Upper West Side Secondary Plan

Master Environmental Impact Statement and Linkage Assessment

Prepared for:

Upper West Side Landowners Group
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Project No. 1974E | December 2023

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Upper West Side Secondary Plan

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by the Upper West Side Landowners Group (UWSLG), care of Corbett Land Strategies (CLS), to complete a Master Environmental Impact Statement (EIS), Linkage Assessment (LA), and Tree Protection Plan (TPP) in support of the proposed Secondary Plan for the Upper West Side Infill Community. This report (referred to herein as the 'Master EIS') represents the EIS and LA, while the TPP is provided under separate cover. The proposed Upper West Side Secondary Plan consists of residential, commercial and mixed-use development areas, neighbourhood parks and natural open space, an elementary school, stormwater management areas, and a road network.

The Upper West Side Secondary Plan establishes policies, designations, infrastructure, and development phasing for this future community in the **'Study Area'**, defined as the lands bounded by Twenty Road West, Upper James Street, Dickenson Road West, and Glancaster Road, within the City of Hamilton (Map 1). Most of the Study Area is currently subject to the Airport Employment Growth District (AEGD) Secondary Plan, with the exception of two blocks that are designated as 'Urban Expansion Area- Neighbourhoods' and 'Urban Boundary Expansion Area- Employment' on Schedule A of the Urban Hamilton Official Plan (UHOP, City of Hamilton 2013). The term **'Urban Expansion Areas'** refers to these two blocks. The term **'Participating Lands'** refers to the parcels within the Study Area that are owned by members of the UWSLG. The Study Area, Participating Lands, and Urban Expansion Areas are shown on **Map 1**.

Existing natural features within the Study Area are shown on **Map 2**, and include a network of headwater drainage features (HDFs), portions of the Upper Twenty Mile Creek Provincially Significant Wetland (PSW) complex, non-PSW wetlands, Significant Woodlands, other woodlots, a central naturalizing orchard, and hedgerows that intersperse the row crop agricultural fields that dominate the overall Study Area.

The intent of this Master EIS is to describe the existing terrestrial and aquatic environments within the Study Area, analyze the significance and sensitivity of ecological features and functions, establish a Natural Heritage System (NHS) for the Study Area, evaluate potential environmental impacts that may occur from the proposed land use changes, and provide recommendations for future studies, mitigation measures, and ecological monitoring.

1.1 Project Background and Natural Heritage Study Approach

Within the Study Area, the property located at 9511 Twenty Road West is the subject of an active *Planning Act* (R.S.O. 1990) application referred to as the Garth Street Industrial Subdivision Draft Plan, first submitted in July 2018 (City of Hamilton File Nos. UHOPA-18-016, ZAC-18-040, and 25T-201807). To meet the needs of this proposed development as well as future development within the overall UWS, several collector roads are required to provide a road network. The extension of Garth Street is a key component of this network as it represents the arterial road. As such, the Municipal Class Environmental Assessment (EA) for the proposed road infrastructure is integrated with the Garth Street Industrial Subdivision Draft Plan and is therefore referred to as an Integrated EA. A Terms of Reference (TOR) for the Integrated EA (authored by R.J. Burnside & Associates Limited and dated July 2018) was circulated to the City of Hamilton and the Niagara Peninsula Conservation Authority (NPCA) for review and comment.

In 2020, applications for the expansion of the City of Hamilton's urban boundary were also submitted by the UWSLG for several parcels within the Study Area, referred to in previous applications and reports as the Western, Central, and Eastern Urban Boundary Expansion areas, or 'white belt lands'; a provincial order brought these lands into the City's urban boundary in November 2022. As of the date of this report, all portions of the Study Area remain part of the urban boundary.

