, on the Subject Lands was mapped and assessed during botanical surveys in 2017.

Bat Surveys

a) *Habitat Assessment*

The Subject Lands were assessed through aerial interpretation and ELC to identify whether any forest communities were present that would be suitable for bat maternity roosts. The habitat assessment was completed using criteria provided in “Survey Protocols for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis, and Tri-Coloured Bat” (MNRF 2017), and as described in Province’s Significant Wildlife Habitat Criterion Schedule for Ecoregion 7E (MNRF 2015). No forest communities exist on the property, and therefore the Subject Lands do not meet the habitat requirements for Bat Maternity Colonies.

Isolated trees, hedgerows, and trees over 10 cm Diameter at Breast Height (DBH) are present on the Subject Lands. These types of habitats could potentially provide roosting habitat for Species at Risk bats and were further assessed for presence of SAR bats through acoustic surveys.

b) *Acoustic Surveys*

Surveys to detect bat species by ultrasonic recording devices were carried out on the Subject Lands on June 5, June 13, and June 24, 2017, using Wildlife Acoustics EchoMeter Touch (EMT) and Pettersson M500-384 recording devices.

Survey sites, as shown in **Figure 3 (Appendix A)**, were selected based on aerial interpretation, ELC vegetation community types, and ground-truthing for suitable bat micro-habitat such as clusters of ≥ 10 cm dbh trees with peeling bark, leaf clusters, and cavities, along the edges of hedgerows, and in areas where trees are proposed to be removed.

Surveys were conducted starting no earlier than sunset and ending no later than sunrise when temperatures were $>10^{\circ}\text{C}$ with low winds and no precipitation. In addition, the EMT and Pettersson microphones were elevated approximately 2 m above the ground to reduce background noise during transect walks and at point-count stations.

Table 3 (Appendix B) summarizes the dates and times, and weather conditions encountered during bat acoustic surveys.

Fisheries Surveys

a) Shale Pond Fish Community Survey

A fish community survey was completed within the Shale Pond to confirm if fish were inhabiting the pond, and if so, what species and life stages were present. Accessible areas of the shallow shoreline of the pond were assessed using a backpack electrofisher (Halltech HT-2000) on June 21, 2017. The survey protocol consisted of electrofishing areas around the periphery that could be safely waded (e.g., shallow and suitable walking surface), as shown on **Figure 4 (Appendix A)**.

Eight minnow traps, baited with bread, were installed around the shoreline on June 21, 2017, in a variety of habitats including cattails and other emergent vegetation, boulders and steeper drop offs along the shoreline, as shown in **Figure 4 (Appendix A)**. Minnow traps were retrieved after approximately 24 hours, any fish and invertebrates were removed and fish were identified to species and enumerated before being released back into the pond at the capture location. After the contents were removed, the traps were reset for an additional 24-hour period, before being removed on the afternoon of July 23, 2017. All fish and invertebrates captured during this set were identified, enumerated and released back to the pond.

Any incidental observations of fish in the pond during these surveys were recorded.

b) Bass and Sunfish Spawning Surveys

Visual spawning surveys were completed in the Shale Pond and along the Lake Ontario shoreline fronting the Subject Lands on May 15 and June 8, 2017 to identify if bass or sunfish species were nesting in the area. The surveys were conducted under calm, sunny conditions and observers used polarized sunglasses to enhance in-water viewing. Surveys consisted of walking the perimeter of the Shale Pond and Lake Ontario shoreline, viewing the bottom in accessible areas, as shown on **Figure 4 (Appendix A)**. The bed of the area was observed for presence of bass or sunfish and any observations of nesting (e.g., nest presence, fish on or defending nests). Any nests or nesting activity observed would have been documented and locations recorded with GPS. Any incidental observations of other fish in either area were also recorded during the survey.

3.2.3 Aquatic Habitat Assessment

An Aquatic Habitat Assessment, consisting of a visual survey of existing instream and riparian habitat conditions within the Shale Pond and along the Lake Ontario shoreline fronting the Subject Lands, was completed on March 7, 2017 with supplemental observations on May 15, 2017. The following characteristics and features were noted during the assessment of each watercourse:

- Wetted width and depth of the Shale Pond (at time of survey);
- Bed and shoreline substrate;
- Instream habitat (e.g., woody debris, aquatic vegetation, undercut banks);
- Evidence of channel bed and bank erosion;

- Riparian habitat; and
- Presence of fish (based on visual observations).

A photographic record of habitat conditions on and adjacent to the Subject Lands was collected during the assessment.

4.0 BIO-PHYSICAL CHARACTERIZATION

4.1 Physiography and Topography

The Subject Lands are located in the Lower Credit River Watershed, within the Peel Plain physiographic region, which is dominated by clay soils (MNRF and CVC 2002). CVC (2008) describes the Peel Plain as “flat to undulating topography consisting of clay soils deposited when glacial melt water ponded on top of the low permeability Halton Till Plain”. The Halton Till lies on top of Queenston Shale bedrock (Karrow 1991; cited in CVC 2008), which is exposed in some locations around the Shale Pond. This bedrock unit consists of thin to thickly-bedded red shale (CVC 2008).

The site is relatively flat, with some undulation created when buried infrastructure (e.g., oil tanks) was removed during the refinery decommissioning process. Numerous stockpiles of soil and debris are scattered throughout the area. The Shale Pond, situated at elevation 75.99 meters above sea level (masl) is the lowest point on the Subject Lands, being approximately 5 m lower than the adjacent tablelands to the east and north. The lands to the western side of the Shale Pond are also lower than the surrounding lands, a remnant of the topography associated with the operating refinery. The southeastern corner of the Subject Lands is also slightly lower than the majority of the site, since it was formerly the location of a boat slip that was filled during the refinery decommissioning process. A berm is present along much of the area adjacent to the Lake Ontario shoreline and waterfront trail. The tablelands adjacent to the shoreline range from approximately 3 m to 10 m above the lake water level.

4.2 Landscape Ecology

The Subject Lands are in the Port Credit urban area of the City of Mississauga. The Subject Lands are in a process of natural regeneration following decommissioning of the Imperial Oil refinery in 1987. They are surrounded by mature, low density residential communities on the northeast and southwest sides, J.C. Saddington Park to the east and commercial developments associated with Lakeshore Road to the northwest. A strip of Lake Ontario shoreline, under separate ownership, borders the Subject Lands to the south and the waterfront trail runs across the southern end between the Subject Lands and the lake.

From a landscape ecology perspective, the Subject Lands are generally isolated from other terrestrial natural features, being surrounded on all three sides by heavily developed urban lands. However, connection to the shoreline and Lake Ontario results in portions of the Subject Lands providing an important ecological linkage, particularly for birds and butterflies migrating along the lake shoreline in the spring and fall. However, given the adjacent residential areas, the shoreline does not provide a consistent migration corridor for land-based mammals. Migratory birds and insects were found to make periodic use of some portions of the Subject Lands during the spring migration period, as will be discussed in future sections of the report.

The Credit River mouth is located approximately 375 m northeast of the Subject Lands. The lands adjacent to the mouth of the river are generally developed with commercial and open space uses including JC Saddington Park, JJ Plaus Park, the Port Credit Marina, several commercial establishments and a residential apartment building. Regardless of the level of development, the Credit River provides an important ecological corridor from Lake Ontario to

natural areas further upstream. This includes fish species that migrate into the Credit River for spawning purposes (e.g., migratory salmon and trout) and birds and insects that migrate up and down the valley, to and from the lake.

4.3 Vegetation

The results of the ELC mapping and botanical investigations on the Subject Lands are discussed in the following sections. These surveys documented vegetation communities and species on the Subject Lands and provide baseline information to allow a determination of sensitivity and provincial and/or regional significance.

4.3.1 Ecological Land Classification

The Subject Lands consist predominantly of cultural meadow habitat on the lands of the former oil refinery, which was decommissioned in 1987. Due to this former land use, habitat is often influenced by degraded soil and mounds of debris (e.g. concrete). Areas where past soil removal or grading have occurred often exhibit poor drainage, which has created small wetland pockets scattered throughout the Subject Lands. These wetlands are typically less than 0.1 hectares and often consist of European Reed. Shallow surface water (≤ 15 cm) was observed in many of these wetlands in June but most were dry in July.

ELC mapping of the Subject Lands is shown on **Figure 5 (Appendix A)**. A detailed list and description of ELC units is provided in **Table 4 (Appendix B)**. No provincially rare vegetation communities were present on the Subject Lands (NHIC 2016).

4.3.2 Vascular Plants

Botanical inventories completed on the Subject Lands identified a total of 129 species of vascular plants. Of these, 59 species are native, 67 are exotic, and three species are hybrid. No provincially rare, protected, or species having a co-efficient of conservation value of 9 or 10 were observed. Seven species rare to Peel Region and the CVC watershed (Varga 2005 and CVC 2002, respectively) were observed, while one species rare in the CVC watershed (per CVC 2002) but not noted in the Peel Region rarity list (Varga 2005) was also identified. A full species list, including global, provincial and local rarity rankings is included in **Table 5 (Appendix B)**.

4.3.3 Evaluated Wetlands / Other Wetlands

The LIO database was accessed to determine if any wetlands known to the MNRF occur on or in the vicinity of the Subject Lands. Such wetlands could include PSWs, MNRF evaluated wetlands, unevaluated wetlands, or wetlands identified as “other”. No LIO wetlands were shown to occur on or in close proximity to the Subject Lands. The Credit River Marshes Wetland PSW Complex occurs approximately 550 m north of the Subject Lands. However, wetlands on the Subject Lands are not considered suitable for complexing into this PSW (i.e., due to their small size, fragmented and disturbed landscape position, and a lack of hydrological and functional relationship with the PSW).

4.4 Wildlife

The results from the wildlife field studies completed on and adjacent to the Subject Lands are summarized in the following sections. A list of all wildlife species recorded during the site investigations is provided in **Table 6 (Appendix B)**.

4.4.1 Birds

Wintering Waterfowl

A total of 13 species of waterfowl were observed during wintering waterfowl surveys in March 2017, along with a number of non-waterfowl species. All birds observed during wintering waterfowl surveys are listed in **Table 7 (Appendix A)**, which also identifies the number and location in relation to the Lake Ontario shoreline, for observed waterfowl species. The most common waterfowl species observed in Lake Ontario on March 1, 2017 included Common Goldeneye (*Bucephala clangula*), Long-tailed Duck (*Clangula hyemalis*), and Bufflehead (*Bucephala albeola*), with the majority of individuals observed <200 m offshore, with some observed >500 m offshore. These three species were also the most common waterfowl species observed in Lake Ontario on March 12, 2017, with individual numbers being higher than on March 1, 2017. The highest numbers of each were observed >200 m but <500 m from shore.

Additional wintering waterfowl surveys will be completed in late 2017/early 2018.

General Spring Migration

A total of 126 bird species were observed during the general spring migration surveys conducted between March 21 and May 29, 2017. All birds observed during these surveys are listed in **Table 7 (Appendix A)**. The most abundant species observed during the surveys was Double-crested Cormorant (*Phalacrocorax auritus*), with approximately 5800 birds being observed on May 2, 2017, all within 200 m offshore of the Lake Ontario shoreline. Long-tailed Duck had the second highest abundance, with most birds <500 m offshore. Many of the migratory species were only observed on single occasions, with some observations from the Subject Lands consisting of birds that were likely going to remain on the lands for breeding purposes. Migrant species on the Subject Lands were primarily using the east and west borders where vegetation structure is denser.

Spring Shorebird Surveys

All shorebirds observed during the spring shorebird surveys are listed in **Table 7 (Appendix A)**. The most abundant shorebirds observed included Whimbrel (*Numenius paheopus*), with 210 birds observed on May 22, and Dunlin (*Calidris alpina*), with 43 observed on May 22. Species observed in lesser numbers (<10) included White-rumped Sandpiper (*Calidris fuscicollis*), Spotted Sandpiper (*Actitis macularius*) and Solitary Sandpiper (*Tringa solitaria*). The flocks of Dunlin and Whimbrel observed were not using the Subject Lands directly. Whimbrel were observed flying along the lakeshore in an easterly direction at dawn and westerly direction before 6:00 AM. The Dunlin were primarily observed on rocks in the Port Credit harbour.

Breeding Bird Surveys

A total of 67 bird species were observed within the Subject Lands during the three rounds of breeding bird surveys. Of this total, 12 species are confirmed, 20 are probable and 17 are possible breeders on the Subject Lands. The remaining 18 bird species are considered non-breeders, flyovers or migrants. The observed breeding bird species are discussed in the sections below. All bird species observed on the Subject Lands during the breeding bird surveys are listed in **Table 8 (Appendix B)**.

A total of 49 (100%) 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 2016).

The following Species at Risk were observed on the Subject Lands:

- Chimney Swift: Threatened in Ontario and Canada;
- Peregrine Falcon: Special Concern in Ontario and Canada;
- Bank Swallow: Threatened in Ontario and Canada;
- Barn Swallow: Threatened in Ontario and Canada; and
- Bobolink: Threatened in Ontario and Canada.

Chimney Swift:

This species was observed throughout the survey period foraging over the Subject Lands. The birds were followed to a presumed nesting structure on Lakeshore Road (Westedge Community Church, 175 Lakeshore Rd.) east of the Subject Lands. The population was estimated to contain approximately 45 to 50 birds. There was no evidence of nesting nor any suitable nesting structures for this species on the Subject Lands.

Peregrine Falcon:

A single bird was observed in flight over the Subject Lands on the second round of surveys. This was most likely a foraging adult from one of the nesting locations in the Greater Toronto Area. No suitable nesting structures are present on the Subject Lands.

Bank Swallow:

Small numbers of adults were observed foraging over the Subject Lands on two survey dates. No suitable nesting substrate is present on the Subject Lands. The adjacent shoreline was inspected for use by this species (exposed shale slips) on several occasions in May and June but none were observed. These individuals were likely from nearby colonies along the shoreline.

Barn Swallow:

Regular observations were made of adults foraging over the Subject Lands in May and throughout the breeding period. Up to 15 adults were observed, including perched birds at the

Shale Pond, using snags. Birds were also observed collecting mud 20 m from the abandoned outbuilding along the eastern border of the Subject Lands. Repeated inspection of the inside and outside of this building (the only suitable nesting structure on the lands) throughout the breeding surveys did not reveal any nests of this species. It is likely that these birds were taking the mud to structures at the Port Credit harbor, as several were observed flying with mud in that direction. Juveniles were observed foraging over the lands in early July.

Bobolink:

A single flyover was observed on July 4, 2017, identified as a juvenile of the year. This individual was a post-breeding dispersal, with the lakeshore acting as a concentrating barrier. The open grassy areas of the Subject Lands were surveyed for this species as it contained some suitable areas for Bobolink breeding. No observations were made during the breeding season, when this species is conspicuous and readily detected.

4.4.2 Mammals

Bats

The results of bat surveys conducted on the Subject Lands are documented in **Table 9 (Appendix B)**. Bat species can be identified using sonographic characteristics from calls used by bats to echolocate. These ultrasonic calls can be detected, recorded, and analyzed by biologists trained in bat sonogram interpretation to reasonably predict the species of bats present. All ultrasonic recordings were filtered to eliminate recordings with high levels of noise or with no bat calls, and then further analyzed using SonoBat's auto-classification tool. Any calls with a positive identification were manually vetted by a wildlife ecologist with training in bat species identification by sonogram. All species of bats can make calls that range in frequencies and sonogram shape, depending on the behavior at the time of call recording. Echolocation calls are not unique to species and vary between social echolocation calls, and foraging calls, in addition to the search phase calls currently used to identify to species. Calls recorded during a bat's search phase are the most reliable for an accurate species identification.

During passive acoustic surveys, four bat species were confirmed to be present on the Subject Lands: Big Brown Bat (*Eptesicus fuscus*), Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), and Eastern Red Bat (*Lasiurus borealis*). During three evenings of active acoustic surveys, a total of 49 low frequency calls and one high frequency call was recorded; with a cumulative total of 50 passes by all species. Of the low frequency calls, 28 calls were confirmed to be Big Brown Bat, four confirmed calls were Hoary Bat, two confirmed calls were Silver-haired Bat, and the remaining 15 low frequency calls were not identifiable to species (**Table 9, Appendix B**). The one high frequency call was confirmed by manual identification by a trained ecologist to be Eastern Red Bat. No Species at Risk bats were identified on the Subject Lands.

Other Mammals

Six mammal species were recorded during incidental wildlife surveys on the Subject Lands, as noted in **Table 6 (Appendix B)**. All species observed are provincially ranked S5 (common and secure), S4 (apparently common and secure) or SNA (species not native to Ontario). No

species were identified that are Species at Risk (Special Concern, Threatened or Endangered) or are SWH indicator species (includes provincially rare species ranked S1-S3 in NHIC 2016; MNRF 2015).

4.4.3 Amphibians

A cumulative total of two amphibian species were recorded within the Subject Lands during the amphibian call-count and egg mass surveys, with detailed results provided in **Table 10** and **Table 11 (Appendix B)**, respectively. One additional species was observed during amphibian call-count surveys in the off-site JC Saddington Park. All amphibian species recorded on the Subject Lands are listed in **Table 6 (Appendix B)**. All the amphibian species are provincially ranked S5 (common and secure). None of the species are listed on the SARO list.

4.4.4 Reptiles

The only snake species observed during the field investigations was Eastern Gartersnake (*Thamnophis sirtalis*), with individuals observed on three occasions during the transect surveys (**Table 12, Appendix B**).

One Midland Painted Turtle (*Chrysemis picta*) was observed within the Shale Pond on two occasions during basking surveys in April and May 2017, as documented in **Table 13 (Appendix B)**. No evidence of turtle nesting or any suitable nesting habitat was observed on the Subject Lands in June 2017.

4.4.5 Insects

There were four butterfly and eight dragonfly species recorded on the Subject Lands during insect surveys in spring and early summer 2017 (**Table 6, Appendix B**). All species observed are provincially ranked S5 (common and secure), S4 (apparently common and secure) or SNA (species not native to Ontario). No species were identified that are Species at Risk (Special Concern, Threatened or Endangered) or are SWH indicator species (includes provincially rare species ranked S1-S3 in NHIC 2016; MNRF 2015).

Individual Monarch butterflies were observed incidentally on two occasions on the Subject Lands in spring and early summer 2017. No Monarch larva or chrysalis were observed on the Subject Lands. A survey of Milkweed populations was completed in July 2017 to assess the distribution and abundance of this species, which is the host breeding plant for Monarch. Clusters of Milkweed were observed in three disturbed, cultural meadow areas on the Subject Lands. The largest accumulation of Milkweed (with less than 100 plants observed within a 30-m radius) occurred along the northern boundary of the property, approximately 45 m from Lakeshore Road. The second consisted of an observation of less than 10 Milkweed plants near the northwestern corner of the Subject Lands. The third area consisted of less than 20 Milkweed plants along the eastern boundary, approximately 30 m from the JC Saddington Park parking lot. Individual Milkweed plants are scattered in cultural meadow areas on the Subject Lands, but no other accumulations of this species were observed.

4.4.6 Terrestrial Crayfish

One terrestrial crayfish chimney was identified on the periphery of the Shale Pond adjacent to cattail mineral shallow marsh community. No terrestrial crayfish were observed.

4.5 Fisheries

4.5.1 Shale Pond Fish Community

One fish species, Fathead Minnow (*Pimephales promelas*), was captured during the fish community surveys in the Shale Pond in June 2017. Adults of the species were captured while young-of-the-year (YOY) were observed in shallow water along the shoreline, but could not be captured due to their small size. The presence of YOY indicates that Fathead Minnow are successfully reproducing within the Shale Pond. Crayfish were also captured in relatively high numbers in the minnow traps (up to 15 captured in individual traps).

4.5.2 Bass and Sunfish Spawning Surveys

No bass or sunfish nest or nesting activities were observed along the accessible portions of the Shale Pond shoreline, nor along the Lake Ontario shoreline south of the Subject Lands. Given that neither bass nor sunfish were captured in the Shale Pond during fish community surveys, it is unlikely that these species are present.

Bass and sunfish species are known to be present within Lake Ontario, but they do not appear to be using the shoreline fronting the Subject Lands for spawning purposes. Bass and sunfish typically spawn by creating a small nest in gravelly and sandy substrates and there is limited gravelly spawning habitat in the area. Sand is present in protected portions of the Lake Ontario shoreline that promote deposition (i.e., in the corner of the pier and offshore areas beyond the wave zone), but small gravel is generally absent within shoreline areas, likely due to extensive wave action that moves this material within exposed areas.

During the May 15, 2017 spawning survey, fish species observed along the Lake Ontario shoreline included Round Goby (*neogobius melanostomus*) and Common Carp (*Cyprinus carpio*), both of which are not native to Ontario but are known to be present in Lake Ontario. During the June 8, 2017 spawning survey, Alewife (*Alosa pseudoharengus*), a non-native but important prey species, was observed in sheltered shoreline areas over sand substrate. Alewife are known to spawn in such areas around the Lake Ontario shoreline between late April and July (Scott and Crossman 1973), so the observed fish were likely spawning along the shoreline.

4.6 Fish Habitat

The following sections discuss the existing aquatic habitat conditions within the Shale Pond and along the Lake Ontario shoreline south of the Subject Lands.