Apart from the Urban Expansion Areas, lands within the Study Area are currently subject to the policies and schedules of the AEGD Secondary Plan. The Upper West Side Secondary Plan for which this Master EIS is being prepared is intended "*to guide the comprehensive development of the Study Area and establish policies, designations, infrastructure, and phasing of the development of the future community*" (CLS 2023). However, *"Lands located within the Secondary Plan Boundary but outside of the Urban Expansion Areas shall continue to be subject to the Airport Employment Growth District Secondary Plan and its respective policies, as applicable, until such time that the lands are converted through a Municipal Comprehensive Review, or alternative legislative process*" (CLS 2023). Nonetheless, a landscape-level approach is necessary from the natural heritage perspective to ensure that important ecological features and functions within and adjacent to the overall Study Area are considered and protected appropriately as development of the future community proceeds.

This Master EIS will therefore present high-level descriptions and analyses, and make recommendations for the protection and management, of all natural features within the Study Area. A proposed NHS for the Study Area is delineated and included as part of the Upper West Side 'Secondary Plan Boundary' (shown on the proposed Land Use Plan developed by CLS and included as **Appendix I** of this report). While the proposed NHS incorporates some of the results and designations of the AEGD Subwatershed Study (Dillon Consulting & Aquafor Beech Ltd. 2011) and Implementation Document (Aquafor Beech Ltd. 2017), the intent of this Master EIS is to provide updated recommendations for natural heritage management policies based on more recent field survey data and current ecological management principals. While it is expected that the AEGD Secondary Plan and its respective policies will continue to govern development on lands within the Study Area but outside of the Urban Expansion Areas for the time-being, this Master EIS document provides a natural heritage management framework that may be used (at the discretion of City Natural Heritage Planning staff) to guide development anywhere within the Study Area.

1.1.1 Terms of Reference

A Development Review Team (DRT) meeting for this proposal (File No. FC-23-049) was held on April 26, 2023; a Formal Consultation Document was subsequently provided outlining the required reports, studies and plans for this privately-initiated Secondary Plan application. Detailed comments from City Natural Heritage Planning staff were received through the Formal Consultation Process, and were considered during the preparation of a TOR for this Master EIS, LA, and TPP.

The Formal Consultation Document and comments received from City Natural Heritage Planning staff identified a requirement for a Subwatershed Study to inform the Secondary Planning process for the Urban Expansion Areas. City staff have indicated that the AEGD Subwatershed Study and Stormwater Master Plan (Dillon Consulting & Aquafor Beech Ltd. 2011) are now considered out of date. Additionally, these previous studies considered employment-related land uses only, whereas the UWS Secondary Plan proposes both employment and residential land uses.

A Subwatershed Study is typically completed in advance of, and separate from, a Secondary Planning Study, and usually establishes the Natural Heritage System (NHS), water resource management framework, land use impacts, mitigation measures, buffers, and restoration

opportunities. In some instances, including for the AEGD, the two studies are fully integrated and completed as a simultaneous, iterative process.

The natural heritage component of the Upper West Side Secondary Plan application is comprised of the Master EIS, LA, and TPP, which will consider and integrate Subwatershed Study components in addition to a comprehensive evaluation of the proposed Secondary Plan land use concepts and water resource management strategies from the ecological perspective.

A TOR, dated July 17, 2023, was submitted to the City and NPCA for review; a copy of this TOR is provided in **Appendix II**. Comments were received on October 13, 2023; where possible, this Master EIS addresses comments and integrates additional information requested by agency staff. It is anticipated that the TOR will be revised and re-submitted at the next submission stage.

2.0 Policy Context

Information on the natural heritage features in the Study Area was collected and assessed for significance. These features are evaluated against the relevant policies, legislation, and planning studies described in the sections below to help inform the Master EIS, identify areas to be protected, and identify areas that may require further study.

2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) (OMMAH 2020) is issued under the authority of Section 3 of the *Planning Act* and came into effect on May 1, 2020, replacing the 2014 PPS. Section 3 of the *Planning Act* requires that decisions affecting planning matters shall be consistent with policy statements under the Act. Part III of the PPS establishes that the PPS is to be read in its entirety and all relevant policies are to be applied to each situation.

Section 1.8. of the PPS – Energy Conservation, Air Quality and Climate Change, states that "Planning authorities shall support energy conservation and efficiency, improved air quality, reduced greenhouse gas emissions, and preparing for the impacts of a changing climate through land use and development patterns…". Policy 1.8.1.g) identifies the maximization of vegetation within settlement areas, where feasible, as an item that planning authorities should support to address climate change issues.

The NHS proposed for the Upper West Side Secondary Plan will incorporate plantings and the enhancement of VPZs through landscape and naturalization plans, as well as replacing any trees removed for the development following the City of Hamilton's tree compensation requirements. This work will be completed as part of Draft Plan and/or Site Plan planning stages as appropriate.

Section 2.1 of the PPS – Natural Heritage establishes clear direction for the application of an ecosystem approach and the protection of 'significant' natural resources, as well as the form, function, and connectivity of natural features. These features are broadly defined in the PPS and rely on the Ministry of Natural Resources and Forestry (MNRF) and the municipality to identify and delineate specific natural features. The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (SWHTG) and Criteria Schedules (OMNR 2000, MNRF 2015a) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS. The significant features in Ecoregion 7E, within which the Study Area is located, include:

a) Significant wetlands;
b) Significant and other coastal wetlands;
c) Fish habitat;
d) Significant woodlands;
e) Significant valleylands;
f) Habitat of endangered species and threatened species;
g) Candidate and confirmed significant wildlife habitat (SWH); and
h) Significant areas of natural and scientific interest (ANSI).

Where they are present within the Study Area, these features are discussed in detail in this Master EIS. Policies found in Section 2.1 of the PPS that provide context to the current proposed development include the following:

- Section 2.1.1 of the PPS states that natural features and areas shall be protected for the long-term
- Section 2.1.2 of the PPS states that the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.
- Section 2.1.3 of the PPS states that natural heritage systems shall be identified in Ecoregions 6E & 7E. The City of Hamilton has identified a Natural Heritage System (NHS) for the municipality, which is provided in the Urban Hamilton Official Plan (UHOP) (2013), and the Rural Hamilton Official Plan (RHOP) (2012).
- Section 2.1.4 of the PPS states that development and site alteration shall not be permitted in significant wetlands in Ecoregions 5E, 6E, and 7E, or significant coastal wetlands.
- Section 2.1.5 of the PPS states that development or site alteration shall not be permitted in b) Significant Woodlands in Ecoregions 6E and 7E, and d) Significant Wildlife Habitat, or other types of significant habitat unless it has been demonstrated that there will be no negative impacts on the features or their ecological functions.

- Section 2.1.6 of the PPS states that development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.
- Section 2.1.7 of the PPS states that development or site alteration shall not be permitted in habitat of Endangered or Threatened species except in accordance with provincial or federal requirements.
- Section 2.1.8 of the PPS states that development and site alteration shall not be permitted on adjacent lands in 120m of the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

The Natural Heritage Reference Manual (OMNR 2010) provides technical guidance for implementing the natural heritage policies of the PPS. Although the Natural Heritage Reference Manual was based on the 2005 PPS, its guidance may be applied to the 2020 PPS. The manual represents the province's recommended technical criteria and guidance for identifying and protecting significant natural features as defined in the PPS.

The SWHTG was prepared to assist planning authorities and other participants in the land use planning system (OMNR 2000). The SWHTG is a detailed technical manual that provides information on the identification, description, and prioritization of SWH. The manual is intended for use in the municipal policy and development process under the *Planning Act*. An addendum to the SWHTG provides further detail on characterizing and identifying SWH in Ecoregion 7E (MNRF 2015a).

Section 2.2 of the PPS – Water outlines specific planning approaches for the protection, improvement, or restoration of the quality and quantity of water. Policies establish the need to identify the water resource system, which includes groundwater features, hydrologic functions, natural heritage features and areas, and surface water features. These features are established as the necessary components for the ecological and hydrological integrity of the watershed. The watershed is identified as the ecologically meaningful scale for integrated and long-term planning. Policies found in Section 2.2 of the PPS that provide context to the current proposed development include the following:

- Section 2.2.2 of the PPS states that development and site alteration shall be restricted in or near sensitive surface water features and sensitive ground water features such that these features and their related hydrologic functions will be protected, improved or restored. Mitigative measures and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions.