4.6.1 Shale Pond

The Shale Pond, originally excavated for brick extraction and later used as a stormwater management and settling pond for the oil refinery, is approximately 165 m long by 55 m wide (at

its longest axes) with an overall surface area of 0.66 ha. The pond has been reported to have a maximum water depth of approximately 2.4 m, with several meters of impacted sediment. The pond was originally excavated in shale but surficial substrates include a mix of fine materials, – the fines have been deposited as a result of use of the pond as a settling basin – exposed shale and some rocky material. The majority of the pond consists of a narrow band of emergent vegetation around the periphery (e.g., cattail and arrowhead), while larger patches of cattail (mapped as MAS2-1 – mineral cattail shallow marsh) are present at the north and south ends of the pond.

A stormwater sewer discharge is present in the northeastern corner of the pond and a remnant gate system is present in the southwest end. It appears the pond historically discharged to the adjacent oil-water separator (still present on the Subject Lands), prior to being discharged to Lake Ontario. However, the discharge is no longer operated and the pond is isolated, with no discharge going to the lake. Remnant piping from the oil refinery is present within and along the shoreline of the pond.

During studies in 2017, a visible sheen, potentially from hydrocarbon contamination, was observed over much of the surface of the pond, with concentrations appearing higher in late spring/early summer. Potential hydrocarbon accumulation was also observed along several areas of the pond shoreline.

The pond is known to provide habitat for a population of Fathead Minnow. Aside from potential hydrocarbon contamination, the pond appears to provide suitable habitat conditions to facilitate successful reproduction of this species, given the presence of YOY in 2017.

4.6.2 Lake Ontario

The Subject Lands are located within proximity to the Lake Ontario waterfront over a linear distance of approximately 525 m, although the shoreline area itself is not part of the Subject Lands, as it is under different ownership. This section of the Lake Ontario shoreline is considered to be an exposed coastal nearshore zone and open coast habitat type, although the existing pier on the eastern end of the area and a small concrete groyne do provide some protection. The entire shoreline interface is hardened with a mix of armour stone block and larger armour stone boulders and concrete debris to protect against erosion due to wave action. Open coast habitats in Lake Ontario have highly variable water temperatures and extensive wind and wave action that results in a relatively hostile environment for fish and the communities in these areas tend to be transitory (Conservation Halton et al., undated).

Beyond the armour stone, the shoreline generally slopes gradually deeper, with a depth of approximately 5 m observed off the end of the pier at the west end of the pier at the east end. Sand substrate is present in the protected area adjacent to the pier and adjacent shoreline, and gravel to small cobble sized, flat material is present on the inside of the groyne structure. Substrate along the remainder of the shoreline is predominantly a mix of larger boulders overlying sand. Other than the large shoreline boulders, there is relatively limited habitat structure along the shoreline, with no aquatic vegetation or large woody debris providing any form of cover. The area to the west of the pier appears to have been historically dredged to facilitate ship movements into and out of the former docking facility associated with the refinery, and this dredging is evident in current aerial imagery, up to approximately 480 m offshore.

A narrow band of vegetation, including meadow, trees and shrubs is present on the backshore above and adjacent to the armour stone protection. This band ranges from 5 m to 20 m in width and is bordered by the adjacent paved Lake Ontario Waterfront Trail.

The Urban Recreational Fisheries Strategy for the Lake Ontario Northwest Waterfront (Conservation Halton et al., undated) notes that artificial shorelines, such as the armoured shoreline south of the Subject Lands, generally provide poor fish habitat. During monitoring conducted between 1998 and 2002 on open coast areas in Toronto, the fish community was numerically dominated by Alewife (*Alosa pseudoharengus*) which accounted for 62% of the catch, White Sucker (*Catostomus commersonii*) accounting for 13% of the catch and Emerald Shiner (*Notropis atherinoides*), accounting for 9% of the catch. White Sucker accounted for 46% of the biomass, following by Common Carp (*Cyprinus carpio*) (29% of the biomass) and Alewife (7% of the biomass). CVC noted that local fishermen have reported that Brown Trout (*Salmo trutta*) are often caught while angling offshore from the existing pier.

The Lake Ontario Fish Community Objectives (Stewart et. al., 2013) indicates that the goal for the nearshore zone is to “protect, restore and sustain the diversity of the nearshore fish community, with an emphasis on self-sustaining native fishes, including Walleye, Yellow Perch, Lake Sturgeon, Smallmouth Bass, Largemouth Bass, sunfish, Northern Pike, Muskellunge, Round Whitefish and American Eel”. Specific objectives for the nearshore zone include:

- Maintaining healthy, diverse fisheries;
- Restoring Lake Sturgeon populations;
- Restoring American Eel abundance; and
- Maintaining and restoring native fish communities.

The Credit River, the main watershed within the Mississauga Area, drains into Lake Ontario approximately 300 m northeast of the Subject Lands. The River extends for approximately 60 km from its headwaters north of Orangeville to Lake Ontario, with the watershed covering an area of 871 km² (MNR & CVC, 2002). The River supports nearly 60 species of fish, including residents and migratory species (MNR & CVC, 2002). The upper watershed supports a high quality cold water fishery for resident Brook Trout (*Salvelinus fontinalis*) and Brown Trout (*Salmo trutta*), while the lower watershed supports migratory runs of Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*Oncorhynchus kisutch*) and Rainbow Trout (*Oncorhynchus mykiss*) from Lake Ontario. The reach of the river adjacent to the Subject Lands is considered to be a warmwater reach, supporting a warmwater community of large fish species, with a diversity of common species and habitat specialists, as well as top predators. Conservation Halton et al. (undated), notes that significant numbers of Rainbow Trout and Chinook Salmon stage in the Lake Ontario nearshore zone prior to migrating into the Credit River to spawn. The Credit River Fisheries Management Plan (MNR & CVC, 2002) was developed to provide a wide range of recommendations to protect, enhance and rehabilitate the Credit River watershed’s aquatic ecosystem.

4.7 Natural Hazards

Portions of the Subject Lands adjacent to the Lake Ontario shoreline are regulated by CVC under Ontario Regulation (O.Reg.) 160/06 (*Regulation of Development, Interference with*

Wetlands and Alterations to Shorelines and Watercourses) as a result of the natural hazard created by the presence of the lake and associated potential for flooding, erosion or dynamic beach activity. O.Reg. 160/06 regulates the Lake Ontario shoreline to the furthest extent of the aggregate of the following distances:

- “The 100-year flood level, plus the appropriate allowance for wave uprush and other water-related hazards;
- The existing long term stable slope projected from the existing stable toe of the slope or from the predicted location of the toe of the slope as that location may have shifted as a result of shoreline erosion over a 100-year period;
- Where a dynamic beach is associated with the waterfront lands, an allowance of 30 m inland to accommodate dynamic beach movement; and
- An allowance of 15 m inland.”

Shoreplan Engineering Limited has completed an assessment of the limit of the hazard associated with Lake Ontario (provided under separate cover) and all development activities will occur outside that limit.

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 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, the MNR's Natural Heritage Reference Manual (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 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 Natural Heritage System that are not covered by the PPS (Natural Green Spaces, Special Management Areas, Residential Woodlands and Linkages).

5.1 Significant Natural Areas

5.1.1 Provincially or Regionally Significant ANSIs

An ANSI is identified by the MNRF as “*areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education*” (MNR 2010).

A review of mapping from MNRF’s LIO and NHIC databases did not indicate the presence of any provincially or regionally significant ANSI’s on or within 120 m of the Subject Lands.

5.1.2 Environmentally Sensitive or Significant Areas

The City of Mississauga Official Plan identifies Environmentally Sensitive or Significant Areas as “places where ecosystem functions or features warrant special protection” and further notes that “these may include but are not limited to rare or unique plant or animal populations or habitats, plant or animal communities or concentrations of ecological functions”. The Official Plan also notes that “in the City, Environmentally Sensitive or Significant Areas are inventoried and designated by Conservation Authorities and the Provincial Government”.

No areas on or within 120 m of the Subject Lands are known to have been designated as Environmentally Sensitive or Significant Areas.

5.1.3 Habitat of Endangered and Threatened Species

Endangered and threatened species are those identified on the SARO list. No endangered or threatened species were confirmed as breeding on the Subject Lands during the ecological investigations.

Several threatened bird species were observed on the Subject Lands during the course of the bird survey work in spring and early summer 2017. These observations included:

- Barn Swallow (Threatened) – Species was present on the Subject Lands throughout spring but it does not appear to be nesting in the remnant building on the property. Individuals may be obtaining mud from the property and building nests at nearby marina buildings, since over 50 active Barn Swallow nests were observed in the marina buildings in 2012 (CVC 2014);
- Chimney Swift (Threatened) - appear to be nesting in an adjacent church chimney and foraging over the Subject Lands;
- Bobolink (Threatened) – One individual was observed flying over the Subject Lands during the breeding bird survey in early July, but no observations of breeding on the Subject Lands were made; and
- Bank Swallow (Threatened) – observed on site during spring migration and incidentally during first breeding bird survey (May 26) but no evidence of breeding was observed. Exposed shorelines around the pond and along the lake were examined.

Therefore, although the Subject Lands were used to some degree by several threatened species, the property was not providing any significant habitat function and use was mostly incidental. Therefore, habitat of endangered and threatened species is not considered to be present.

5.1.4 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”.

Fish habitat is present within the Shale Pond on the Subject Lands, based on the presence of various life stages of naturally reproducing population of a single species (Fathead Minnow) within the pond. Given that that Shale Pond is an artificial body of water and is not connected to any other waterbody containing fish (e.g., Lake Ontario), development or site alteration activities occurring within the Shale Pond are not subject to review by DFO under the *Fisheries Act*, as per the self-assessment criteria on the DFO website. However, for the purposes of this EIS, the Shale Pond is identified as fish habitat.

Fish habitat is also present within Lake Ontario, located within 120 m of the Subject Lands, as the area is known to provide a range of habitat functions, including spawning, nursery and foraging habitat for a wide range of commercial and recreational fish species.

Fish habitat on and adjacent to the Subject Lands is shown in **Figure 6 (Appendix A)**.

5.1.5 Significant Wildlife Habitat

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: the NHRM, the Significant Wildlife Habitat Technical Guide (MNR 2000), and the SWH Ecoregion 7E Criterion Schedule (MNR 2015).

There are four general types of SWH: seasonal concentration areas, migration corridors, rare or specialized habitat, and species of conservation concern. All types of SWH that could be potentially be present on the Subject Lands, based on the types of habitat found, are discussed in detail below.

5.1.5.1 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. Examples include deer yards, snake and bat hibernacula, waterfowl staging areas, raptor wintering areas, bird nesting colonies, shorebird stopover areas, and colonial nesting bird habitats. Areas that support a species at risk, 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.

Of the types of seasonal concentration areas that could potentially be present, based on the habitat types and vegetation communities present, additional information is provided in respect of the following features:

- *Waterfowl Stopover and Staging Areas (Aquatic)* – As a man-made feature previously used for stormwater management, the Shale Pond does not qualify as a potential candidate for this type of SWH. The Lake Ontario shoreline south of the Subject Lands does not have any wetlands that would provide this type of habitat. Therefore, this type of SWH is absent from the Subject Lands and adjacent lands.
- *Shorebird Migratory Stopover Area* - None of the ELC codes identified as being candidate habitat for *Shorebird Migratory Stopover Area SWH* are present on the Lake Ontario shoreline (e.g. open beaches, beach bars, meadow marshes), but the shoreline does have armour rock present, which is identified in the SWH Criteria Schedule as being important for shorebird stopover. Dunlin, Whimbrel, Spotted Sandpiper and Solitary Sandpiper (observed in the area) are indicator species for the *Shorebird Migratory Stopover Area SWH*. Sufficient numbers of indicator species may be present during spring migration (including >100 Whimbrel), but actual stopover on the shoreline is limited due to general lack of suitable stopover habitat and level of disturbance with trail adjacent to shoreline. Areas in the Port Credit harbour were being used by Dunlin as stopover points. Therefore, the Lake Ontario shoreline fronting the Subject Lands is not considered to be *Shorebird Migratory Stopover Area SWH*. As a man-made pond used for stormwater management, per the SWH Ecoregion 7E Criterion Schedule (MNR 2015), the Shale Pond is not eligible to be considered a candidate for this type of SWH.
- *Bat Maternity Colonies* - Although Big Brown Bat and Silver-haired Bats were recorded on the Subject Lands, they were identified within the hedgerow and marsh communities on the Subject Lands. Since hedgerows and marsh communities do not meet the minimum habitat requirements for candidate maternity colonies, *Bat Maternity Colonies SWH* is not present on the Subject Lands.
- *Turtle Wintering Area* - The Shale Pond on the Subject Lands was assessed for the presence of turtle wintering areas, given that one Midland Painted Turtle was observed basking in the pond in May 2017. However, as the Shale Pond is man-made, it is not considered to be SWH;
- *Reptile Hibernaculum* - Rock piles are present on the Subject Lands although there is no evidence they go below the frost line to provide suitable hibernacula. There is also no evidence that the building on the site could provide suitable overwintering habitat (e.g., crumbling foundations). Eastern Gartersnake was observed during transect surveys on the Subject Lands, although the number of individuals observed did not exceed the threshold for this type of SWH and therefore, it is absent from the Subject Lands;
- *Colonially Nesting Bird Breeding Habitat (Bank and Cliff)* – Cliff Swallow and Northern Rough-winged Swallow, which are both indicator species for this type of SWH, were observed breeding in the remnant building on the Subject Lands. However, buildings are not to be considered SWH, therefore, this type of habitat is not present; and
- *Migratory Butterfly Stopover Areas* – Butterfly migration surveys are proposed in August and September 2017 to identify if butterflies are using the Lake Ontario shoreline (including terrestrial areas on and adjacent to the Subject Lands) as a migratory stopover point. However, habitat for *Migratory Butterfly Stopover Areas SWH* typically

consists of a combination of field and forest, which is not present on or adjacent to the Subject Lands. Further, the SWH Criteria Schedule notes that candidate habitat for this type of SWH should not be disturbed, however, habitat on and adjacent to the Subject Lands is highly disturbed and therefore not suitable for SWH consideration. Staging areas “usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes”. Habitat on and adjacent to the Subject Lands does not appear to be suitable for consideration as this type of SWH. However, the migratory stopover function of the lake shoreline is considered in this EIS, since the shoreline (which includes the land/water interface and adjacent aquatic and terrestrial lands, including a portion of the Subject Lands) meets the requirements to be considered a Linkage area, per the City of Mississauga Official Plan. Therefore, the linkage functions, primarily for birds and butterflies will be addressed in Section 7 (Impact Assessment).

5.1.5.2 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, 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. As previously identified, there are no rare vegetation communities on or adjacent to the Subject Lands.

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.

Of the types of specialized habitats for wildlife that may be present, additional information is provided in respect of the following features:

- *Waterfowl Nesting Areas* - Mallard (*Anas platyrhynchos*), Hooded Merganser (*Lophodytes cucullatus*) and Wood Duck (*Aix sponsa*), which are indicator species for this type of SWH, were observed nesting within the Shale Pond. However, the criteria for this SWH type are not met due to insufficient numbers of nesting pairs being present;
- *Turtle Nesting Areas* – Midland Painted Turtle, an indicator species for this type of SWH was observed in the Shale Pond. However, habitat on the site is generally not suitable for turtle nesting and no evidence of turtle nesting was observed during the field investigations. Further, based on the results of basking surveys, the number of turtles within the pond does not appear to be sufficient to meet the SWH criteria. Therefore, this type of SWH is absent; and
- *Amphibian Breeding Habitat (Wetlands)* - Amphibian breeding surveys, consisting of both call count and egg mass surveys, determined that insufficient numbers of amphibians were breeding within the Shale Pond, the oil-water separator or the pond in the adjacent J.C. Saddington Park to qualify as this type of SWH. Therefore, this type of SWH is absent.

5.1.5.3 Habitat for Species of Conservation Concern

According to the Significant Wildlife Habitat Ecoregion Criterion Schedule (MNRF, 2015), habitat for species of conservation concern includes five types of habitats:

- a) Marsh bird breeding habitat;
- b) Open country bird breeding habitat;
- c) Shrub/early successional bird breeding habitat;
- d) Terrestrial crayfish; and
- e) Special concern and rare wildlife species.

Habitats of species of conservation concern do not include habitats of Endangered or Threatened species, as identified by the *Endangered Species Act, 2007*. These are discussed in Section 5.1.3.

Of the types of habitat for species of conservation concern that may be present, additional information is provided in respect of the following features:

- *Marsh Breeding Bird Habitat* – Sedge Wren, Marsh Wren and Virginia Rail, all of which are indicator species of this type of SWH, were observed breeding in the marsh habitat in the Shale Pond. However, insufficient numbers of breeding pairs and indicator species were observed to meet the criteria for this type of SWH;
- *Open Country Bird Breeding Habitat* – Savannah Sparrow, an indicator of this type of habitat, was observed in the cultural meadow on the Subject Lands. However, the numbers and diversity of species were insufficient to meet the criteria for this type of SWH;
- *Shrub/Early Successional Bird Breeding Habitat* – Willow Flycatcher and Brown Thrasher, both of which are indicator species for this type of SWH, were observed on the Subject Lands. However, an insufficient number of indicator species was observed to meet the criteria for SWH;
- *Terrestrial Crayfish* – one terrestrial crayfish chimney was observed on the Subject Lands adjacent to the Shale Pond. The SWH Criteria Schedule indicates that the presence of one or more chimneys in suitable meadow marsh, swamp or moist terrestrial sites should be considered SWH. However, the chimney observation on the Subject Lands was observed in marginal habitat (i.e., heavily disturbed, culturally influenced environment) in a hydrocarbon contaminated area. Based on these characteristics, the habitat is not considered to be *Terrestrial Crayfish* SWH; and
- *Special Concern and Rare Wildlife Species* – Individual Monarch butterflies were observed incidentally on the Subject Lands in spring and early summer 2017. No Monarch larva or chrysalis were observed on the Subject Lands. A survey of Milkweed populations was completed in July 2017 to assess the distribution and abundance of this species, which is the host breeding plant for Monarch. Clusters of Milkweed were observed in three disturbed, cultural meadow areas on the Subject Lands. The largest accumulation of Milkweed (with less than 100 plants observed within a 30-m radius) occurred along the northern boundary of the property, approximately 45 m from

Lakeshore Road. The second consisted of an observation of less than 10 Milkweed plants near the northwestern corner of the Subject Lands. The third area consisted of less than 20 Milkweed plants along the eastern boundary, approximately 30 m from the JC Saddington Park parking lot. Individual Milkweed plants are scattered in cultural meadow areas on the Subject Lands, but no other accumulations of this species were observed. Given that very low numbers of Monarchs were observed on the Subject Lands in spring/early summer, no evidence of life cycle completion was observed (e.g., early life stages) and that Milkweed is not abundant on the Subject Lands, this is not considered to be SWH for Monarch. However, Monarch is also being considered as part of the Linkage function being provided by the shoreline corridor (which includes a portion of the Subject Lands, as well as lands owned by others and not part of this application) and habitat for Monarch (e.g., Milkweed and other pollinator plants) will be included in the open space landscaping (as discussed further in Section 7.3).

5.1.5.4 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. There are two types of animal movement corridors that must be considered: trails used by deer to move to wintering areas, and areas used by amphibians between breeding and summering habitat. Animal movement corridors are only identified as SWH where a confirmed or candidate significant wildlife habitat has been identified by MNRF or the planning authority.

As neither deer wintering areas nor significant amphibian breeding habitats were identified on or adjacent to the Subject Lands, there is no requirement to assess the occurrence of animal movement corridors.

5.1.6 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 indicates that significant woodlands are those that meet one or more of the following criteria:

- woodlands, excluding cultural savannahs, great 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 great 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.

No woodland communities had been previously identified on the Subject Lands by MNRF, CVC or the municipality and no woodland communities were mapped as part of the ELC by Savanta. Further, no woodlands are present within 120 m of the Subject Lands. Therefore, there are no significant woodlands on or within 120 m of the Subject Lands.

5.1.7 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. The City of Mississauga Official Plan indicates that for the purposes of the plan, significant wetlands include:

- Provincially significant coastal wetlands;
- Provincially significant wetlands;
- Coastal wetlands; and
- Other wetlands greater than 0.5 ha.

There are no significant wetlands located on or within 120 m of the Subject Lands. There are several unevaluated wetlands on the Subject Lands, but these isolated, disturbance origin communities are small (i.e., < 0.5 ha in size) and are not considered to be significant wetlands, per the definition in the City's Official Plan.

5.1.8 Significant Valleylands

There are no valleylands on the Subject Lands and therefore, no significant valleylands. The Credit River, which is considered to be a significant valleyland by the City of Mississauga, is located approximately 300 m north east of the Subject Lands. The Credit River corridor from Lake Ontario to its headwaters is identified as a High Functioning Valleyland in the Credit River Watershed Natural Heritage System (CVC 2015).

5.2 Natural Green Spaces

5.2.1 Woodlands >0.5 ha Not Meeting Criteria for Significance

There are no woodlands communities greater than 0.5 ha in size on or adjacent to the Subject Lands and therefore, this type of Natural Green Space is absent.

5.2.2 Wetlands Not Meeting Criteria for Significance

Wetlands that do not fulfil the criteria to be a significant wetland (as identified in Section 5.1.10) are considered to be Natural Green Spaces in the City's Natural Heritage System. There were two wetland communities identified in the ELC mapping (**Figure 5, Appendix A**) and 16 other small wetlands (<0.1 ha) that would be considered inclusions in the ELC mapping.

These wetlands, as shown in **Figure 6 (Appendix A)**, are therefore considered to be Natural Green Spaces under the City's Official Plan and they will be treated as such in this EIS.