Other approaches provided for planning authorities to protect, improve, or restore the quality and quantity of water that are applicable to the Upper West Side Secondary Plan include (as detailed in Section 2.2.1 of the PPS):

- minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts
- evaluating and preparing for the impacts of a changing climate to water resource systems at the watershed level
- maintaining linkages and related functions among ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas
- implementing necessary restrictions on development and site alteration to:
    - protect all municipal drinking water supplies and designated vulnerable areas; and
    - protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions;
- planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality
- ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces

In the Study Area, features protected under Section 2.1 and 2.2 of the PPS include provincially significant wetlands (PSWs), non-PSW wetlands, headwater Drainage Features (HDFs) and stream channels, fish habitat, significant woodlands, confirmed and potential habitat of

endangered and threatened species, confirmed and candidate significant wildlife habitat, and riparian lands associated with surface water features defined by their soil moisture, soil type, vegetation, or topographic characteristic. The water balance, as prepared by Urbantech and presented in Water, Wastewater Servicing and Stormwater Management Overview Report (Servicing and SWM Report) (2022) and summarized in Section 10.3.1 of this EIS, addresses the hydrological function component of the above policies.

The Upper West Side Secondary Plan addresses the above policies through the establishment of an ecologically and hydrologically sound NHS and stormwater management strategy.

2.2 Endangered Species Act

The *Endangered Species Act* (ESA, 2007) prohibits killing, harming, harassing, or capturing Species at Risk (SAR) and protects their habitats from damage and destruction. The Committee on the Status of Species at Risk in Ontario (COSSARO) reviews and assesses species' populations and statuses. Species designated as Threatened or Endangered, as well as their general or regulated habitats, receive legal protection under the ESA (2007).

One tree SAR, Butternut (*Juglans cinerea*), is confirmed as present and abundant within the Study Area through NRSI field surveys. Four bat SAR, Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*), have the potential to occur in the Study Area based on the habitats present. However, acoustic monitoring is necessary to determine which (if any) SAR bats are present within the Study Area. A comprehensive analysis of SAR and ESA considerations applicable to the Upper West Side Secondary Plan is provided in Sections 6.1 and 6.4.

2.3 Canadian Fisheries Act

The federal *Fisheries Act*, 1985 (amended in 2019) provides provisions for the protection of fish and fish habitat. Under the updated federal *Fisheries Act*, fish populations are protected through two core prohibitions: Section 34.4(1) the death of fish by means other than fishing, and Section 35(1) the harmful alteration, disruption, or destruction (HADD) of fish habitat. Any proposed work, undertaking, or activity should aim to avoid causing the death of fish, or the harmful alteration, disruption or destruction of fish habitat through the course or as a result of any proposed undertaking. Fish habitat is defined 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".

Another important provision, Section 36 (3) states that no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter any such water. These 2 provisions and the other habitat protection and pollution prevention sections of the *Fisheries Act* are meant to conserve and protect fish habitat.

The Department of Fisheries and Oceans (DFO) has developed guidelines for a proponent-led assessment to determine whether a project requires DFO review based on the type of water body where the work will occur, the nature of the proposed activity, and if following the Pathways of Effects will still result in potential residual effects to fish or fish habitat.

Aquatic features are present in the Study Area that are confirmed to provide direct and indirect fish habitat. The proposed Upper West Side Secondary Plan will have implications under the federal *Fisheries Act*, as described in Section 6.2 of this report. Features within the Study Area that provide direct and indirect fish habitat are described in Section **Error! Reference source not found.**.

2.4 Migratory Birds Convention Act

The federal *Migratory Birds Convention Act* (MBCA, 1994) is applied through the Migratory Birds Regulations (MBR, 2022), which states that *"[…] A person must not engage in any of the following activities unless they have a permit that authorizes them to do so or they are authorized by these Regulations to do so:*

- *capture, kill, take, injure or harass a migratory bird or attempt to do so;*
- *destroy, take or disturb an egg; and*
- *damage, destroy, remove or disturb a nest, nest shelter, eider duck shelter or duck box."*

The MBR, 2022 came into force on July 30, 2022. These regulations have been implemented to modernize those that were originally set out in 1918 with the primary objective of regulating the overharvesting and unregulated commerce of migratory birds across Canada. The most significant change under the MBR, 2022 is that the nests of migratory birds are now only

provided protection if they contain a live bird or viable egg. The exception to this rule is for nests of 18 species identified in Schedule 1 of the MBR, 2022.