However, these wetlands are the product of the Imperial Oil Refinery decommissioning process which created these low-lying areas scattered throughout the Subject Lands. These sites typically receive and sustain sufficient surface water (due to snow melt and precipitation events) that wetland characteristics have developed, including hydric soils and wetland vegetation species. The wetlands are generally hydrologically isolated, since there are no watercourses on the Subject Lands. Water present in these features either infiltrates into the ground or evaporates and there is no surface hydrological linkage from any of these features to a larger waterbody (e.g., Lake Ontario or the Credit River). Therefore, they do not appear to provide an important hydrological function in the watershed. Further, these wetland areas do not provide important wildlife habitat, such as habitat for species at risk, or SWH, although they may provide limited habitat for common species.

5.2.3 Watercourses Not Considered to be Significant Valleylands

There are no watercourses present on the Subject Lands, therefore, this type of Natural Green Space is absent.

5.2.4 Natural Areas >0.5 ha With Uncommon Vegetation Communities

The natural areas on the property, dominated by culturally influenced meadow and thicket communities that have formed since decommissioning of the oil refinery in 1987, are greater than 0.5 ha in size, but do not contain vegetation that is uncommon in the city. Therefore, this type of Natural Green Space is not present.

5.3 Special Management Areas

The City of Mississauga Official Plan 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 that they are associated with. 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 lack of Significant Natural Areas and limited number, size and quality of wetlands being considered as Natural Green Spaces, no Special Management Areas are defined for the Subject Lands.

5.4 Residential Woodlands

These are defined by the City of Mississauga Official Plan 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 in Schedule 3 of the City of the Mississauga Official Plan. Therefore, this component of the City's Natural Heritage System is considered to be absent from the Subject Lands.

5.5 Linkages

These are defined by the City of Mississauga Official Plan as areas necessary to maintain biodiversity and support the ecological functions of Significant Natural Areas and Natural Green

Spaces, but that don't 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. However, the Lake Ontario shoreline, which includes the land/water interface and adjacent aquatic and terrestrial areas, and a portion of the Subject Lands at the south, provides that linkage function for wildlife (e.g., birds and butterflies) migrating along the lake shoreline, including to and from the adjacent Credit River valley. Therefore, this component of the City's Natural Heritage System is considered to be present in these locations. The general area providing this Linkage function is outlined in **Figure 6 (Appendix A)**.

The area is generally disturbed, with vegetation communities only forming since the Imperial Oil refinery was decommissioned. There are trees, shrubs and meadow areas within the existing shoreline corridor, that support migratory stopover functions, although the density of woody vegetation is relatively low, particularly along the immediate shoreline area, south of the Subject Lands, which includes the waterfront trail with adjacent manicured lawn.

5.6 Summary of Natural Heritage System 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, the NHRM and Ecoregion 7E Criteria Schedule.

The results of this analysis determined that per the requirements of the City of Mississauga Official Plan and the PPS, the following significant natural features are present that will require assessment in Section 7.0:

- Fish Habitat – with Shale Pond (on the Subject Lands) and Lake Ontario (within 120 m of the Subject Lands).

In addition, the impact assessment will also address potential impacts to the following non-significant features:

- Natural Green Spaces – wetlands not meeting the requirement for significance; and
- Linkage – along the Lake Ontario shoreline, which includes adjacent aquatic and terrestrial areas and a portion of the Subject Lands.

6.0 DESCRIPTION OF DEVELOPMENT PROPOSAL

The proposed development will convert the brownfield former Imperial Oil refinery lands to a mixed-use community with a variety of residential, commercial and institutional uses, an open space system and a public road network. The proposed site plan is shown in **Figure 7 (Appendix A)** and the conceptual landscaping plan is provided in **Appendix C**. The purpose of the proposed development is to provide a range of living areas, employment opportunities, commercial facilities, institutional uses and open space lands to benefit the residents that will move into the new community, the existing residents surrounding the proposed community and others who may travel to the new community to make use of the numerous amenities that will be built.

The Subject Lands were formerly occupied by the Imperial Oil refinery which operated from 1932 to 1985, before being decommissioned in 1987. Currently, the site is a vacant brownfield with some remnant infrastructure (e.g., internal facility roads, one building and an oil-water separator) and open space areas undergoing vegetation succession. The lands are fenced and public access is restricted.

The majority of the Subject Lands are currently designated as “Special Waterfront” in the City of Mississauga (2011) Official Plan, Schedule 10 (Land Use Designations), in recognition of the future development of the lands following decommissioning of the oil refinery. The portion of the Subject Lands at 181 Lakeshore Road West is designated as motor vehicle commercial (associated with a former gas station). Adjacent land use designations include public open space (JC Saddington Park and the waterfront trail adjacent to Lake Ontario), residential low density 1 (to the east and west south of Lakeshore Road) and mixed use (along Lakeshore Road). A church is present near the northeast corner of the Subject Lands.

The Subject Lands are currently zoned as Development (D). Zoning of adjacent lands includes:

- Open Space (OS2) – Associated with JC Saddington Park;
- Residential (R15-1, R15-2 and R15-5) – east of Mississauga Road South and west of the Subject Lands;
- Greenlands (G1) – along the waterfront trail separating the Subject Lands from Lake Ontario; and
- Commercial (C4, C5, C4-22, C4-44, C4-66, C4-59 and C4-13) – along Lakeshore Road.

Prior to the commencement of construction of the proposed development, environmental remediation activities will occur throughout the Subject Lands to address impacts to soil and groundwater. This will involve excavation and removal of impacted soil from the property. The remediation process will require removal of most of the vegetation on the property, excluding most of the mature trees along the property boundaries, although trees with root systems within impacted areas, will also be removed. Remediation will also require dewatering of the Shale Pond and excavation/removal of impacted sediments. Site preparation and remedial activities are currently scheduled to commence in fall 2017.

Following the completion of targeted remediation, construction of the proposed development will commence in a phased manner. This will generally include:

- Site-wide grading;
- Installation of buried services (e.g., water and sewer lines);
- Installation of municipal roads;
- Construction of residential, commercial and institutional buildings; and
- Landscaping throughout the development, including open space and parkland areas.

Stormwater management for the development is being addressed separately by Urbantech Consulting. The stormwater management plan for the Subject Lands will provide quality control for all stormwater, but given the location adjacent to Lake Ontario, quantity control is not required.

7.0 IMPACT ASSESSMENT, MITIGATION, AND ENHANCEMENT OPPORTUNITIES

This section of the EIS assesses the potential effects on the previously identified ecological components that could occur over the short-term and long-term, following implementation of the development plan. It also suggests appropriate mitigation measures to avoid or minimize negative impacts and/or to enhance features and functions where practical.

Impacts from a proposed land development application can generally be considered in two broad categories, direct and indirect. 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 to less visible functions or pathways that could cause negative impacts to natural heritage features over time.

Details of the impact assessment are provided within **Table 14** (following). Some key points are discussed in the following sections.

7.1 Fish Habitat

This section discusses the potential impacts of the proposed development on fish habitat in the Shale Pond and Lake Ontario during the construction and post-construction periods.

7.1.1 Fish Habitat in the Shale Pond

Given that a naturally reproducing population of fish (Fathead Minnow) are present within the Shale Pond, it is considered to be fish habitat, per the definition in the federal *Fisheries Act*. However, the fish population in the pond is isolated and not connected to any other fisheries waters. Fathead Minnow, the only species known to be present in the pond, is tolerant of a wide range of environmental conditions and can therefore persist within the poor quality, potentially contaminated, pond environment. While fish from the pond may be eaten by predators (e.g., piscivorous birds), there is a high probability that these fish may have elevated body burdens of hydrocarbons, resulting in potential negative effects along the food chain. Overall, the significance and sensitivity of this fish population and associated fish habitat is low.

Site remediation activities will require complete dewatering of the Shale Pond to excavate impacted sediments. To mitigate potential impacts on fish in the Shale Pond, a fish salvage program will be implemented to ensure that fish are humanely removed from the pond prior to complete dewatering. The fish salvage will be implemented in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNR. It is anticipated that the License will contain conditions regarding the ultimate disposition of fish salvaged from the pond.

Following completion of remediation activities, it is anticipated that a water feature will be established as part of the open space plan for the proposed development. Similar to the existing Shale Pond, it is not anticipated that the feature will have a direct surface water connection to Lake Ontario or the Credit River and therefore, fish would not be able to move into the pond via a surface water pathway. However, over time, establishment of a fish population in the pond is likely via other pathways (e.g., through piscivorous bird activity). The naturalized water feature is anticipated to provide suitable habitat for self-sustaining populations of a number of common

fish species should they become established in the water feature. Environmental (e.g., sediment and water quality) conditions within the water feature will be significantly improved compared to existing conditions as a result of the remediation and redevelopment process, resulting in an ecologically more suitable environment for fish and elimination of potential food chain issues associated with the current potentially contaminated fish from the pond.

Therefore, site remediation activities will result in the removal of the existing low sensitivity population of Fathead Minnow from the Shale Pond. Over time, a fish population may establish in the proposed pond; the naturalized water feature would provide improved habitat for fish, and the feature will have significantly enhanced overall environmental quality of the aquatic habitat.

Given that that Shale Pond is an artificial body of water and is not connected to any other waterbody containing fish (e.g., Lake Ontario), development or site alteration activities occurring within the Shale Pond are not subject to review by DFO under the *Fisheries Act*, as per the self-assessment criteria on the DFO website. However, as noted previously, fish salvage from the pond will occur in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF.

7.1.2 Fish Habitat in Lake Ontario

Lake Ontario south of the Subject Lands provides a variety of direct habitat functions for various species and life stages of fish. There will be no direct impact on fish habitat in Lake Ontario, since no work will occur within the average annual high water mark of the lake. Grading and landscaping associated with open space development activities may occur within 120 m of Lake Ontario and this could potentially result in indirect impacts on fish habitat as a result of:

- Erosion and sedimentation from the construction area; and
- Accidental spills (e.g., fuel or oil from machinery) with transport of spilled material to watercourses.

In addition, the presence of the proposed development could potentially impact water quality and associated fish habitat in Lake Ontario due to indirect effects associated with stormwater runoff from the development area over the long-term.

Each of these potential impacts is discussed in the following sections.

Erosion and Sedimentation

Erosion and sedimentation from the disturbed work area associated with the proposed development could potentially result in adverse effects to water quality (e.g., increased turbidity) or sedimentation and associated effects on fish (e.g., injury or mortality due to suspended sediments or altered habitat use) or fish habitat (e.g., loss of interstitial spaces in rocky areas, smothering of aquatic vegetation and/or incubating eggs).

The contractor will prepare and implement an Erosion and Sedimentation Control (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;
- Stormwater management strategies during construction;
- 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 off-site towards fish habitat in Lake Ontario.

Overall, no adverse effects to fish and fish habitat 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.

Accidental Spills

Accidental spills of potentially hazardous materials (e.g., fuel and oil from heavy equipment), if transported to Lake Ontario, could cause stress or injury to fish and other aquatic biota (e.g., benthic invertebrates, zooplankton, phytoplankton).

In order to mitigate the potential for adverse effects on fish and fish habitat due to 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 MOECC 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 offsite adverse effects on fish and fish habitat in Lake Ontario.

Post-Construction Impacts on Water Quality

The proposed stormwater management system is anticipated to provide enhanced level quality control to mitigate potential effects on water quality in Lake Ontario due to suspended sediments and turbidity.

Some surface water on the Subject Lands will infiltrate through residential lawns and open spaces into the shallow groundwater flowing towards Lake Ontario on the Subject Lands, or will

flow directly as overland runoff from open space into Lake Ontario. This runoff or infiltration water could potentially be impaired due to use of potential contaminants (e.g., lawn fertilizers) or other land use activities (including accidental spills). However, given the relatively limited potential for this to occur, and the fact that all flow eventually would go to Lake Ontario, which has significant dilution capacity compared to the amount of runoff that could be anticipated from the adjacent open space, no impacts on fish habitat in the lake are anticipated to occur. It is recommended that planting plans be developed as part of the overall open space for the development to enhance existing riparian functions.

7.2 Natural Green Spaces (Non-Significant Wetlands)

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

Each of the small, isolated wetland communities on the Subject Lands will be removed to facilitate the proposed environmental remediation process and/or the proposed development. This includes 18 individual wetland pockets, ranging in size from approximately 50 m² to 0.10 ha, for a total wetland area of 0.80 ha. As noted previously, these wetlands are of cultural origin (created by grading during the oil refinery decommissioning process or within the man-made shale pond) and they provide limited ecological function, due to their small size, isolated nature, lack of hydrological connection to watercourses, lack of floristic diversity and presence of invasive species (e.g., *Phragmites*). The wetlands within the Shale Pond do provide breeding habitat for a more diverse range of bird species, including some indicators of Marsh Breeding Bird SWH, although the diversity and number of species present are not sufficient to meet SWH thresholds.

Removal of these small, isolated, low sensitivity wetlands, that do not meet the requirements to be considered Significant Natural Areas, will result in the loss of 0.80 ha of low functioning wetland habitat. Many of these wetlands are in areas that have been identified as requiring remediation, due to impacted soil and groundwater conditions. Given that these wetlands are of cultural origin, were only created due to the decommissioning of the oil refinery, do not meet the requirements of any significant natural features under the PPS, contain invasive species (*Phragmites*) and provide relatively limited ecological functions (e.g., provision of wildlife habitat for relatively common species), their removal is not expected to result in negative impacts to the City's Natural Heritage System.

Port Credit West Village Partners Inc. may create a water feature as part of the Aquatic Habitat Garden within the open space of the proposed development, as shown in the conceptual open space landscaping plan (**Appendix C**). The water feature will generally be located in the area of the existing Shale Pond footprint and will be incorporated into the proposed adjacent ecological gardens as a functioning ecological feature within the open space of the proposed development. Through the remediation process that will occur prior to development, sediment quality within the pond and soil and groundwater quality on the Subject Lands will be substantially improved to meet current requirements with respect to open space and parkland uses, resulting in significant improvements to local environmental quality. Over time, it is anticipated that wetland vegetation will grow around the edges of the water feature and provide similar wildlife habitat functions (e.g., breeding bird habitat) as those provided by the current wetlands on the Subject

Lands. That vegetation succession can be accelerated and enhanced through specific ecological restoration works incorporated within landscape design and planning.

7.3 Linkages

The Lake Ontario shoreline area, including the shore/water interface and adjacent aquatic and terrestrial lands provides an important linkage corridor for migratory birds and insects. The linkage function of this shoreline area is driven by the location along Lake Ontario and adjacent to the Credit River mouth, both of which are known to be important areas for migrating birds and butterflies.

This corridor function will be partially impacted through environmental remediation and construction activities that remove vegetation within the portion of the corridor occurring on the Subject Lands. However, the proposed public park and open space that will occupy the southern end of the Subject Lands post-construction, will re-establish a connected, vegetated linkage corridor on that portion of the Subject Lands. Maintaining this linkage function does not require the applicant to incorporate those southern waterfront lands that are not part of this application, into the development in order to satisfy the linkage use.

To mitigate the temporary impairment of the linkage function during construction, removal of vegetation will be staged/phased to maintain the existing functions for as long as possible. Once the vegetation is removed, creation of the public open space will proceed as quickly as possible to restore the linkage function of the area. Further, a variety of sizes of trees and shrubs will be used in the restoration of the area to minimize the amount of time that the vegetation takes to develop to provide linkage migratory functions. During the intervening period (e.g., when construction is occurring and post-construction when the site is regenerating), the linkage function of the area will be temporarily reduced. During this time, migratory birds and butterflies will likely rely upon other areas within the surroundings for migratory stopover purposes, including JC Saddington Park. As well, there will be residual trees and shrubs present on the adjacent lands south of the Subject Lands that will not be disturbed, and that vegetation may continue to provide this function during this time.

Over the longer term, the public park and open space associated with the proposed development, will provide a contiguous green space corridor along this portion of the Lake Ontario shoreline, linking JC Saddington Park and the Credit River estuary to the residential areas with mature trees along the shoreline to the southwest of the Subject Lands. The proposed open space on the Subject Lands, offers an opportunity to incorporate ecological design principles and practices.

As requested by CVC at the Development Application Review Committee meeting on July 5, 2017, the ultimate landscaping strategy for the open space on the Subject Lands and the overall development will focus on enhancing the migratory function of the shoreline corridor while attempting to minimize migratory species use of open space areas further into the urban portions of the development.

As noted above, providing a vegetated, open space corridor on the southern portion of the Subject Lands will maintain important linkage functions. However, there are other restoration themes that could be considered to enhance this linkage function.

The Credit River Estuary Species at Risk Research Project (CVC 2014) identified a preliminary restoration plan for the Credit River estuary and adjacent tablelands (including JC Saddington Park adjacent to the Subject Lands), targeting species at risk and species of conservation concern. The first opportunity was to plant vegetation that would provide habitat for migratory birds in public parks in the area, including JC Saddington Park, which was identified as being dominated by manicured lawn with limited woody vegetation. CVC (2014) indicated that planting of woody vegetation in JC Saddington Park would provide benefits to migratory birds. CVC (2014) suggested that plantings be comprised of native fruit-bearing species such as dogwood (*Cornus sp.*), Mountain-ash (*Sorbus sp.*), Nannyberry (*Virburnum lentago*), Wild Raisin (*Virburnum nudum*), Highbush Cranberry (*Virburnum trilobum*), Winterberry (*Ilex verticillata*) and Staghorn sumac (*Rhus typhina*). In addition, CVC (2014) suggested that plantings of native cone-bearing coniferous trees, such as Eastern White Cedar (*Thuja occidentalis*) along the shoreline area would provide dense spring foliage to provide cover for non-biting midges, which are heavily predated by migratory birds.

Therefore, to enhance the migratory bird stopover function in the open space corridor along the southern portion of the Subject Lands, the open space landscaping plan should incorporate fruit and cone-bearing species in identified planting nodes that will concentrate these plantings, as well as throughout the open space areas within the public park. This will provide beneficial vegetation species to promote migratory bird stopover in conjunction with existing stopover habitat in JC Saddington Park and the Credit River estuary.

The second restoration opportunity identified in CVC (2014) for the Credit River estuary and adjacent tablelands was meadow naturalization in JC Saddington Park. The meadow naturalization was identified as an opportunity given that Monarch butterflies are known to use the area as migratory habitat, and enhancement of migratory and breeding opportunities for this species could result in substantial benefits. JC Saddington Park was identified as a potential restoration area given the presence of manicured lawn, which is suitable for meadow naturalization. CVC (2014) recommended that the JC Saddington Park shoreline no longer be manicured to permit regeneration of meadow communities including species such as Milkweed, goldenrods (*Solidago sp.*) and asters (*Symphotrichum sp.*) that would benefit both migratory and breeding Monarchs. CVC (2014) also indicated that the suggested vegetation plantings to enhance migratory bird habitat would also benefit roosting monarchs along the shoreline.

Therefore, to enhance Monarch habitat along the southern portion of the Subject Lands and within the ecological gardens, it is recommended that specific areas of naturalized meadow be planted using a variety of native meadow species, within these open space lands. These areas should not be manicured (e.g., mowed), but maintenance should be conducted over the long-term to maintain these features as meadows. This could include selective removal of pioneering shrub and tree species that invade the planted meadow areas.

Given the beneficial vegetation forms and species that can be incorporated into the open space landscaping plans, no long-term negative impacts on the linkage function of the shoreline are anticipated to occur. Environmental remediation and the use of beneficial vegetation species can contribute to long-term enhancements to the migratory stopover and linkage functions.

Table 14: 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
Significant Natural Areas						
1. Provincially or Regionally Significant Areas of Natural and Scientific Interest	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
2. Environmentally Sensitive or Significant Areas	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
3. Habitat of Endangered and Threatened Species	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
4. Fish Habitat	<ul style="list-style-type: none"> Habitat is present in the man-made Shale Pond for an isolated community of tolerant Fathead Minnows. The pond is not connected via surface water to Lake Ontario or the Credit River. The pond provides low quality habitat given the contaminated nature of the sediments and surface water. As a man-made feature not connected to any other fisheries water, activities associated with the feature are not subject to review under the <i>Fisheries Act</i> Lake Ontario provides habitat for a range of fish and life stages. The shoreline fronting the Subject Lands provides non-specific, open-coast habitat with relatively limited in-water habitat features. The fish habitat along the shoreline has relatively low sensitivity compared to other more complex habitats that would support various life stages and functions 	<ul style="list-style-type: none"> Remediation of the shale pond (dewatering, excavation of impacted sediments) and subsequent restoration (grading, landscaping, potential water feature construction in the general area) will result in temporary disturbance and long-term changes Earthworks (e.g., grading, filling) and vegetation removal on the Subject Lands during remediation and construction of the development could potentially result in decreased quality of surface water runoff (due to increased suspended solids) from the Subject Lands to Lake Ontario During construction, spills can occur from equipment and vehicles that could enter the Shale Pond or Lake Ontario 	<ul style="list-style-type: none"> Disruption and potential mortality of fish during Shale Pond dewatering Potential loss of fish habitat due to removal of fish from the Shale Pond Indirect effects on fish habitat in Lake Ontario could occur due to erosion and sedimentation from the disturbed work area during construction. Increased erosion from the Subject Lands could result in negative effects on fish habitat and mortality, health effects or altered behaviour of aquatic biota (benthic invertebrates and fish) During construction, water quality, aquatic biota (fish and benthic invertebrates) and vegetation could be negatively affected due to spills Stormwater runoff from the 	<ul style="list-style-type: none"> A fish salvage program will be implemented to humanely remove fish from the Shale Pond prior to complete dewatering. Program will be implemented in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF The water feature that will be installed in the open space of the proposed development is anticipated to be suitable for fish, should a population become established (e.g., by bird transport from other fisheries waters) An Erosion and Sedimentation Control Plan will be developed prior to construction During construction, the contractor will have spill kits on site, manage spills accordingly, and report spills to the appropriate MOECC Spills Action 	<ul style="list-style-type: none"> Fish will be removed from the Shale Pond, although the resulting water feature may provide enhanced fish habitat conditions compared to the currently impacted shale pond, should a fish population become established in the feature No net effect on fish habitat in Lake Ontario is anticipated to occur as a result of erosion and sediment, accidental spills or stormwater management on the Subject Lands during or following construction 	<ul style="list-style-type: none"> Construction monitoring to ensure effectiveness and maintenance of the ESC and spill prevent and response measures throughout construction Construction monitoring to ensure that fish are removed from in-water work areas prior to complete dewatering Stormwater runoff quality monitoring is anticipated to be required as a condition of provincial approvals for the stormwater management system

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
		<ul style="list-style-type: none"> Stormwater run-off from the proposed development into Lake Ontario 	proposed development, if not properly treated, could potentially result in negative effects to water quality in Lake Ontario	Centre, if applicable <ul style="list-style-type: none"> Stormwater from the proposed development will be appropriately treated prior to discharge to Lake Ontario to prevent negative impacts on water quality 		
5. Significant Wildlife Habitat	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
6. Significant Woodlands	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
7. Significant Wetlands	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
8. Significant Coastal Wetlands	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
9. Significant Valleylands	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
Natural Green Spaces						
1. Woodlands >0.5 ha	<ul style="list-style-type: none"> Not Present 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
2. Other Wetlands	<ul style="list-style-type: none"> Eighteen isolated, small (<0.1 ha) wetland pockets were identified on the Subject Lands Wetland pockets created by poor drainage due to grading following decommissioning of the Oil Refinery Wetlands low functioning – not hydrologically connected via surface water drainage to Lake Ontario or Credit River Most may only provide minor wildlife habitat for common species (e.g., Red-winged Blackbird) Marsh pockets in Shale Pond provide breeding habitat for marsh bird species but do not meet SWH criteria 	<ul style="list-style-type: none"> All wetland pockets will be removed for site remediation, site alteration or development purposes 	<ul style="list-style-type: none"> Loss of a combined 0.8 ha of wetland communities. Wetland communities are comprised of common vegetation species providing relatively limited ecological function As isolated features, these wetland communities do not provide any direct benefit to Lake Ontario or the Credit River Loss of minor wildlife habitat function (e.g., breeding bird habitat) Alternative marsh breeding habitat is present in the nearby Credit River Marshes PSW, which provides similar emergent aquatic vegetation 	<ul style="list-style-type: none"> A water feature may be constructed in the open space of the development. Over time, the feature is anticipated to develop wetland characteristics and may provide habitat for tolerant wildlife species. Pre-development remediation activities will ensure that the environmental quality of the water feature is substantially improved compared to current conditions Removal of wetlands will occur outside breeding periods to avoid disrupting wildlife during critical times 	<ul style="list-style-type: none"> Removal of 0.8 ha of low-functioning wetland community from the Subject Lands, resulting in minor loss of non-significant, minor wildlife habitat within a contaminated environment Over time, wetland development within the potential water feature may replace these functions on the Subject Lands 	<ul style="list-style-type: none"> N/A

NATURAL HERITAGE FEATURES AND ASSOCIATED FUNCTIONS	SIGNIFICANT CHARACTERISTICS AND SENSITIVITY	IMPACTOR	PREDICTED EFFECTS	AVOIDANCE, MITIGATION AND/OR RESTORATION	NET EFFECTS	MONITORING AND MANAGEMENT
			over a substantially larger area and is of better environmental quality compared to the currently impacted wetlands on the Subject Lands			
3. Watercourses	<ul style="list-style-type: none">Not Present	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A
4. Natural Areas >0.5 ha with Uncommon Vegetation	<ul style="list-style-type: none">Not Present	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A
Other Natural Heritage System Areas						
1. Special Management Areas	<ul style="list-style-type: none">Not Present	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	N/A
2. Residential Woodlands	<ul style="list-style-type: none">Not Present	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	N/A
3. Linkages	<ul style="list-style-type: none">Lake Ontario shoreline, including the land/water interface and adjacent aquatic and terrestrial areas (including a portion of the Subject Lands) provides an important linkage function for migratory birds and butterflies	<ul style="list-style-type: none">Remediation, site alteration and development will result in removal of existing vegetation and grading within a portion of the linkage corridor along the Lake Ontario shorelineDevelopment of residential, commercial, institutional and open space facilities on the Subject Lands	<ul style="list-style-type: none">Temporary reductions in the functionality of a portion of the linkage corridor for migratory birds and butterflies’ due to removal of vegetation and heavy equipment use, noise and human presence during constructionPotential impacts on the function of the ecological linkage of the linkage corridor due to encroachment by residential, commercial or institutional land uses	<ul style="list-style-type: none">Commercial, residential and institutional development will be set back by a minimum of 35 m from Lake Ontario to maintain a vegetated corridor along the lakeshoreThe portions of the linkage corridor on the Subject Lands that will be disturbed due to site remediation and development will be revegetated with beneficial vegetation forms and species (e.g., fruit and cone bearing trees and shrubs, and naturalized meadow communities) to benefit migratory birds and butterflies by providing migratory stopover roosting areas and food sources	<ul style="list-style-type: none">Potential short-term reduction in the use of the area by migratory birds and butterflies during the construction processLong-term enhancement to functionality of the migratory linkage due to use of beneficial vegetation forms and species in the open space landscaping plan on the portion of the linkage corridor occupied by the Subject Lands	<ul style="list-style-type: none">A monitoring plan will be developed to assess the success of linkage enhancement measures

8.0 CONCLUSIONS AND RECOMMENDATIONS

This EIS has been developed as part of the planning process for the proposed Port Credit West Village development at 70 Mississauga Road South and 181 Lakeshore Road West, Mississauga, on the site of the former Imperial Oil refinery.

An assessment of impacts on natural features and their associated functions has been conducted, and discussed in relation to the PPS, related guidance documents and the City of Mississauga Official Plan. The existing natural environment on the Subject Lands has been heavily influenced by former use as an oil refinery, and the natural features present on the site are the direct result of regeneration that has occurred since the facility was decommissioned in 1987. The only Significant Natural Area on and adjacent to the Subject Lands is fish habitat, which is present within Lake Ontario and in the Shale Pond. There are wetlands on the Subject Lands that don't meet the requirement to be considered Significant Natural Areas, therefore, they are classed as Natural Green Spaces in accordance with the City Official Plan. Finally, the Lake Ontario shoreline (including adjacent terrestrial areas on and adjacent to the Subject Lands) is an important wildlife linkage in the area, primarily for birds and butterflies migrating along the Lake Ontario shoreline.

The concept plan includes the following activities that will cause direct impacts on the identified natural heritage features:

- Site remediation, grading and installation of proposed community buildings and infrastructure;
- Grading, vegetation restoration and creation of public open space/ecological gardens; and
- Grading, vegetation restoration and creation of public open space near the Lake Ontario shoreline;

Based upon the natural heritage feature inventories and analyses carried out, the following conclusions are provided:

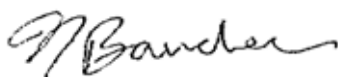
- The results of the natural heritage assessment identified fish habitat, non-significant wetlands and linkages on and adjacent to the Subject Lands, as detailed below:
 - The Shale Pond and Lake Ontario south of the Subject Lands provide fish habitat;
 - Two wetland units mapped under ELC were recorded on the Subject Lands, as well as 16 other small, isolated wetland inclusions; and
 - The Lake Ontario shoreline, including the land/water interface and adjacent aquatic and terrestrial areas (including a portion of the Subject Lands, as well as lands owned by others) provides an important wildlife linkage.
- Fish will be removed from the Shale Pond prior to commencement of remediation activities in accordance with the conditions of a License to Collect Fish for Scientific Purposes that will be obtained from the MNRF;

- Removal of impacted sediments within the Shale Pond will result in significant enhancements to local environmental quality;
- The potential water feature in the open space on the Subject Lands may ultimately be colonized by fish, although there will be no direct, surface water connection to Lake Ontario;
- No direct impacts on fish habitat in the lake will occur since no work will occur within or immediately adjacent to the high water mark;
- An Erosion and Sedimentation Control Plan, Stormwater Management Plan and Accidental Spills Response Plan will be required as part of the detailed design to ensure no indirect impacts on fish habitat in Lake Ontario as a result of the proposed works;
- Loss of 0.80 ha of low functioning wetland (small, isolated communities created by grading during decommissioning of the oil refinery) on the Subject Lands is not predicted to cause negative impacts on the Natural Green Space component of the City's Natural Heritage System, since these cultural origin wetlands provide limited ecological value;
- The proposed ecological gardens may incorporate a water feature that may develop into wetland habitat over time providing similar habitat functions; and
- Landscaping and revegetation measures in the public open space at the southern end of the Subject Lands can enhance the function of the area as a linkage for migratory birds and butterflies.

Considering the above, and as discussed within the accompanying Impact Assessment table, the development of the Subject Lands can be completed without negative impact on the natural heritage features and associated functions. Conceptual planning for opportunities to provide a net gain, or overall benefit to the local natural heritage have been presented.

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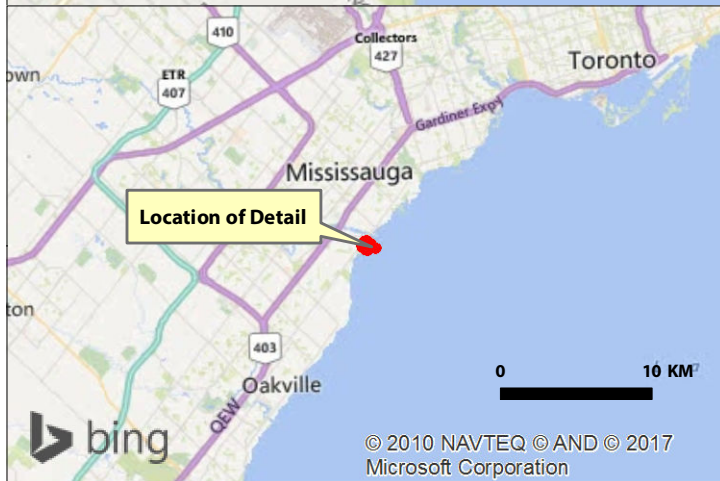
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APPENDICES

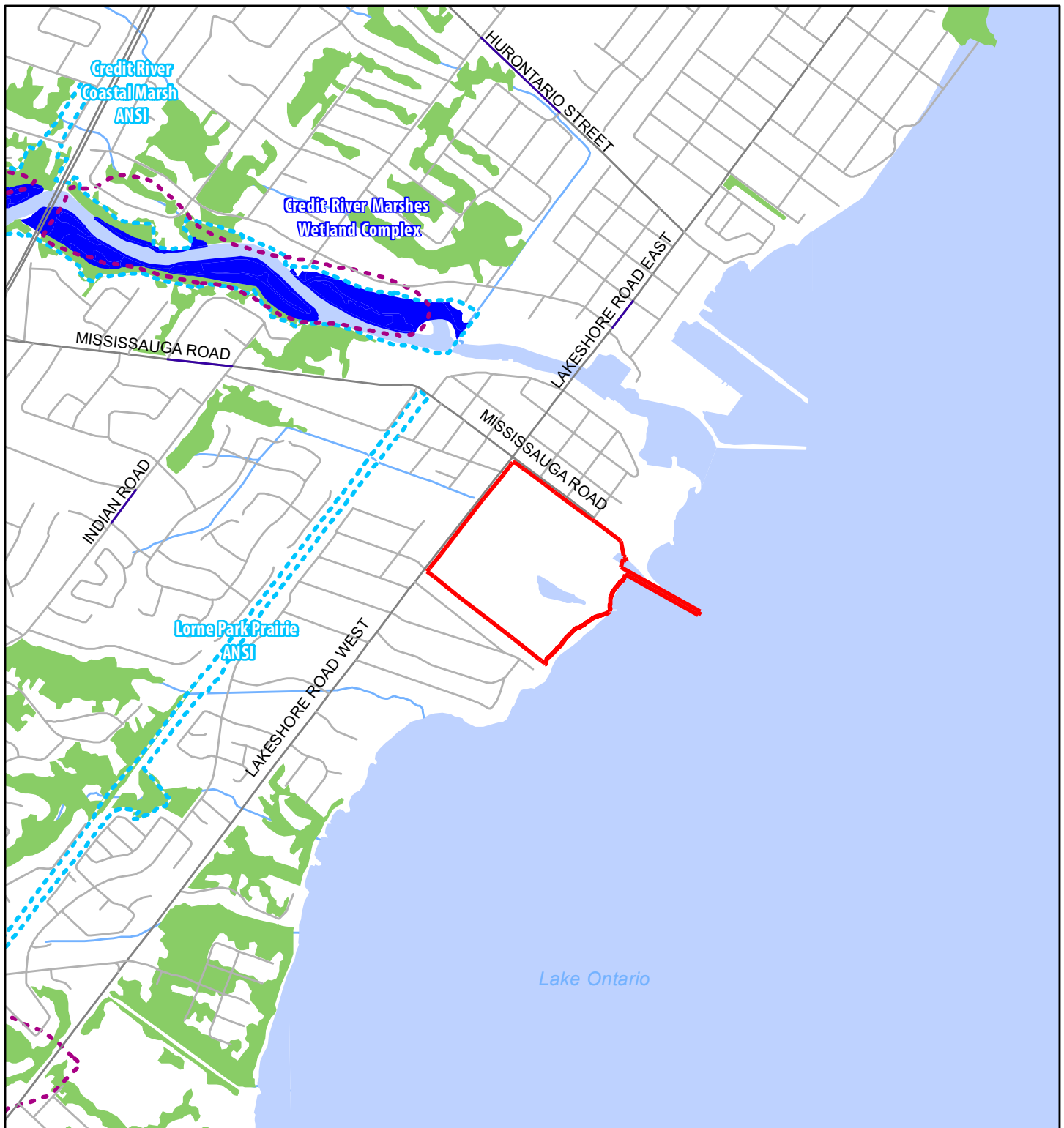
Appendix A – Figures



Port Credit West Village

Figure 1
Location of Subject Lands





Port Credit West Village

Figure 2 Natural Heritage Features



— Subject Lands

— ANSI (MNR LIO)

— ESA (MNR LIO)

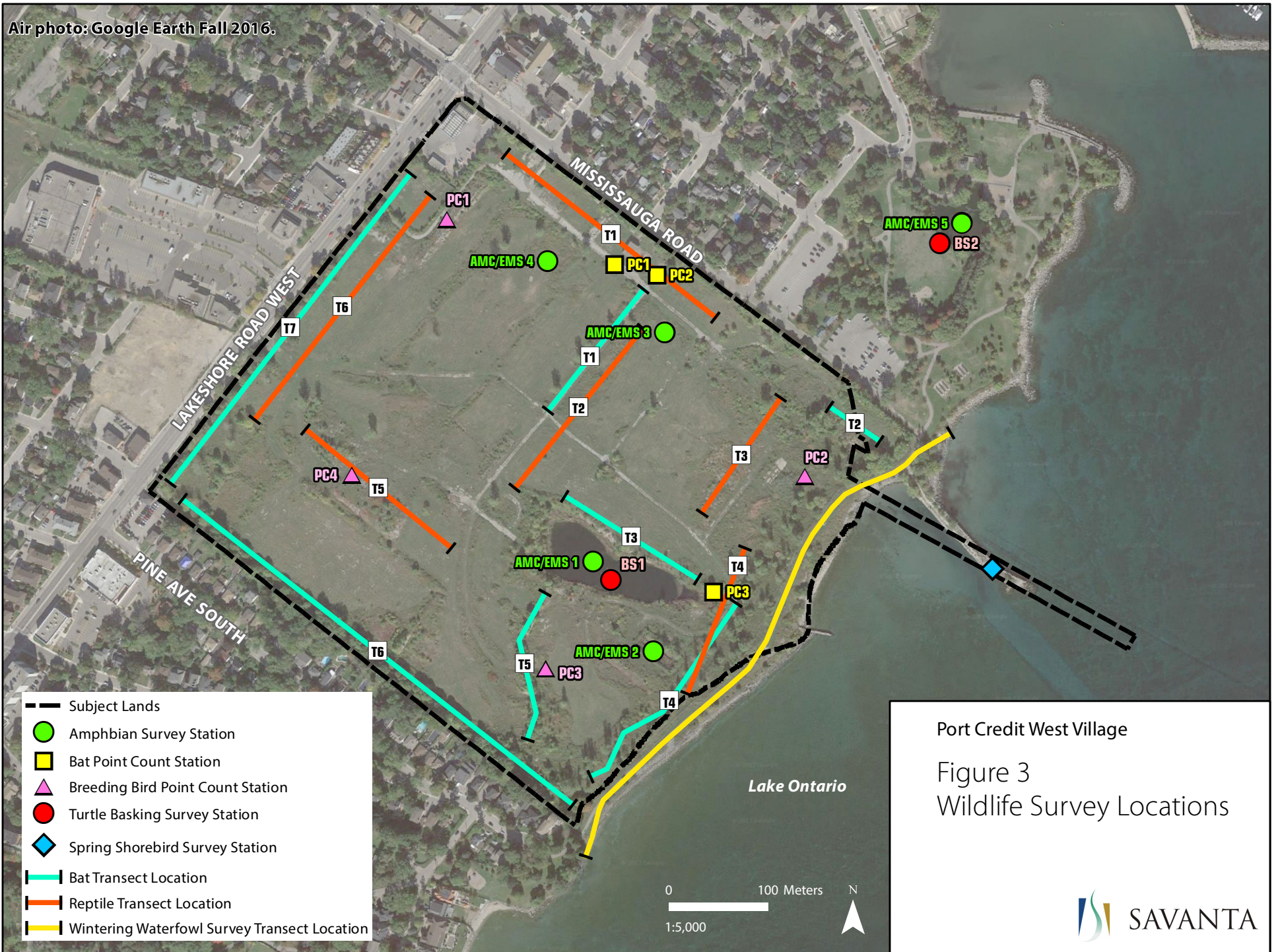
— Watercourse (MNR LIO)

Waterbody (MNR LIO)

Wetland Evaluated-Provincial (MNR LIO)

Woodland (MNR LIO)

Air photo: Google Earth Fall 2016.



Port Credit West Village

Figure 3
Wildlife Survey Locations

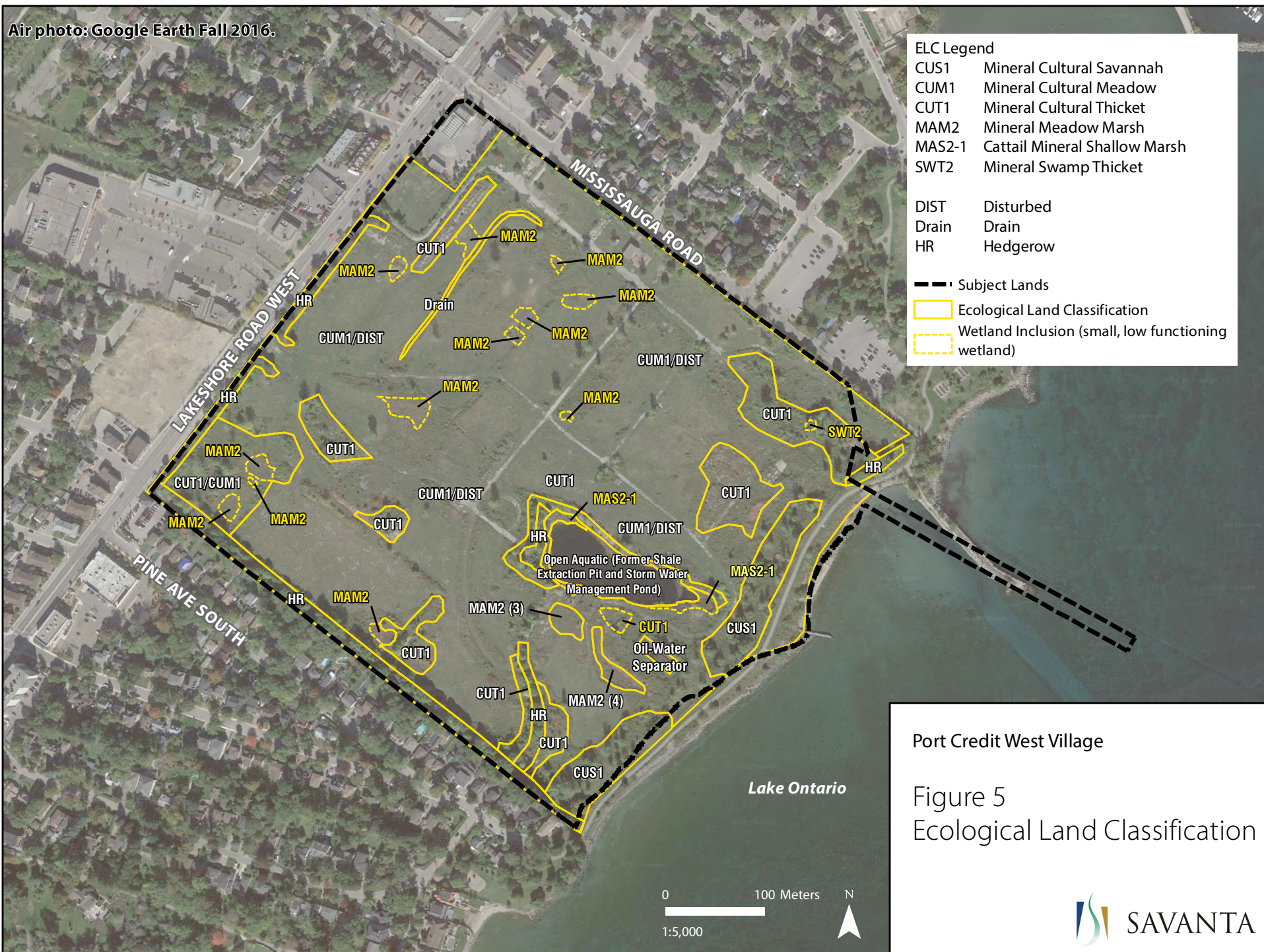
Air photo: Google Earth Fall 2016.