Implications of the MBCA may occur at future development stages when construction commences on lands within the Study Area. Tree and vegetation clearing will need to be completed in accordance with the MBCA and MBR, 2022. Discussion of the bird species documented within the Study Area is provided in **Section 4.3.1**.

2.5 Greater Golden Horseshoe Growth Plan & Greenbelt Plan

The Growth Plan for the Greater Golden Horseshoe (GGH) came into effect May 16, 2019; Amendment 1 (2020) was approved on August 28, 2020 (OMMAH 2020). The City of Hamilton (and therefore the Study Area) is located within the GGH Growth Plan Area, as per Ontario Regulation (O. Reg.) 416/05. The Study Area is not, however, located within the Greenbelt Plan Area defined in O. Reg. 59/05 under the provincial *Greenbelt Act*, 2005. Lands designated as Protected Countryside under the Greenbelt Plan begin southeast of the Upper James Street and Twenty Road East intersection, adjacent to (and outside of) the Study Area.

The GGH Growth Plan designates regional NHSs guided by criteria used in other provincial land use plans for the Oak Ridges Moraine and the Greenbelt. Growth Plan NHS mapping was finalized in February 2018 and is made up of natural heritage features and areas (core areas, ranging between 100ha and 500ha) connected by natural corridors (linkages, of a minimum 500m width) (MNRF 2018a). The regional NHS comprises 45% of the Growth Plan area, excluding settlements. The local NHS mapped on Schedule B of the UHOP is therefore the governing plan within the Study Area.

The regional NHS was identified so that biological and geological diversity, natural functions, and ecosystems can be maintained in the long term. NHS mapping for the GGH Growth Plan was completed on a broad, regional scale and therefore identifies larger Core Areas and wider Linkages than would be appropriate or useful on a smaller, local scale (MNRF 2018a). Nonetheless, the approach used to develop the proposed NHS for the Upper West Side Secondary Plan is complementary to both the Greenbelt Area NHS and the GGH Growth Plan NHS to ensure connectivity with these higher-level systems located outside but adjacent to the Study Area.

2.6 Urban Hamilton Official Plan (2012)

General NHS Policies for the urban areas of the City of Hamilton are detailed in Section C.2.2 of the Urban Hamilton Official Plan (UHOP); the NHS is presented in Schedule B. As per UHOP Schedule B, Core Areas including Key Natural Heritage Features (Significant Woodlands and Wetlands), and Key Hydrologic Features (Streams and Wetlands) are present in the Study Area. Linkages, defined as natural areas on the landscape that connect Core Areas, are also mapped on Schedule B and occur within the Study Area.

Section C.2.2.2 of the UHOP indicates that minor refinements to boundaries of Core Areas and Linkages may occur through the completion of an EIS, watershed study, or other appropriate study accepted by the city. Additionally, Section C.2.2.8 of the UHOP states that natural features require Vegetation Protection Zones (VPZs). VPZ policies are outlined in Section C.2.5.9 to C.2.5.13.

Section C.2.3 includes polices for the preservation and enhancement of Core Areas in the NHS and states that the goal of these policies is to ensure that any development in or adjacent to Core Areas will not negatively impact their natural features or ecological functions. Under Section 2.3.3, encroachment and vegetation removal in Core Areas is not permitted. Section 2.5 provides greater detail on the requirements of the UHOP relating to Core Areas outside of the Greenbelt Plan Area. Alterations are not permitted in fish habitat, Significant Woodlands, Significant Valleylands, SWH, or on lands adjacent to natural heritage features unless it can be demonstrated, through applicable studies, that no negative impacts on natural features or their ecological functions will occur.