Port Credit West Village

Figure 4
Aquatic Monitoring
Locations

Air photo: Google Earth Fall 2016.

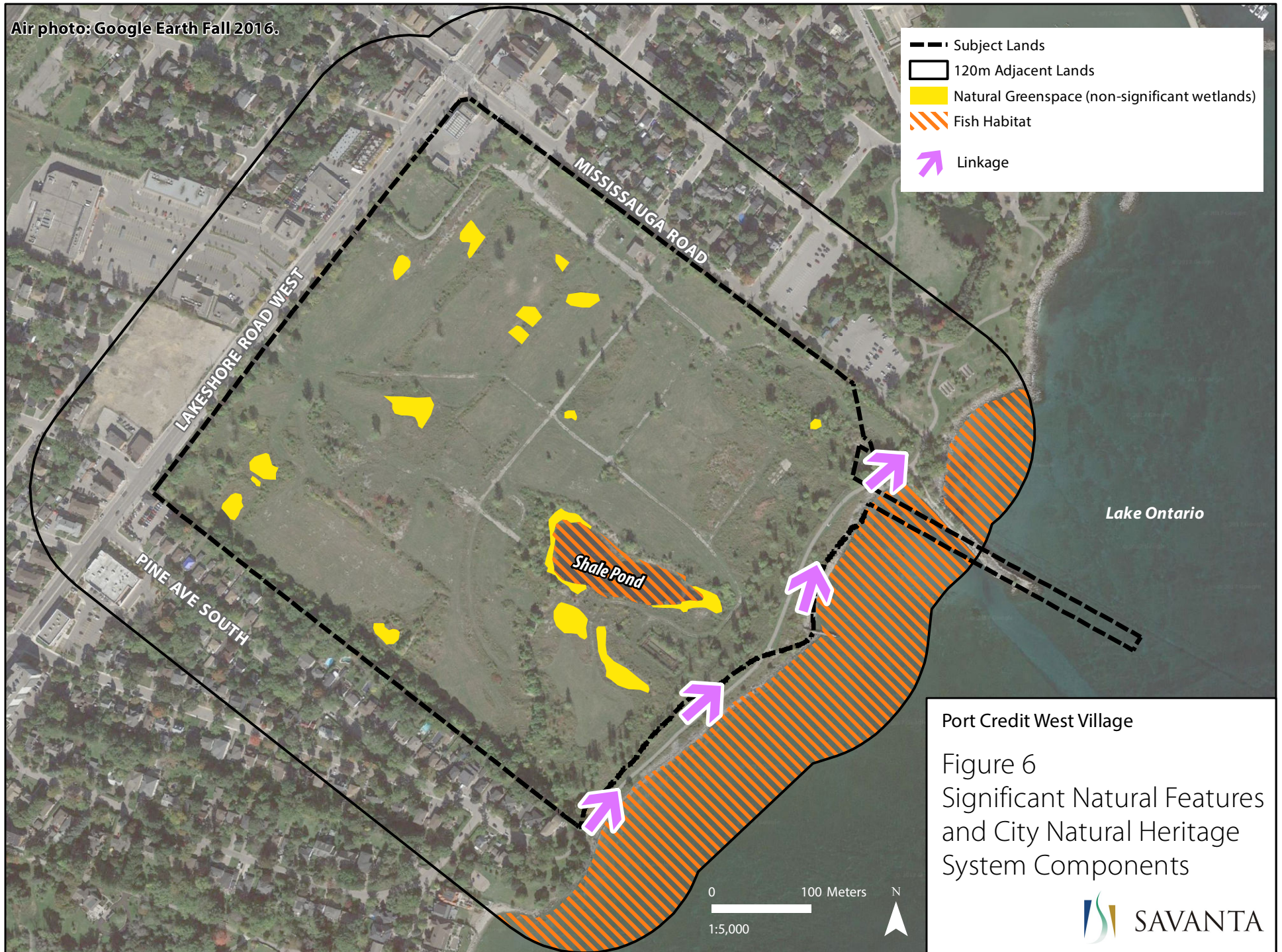


Port Credit West Village

Figure 5
Ecological Land Classification



Air photo: Google Earth Fall 2016.



Air photo: Google Earth Fall 2016.



Appendix B – Tables

Table 1: Natural Heritage Information Centre (NHIC) Data

COMMON NAME	SCIENTIFIC NAME	S-RANK	G-RANK	COSSARO	COSWEIC	LAST OBSERVED	EXTIRPATED
Cleland's Evening Primrose	<i>Oenothera clelandii</i>	S1	G3G5	NR	NR	21-SEP-1985	N
Kansas Hawthorn	<i>Crataegus coccinioides</i>	S2	G4	NR	NR	30-AUG-1980	N
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	S3	G5	SC	SC	1969-?	N
Snapping Turtle	<i>Chelydra serpentina</i>	S3	G5	SC	SC	1996-?	N
Fall Crabgrass	<i>Digitaria cognata</i>	S1?	G5T5	NR	NR	22-SEP-1971	N
Sundial Lupine	<i>Lupinus perennis</i>	S2S3	G5T4?	NR	NR	29-MAY-1980	N

Table 2: Field Studies and Natural Inventories (2017)

Field Date	Nature of Investigation	Surveyor(s)
March 1	<ul style="list-style-type: none"> Winter Waterfowl Survey 	P. Burke
March 7	<ul style="list-style-type: none"> Site Reconnaissance to complete a preliminary assessment of natural heritage features on the Subject Lands to help scope field studies and natural inventories 	N. Boucher R. Lee J. Leslie
March 12	<ul style="list-style-type: none"> Winter Waterfowl Survey 	P. Burke
March 21	<ul style="list-style-type: none"> General Spring Migration Survey 	P. Burke
March 31	<ul style="list-style-type: none"> General Spring Migration Survey 	P. Burke
April 10	<ul style="list-style-type: none"> General Spring Migration Survey 	P. Burke
April 10	<ul style="list-style-type: none"> First Round Amphibian Call Survey 	E. Lee L. Williamson
April 11	<ul style="list-style-type: none"> Amphibian Egg Mass Survey 	R. Lee L. Williamson
April 17	<ul style="list-style-type: none"> Snake Transect Survey Turtle Basking Survey 	R. Lee L. Williamson
April 21	<ul style="list-style-type: none"> General Spring Migration Survey Spring Shorebird Survey 	P. Burke
April 28	<ul style="list-style-type: none"> Snake Transect Survey Turtle Basking Survey 	O. Park M. Green
May 2	<ul style="list-style-type: none"> General Spring Migration Survey Spring Shorebird Survey 	P. Burke
May 3	<ul style="list-style-type: none"> Snake Transect Survey Turtle Basking Survey 	O. Park L. Williamson
May 10	<ul style="list-style-type: none"> Snake Transect Survey Turtle Basking Survey 	O. Park L. Williamson
May 12	<ul style="list-style-type: none"> General Spring Migration Survey 	P. Burke

Table 2: Field Studies and Natural Inventories (2017)

Field Date	Nature of Investigation	Surveyor(s)
	<ul style="list-style-type: none"> Spring Shorebird Survey 	
May 15	<ul style="list-style-type: none"> Bass and Sunfish Visual Spawning Surveys Aquatic Habitat Assessment 	N. Boucher O. Park
May 17	<ul style="list-style-type: none"> Second Round Amphibian Call Survey 	R. Lee M. Green
May 22	<ul style="list-style-type: none"> General Spring Migration Survey Spring Shorebird Survey 	P. Burke B. Charlton
May 24	<ul style="list-style-type: none"> Spring Shorebird Survey 	P. Burke
May 26	<ul style="list-style-type: none"> First Round Breeding Bird Surveys Spring Shorebird Survey 	P. Burke
May 29	<ul style="list-style-type: none"> General Spring Migration Survey Spring Shorebird Survey 	B. Charlton
June 5	<ul style="list-style-type: none"> Bat Acoustic Monitoring Survey 	O. Park M. Green
June 7	<ul style="list-style-type: none"> Turtle Nesting Survey and Nesting Habitat Assessment 	O. Park L. Williamson
June 8	<ul style="list-style-type: none"> Preliminary Ecological Land Classification Mapping 	J. Leslie
June 8	<ul style="list-style-type: none"> Bass and Sunfish Visual Spawning Surveys 	N. Boucher
June 13	<ul style="list-style-type: none"> Third Round Amphibian Call Survey Bat Acoustic Monitoring Survey 	S. Lohnes
June 21	<ul style="list-style-type: none"> Bat Acoustic Monitoring Survey 	O. Park M. Green
June 21	<ul style="list-style-type: none"> Fish Community Surveys in Shale Pond (Backpack Electrofishing and Minnow Trapping) 	O. Park M. Green
June 22	<ul style="list-style-type: none"> Fish Community Surveys in Shale Pond (Minnow Trapping) 	N. Boucher

Table 2: Field Studies and Natural Inventories (2017)

Field Date	Nature of Investigation	Surveyor(s)
June 23	<ul style="list-style-type: none"> Fish Community Surveys in Shale Pond (Minnow Trapping) 	N. Boucher
June 28	<ul style="list-style-type: none"> Third Round Amphibian Call Survey (repeated) 	O. Park M. Green
June 15	<ul style="list-style-type: none"> Second Round Breeding Bird Surveys Random Area Insect Surveys 	P. Burke
July 4	<ul style="list-style-type: none"> Third Round Breeding Bird Surveys Random Area Insect Surveys 	P. Burke
July 5	<ul style="list-style-type: none"> Botanical Inventory, Milkweed Distribution Assessment and Ecological Land Classification Mapping Refinement 	J. Leslie

Table 3: Bat Acoustic Survey Dates and Conditions

SURVEYORS (SURNAME, INITIAL)	SURVEY ROUND	DATE (2017)	TIME		EQUIPMENT USED	AIR TEMP (°C)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION	MOON PHASE
			START	END							
Park, O. Green, M.	1	JU 5	21:08	21:57	EMT	16	71	80	1	None	Waxing Gibbous (89%)
Lohnes, S	2	JU 13	20:25	22:30	Petterson	21	73	0	1	None	Waning Gibbous (83%)
Park, O. Williamson, L.	3	JU 26	22:35	23:40	EMT	19	10	70	1	None	Waning Crescent (5%)

Table 4: Ecological Land Classification (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK / G-RANK (NHIC, 2013)
CULTURAL		
Cultural Meadow		
CUM1 Mineral Cultural Meadow	<ul style="list-style-type: none"> Typically graminoid dominated but included areas dominated by forbs, or mixed Species composition commonly included Kentucky Bluegrass (<i>Poa pratensis</i>), Tall Fescue (<i>Lolium arundinaceum</i>), Redtop (<i>Agrostis gigantea</i>), Bird's-Foot Trefoil (<i>Lotus corniculatus</i>), Canada Thistle (<i>Cirsium arvense</i>), Wild Carrot (<i>Daucus carota</i>), Tall Goldenrod (<i>Solidago altissima</i>), and Bladder Campion (<i>Silene vulgaris</i>), among others This community consists of a complex of small pockets of Mineral Meadow Marsh (MAM2) and Mineral Cultural Thicket (CUT1) 	Not ranked
Cultural Thicket		
CUT1 Mineral Cultural Thicket	<ul style="list-style-type: none"> Often composed of young, scattered tree regeneration but included shrub dominated stands Species most commonly represented include: young Manitoba Maple (<i>Acer negundo</i>) and Green Ash (<i>Fraxinus pennsylvanica</i>), with varying abundances of Staghorn Sumac (<i>Rhus typhina</i>), Showy Fly Honeysuckle (<i>Lonicera x bella</i>), and Red-osier Dogwood (<i>Cornus stolonifera</i>) Ground cover commonly consisted of Tall Goldenrod, New England Aster (<i>Symphyotrichum novae-angliae</i>), Bird's-Foot Trefoil, and Kentucky Bluegrass 	Not ranked
Cultural Savannah		
CUS1 Mineral Cultural Savannah	<ul style="list-style-type: none"> Mid-age treed communities present along the east edge of the Subject Lands Canopy species consisted of Eastern Cottonwood (<i>Populus deltoides</i> ssp. <i>deltoides</i>) (or a hybrid of this), Hybrid Crack Willow (<i>Salix x fragilis</i>), and Manitoba Maple Understory generally sparse, consisting most commonly of Staghorn Sumac and Manitoba Maple Ground cover consists of Tall Goldenrod, Kentucky Bluegrass, Tufted Vetch (<i>Vicia cracca</i>), Canada Thistle, and New England Aster 	Not ranked
SWAMP		
Thicket Swamp		
SWT2 Mineral Thicket Swamp	<ul style="list-style-type: none"> Small (0.01 ha) thicket swamp inclusion with standing water in both June and July, depths ≤30 cm This was a sparsely vegetated thicket swamp, with shrub species composed of Red-osier Dogwood and associations of Cranberry Viburnum (<i>Viburnum opulus</i> ssp. <i>opulus</i>) and European Buckthorn (<i>Rhamnus cathartica</i>) Herbaceous cover was also sparse (<10%), consisting of Purple Loosestrife and Bittersweet Nightshade (<i>Solanum dulcamara</i>) 	Not ranked

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK / G-RANK (NHIC, 2013)
MARSH		
Meadow Marsh		
MAM2 Mineral Meadow Marsh	<ul style="list-style-type: none"> Typically, small inclusions within the Cultural Meadow community, the sizes of which ranged from 50 m² to 0.1 ha These communities most commonly dominated by European Reed (<i>Phragmites australis</i> ssp. <i>australis</i>). Associate species included Purple Loosestrife (<i>Lythrum salicaria</i>), White Panicked Aster (<i>Symphotrichum lanceolatum</i>), Fox Sedge (<i>Carex vulpinoidea</i>), Red-stemmed Spikerush (<i>Eleocharis erythropoda</i>), and Dudley's Rush (<i>Juncus dudleyi</i>) Surface water was often observed in these communities in June (depth ≤15 cm) but most were completely dry in July 	Not ranked
Shallow Marsh		
MAS2-1 Cattail Mineral Shallow Marsh	<ul style="list-style-type: none"> Observed around perimeter of Open Aquatic SWM pond Broad-Leaved Cattail (<i>Typha latifolia</i>) was the dominant species, with associations of Broad-leaved Arrowhead (<i>Sagittaria latifolia</i>), Small Duckweed (<i>Lemna minor</i>), and Soft-stemmed Bulrush (<i>Schoenoplectus tabernaemontani</i>) 	S5

COMMON NAME	SCIENTIFIC NAME	SPECIES ORDER	SPECIES FAMILY	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC (FEDERAL)	LOCAL STATUS PEEL (VARGA 2005)
Eastern Red Cedar	<i>Juniperus virginiana</i> var. <i>virginiana</i>	CONIFERS (GYMNOSPERMS)	CYPRESS (CUPRESSACEAE)	4	3		S5	G5T			R5
Balsam Fir	<i>Abies balsamea</i>	CONIFERS (GYMNOSPERMS)	PINE (PINACEAE)	5	-3		S5	G5			X
Austrian Pine	<i>Pinus nigra</i>	CONIFERS (GYMNOSPERMS)	PINE (PINACEAE)		-5	-1	SNA	GNR			
Common Yarrow	<i>Achillea millefolium</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		3	-1	SNA	G5			X
Common Burdock	<i>Arctium minus</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-2	SNA	G?T?			X
Nodding Thistle	<i>Carduus nutans</i> ssp. <i>nutans</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-1	SNA	G?T?			X
Wild Chicory	<i>Cichorium intybus</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-1	SNA	GNR			X
Canada Thistle	<i>Cirsium arvense</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		3	-1	SNA	GNR			X
Bull Thistle	<i>Cirsium vulgare</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		4	-1	SNA	G5			X
Rough Fleabane	<i>Erigeron strigosus</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		1		S5	G5			X
Oxeye Daisy	<i>Leucanthemum vulgare</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-1	SNA	GNR			X
Meadow Hawkweed	<i>Pilosella caespitosa</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-2	SNA	GNR			X
Tall Goldenrod	<i>Solidago altissima</i> var. <i>altissima</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)	1	3		S5	GNR			X
Early Goldenrod	<i>Solidago juncea</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)	3	5		S5	G5			U
White Heath Aster	<i>Symphyotrichum ericoides</i> var. <i>ericoides</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)				S5	G5T5			X
White Panicked Aster	<i>Symphyotrichum lanceolatum</i> var. <i>lanceolatum</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)	3	-3		S5	G5T5			X
New England Aster	<i>Symphyotrichum novae-angliae</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)	2	-3		S5	G5			X
Common Dandelion	<i>Taraxacum officinale</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		3	-2	SNA	G5			X
Yellow Goatsbeard	<i>Tragopogon dubius</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		5	-1	SNA	GNR			X
Coltsfoot	<i>Tussilago farfara</i>	DICOTS (DICOTYLENDONS)	ASTER (ASTERACEAE)		3	-2	SNA	GNR			X
Creeping Bellflower	<i>Campanula rapunculoides</i>	DICOTS (DICOTYLENDONS)	BELLFLOWER (CAMPANULACEAE)		5	-2	SNA	GNR			X
Common Viper's Bugloss	<i>Echium vulgare</i>	DICOTS (DICOTYLENDONS)	BORAGE (BORAGINACEAE)		5	-2	SNA	GNR			X
European Buckthorn	<i>Rhamnus cathartica</i>	DICOTS (DICOTYLENDONS)	BUCKTHORN (RHAMNACEAE)		3	-3	SNA	GNR			X
Japanese Knotweed	<i>Reynoutria japonica</i> var. <i>japonica</i>	DICOTS (DICOTYLENDONS)	BUCKWHEAT (POLYGONACEAE)		3	-1	SNA	GNR			X
Curled Dock	<i>Rumex crispus</i>	DICOTS (DICOTYLENDONS)	BUCKWHEAT (POLYGONACEAE)		-1	-2	SNA	GNR			X
Common Buttercup	<i>Ranunculus acris</i>	DICOTS (DICOTYLENDONS)	BUTTERCUP (RANUNCULACEAE)			-2	SNA	G5			X
Wild Carrot	<i>Daucus carota</i>	DICOTS (DICOTYLENDONS)	CARROT (APIACEAE)		5	-2	SNA	GNR			X
Staghorn Sumac	<i>Rhus typhina</i>	DICOTS (DICOTYLENDONS)	CASHEW (ANACARDIACEAE)	1	5		S5	G5			X
Western Poison Ivy	<i>Toxicodendron radicans</i> var. <i>rydbergii</i>	DICOTS (DICOTYLENDONS)	CASHEW (ANACARDIACEAE)				S5	G5			X

COMMON NAME	SCIENTIFIC NAME	SPECIES ORDER	SPECIES FAMILY	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNR)	COSEWIC (FEDERAL)	LOCAL STATUS PEEL (VARGA 2005)
Pale Dogwood	<i>Cornus obliqua</i>	DICOTS (DICOTYLENDONS)	DOGWOOD (CORNACEAE)	5	-4		S5	G5T?			R5
Red-Osier Dogwood	<i>Cornus stolonifera</i>	DICOTS (DICOTYLENDONS)	DOGWOOD (CORNACEAE)	2	-3		S5	G5			X
Siberian Elm	<i>Ulmus pumila</i>	DICOTS (DICOTYLENDONS)	ELM (ULMACEAE)		5	-1	SNA	GNR			X
Common Mullein	<i>Verbascum thapsus ssp. thapsus</i>	DICOTS (DICOTYLENDONS)	FIGWORT (SCROPHULARIACEAE)		5	-2	SNA	GNR			X
Herb-Robert	<i>Geranium robertianum</i>	DICOTS (DICOTYLENDONS)	GERANIUM (GERANIACEAE)		5	-2	S5	G5			X
Thicket Creeper	<i>Parthenocissus vitacea</i>	DICOTS (DICOTYLENDONS)	GRAPE (VITACEAE)	3	3		S5	G5			X
Riverbank Grape	<i>Vitis riparia</i>	DICOTS (DICOTYLENDONS)	GRAPE (VITACEAE)		-2		S5	G5			X
Showy Fly Honeysuckle	<i>Lonicera x bella</i>	DICOTS (DICOTYLENDONS)	HONEYSUCKLE (CAPRIFOLIACEAE)		5	-3	HYB	GNR			X
Garden Bird's-Foot Trefoil	<i>Lotus corniculatus</i>	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		1	-2	SNA	GNR			X
Black Medick	<i>Medicago lupulina</i>	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		1	-1	SNA	GNR			X
Yellow Sweet-Clover	<i>Mellilotus officinalis</i>	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		3	-1	SNA	GNR			X
Purple Crown-Vetch	<i>Securigera varia</i>	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		5	-2	SNA	GNR			X
Alsike Clover	<i>Trifolium hybridum</i>	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		1	-1	SNA	GNR			X
Red Clover	<i>Trifolium pratense</i>	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		2	-2	SNA	GNR			X
Tufted Vetch	<i>Vicia cracca</i>	DICOTS (DICOTYLENDONS)	LEGUME (FABACEAE)		5	-1	SNA	GNR			X
Purple Loosestrife	<i>Lythrum salicaria</i>	DICOTS (DICOTYLENDONS)	LOOSESTRIFE (LYTHRACEAE)		-5	-3	SNA	G5			X
Manitoba Maple	<i>Acer negundo</i>	DICOTS (DICOTYLENDONS)	MAPLE (SAPINDACEAE)		-2		S5	G5			X
Norway Maple	<i>Acer platanoides</i>	DICOTS (DICOTYLENDONS)	MAPLE (SAPINDACEAE)		5	-3	SNA	GNR			X
Silver Maple	<i>Acer saccharinum</i>	DICOTS (DICOTYLENDONS)	MAPLE (SAPINDACEAE)	5	-3		S5	G5			X
Freeman's Maple	<i>Acer x freemanii</i>	DICOTS (DICOTYLENDONS)	MAPLE (SAPINDACEAE)				HYB	GNA			XSR
Common Milkweed	<i>Asclepias syriaca</i>	DICOTS (DICOTYLENDONS)	MILKWEED (APOCYNACEAE)		5		S5	G5			X
European Swallowwort	<i>Cynanchum rossicum</i>	DICOTS (DICOTYLENDONS)	MILKWEED (APOCYNACEAE)				SNA	GNR			X
Ground-Ivy	<i>Glechoma hederacea</i>	DICOTS (DICOTYLENDONS)	MINT (LAMIACEAE)		5	-2	SNA	GNR			X
American Water-Horehound	<i>Lycopus americanus</i>	DICOTS (DICOTYLENDONS)	MINT (LAMIACEAE)	4	-5		S5	G5			X
Northern Water-Horehound	<i>Lycopus uniflorus</i>	DICOTS (DICOTYLENDONS)	MINT (LAMIACEAE)	5	-5		S5	G5			X
Catnip	<i>Nepeta cataria</i>	DICOTS (DICOTYLENDONS)	MINT (LAMIACEAE)		1	-2	SNA	GNR			X
Cranberry Viburnum	<i>Viburnum opulus ssp. opulus</i>	DICOTS (DICOTYLENDONS)	MOSCHATEL (ADOXACEAE)			-1	SNA	G5			X
Garlic Mustard	<i>Alliaria petiolata</i>	DICOTS (DICOTYLENDONS)	MUSTARD (BRASSICACEAE)			-3	SNA	GNR			X
Bitter Wintercress	<i>Barbarea vulgaris</i>	DICOTS (DICOTYLENDONS)	MUSTARD (BRASSICACEAE)			-1	SNA	GNR			X

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Dame's Rocket	<i>Hesperis matronalis</i>	DICOTS (DICOTYLENDONS)	MUSTARD (BRASSICACEAE)		5	-3	SNA	G4G5			X
Field Peppergrass	<i>Lepidium campestre</i>	DICOTS (DICOTYLENDONS)	MUSTARD (BRASSICACEAE)		5	-1	SNA	GNR			X
Bittersweet Nightshade	<i>Solanum dulcamara</i>	DICOTS (DICOTYLENDONS)	NIGHTSHADE (SOLANACEAE)			-2	SNA	GNR			X
Russian Olive	<i>Elaeagnus angustifolia</i>	DICOTS (DICOTYLENDONS)	OLEASTER (ELAEAGNACEAE)		4	-1	SNA	GNR			X
Red Ash	<i>Fraxinus pennsylvanica</i>	DICOTS (DICOTYLENDONS)	OLIVE (OLEACEAE)	3	-3		S4	G5			X
Common Mouse-Ear Chickweed	<i>Cerastium fontanum ssp. vulgare</i>	DICOTS (DICOTYLENDONS)	PINK (CARYOPHYLLACEAE)		3	-1	SNA	GNR			X
Deptford Pink	<i>Dianthus armeria ssp. armeria</i>	DICOTS (DICOTYLENDONS)	PINK (CARYOPHYLLACEAE)		5	-1	SNA	GNR			X
Bladder Campion	<i>Silene vulgaris</i>	DICOTS (DICOTYLENDONS)	PINK (CARYOPHYLLACEAE)		5	-1	SNA	GNR			X
Butter-And-Eggs	<i>Linaria vulgaris</i>	DICOTS (DICOTYLENDONS)	PLANTAIN (PLANTAGINACEAE)		5	-1	SNA	GNR			X
English Plantain	<i>Plantago lanceolata</i>	DICOTS (DICOTYLENDONS)	PLANTAIN (PLANTAGINACEAE)			-1	SNA	G5			X
Common Plantain	<i>Plantago major</i>	DICOTS (DICOTYLENDONS)	PLANTAIN (PLANTAGINACEAE)		-1	-1	SNA	G5			X
Rugel's Plantain	<i>Plantago rugelii</i>	DICOTS (DICOTYLENDONS)	PLANTAIN (PLANTAGINACEAE)	1			S5	G5			X
Woodland Strawberry	<i>Fragaria vesca</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	4	4		S5	G5			X
Yellow Avens	<i>Geum aleppicum</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	2	-1		S5	G5			X
White Avens	<i>Geum canadense</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	3			S5	G5			X
Siberian Crabapple	<i>Malus baccata</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)				SNA	GNR			X
Eastern Ninebark	<i>Physocarpus opulifolius</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	5	-2		S5	G5			R1
Sulphur Cinquefoil	<i>Potentilla recta</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)		5	-2	SNA	GNR			X
Chokecherry	<i>Prunus virginiana var. virginiana</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	2	1		S5	G5T?			X
Smooth Rose	<i>Rosa blanda</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)	3	3		S5	G5			X
Multiflora Rose	<i>Rosa multiflora</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)		3	-3	SNA	GNR			X
North American Red Raspberry	<i>Rubus idaeus ssp. strigosus</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)		-2		S5	G5T5			X
European Mountain-Ash	<i>Sorbus aucuparia</i>	DICOTS (DICOTYLENDONS)	ROSE (ROSACEAE)		5	-2	SNA	G5			X
Common St. John's-Wort	<i>Hypericum perforatum ssp. perforatum</i>	DICOTS (DICOTYLENDONS)	ST. JOHN'S-WORT (HYPERICACEAE)		5	-3	SNA	GNR			X
Fuller's Teasel	<i>Dipsacus fullonum</i>	DICOTS (DICOTYLENDONS)	TEASEL (DIPSACACEAE)		5	-1	SNA	GNR			X
Tree-Of-Heaven	<i>Ailanthus altissima</i>	DICOTS (DICOTYLENDONS)	TREE-OF-HEAVEN (SIMARUBACEAE)		5	-1	SNA	GNR			X
Black Walnut	<i>Juglans nigra</i>	DICOTS (DICOTYLENDONS)	WALNUT (JUGLANDACEAE)	5	3		S4?	G5			X
White Poplar	<i>Populus alba</i>	DICOTS (DICOTYLENDONS)	WILLOW (SALICACEAE)		5	-3	SNA	G5			X
Eastern Cottonwood	<i>Populus deltoides ssp. deltoides</i>	DICOTS (DICOTYLENDONS)	WILLOW (SALICACEAE)	4	-1		S5	G5T5			X

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Trembling Aspen	<i>Populus tremuloides</i>	DICOTS (DICOTYLEDONS)	WILLOW (SALICACEAE)				S5	G5			X
White Willow	<i>Salix alba</i>	DICOTS (DICOTYLEDONS)	WILLOW (SALICACEAE)			-2	SNA	G5			X
Peach-Leaved Willow	<i>Salix amygdaloides</i>	DICOTS (DICOTYLEDONS)	WILLOW (SALICACEAE)	6	-3		S5	G5			R6
Pussy Willow	<i>Salix discolor</i>	DICOTS (DICOTYLEDONS)	WILLOW (SALICACEAE)	3	-3		S5	G5			X
Cottony Willow	<i>Salix eriocephala</i>	DICOTS (DICOTYLEDONS)	WILLOW (SALICACEAE)	4	-3		S5	G5			X
Sandbar Willow	<i>Salix interior</i>	DICOTS (DICOTYLEDONS)	WILLOW (SALICACEAE)	3	-5		S5	G5			R5
Meadow Willow	<i>Salix petiolaris</i>	DICOTS (DICOTYLEDONS)	WILLOW (SALICACEAE)	3	-4		S5	G4			X
Hybrid Crack Willow	<i>Salix x fragilis</i>	DICOTS (DICOTYLEDONS)	WILLOW (SALICACEAE)		-1	-3	HYB	GNR			XSR
Small Duckweed	<i>Lemna minor</i>	MONOCOTS (MONOCOTYLEDONS)	ARUM (ARACEAE)	2	-5		S5	G5			X
Broad-Fruited Burreed	<i>Sparganium eurycarpum</i>	MONOCOTS (MONOCOTYLEDONS)	CATTAIL (TYPHACEAE)	3	-5		S5	G5			R6
Narrow-Leaved Cattail	<i>Typha angustifolia</i>	MONOCOTS (MONOCOTYLEDONS)	CATTAIL (TYPHACEAE)	3	-5		SNA	G5			X
Broad-Leaved Cattail	<i>Typha latifolia</i>	MONOCOTS (MONOCOTYLEDONS)	CATTAIL (TYPHACEAE)	3	-5		S5	G5			X
Redtop	<i>Agrostis gigantea</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)			-2	SNA	G4G5			X
Smooth Brome	<i>Bromus inermis</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		5	-3	SNA	G4G5T?			X
Rye Brome	<i>Bromus secalinus</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		5	-1	SNA				X
Orchard Grass	<i>Dactylis glomerata</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		3	-1	SNA	GNR			X
Foxtail Barley	<i>Hordeum jubatum ssp. jubatum</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		-1		S5?	G5T5			X
Rice Cutgrass	<i>Leersia oryzoides</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)	3	-5		S5	G5			X
Tall Fescue	<i>Lolium arundinaceum</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		2	-1	SNA	GNR			X
Reed Canary Grass	<i>Phalaris arundinacea var. arundinacea</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		-4		S5	G5TNR			X
Common Timothy	<i>Phleum pratense ssp. pratense</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		3	-1	SNA	GNR			X
European Reed	<i>Phragmites australis ssp. australis</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)				SNA	G5T5			X
Canada Bluegrass	<i>Poa compressa</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		2		SNA	GNR			X
Fowl Bluegrass	<i>Poa palustris</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)	5	-4		S5	G5			X
Kentucky Bluegrass	<i>Poa pratensis ssp. pratensis</i>	MONOCOTS (MONOCOTYLEDONS)	GRASS (POACEAE)		1		SNA	G5T5			X
Jointed Rush	<i>Juncus articulatus</i>	MONOCOTS (MONOCOTYLEDONS)	RUSH (JUNCACEAE)	5	-5		S5	G5			X
Dudley's Rush	<i>Juncus dudleyi</i>	MONOCOTS (MONOCOTYLEDONS)	RUSH (JUNCACEAE)	1			S5	G5			X
Soft Rush	<i>Juncus effusus ssp. solutus</i>	MONOCOTS (MONOCOTYLEDONS)	RUSH (JUNCACEAE)	4	-5		S5?	G5T5			X
Blackgrass Rush	<i>Juncus gerardii ssp. gerardii</i>	MONOCOTS (MONOCOTYLEDONS)	RUSH (JUNCACEAE)		-5	-1	SNA	G5			

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Bebb's Sedge	<i>Carex bebbii</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	3	-5		S5	G5			X
Crested Sedge	<i>Carex cristatella</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	3	-4		S5	G5			X
Pointed Broom Sedge	<i>Carex scoparia</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	5	-3		S5	G5			R5
Spiked Sedge	<i>Carex spicata</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)		5	-1	SNA	GNR			X
Tender Sedge	<i>Carex tenera</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	4	-1		S5	G5			X
Fox Sedge	<i>Carex vulpinoidea</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	3	-5		S5	G5			X
Red-Stemmed Spikerush	<i>Eleocharis erythropoda</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	4	-5		S5	G5			X
Blunt Spikerush	<i>Eleocharis obtusa</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	5	-5		S5	G5			U
Common Three-Square Bulrush	<i>Schoenoplectus pungens</i> var. <i>pungens</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)				SU	G5T5			
Soft-Stemmed Bulrush	<i>Schoenoplectus tabernaemontani</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)	5	-5		S5	G5			X
Strict Blue-Eyed Grass	<i>Sisyrinchium montanum</i> var. <i>montanum</i>	MONOCOTS (MONOCOTYLEDONS)	SEDGE (CYPERACEAE)				S5	G5T4T5			
Southern Water-Plantain	<i>Alisma subcordatum</i>	MONOCOTS (MONOCOTYLEDONS)	WATER-PLANTAIN (ALISMATACEAE)		-5		S4?	G4G5			
Field Horsetail	<i>Equisetum arvense</i>	PTERIDOPHYTES	HORSETAIL (EQUISETACEAE)				S5	G5			X

BOTANY LIST: EXPLANATION OF TERMS		
Botanical and Common Name	From Newmaster and Ragupathy (2012). Species requiring confirmation noted (cf)	
Co-efficient of Conservatism	This value, ranging from 0 (low) to 10 (high), is based on a species tolerance to disturbance and fidelity to a specific habitat	
Wetness Index	This value, ranging from -5 (obligate wetland) to 5 (upland) provides the probability of a species occurring in wetland or upland habitats	
Weediness Index	This value, ranging from -1 (low) to -3 (high) quantifies the potential invasiveness of non-native plants. In combination with the percentage of non-native plants, it can be used as an indicator of disturbance	
Provincial Status	Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario	
Local Status	X:	Native species present (collection-based) and all exotic species
	R:	Native species locally rare (number of sites): Hamilton-Wentworth (<6 sites), Durham (<10 sites), GTA (<40 sites), Site District 6E7 (<20 sites), Oak Ridges Moraine (20 or fewer sites), Halton (<5 sites); Peterborough (suspected of being rare, 5 or fewer occurrences); CVC/Peel Region (<11 sites)
	U:	Native species locally uncommon Hamilton-Wentworth (6-10 sites), Durham (11-20 sites), GTA (41-80 sites), Site District 6E7 (21-40 sites), Halton (5-15 sites)
	E:	Presumed Extirpated
	?:	More work required to determine status
	H:	Historic record
	O:	Only old (>20 years) records known (Peterborough)
Record Type	SR: -	Sight record

BOTANY LIST: EXPLANATION OF TERMS		
	SRP	Sight record with photograph
VARGA 2005 Rankings	+	Introduced species
	X+	Native species that is introduced in that municipality
	(+)	Possibly introduced species or a native species that is introduced in some municipalities
	X	Common native species or an introduced species that is present
	R	Rare native species
	E	Extirpated native species that has not been re-found at its known locations or its habitat is gone
	SR	Species record based on a sight record (all other species records based on herbaria collections)
	LR	Species record based on a literature record
	U	Uncommon native species
	R6	Number of stations for a rare native species
	H	Historical species not seen since 1950, however its habitat is still present
	<u>X</u>	Species that occur only in the portion of site district 6E7 outside of the Greater Toronto Area
TRCA Rankings	L5	Able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix. May be of very localized concern in highly degraded areas
	L4	Able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix
	L3	Able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern

BOTANY LIST: EXPLANATION OF TERMS		
TRCA Rankings (Cont'd)	L2	Unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally
	L1	Unable to withstand disturbance; many criteria are limiting factors; generally, occur in high-quality natural areas in natural matrix; almost certainly rare in the TRCA jurisdiction; of concern regionally
	LX	Extirpated from our region with remote chance of rediscovery. Presumably highly sensitive
	LH	Hybrid between two native species. Usually not scored unless highly stable and behaves like a species (e.g. <i>Equisetum x nelsonii</i>)
	L+	Exotic. Not native to TRCA jurisdiction. Includes hybrids between a native species and an exotic
	L+?	Origin uncertain or disputed, i.e., may or may not be native
	pL	Found in natural cover, but only as planted, not regenerating
Status in Region of Waterloo	<p>* Significant but with the expectation that additional research may prove otherwise</p> <p>+ Significant only if demonstrably indigenous - most populations in Region of Waterloo are thought to be of non-indigenous origin</p> <p># Significant but known Region of Waterloo reports are treated as hypothetical</p> <p>The sensitivity of natural areas can be assessed through application of the Weediness Index. The Weediness Index quantifies the potential invasiveness of non-native plants, and, in combination with the percentage of non-native plants can be used as an indicator of disturbance. Values (ranging from -1 to -3) have been assigned to most non-native species based on the potential impact each species can have in natural areas:</p> <p>-1: little or no impact on natural areas (most non-native plants are in this category)</p> <p>-2: occasional impacts on natural areas, generally infrequent or localized</p> <p>-3: major potential impacts on natural areas</p>	

BOTANY LIST: EXPLANATION OF TERMS		
Status in Regional Municipality of Niagara (Oldham 2010)	R: Rare, 10 or fewer post 1980 records RH: Rare Historic, no records post 1980 U: Uncommon, 11-20 post 1980 records C: Common, more than 20 post 1980 records DD: Data deficient, further work needed to determine status I: Introduced hyb: Hybrid, no Niagara status assigned	
Status in County Haldimand-Norfolk (Sutherland 1987)	R Rare, 1-5 sites, number of sites indicated VU Very Uncommon, 6-8 sites U Uncommon, 9-15 sites C Common, more than 15 sites I Introduced, not native X Present in Haldimand-Norfolk, no status assigned ? Status uncertain	
Status in Wellington County (Frank and Anderson 2009)	R1 1-3 sites R2 4-6 sites R3 7-10 sites FACW (Facultative Wetland): usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67-99% probability) FAC (Facultative): equally likely to occur in wetlands or non-wetlands (estimated 34-66% probability) FACU (Facultative Upland): occasionally occurs in wetlands, but usually occurs in non-wetlands (estimated 1-33% probability) UPL (Upland): occurs almost never in wetlands under natural conditions (estimated <1% probability)	

BOTANY LIST: EXPLANATION OF TERMS			
Status in Wellington County (Cont'd)		<p>Further refinement of the Facultative categories is denoted by a "+" or "-" to express exaggerated tendencies for those species. The "+" denotes a greater estimated probability occurring in wetlands than species in the general indicator category, but a lesser probability than species occurring in the next higher category. The "-" denotes a lesser estimated probability of occurring in wetlands than species in the general indicator category, but a greater probability than species occurring in the next lower general category.</p> <p>Each wetland category has been assigned a numerical value to facilitate the quantification of the wetness index. The wetland categories and their corresponding values are as follows:</p> <p>OBL: -5</p> <p>FACW+: -4</p> <p>FACW: -3</p> <p>FACW-: -2</p> <p>FAC+: -1</p> <p>FAC: 0</p> <p>FAC-: 1</p> <p>FACU+: 2</p> <p>FACU: 3</p> <p>FACU-: 4</p> <p>UPL: 5</p>	
	Provincial Status	<p>Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. The ranks are as follows:</p> <table><tr><td>S1</td><td><p>Critically Imperiled</p><p>Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.</p></td></tr></table>	S1
S1	<p>Critically Imperiled</p> <p>Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.</p>		

BOTANY LIST: EXPLANATION OF TERMS

Provincial Status (Cont'd)	<p>S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.</p> <p>S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation</p> <p>S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors</p> <p>S5 Secure - Common, widespread, and abundant in the nation or state/province</p> <p>SH Possibly Extirpated (Historical) - Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.</p> <p>SR Reported in Ontario, but without persuasive documentation.</p> <p>SX Presumed Extirpated - Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.</p> <p>SE Exotic; not believed to be a native component of Ontario's flora. Numerical rankings after SE follow designations described above</p> <p>SNA Status not assigned.</p> <p>SU Nation or state/province conservation status not yet assessed.</p> <p>Rank ranges (e.g., S2S3) indicate that the rank is either S2 or S3, but that current information is insufficient to differentiate.</p> <p>"?" following a rank indicates uncertainty about the assigned rank.</p>
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BOTANY LIST: EXPLANATION OF TERMS

Q

Questionable Taxonomy - Taxonomic distinctiveness of this entity is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation status

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BOTANY LIST: EXPLANATION OF TERMS