2.6.1 Airport Employment Growth District Secondary Plan

The area of the AEGD Secondary Plan is composed of 1,204ha of land surrounding John C. Munro Hamilton International Airport. The plan identifies the phasing, specific land uses, transportation network, infrastructure requirements, design principles, and development standards to guide development and redevelopment within the secondary plan area. The goals of the Secondary Plan include:

- Providing a major business park development which complements the existing John C. Munro International Airport;
- Recognizing and allowing for certain existing land uses to continue; and

- Respecting and enhancing prominent natural areas throughout the Secondary Plan area.

The secondary plan also includes a set of Natural Heritage Principles intended to guide development near natural areas and preserve their ecological form and function. These principles are as follow:

- Develop in a manner that is *sensitive* to the natural environment;
- Use innovative, sustainable storm and wastewater *infrastructure* to protect water quality and source water;
- Protect and integrate provincially and municipally *significant* natural features, such as streams, *valley lands*, *wetlands*, mature trees, and forests into the employment district's *development*, implement provincial policy and meet municipal policy;
- Use sustainable design to limit the emissions, water, and energy consumption of buildings within the employment district; and
- Connect the employment district's open space system to surrounding natural areas to allow employees to enjoy and explore the region's natural heritage.

Specific policies relating to Natural Open Spaces are presented in Section 8.5 of the Secondary Plan. As per these policies, minor refinements to the Natural Open Space land use designation boundaries are permitted provided the change is justified through the completion of an EIS approved by the City of Hamilton.

Water Resource and Stormwater Management Policies are presented in Section 8.9 of the Secondary Plan. These policies guide development relating to the protection of stream corridors and natural heritage features while providing suitable storm water management design which is consistent with Low Impact Development design principles.

Policies relating to the NHS are presented in Section 8.12 of the Secondary Plan. These policies identify the presence of natural features, including wetlands, streams, woodlands, meadows, successional areas, and hedgerows, identified as Core Areas, Linkages, or Hedgerows within the AEGD and presented on Map B.8-2.

Policy 8.14.33, within the Secondary Plan, identifies the requirement for development setbacks adjacent to the boundary of natural features under the jurisdiction of any one of the relevant Conservation Authorities (including the NPCA). Additionally, under Section 8.14.32, landscape

buffers are encouraged to address edges and provide natural buffers between developed areas, streets, and adjacent natural features.

As noted previously in this report, the Study Area is located within the AEGD Secondary Plan Area and, with the exception of the Urban Expansion Areas, is subject to the policies and schedules of the AEGD Secondary Plan until the appropriate planning or legislative processes are completed and the Upper West Side Secondary Plan is approved.

Airport Employment Growth District Subwatershed Study & Stormwater Master Plan

Studies and field work informing the AEGD Subwatershed Study & Stormwater Master Plan (Dillon Consulting & Aquafor Beech Ltd. 2011) and associated Implementation Document (Aquafor Beech Ltd. 2017) were initiated prior to 2010 and informed the development of the AEGD Secondary Plan. Ecological field investigations informing the conclusions of these reports were limited, and did not include detailed site-specific field work. The Implementation Document states that *"detailed context-appropriate field surveys and assessments must be completed at subsequent stages of the planning process in order to confirm designations shown in the City of Hamilton's Official Plans and to determine if natural heritage features in addition to those identified by the City are present (i.e. through the completion of an Environmental Impact Statement (EIS); […]"* (Aquafor Beech Ltd. 2017). The completion of this Master EIS will provide updated and site-specific information for the Upper West Side Infill Community, including the results of field survey completed by NRSI biologists between late 2017 and 2021.

The AEGD subwatershed area is unique in that it includes 4 watersheds (Welland River, Twenty Mile Creek, Sulphur Creek, and Big Creek) and is under the jurisdiction of the NPCA, the Hamilton Conservation Authority (HCA), and the Grand River Conservation Authority (GRCA) (Dillon Consulting & Aquafor Beech Ltd. 2011). The study area encompasses approximately 2,800ha of land and is bounded by Garner Road and Twenty Road to the north, Carluke Road East/White Church Road to the south, Fiddler's Green Road to the west, and Upper James Street to the east.