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COMMON NAME	SCIENTIFIC NAME	SPECIES GROUPS	PROVINCIAL STATUS (S RANK)	GLOBAL STATUS (G RANK)	COSSARO (MNR)	COSEWIC (FEDERAL)	LOCAL STATUS HALTON	LOCAL STATUS HAMILTON	LOCAL STATUS TRCA	REGIONAL STATUS (REGION OF WATERLOO)	LOCAL STATUS (CVC)
Slender Spreadwing	<i>Lestes rectangularis</i>	ODONATA	S5	G5							
Spotted Spreadwing	<i>Lestes congener</i>	ODONATA	S5	G5			HU				
Lyre-tipped Spreadwing	<i>Lestes unguiculatus</i>	ODONATA	S5	G5			HU				
Familiar Bluet	<i>Enallagma civile</i>	ODONATA	S5	G5							
Eastern Forktail	<i>Ischnura verticalis</i>	ODONATA	S5	G5							
Common Green Darner	<i>Anax junius</i>	ODONATA	S5	G5							
Blue Dasher	<i>Pachydiplax longipennis</i>	ODONATA	S5	G5							
Twelve-Spotted Skimmer	<i>Libellula pulchella</i>	ODONATA	S5	G5							
European Skipper	<i>Thymelicus lineola</i>	BUTTERFLIES	SNA	G5							
Cabbage White	<i>Pieris rapae</i>	BUTTERFLIES	SNA	G5							
Question Mark	<i>Polygonia interrogationis</i>	BUTTERFLIES	S5	G5							
Common Ringlet	<i>Coenonympha tullia</i>	BUTTERFLIES	S5	G5							
Digger Crayfish	<i>Fallicambarus fodiens</i>	NON-INSECT ANTHROPODS	S4	G5					L2		
American Toad	<i>Anaxyrus americanus</i>	AMPHIBIAN	S5	G5					L4	X	
Northern Green Frog	<i>Lithobates clamitans</i>	AMPHIBIAN	S5	G5					L4	X	
Northern Leopard Frog	<i>Lithobates pipiens</i>	AMPHIBIAN	S5	G5		NAR			L3	X	
Eastern Gartersnake	<i>Thamnophis sirtalis</i>	REPTILE	S5	G5					L4		
Midland Painted Turtle	<i>Chrysemys picta marginata</i>	REPTILE	S5	G5T5							
Canada Goose	<i>Branta canadensis</i>	BIRD	S5	G5					L5		
Wood Duck	<i>Aix sponsa</i>	BIRD	S5	G5			m		L4	X	
Gadwall	<i>Anas strepera</i>	BIRD	S4	G5			HU		L4	X	
Mallard	<i>Anas platyrhynchos</i>	BIRD	S5	G5					L5		
Hooded Merganser	<i>Lophodytes cucullatus</i>	BIRD	S5B, S5N	G5			HU		L3	X	
Rock Pigeon	<i>Columba livia</i>	BIRD	SNA	G5							
Mourning Dove	<i>Zenaidura macroura</i>	BIRD	S5	G5					L5		
Chimney Swift	<i>Chaetura pelagica</i>	BIRD	S4B, S4N	G5	THR	THR	HU		L4		
Virginia Rail	<i>Rallus limicola</i>	BIRD	S5B	G5					L3	X	
Killdeer	<i>Charadrius vociferus</i>	BIRD	S5B, S5N	G5					L4		
American Woodcock	<i>Scolopax minor</i>	BIRD	S4B	G5					L3		
Spotted Sandpiper	<i>Actitis macularia</i>	BIRD	S5	G5							
Ring-billed Gull	<i>Larus delawarensis</i>	BIRD	S5B, S4N	G5					L4		
Herring Gull	<i>Larus argentatus</i>	BIRD	S5B, S5N	G5					L4		
Caspian Tern	<i>Hydroprogne caspia</i>	BIRD	S3B	G5					L3		
Common Tern	<i>Sterna hirundo</i>	BIRD	S4B	G5					L3		
Common Loon	<i>Gavia immer</i>	BIRD	S5B, S5N	G5						X	
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	BIRD	S5B	G5					L2		
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	BIRD	S3B, S3N	G5			HU		L3	X	
Cooper's Hawk	<i>Accipiter cooperii</i>	BIRD	S4	G5			HU		L4	X	
Red-tailed Hawk	<i>Buteo jamaicensis</i>	BIRD	S5	G5					L5		

COMMON NAME	SCIENTIFIC NAME	SPECIES GROUPS	PROVINCIAL STATUS (S RANK)	GLOBAL STATUS (G RANK)	COSSARO (MNRF)	COSEWIC (FEDERAL)	LOCAL STATUS HALTON	LOCAL STATUS HAMILTON	LOCAL STATUS TRCA	REGIONAL STATUS (REGION OF WATERLOO)	LOCAL STATUS (CVC)
Belted Kingfisher	<i>Megaceryle alcyon</i>	BIRD	S4B	G5					L4	X	
Downy Woodpecker	<i>Picoides pubescens</i>	BIRD	S5	G5					L5		
Hairy Woodpecker	<i>Picoides villosus</i>	BIRD	S5	G5					L4	X	
Northern Flicker	<i>Colaptes auratus</i>	BIRD	S4B	G5					L4		
Peregrine Falcon	<i>Falco peregrinus</i>	BIRD	S3B	G4	SC	SC			L4		
Willow Flycatcher	<i>Empidonax traillii</i>	BIRD	S5B	G5			HU		L4	X	
Least Flycatcher	<i>Empidonax minimus</i>	BIRD	S4B	G5			HU		L3	X	
Eastern Phoebe	<i>Sayornis phoebe</i>	BIRD	S5B	G5					L5		
Eastern Kingbird	<i>Tyrannus tyrannus</i>	BIRD	S4B	G5					L4		
Warbling Vireo	<i>Vireo gilvus</i>	BIRD	S5B	G5					L5	X	
Red-eyed Vireo	<i>Vireo olivaceus</i>	BIRD	S5B	G5					L4		
Blue Jay	<i>Cyanocitta cristata</i>	BIRD	S5	G5					L5		
American Crow	<i>Corvus brachyrhynchos</i>	BIRD	S5B	G5					L5		
Fish Crow	<i>Corvus ossifragus</i>	BIRD	SNA	G5							
Tree Swallow	<i>Tachycineta bicolor</i>	BIRD	S4B	G5					L4		
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	BIRD	S4B	G5			HU		L4		
Bank Swallow	<i>Riparia riparia</i>	BIRD	S4B	G5	THR	THR			L3		
Barn Swallow	<i>Hirundo rustica</i>	BIRD	S4B	G5	THR	THR			L4		
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	BIRD	S4B	G5					L5		
Black-capped Chickadee	<i>Poecile atricapillus</i>	BIRD	S5	G5					L5		
Red-breasted Nuthatch	<i>Sitta canadensis</i>	BIRD	S5	G5			HU		L4	X	
House Wren	<i>Troglodytes aedon</i>	BIRD	S5B	G5					L5		
Marsh Wren	<i>Cistothorus palustris</i>	BIRD	S4B	G5			HU		L2	X	
American Robin	<i>Turdus migratorius</i>	BIRD	S5B	G5					L5		
Gray Catbird	<i>Dumetella carolinensis</i>	BIRD	S4B	G5					L4		
Brown Thrasher	<i>Toxostoma rufum</i>	BIRD	S4B	G5					L3	X	
Northern Mockingbird	<i>Mimus polyglottos</i>	BIRD	S4	G5			HU		L5	X	
European Starling	<i>Sturnus vulgaris</i>	BIRD	SNA	G5					L+		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	BIRD	S5B	G5					L5		
House Sparrow	<i>Passer domesticus</i>	BIRD	SNA	G5					L+		
House Finch	<i>Carpodacus mexicanus</i>	BIRD	SNA	G5					L+		
American Goldfinch	<i>Spinus tristis</i>	BIRD	S5B	G5					L5		
Black-and-white Warbler	<i>Mniotilta varia</i>	BIRD	S5B	G5			HU		L2	X	
Common Yellowthroat	<i>Geothlypis trichas</i>	BIRD	S5B	G5					L4		
Yellow Warbler	<i>Setophaga petechia</i>	BIRD	S5B	G5					L5		
Blackpoll Warbler	<i>Setophaga striata</i>	BIRD	S4B	G5							
Wilson's Warbler	<i>Cardellina pusilla</i>	BIRD	S4B	G5							
Chipping Sparrow	<i>Spizella passerina</i>	BIRD	S5B	G5					L5		
Savannah Sparrow	<i>Passerculus sandwichensis</i>	BIRD	S4B	G5					L4		
Song Sparrow	<i>Melospiza melodia</i>	BIRD	S5B	G5					L5		
Lincoln's Sparrow	<i>Melospiza lincolni</i>	BIRD	S5B	G5							
Northern Cardinal	<i>Cardinalis cardinalis</i>	BIRD	S5	G5					L5		
Bobolink	<i>Dolichonyx oryzivorus</i>	BIRD	S4B	G5	THR	THR			L2		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	BIRD	S4	G5					L5		

COMMON NAME	SCIENTIFIC NAME	SPECIES GROUPS	PROVINCIAL STATUS (S RANK)	GLOBAL STATUS (G RANK)	COSSARO (MNRF)	COSEWIC (FEDERAL)	LOCAL STATUS HALTON	LOCAL STATUS HAMILTON	LOCAL STATUS TRCA	REGIONAL STATUS (REGION OF WATERLOO)	LOCAL STATUS (CVC)
Common Grackle	<i>Quiscalus quiscula</i>	BIRD	S5B	G5					L5		
Brown-headed Cowbird	<i>Molothrus ater</i>	BIRD	S4B	G5					L5		
Orchard Oriole	<i>Icterus spurius</i>	BIRD	S4B	G5			HR		L5	X	
Baltimore Oriole	<i>Icterus galbula</i>	BIRD	S4B	G5					L5		
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	MAMMAL	S5	G5					L5		
Eastern Chipmunk	<i>Tamias striatus</i>	MAMMAL	S5	G5					L4		
Coyote	<i>Canis latrans</i>	MAMMAL	S5	G5					L4		
Northern Raccoon	<i>Procyon lotor</i>	MAMMAL	S5	G5					L5		
American Mink	<i>Mustela vison</i>	MAMMAL	S4	G5					L4		
White-tailed Deer	<i>Odocoileus virginianus</i>	MAMMAL	S5	G5					L4		

Table 7: Migratory Bird Survey List

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	Location	Total Individuals Observed
Brant	<i>Branta bernicla</i>	S4N	G5				1
Canada Goose	<i>Branta canadensis</i>	S5	G5				167
Mute Swan	<i>Cygnus olor</i>	SNA	G5				48
Trumpeter Swan	<i>Cygnus buccinator</i>	S4	G4				1
Wood Duck	<i>Aix sponsa</i>	S5	G5			Shale Pond	4
Gadwall	<i>Anas strepera</i>	S4	G5			<200 m	12
						Shale Pond	3
American Black Duck	<i>Anas rubripes</i>	S4	G5			<200 m	16
						Shale Pond	10
Mallard	<i>Anas platyrhynchos</i>	S5B	G5			<200 m	70
						Shale Pond	7
Blue-winged Teal	<i>Anas discors</i>	S4	G5			>200 m	5
Green-winged Teal	<i>Anas crecca</i>	S4	G5			>200 m	2
Ring-necked Duck	<i>Aythya collaris</i>	S5	G5			<200 m	4
Greater Scaup	<i>Aythya marila</i>	S4	G5			<200 m	5
						>200 m	207
Lesser Scaup	<i>Aythya affinis</i>	S4	G5			>200 m	3
White-winged Scoter	<i>Melanitta fusca</i>	S4B,S4N	G5			<200 m	102
						>200 m	16
						>500 m	17
Black Scoter	<i>Melanitta americana</i>	S4B,S4N	G5			>200 m	2
Long-tailed Duck	<i>Clangula hyemalis</i>	S3B	G5			<200 m	851
						>200 m	768
						>500 m	147
Bufflehead	<i>Bucephala albeola</i>	S4	G5			<200 m	246
						>200 m	87
						Shale Pond	4
Common Goldeneye	<i>Bucephala clangula</i>	S5	G5			<200 m	524
						>200 m	654
						>500 m	30
Hooded Merganser	<i>Lophodytes cucullatus</i>	S5B,S5N	G5			<200 m	3
						Shale Pond	8
Common Merganser	<i>Mergus merganser</i>	S5B,S5N	G5			<200 m	2
Red-Breasted Merganser	<i>Mergus serrator</i>	S4B,S5N	G5			<200 m	215
						>200 m	93
Ruddy Duck	<i>Oxyura jamaicensis</i>	S4B,S4N	G5			>200 m	8
Rock Pigeon	<i>Columba livia</i>	SNA	G5				38
Mourning Dove	<i>Zenaidura macroura</i>	S5	G5				16
Chimney Swift	<i>Chaetura pelagica</i>	S4B, S4N	G5	THR	THR		20
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N	G5				28
Whimbrel	<i>Numenius phaeopus</i>	S3B, S4N	G5				210
Dunlin	<i>Calidris alpina</i>	S4B, S5N	G5				43
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	S5N	G5				1
Spotted Sandpiper	<i>Actitis macularia</i>	S5	G5				5
Solitary Sandpiper	<i>Tringa solitaria</i>	S4B	G5				1
American Woodcock	<i>Scolopax minor</i>	S4B	G5				1
Gull sp.							21
Bonaparte's Gull	<i>Chroicocephalus philadelphia</i>	S4B,S4N	G5				6
Ring-billed Gull	<i>Larus delawarensis</i>	S5B,S4N	G5				371
Herring Gull	<i>Larus argentatus</i>	S5B,S5N	G5				30
Iceland Gull	<i>Larus glaucoides</i>	S4N	G5				1
Great Black-backed Gull	<i>Larus marinus</i>	S2B	G5				3
Caspian Tern	<i>Hydroprogne caspia</i>	S3B	G5				15

Table 7: Migratory Bird Survey List

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNR)	COSEWIC (Federal)	Location	Total Individuals Observed
Common Tern	<i>Sterna hirundo</i>	S4B	G5				235
Common Loon	<i>Gavia immer</i>	S5B,S5N	G5				13
Pied-billed Grebe	<i>Podilymbus podiceps</i>	S4B,S4N	G5			Shale Pond	1
Horned Grebe	<i>Podiceps auritus</i>	S1B, S4N	G5	SC	SC	<200 m	5
						>200 m	7
Red-necked Grebe	<i>Podiceps grisegena</i>	S3B,S4N	G5			<200 m	122
						>200 m	73
Western/Clark's Grebe	<i>Aechmophorus occidentalis</i>		G5			>200 m	1
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	S5B	G5			<200 m	7642
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	S3B,S3N	G5				2
Black-bellied Plover	<i>Pluvialis squatarola</i>	S4N	G5				1
Great Blue Heron	<i>Ardea herodias</i>	S4	G5				5
Great Egret	<i>Ardea alba</i>	S2B	G5				2
Red-tailed Hawk	<i>Buteo jamaicensis</i>	S5	G5				2
Belted Kingfisher	<i>Megasceryle alcyon</i>	S4B	G5				1
Downy Woodpecker	<i>Picoides pubescens</i>	S5	G5				9
Hairy Woodpecker	<i>Picoides villosus</i>	S5	G5				2
Northern Flicker	<i>Colaptes auratus</i>	S4B	G5				17
American Kestrel	<i>Falco sparverius</i>	S4	G5				2
Eastern Wood-Pewee	<i>Contopus virens</i>	S4B	G5	SC	SC		1
Willow Flycatcher	<i>Empidonax traillii</i>	S5B	G5				3
Least Flycatcher	<i>Empidonax minimus</i>	S4B	G5				8
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	S4B	G5				1
Eastern Phoebe	<i>Sayornis phoebe</i>	S5B	G5				1
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S4B	G5				5
Warbling Vireo	<i>Vireo gilvus</i>	S5B	G5				7
Red-eyed Vireo	<i>Vireo olivaceus</i>	S5B	G5				2
Blue-headed Vireo	<i>Vireo solitarius</i>	S5B	G5				1
Philadelphia Vireo	<i>Vireo philadelphicus</i>	S5B	G5				2
Blue Jay	<i>Cyanocitta cristata</i>	S5	G5				146
American Crow	<i>Corvus brachyrhynchos</i>	S5B	G5				80
Fish Crow	<i>Corvus ossifragus</i>	SNA	G5				1
Purple Martin	<i>Progne subis</i>	S4B	G5				3
Swallow sp.							50
Tree Swallow	<i>Tachycineta bicolor</i>	S4B	G5				30
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	S4B	G5				24
Bank Swallow	<i>Riparia riparia</i>	S4B	G5	THR	THR		10
Barn Swallow	<i>Hirundo rustica</i>	S4B	G5	THR	THR		105
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	S4B	G5				7
Black-capped Chickadee	<i>Poecile atricapillus</i>	S5	G5				32
Red-breasted Nuthatch	<i>Sitta canadensis</i>	S5	G5				2
White-breasted Nuthatch	<i>Sitta carolinensis</i>	S5	G5				5
Brown Creeper	<i>Certhia americana</i>	S5B	G5				2
House Wren	<i>Troglodytes aedon</i>	S5B	G5				5
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	S4B	G5				1
Golden-crowned Kinglet	<i>Regulus satrapa</i>	S5B	G5				3
Ruby-crowned Kinglet	<i>Regulus calendula</i>	S4B	G5				5
Swainson's Thrush	<i>Catharus ustulatus</i>	S4B	G5				2
Hermit Thrush	<i>Catharus guttatus</i>	S5B	G5				1
American Robin	<i>Turdus migratorius</i>	S5B	G5				76
Gray Catbird	<i>Dumetella carolinensis</i>	S4B	G5				5
Brown Thrasher	<i>Toxostoma rufum</i>	S4B	G5				6

Table 7: Migratory Bird Survey List

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	Location	Total Individuals Observed
Northern Mockingbird	<i>Mimus polyglottos</i>	S4	G5				5
European Starling	<i>Sturnus vulgaris</i>	SNA	G5				182
Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5B	G5				21
House Sparrow	<i>Passer domesticus</i>	SNA	G5				23
House Finch	<i>Carpodacus mexicanus</i>	SNA	G5				11
American Goldfinch	<i>Spinus tristis</i>	S5B	G5				106
Ovenbird	<i>Seiurus aurocapilla</i>	S4B	G5				1
Tennessee Warbler	<i>Oreothlypis peregrina</i>	S5B	G5				3
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	S5B	G5				2
Mourning Warbler	<i>Geothlypis philadelphia</i>	S4B	G5				1
Hooded Warbler	<i>Setophaga citrina</i>	S4B	G5	NAR	NAR		1
Northern Parula	<i>Setophaga americana</i>	S4B	G5				1
Magnolia Warbler	<i>Setophaga magnolia</i>	S5B	G5				3
Bay-breasted Warbler	<i>Setophaga castanea</i>	S5B	G5				2
Blackburnian Warbler	<i>Setophaga fusca</i>	S5B	G5				2
Black-and-white Warbler	<i>Mniotilta varia</i>	S5B	G5				3
Common Yellowthroat	<i>Geothlypis trichas</i>	S5B	G5				1
Yellow Warbler	<i>Setophaga petechia</i>	S5B	G5				11
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	S5B	G5				4
Blackpoll Warbler	<i>Setophaga striata</i>	S4B	G5				9
Palm Warbler	<i>Setophaga palmarum</i>	S5B	G5				1
Yellow-rumped Warbler	<i>Setophaga coronata</i>	S5B	G5				9
Black-throated Green Warbler	<i>Setophaga virens</i>	S5B	G5				1
Canada Warbler	<i>Cardellina canadensis</i>	S4B	G5				1
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	S4B	G5	SC	SC		1
American Tree Sparrow	<i>Spizella arborea</i>	S4B	G5				7
Chipping Sparrow	<i>Spizella passerina</i>	S5B	G5				1
Vesper Sparrow	<i>Poocetes gramineus</i>	S4B	G5				1
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S4B	G5				12
Song Sparrow	<i>Melospiza melodia</i>	S5B	G5				62
Swamp Sparrow	<i>Melospiza georgiana</i>	S5B	G5				1
White-throated Sparrow	<i>Zonotrichia albicollis</i>	S5B	G5				7
Dark-eyed Junco	<i>Junco hyemalis</i>	S5B	G5				5
Northern Cardinal	<i>Cardinalis cardinalis</i>	S5	G5				24
Vesper Sparrow	<i>Poocetes gramineus</i>	S4B	G5				1
Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	G5	THR	THR		1
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S4	G5				233
Common Grackle	<i>Quiscalus quiscula</i>	S5B	G5				200
Brown-headed Cowbird	<i>Molothrus ater</i>	S4B	G5				41
Orchard Oriole	<i>Icterus spurius</i>	S4B	G5				2
Baltimore Oriole	<i>Icterus galbula</i>	S4B	G5				7

Note: General Spring Migration and Shorebird Surveys also completed on May 26, 2017 - resulted reported on Breeding Bird Study table

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

Location: refers to the location of the observation with respect to offshore distance from the Lake Ontario shoreline. Use of the Shale Pond on the Subject Lands is also noted where appropriate

Table 7: Migratory Bird Survey List

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	Location	Total Individuals Observed
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S ranks: Provincial ranks are from the Natural Heritage Information Centre; S1 (critically imperiled), S2 (imperiled), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list October 2013

G ranks: National 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); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk; Candidate Species at Risk to be assessed by COSSARO are listed online: www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/STDPROD_068707.html/.

COSEWIC: Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from NHIC Table October 2013); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk; Candidate Species at Risk to be assessed by COSEWIC are listed online: www.cosewic.gc.ca/eng/sct3/index_e.cfm/.