The AEGD Subwatershed Study was prepared with the objective of protecting natural features in the subwatershed area and providing a limited range of employment-related commercial uses to serve residents of the Secondary Plan area. The Subwatershed Study identified environmental constraints to development and opportunities for natural feature protection and

enhancement in the AEGD area through highly scoped field studies, aerial reconnaissance, modeling, and monitoring. Three general components make up the AEGD Subwatershed Plan:

1) Natural Heritage Plan;
2) Groundwater Management; and
3) Surface Water Management.

The AEGD NHS includes Core Areas and Linkages and reflects the UHOP and RHOP NHS. The NHS plan provides guidance on the preparation of EISs for lands in or adjacent to the AEGD NHS.

The Groundwater Management plan identifies significant groundwater features, including recharge and discharge areas, defines water balance criteria that must be maintained during development and provides requirements for the protection of existing public and private wells in the study area.

The Surface Water Management plan identifies stream corridors requiring protection, defines stormwater management guidelines, and identifies potential end-of-pipe flood control facility locations.

Future study requirements are presented in Section 4.1 of the AEGD Subwatershed Plan; specifically, a detailed description of requirements for EISs as well as a checklist are provided in Section 4.1.1. An EIS is required when a development is proposed in or adjacent to a Core Area and a Linkage Assessment may be required for developments proposed in a Linkage. The EIS is to be prepared in accordance with the City of Hamilton's EIS Guidelines (City of Hamilton 2015a).

Airport Employment Growth District Draft Eco-Industrial Guidelines (2010)

The Eco-Industrial Guidelines (Dillon Consulting et al. 2010) provide a set of sustainable design principles and measures to guide development in the AEGD area. The City's objective is to create a business park that can serve as a model for sustainable development. This document outlines criteria and measures to be applied for development in the AEGD.

An Energy and Environmental Assessment Report must be provided to demonstrate that a proposed development meets or exceeds the sustainability provisions of the Eco-Industrial Design Guidelines and Urban Design Guidelines. This report is to be evaluated by the City of

Hamilton and degree of adherence to provisions may be used to prioritize development applications.

Specific eco-industrial design elements are presented in Section 2.0 of the document and have been grouped under 9 principles. These principles are as follow:

- Transportation;
- Energy, Renewables, Air Quality, and Greenhouse Gas Reduction;
- Water and Wastewater, and Water Conservation/Efficiency;
- Storm Water Management Guidelines;
- Materials, Resources, and Solid Waste;
- Economic Sustainability and Business Synergy;
- Social Sustainability;
- Site Development, Disturbance, Natural Corridors and Greenways; and
- Food Production and Community Gardening.

A brief description of each principle is provided in the document as well as a list of specific sustainable design measures to be implemented. The city will evaluate the application against these design principles and elements.

2.7 Niagara Peninsula Conservation Authority Regulation 155/06 and Policy Document

The Niagara Peninsula Conservation Authority Regulation (O. Reg. 155/06) and Policies for Planning and Development in the Watershed of the Niagara Peninsula Conservation Authority (the Policy Document, NPCA 2022) provides regulations for the development or interference with wetlands, watercourses, and shorelines in the jurisdiction of the NPCA. O. Reg 155/06 Section 2(1) states that "*[…] no person shall undertake development or permit another person to undertake development in or on the areas in the jurisdiction of the Authority that are […] adjacent or close to the shoreline […], river or stream valleys […], hazardous lands […], wetlands, or other areas where development could interfere with the hydrologic function of a wetland*". Sections 3(1) of the regulation states that the NPCA may grant permission to develop in the lands defined in Section 2(1), so long as "*in its [the Authority's] opinion, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development*." Section 4(1) states that a signed application for permission to initiate development must be provided to the NPCA.

Section 5 of O. Reg. 155/06 states that "*no person shall straighten, change, divert, or interfere with the existing channel of a river, stream or watercourse or change or interfere with a wetland in any way*". Section 6(1) of Regulation 155/06 includes a provision in which the NPCA may grant permission to straighten, change, divert, or interfere with an existing channel of a river, creek, stream, or watercourse or change or interfere with a wetland. As in Section 4(1), Section 7 states that a signed application for permission to undertake changes to watercourses and wetlands must be filed with the NPCA and provides a list of requirements for the application.