Table 8: Breeding Bird Survey List

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
Canada Goose	<i>Branta canadensis</i>	S5	G5			X	PO-H
Mallard	<i>Anas platyrhynchos</i>	S5	G5			X	PO-H
Wood Duck	<i>Aix sponsa</i>	S5	G5			X	CO-FY
Hooded Merganser	<i>Lophodytes cucullatus</i>	S5B,S5N	G5			X	PO-H
Rock Pigeon	<i>Columba livia</i>	SNA	G5				PO-H
Mourning Dove	<i>Zenaida macroura</i>	S5	G5				PO-H
Chimney Swift	<i>Chaetura pelagica</i>	S4B, S4N	G5	THR	THR		PR-T
Virginia Rail	<i>Rallus limicola</i>	S5B	G5			X	CO-DD
Killdeer	<i>Charadrius vociferus</i>	S5B, S5N	G5				PR-A
American Woodcock	<i>Scolopax minor</i>	S4B	G5				PO-H
Ring-billed Gull	<i>Larus delawarensis</i>	S5B,S4N	G5			X	OB-X
Herring Gull	<i>Larus argentatus</i>	S5B,S5N	G5			X	OB-X
Caspian Tern	<i>Hydroprogne caspia</i>	S3B	G5			X	OB-X
Common Tern	<i>Sterna hirundo</i>	S4B	G5			X	OB-X
Common Loon	<i>Gavia immer</i>	S5B,S5N	G5			X	OB-X
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	S5B	G5				OB-X
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	S3B,S3N	G5			X	OB-X
Cooper's Hawk	<i>Accipiter cooperii</i>	S4	G5			X	OB-X
Red-tailed Hawk	<i>Buteo jamaicensis</i>	S5	G5			X	OB-X
Belted Kingfisher	<i>Megasceryle alcyon</i>	S4B	G5				PO-H
Downy Woodpecker	<i>Picoides pubescens</i>	S5	G5				PR-T
Hairy Woodpecker	<i>Picoides villosus</i>	S5	G5				PO-H
Northern Flicker	<i>Colaptes auratus</i>	S4B	G5				PR-T
Peregrine Falcon	<i>Falco peregrinus</i>	S3B	G4	SC	SC	X	OB-X
Willow Flycatcher	<i>Empidonax traillii</i>	S5B	G5			X	PR-T
Least Flycatcher	<i>Empidonax minimus</i>	S4B	G5				PO-S
Eastern Phoebe	<i>Sayornis phoebe</i>	S5B	G5				PO-H
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S4B	G5				PR-P
Warbling Vireo	<i>Vireo gilvus</i>	S5B	G5				PR-T
Red-eyed Vireo	<i>Vireo olivaceus</i>	S5B	G5				PO-H
Blue Jay	<i>Cyanocitta cristata</i>	S5	G5				OB-X
American Crow	<i>Corvus brachyrhynchos</i>	S5B	G5				PR-A
Fish Crow	<i>Corvus ossifragus</i>	SNA	G5				PO-H
Tree Swallow	<i>Tachycineta bicolor</i>	S4B	G5				CO-AE
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	S4B	G5			X	PR-T
Bank Swallow	<i>Riparia riparia</i>	S4B	G5	THR	THR		OB-X
Barn Swallow	<i>Hirundo rustica</i>	S4B	G5	THR	THR		PO-H
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	S4B	G5			X	CO-AE
Black-capped Chickadee	<i>Poecile atricapillus</i>	S5	G5				CO-CF
Red-breasted Nuthatch	<i>Sitta canadensis</i>	S5	G5			X	OB-X
House Wren	<i>Troglodytes aedon</i>	S5B	G5				PR-T
Marsh Wren	<i>Cistothorus palustris</i>	S4B	G5			X	PO-S
American Robin	<i>Turdus migratorius</i>	S5B	G5				CO-CF
Gray Catbird	<i>Dumetella carolinensis</i>	S4B	G5				CO-FS
Brown Thrasher	<i>Toxostoma rufum</i>	S4B	G5			X	CO-NE
Northern Mockingbird	<i>Mimus polyglottos</i>	S4	G5				PO-H
European Starling	<i>Sturnus vulgaris</i>	SNA	G5				CO-AE
Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5B	G5				PR-T
House Sparrow	<i>Passer domesticus</i>	SNA	G5				PR-T
House Finch	<i>Carpodacus mexicanus</i>	SNA	G5				PR-T
American Goldfinch	<i>Spinus tristis</i>	S5B	G5				PR-P
Black-and-white Warbler	<i>Mniotilta varia</i>	S5B	G5				OB-X
Common Yellowthroat	<i>Geothlypis trichas</i>	S5B	G5				PO-S
Yellow Warbler	<i>Setophaga petechia</i>	S5B	G5				PR-P
Blackpoll Warbler	<i>Setophaga striata</i>	S4B	G5				OB-X

Table 8: Breeding Bird Survey List

Common Name	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
Wilson's Warbler	<i>Cardellina pusilla</i>	S4B	G5				OB-X
Chipping Sparrow	<i>Spizella passerina</i>	S5B	G5				PR-T
Savannah Sparrow	<i>Passerculus sandwichensis</i>	S4B	G5			X	PR-T
Song Sparrow	<i>Melospiza melodia</i>	S5B	G5				CO-CF
Lincoln's Sparrow	<i>Melospiza lincolni</i>	S5B	G5				OB-X
Northern Cardinal	<i>Cardinalis cardinalis</i>	S5	G5				PR-T
Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	G5	THR	THR		OB-X
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S4	G5				CO-FY
Common Grackle	<i>Quiscalus quiscula</i>	S5B	G5				CO-CF
Brown-headed Cowbird	<i>Molothrus ater</i>	S4B	G5				PR-P
Orchard Oriole	<i>Icterus spurius</i>	S4B	G5				PO-S
Baltimore Oriole	<i>Icterus galbula</i>	S4B	G5				PR-T

Species Code: consistent with the American Ornithologists' Union. 2012. 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 (imperiled), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list October 2013

G ranks: National 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); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk; Candidate Species at Risk to be assessed by COSSARO are listed online: www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/STDPROD_068707.html/.

COSEWIC: Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from NHIC Table October 2013); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk; Candidate Species at Risk to be assessed by COSEWIC are listed online: www.cosewic.gc.ca/eng/sct3/index_e.cfm/.

SWH Indicator Species: SWH refers to Significant Wildlife Habitat as defined by the MNRF Significant Wildlife Habitat Criteria Tables for Ecoregion 7E. SWH indicator species are identified in this table and any potential SWH is discussed in the text of this report.

Table 9: 2017 Bat Acoustic Survey Results

SURVEY DATES	SURVEY ROUND	TRANSECT/ POINT COUNT/SM3BAT	SPECIES CODE								
			NOBA	LACI	LANO	EPFU	LABO	PESU	MYLU	MYSE	MYLE
JU-05-2017	1	BT1	X								
JU-05-2017	1	BT2	X								
JU-05-2017	1	BT3				X					
JU-05-2017	1	BT4				X					
JU-05-2017	1	BT5				X					
JU-05-2017	1	BT6	X								
JU-05-2017	1	BP1	X								
JU-05-2017	1	BP2				X					
JU-05-2017	1	BP3				X					
JU-13-2017	2	BT1	X								
JU-13-2017	2	BT2	X								
JU-13-2017	2	BT3				X					
JU-13-2017	2	BT4				X					
JU-13-2017	2	BT5				X					
JU-13-2017	2	BT6				X					
JU-13-2017	2	BP1				X					

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOBA	No Bats	No recorded despite survey effort
LACI	Hoary bat	<i>Lasiurus cinereus</i>
LANO	Silver-haired bat	<i>Lasionycteris noctivagans</i>
EPFU	Big Brown bat	<i>Eptesicus fuscus</i>
LABO	Eastern Red bat	<i>Lasiurus borealis</i>
PESU	Tri-coloured bat	<i>Perimyotis subflavus</i>
MYLU	Little Brown Myotis	<i>Myotis lucifugus</i>
MYSE	Northern Myotis	<i>Myotis septentrionalis</i>
MYLE	Eastern Small-footed Myotis	<i>Myotis leibii</i>

Table 9: 2017 Bat Acoustic Survey Results

SURVEY DATES	SURVEY ROUND	TRANSECT/ POINT COUNT/SM3BAT	SPECIES CODE								
			NOBA	LACI	LANO	EPFU	LABO	PESU	MYLU	MYSE	MYLE
JU-13-2017	2	BP2	X								
JU-13-2017	2	BP3				X					
JU-24-2017	3	BT1	X								
JU-24-2017	3	BT2	X								
JU-24-2017	3	BT3		X		X					
JU-24-2017	3	BT4		X		X					
JU-24-2017	3	BT5		X	X	X					
JU-24-2017	3	BT6				X					
JU-24-2017	3	BP1	X								
JU-24-2017	3	BP2				X					
JU-24-2017	3	BP3		X	X	X	X				

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOBA	No Bats	No recorded despite survey effort
LACI	Hoary bat	<i>Lasiurus cinereus</i>
LANO	Silver-haired bat	<i>Lasionycteris noctivagans</i>
EPFU	Big Brown bat	<i>Eptesicus fuscus</i>
LABO	Eastern Red bat	<i>Lasiurus borealis</i>
PESU	Tri-coloured bat	<i>Perimyotis subflavus</i>
MYLU	Little Brown Myotis	<i>Myotis lucifugus</i>
MYSE	Northern Myotis	<i>Myotis septentrionalis</i>
MYLE	Eastern Small-footed Myotis	<i>Myotis leibii</i>

Table 10: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
1	AMC1	X												Y	200
2	AMC1										1(6)			Y	300
3	AMC1		1(8)											Y	300
3	AMC1										1(2)			Y	100
1	AMC2										1(2)			Y	N/A
2	AMC2	X												Y	N/A

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME	CALL CODES	
NOAM	No Amphibians	No amphibians despite survey effort	X	No amphibians heard
AMTO	American Toad	<i>Anaxyrus americanus</i>	1	Calls can be counted without error
FOTO	Fowler's Toad	<i>Anaxyrus fowleri</i>	2	Calls overlap but can be reliably estimated
GRTR	Gray Treefrog	<i>Hyla versicolor</i>	3	Calls overlap too much to estimate number
CHFR	Western Chorus Frog	<i>Pseudacris triseriata</i>		
WOFR	Wood Frog	<i>Lithobates sylvaticus</i>		
NLRF	Northern Leopard Frog	<i>Lithobates pipiens</i>		
PIFR	Pickerel Frog	<i>Lithobates palustris</i>		
GRFR	Green Frog	<i>Lithobates clamitans</i>		
BULL	American Bullfrog	<i>Lithobates catesbeianus</i>		
MIFR	Mink Frog	<i>Lithobates septentrionalis</i>		
SPPE	Spring Peeper	<i>Pseudacris crucifer</i>		

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

Table 10: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
3	AMC2	X												Y	N/A
3	AMC2	X												Y	N/A
1	AMC3	X												Y	15
1	AMC4	X												Y	10
1	AMC5								1(2)					Y	150
2	AMC5	X												Y	150
3	AMC5	X												Y	100

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME	CALL CODES	
NOAM	No Amphibians	No amphibians despite survey effort	X	No amphibians heard
AMTO	American Toad	<i>Anaxyrus americanus</i>	1	Calls can be counted without error
FOTO	Fowler's Toad	<i>Anaxyrus fowleri</i>	2	Calls overlap but can be reliably estimated
GRTR	Gray Treefrog	<i>Hyla versicolor</i>	3	Calls overlap too much to estimate number
CHFR	Western Chorus Frog	<i>Pseudacris triseriata</i>		
WOFR	Wood Frog	<i>Lithobates sylvaticus</i>		
NLRF	Northern Leopard Frog	<i>Lithobates pipiens</i>		
PIFR	Pickereel Frog	<i>Lithobates palustris</i>		
GRFR	Green Frog	<i>Lithobates clamitans</i>		
BULL	American Bullfrog	<i>Lithobates catesbeianus</i>		
MIFR	Mink Frog	<i>Lithobates septentrionalis</i>		
SPPE	Spring Peeper	<i>Pseudacris crucifer</i>		

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

Table 11: Amphibian Egg Mass Survey Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
1	AMC1	X												Y	200
1	AMC2	N/A												Y	N/A
1	AMC3	X												Y	15
1	AMC4	X												Y	30

Notes:

- The quantity reported in each cell is the cumulative count of all life stages (egg mass, tadpole, adult) of the individuals observed of that species during each egg mass survey round
- Survey station AMC2 consists of a concrete-walled oil-water separator that is fenced off and therefore, could not be accessed to complete the visual egg mass survey

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOAM	No Amphibians	No amphibians despite survey effort
AMTO	American Toad	<i>Anaxyrus americanus</i>
FOTO	Fowler's Toad	<i>Anaxyrus fowleri</i>
GRTR	Gray Treefrog	<i>Hyla versicolor</i>
CHFR	Western Chorus Frog	<i>Pseudacris triseriata</i>
WOFR	Wood Frog	<i>Lithobates sylvaticus</i>
NLRF	Northern Leopard Frog	<i>Lithobates pipiens</i>
PIFR	Pickerel Frog	<i>Lithobates palustris</i>
GRFR	Green Frog	<i>Lithobates clamitans</i>
BULL	American Bullfrog	<i>Lithobates catesbeianus</i>
MIFR	Mink Frog	<i>Lithobates septentrionalis</i>
SPPE	Spring Peeper	<i>Pseudacris crucifer</i>

Table 12: Snake Transect Survey Results

DATE SURVEY D	SURVEY Y ROUND	TRANSECT 'T' NUMBER	SPECIES CODE														
			NOS N	EAG A	MIS N	BRS N	RBS N	RAS N	RIS N	BLR A	BUG A	FOS N	HOS N	MAS S	RNS N	SGS N	QUS N
17-AP-17	1	T1		X													
17-AP-17	1	T2	X														
17-AP-17	1	T3	X														
17-AP-17	1	T4	X														
17-AP-17	1	T5	X														
17-AP-17	1	T6	X														

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOSN	No Snakes	No snakes despite survey effort
EAGA	Eastern Gartersnake	<i>Thamnophis sirtalis sirtalis</i>
MISN	Eastern Milksnake	<i>Lampropeltis triangulum triangulum</i>
BRSN	Northern Brownsnake	<i>Storeria dekayi dekayi</i>
RBSN	Northern Red-bellied Snake	<i>Storeria occipitomaculata occipitomaculata</i>
RASN	Gray Rat Snake	<i>Elaphe obsoleta obsoleta</i>
RISN	Eastern Ribbonsnake	<i>Thamnophis sauritus</i>
BLRA	Blue Race Snake	<i>Coluber constrictor foxii</i>
BUGA	Butlers Gartersnake	<i>Thamnophis butleri</i>
FOSN	Eastern Foxsnake	<i>Elaphi gloydi</i>
HOSN	Eastern Hog-nosed Snake	<i>Heterodon platifrhinos</i>
MASS	Eastern Massasauga	<i>Sistrurus catenatus catenatus</i>
RNSN	Ring-necked Snake	<i>Diadophis punctatus</i>
SGSN	Smooth Greensnake	<i>Opheodrys vernalis</i>
QUSN	Queen Snake	<i>Regina septemvittata</i>

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

Table 12: Snake Transect Survey Results

DATE SURVEY D	SURVEY Y ROUND	TRANSECT 'T' NUMBER	SPECIES CODE														
			NOS N	EAG A	MIS N	BRS N	RBS N	RAS N	RIS N	BLR A	BUG A	FOS N	HOS N	MAS S	RNS N	SGS N	QUS N
28-AP-17	2	T1	X														
28-AP-17	2	T2	X														
28-AP-17	2	T3		X													
28-AP-17	2	T4	X														
28-AP-17	2	T5	X														
28-AP-17	2	T6	X														
3-MA-17	3	T1	X														

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOSN	No Snakes	No snakes despite survey effort
EAGA	Eastern Gartersnake	<i>Thamnophis sirtalis sirtalis</i>
MISN	Eastern Milksnake	<i>Lampropeltis triangulum triangulum</i>
BRSN	Northern Brownsnake	<i>Storeria dekayi dekayi</i>
RBSN	Northern Red-bellied Snake	<i>Storeria occipitomaculata occipitomaculata</i>
RASN	Gray Rat Snake	<i>Elaphe obsoleta obsoleta</i>
RISN	Eastern Ribbonsnake	<i>Thamnophis sauritus</i>
BLRA	Blue Race Snake	<i>Coluber constrictor foxii</i>
BUGA	Butlers Gartersnake	<i>Thamnophis butleri</i>
FOSN	Eastern Foxsnake	<i>Elaphe gloydi</i>
HOSN	Eastern Hog-nosed Snake	<i>Heterodon platifrons</i>
MASS	Eastern Massasauga	<i>Sistrurus catenatus catenatus</i>
RNSN	Ring-necked Snake	<i>Diadophis punctatus</i>
SGSN	Smooth Greensnake	<i>Opheodrys vernalis</i>
QUSN	Queen Snake	<i>Regina septemvittata</i>

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

Table 12: Snake Transect Survey Results

DATE SURVEYED	SURVEY ROUND	TRANSECT 'T' NUMBER	SPECIES CODE														
			NOS N	EAG A	MIS N	BRS N	RBS N	RAS N	RIS N	BLR A	BUG A	FOS N	HOS N	MAS S	RNS N	SGS N	QUS N
3-MA-17	3	T2	X														
3-MA-17	3	T3	X														
3-MA-17	3	T4		X													
3-MA-17	3	T5	X														
3-MA-17	3	T6	X														
10-MA-17	4	T1	X														
10-MA-17	4	T2	X														

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOSN	No Snakes	No snakes despite survey effort
EAGA	Eastern Gartersnake	<i>Thamnophis sirtalis sirtalis</i>
MISN	Eastern Milksnake	<i>Lampropeltis triangulum triangulum</i>
BRSN	Northern Brownsnake	<i>Storeria dekayi dekayi</i>
RBSN	Northern Red-bellied Snake	<i>Storeria occipitomaculata occipitomaculata</i>
RASN	Gray Rat Snake	<i>Elaphe obsoleta obsoleta</i>
RISN	Eastern Ribbonsnake	<i>Thamnophis sauritus</i>
BLRA	Blue Race Snake	<i>Coluber constrictor foxii</i>
BUGA	Butlers Gartersnake	<i>Thamnophis butleri</i>
FOSN	Eastern Foxsnake	<i>Elaphe gloydi</i>
HOSN	Eastern Hog-nosed Snake	<i>Heterodon platifrons</i>
MASS	Eastern Massasauga	<i>Sistrurus catenatus catenatus</i>
RNSN	Ring-necked Snake	<i>Diadophis punctatus</i>
SGSN	Smooth Greensnake	<i>Opheodrys vernalis</i>
QUSN	Queen Snake	<i>Regina septemvittata</i>

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

Table 12: Snake Transect Survey Results

DATE SURVEYED	SURVEY ROUND	TRANSECT 'T' NUMBER	SPECIES CODE														
			NOS N	EAG A	MIS N	BRS N	RBS N	RAS N	RIS N	BLR A	BUG A	FOS N	HOS N	MAS S	RNS N	SGS N	QUS N
10-MA-17	4	T3	X														
10-MA-17	4	T4	X														
10-MA-17	4	T5	X														
10-MA-17	4	T6	X														

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOSN	No Snakes	No snakes despite survey effort
EAGA	Eastern Gartersnake	<i>Thamnophis sirtalis sirtalis</i>
MISN	Eastern Milksnake	<i>Lampropeltis triangulum triangulum</i>
BRSN	Northern Brownsnake	<i>Storeria dekayi dekayi</i>
RBSN	Northern Red-bellied Snake	<i>Storeria occipitomaculata occipitomaculata</i>
RASN	Gray Rat Snake	<i>Elaphe obsoleta obsoleta</i>
RISN	Eastern Ribbonsnake	<i>Thamnophis sauritus</i>
BLRA	Blue Race Snake	<i>Coluber constrictor foxii</i>
BUGA	Butlers Gartersnake	<i>Thamnophis butleri</i>
FOSN	Eastern Foxsnake	<i>Elaphi gloydi</i>
HOSN	Eastern Hog-nosed Snake	<i>Heterodon platifrons</i>
MASS	Eastern Massasauga	<i>Sistrurus catenatus catenatus</i>
RNSN	Ring-necked Snake	<i>Diadophis punctatus</i>
SGSN	Smooth Greensnake	<i>Opheodrys vernalis</i>
QUSN	Queen Snake	<i>Regina septemvittata</i>

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

Table 13: Turtle Survey Results - Basking

DATE SURVEYED	SURVEY ROUND	STATION #	SPECIES CODE								
			NOTU	MPTU	SNTU	MATU	BLTU	SSTU	WOTU	STIN	SPTU
17-AP-11	1	BS-1		1*							
17-AP-11	1	BS-2	X								
28-AP-17	2	BS-1	X								
28-AP-17	2	BS-2	X								
3-MA-17	3	BS-1		1*							
3-MA-17	3	BS-2	X								

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOTU	No Turtles	No turtles despite survey effort
MPTU	Midland painted turtle	<i>Chrysemis picta</i>
SNTU	Snapping turtle	<i>Chelydra serpentina</i>
MATU	Northern map turtle	<i>Graptemys geographica</i>
BLTU	Blanding's turtle	<i>Emydoidea blandingii</i>
SSTU	Spiny soft-shelled turtle	<i>Apalone spinifera</i>
WOTU	Wood turtle	<i>Glyptemys insculpta</i>
STIN	Stinkpot turtle	<i>Stemotherus odoratus</i>
SPTU	Spotted turtle	<i>Clemmys guttata</i>

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

Table 13: Turtle Survey Results - Basking

***Turtle Survey Results – Nesting**

- Turtle nesting survey was completed on June 7, 2017;
- One south facing slope and two non-south facing slopes with exposed soil were observed around the perimeter of the Shale Pond where the Midland Painted Turtle was observed. However, suitability of nesting habitat at each location was generally poor, with clay to silty clay soils with exposed shale and some relatively steep slopes; and
- No nesting evidence was observed.

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOTU	No Turtles	No turtles despite survey effort
MPTU	Midland painted turtle	<i>Chrysemis picta</i>
SNTU	Snapping turtle	<i>Chelydra serpentina</i>
MATU	Northern map turtle	<i>Graptemys geographica</i>
BLTU	Blanding's turtle	<i>Emydoidea blandingii</i>
SSTU	Spiny soft-shelled turtle	<i>Apalone spinifera</i>
WOTU	Wood turtle	<i>Glyptemys insculpta</i>
STIN	Stinkpot turtle	<i>Stemotherus odoratus</i>
SPTU	Spotted turtle	<i>Clemmys guttata</i>

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

Appendix C – Conceptual Landscaping Plan