Several aquatic features (including ponds and HDFs) and wetlands are present in the Study Area. The Upper West Side Secondary Plan Land Use Plan will have implications for these features. Prior to development, the necessary applications will need to be filed with the NPCA and permissions acquired.

2.8 Additional Background Information

2.8.1 Twenty Mile Creek Watershed Plan

The Twenty Mile Creek Watershed Plan (NPCA 2006) provides an introduction to the physical, natural, and socio-economic character of the Twenty Mile Creek Watershed, in which the Study Area is located. The Watershed Plan defines the objectives of the watershed and provides a strategy to guide development, identify and recommend alternative and preferred restoration programs, and strengthen stewardship and partnerships in the watershed. Suitability mapping for different restoration projects is also provided in the plan and identifies areas in the watershed that would benefit most from restoration projects.

The Twenty Mile Creek Watershed is the second largest watershed in the NPCA's jurisdiction. The watershed falls within the City of Hamilton and the Regional Municipality of Niagara. The total drainage area of the watershed is 291 square kilometers. The Twenty Mile Creek Watershed contains five distinct subwatersheds. The Study Area is in the headwaters of the Twenty Mile Creek subwatershed. As per the Watershed Plan, headwater areas such as this would benefit from the protection and enhancement of Provincially Significant Wetlands (PSWs) and forested areas. The Twenty Mile Creek Watershed Plan recommends that all watercourses in the headwater areas be protected with a minimum 30m vegetated buffer on each side. Additionally, the use of erosion control measures should be enforced.

The Watershed Plan recommends the following overall management actions for the Twenty Mile Creek watershed:

- Planning and regulatory actions (e.g., Official Plan Amendments);
- Project opportunities on private and public lands (e.g., riparian buffer planting, wetland creation); and
- Areas requiring additional research and monitoring (e.g., ecological linkages, water temperature monitoring) in the watershed.

Further restoration measure suitability criteria and recommendations are provided in the Appendix of the Twenty Mile Creek Watershed Plan.

3.0 Methods

For the purposes of describing the existing conditions of the terrestrial and aquatic environments within the Study Area, additional terms will be used in reference to specific locations. Field surveys completed by NRSI biologists between late 2017 and early 2021 were initiated at different times within the Participating Lands; **Map 1** shows three general survey blocks. The term **'Western Survey Block'** refers to the lands within and adjacent to the former Glancaster Golf Course (555 Glancaster Road). The term **'Central Survey Block'** refers to the lands previously known as the Garth Street Draft Plan area and adjacent lands, and includes the properties located at 9751, 9625, 9511, 9445, and 9285 Twenty Road West. It is noted here that the property at 9575 Twenty Road West is now included within the area defined as the Participating Lands, but property access was not available for field surveys as this landowner joined the UWSLG in 2023. The term **'Eastern Survey Block'** refers to the naturalized portions of the property located at 2060 Upper James Street.

Natural features within the Study Area that were located on lands where direct property access was not available (i.e., outside of the Participating Lands) were assessed using a combination of property boundary and road right-of-way (ROW) investigations, as well as aerial imagery review and available background information. The term **'Non-Participating Lands'** refers to these areas. Available background information for Non-Participating Lands is generally high-level and does not include comprehensive ground-truthing through field surveys. The exception to this is the lands covered in a recent scoped EIS prepared by Dougan & Associates for the properties located at 9236 and 9322 Dickenson Road West, which are on Non-Participating Lands (Dougan & Associates 2022). The study area for the latter scoped EIS was expanded to include additional lands north and east of the noted subject properties, and the term **'Dickenson Draft Plan Area'** refers to this area. The Non-Participating Lands and the Dickenson Draft Plan Area are shown on **Map 1**.

The results and mapping from the Dougan & Associates 2022 study have been integrated into this Master EIS, and were used to inform the delineation of the proposed NHS and the natural heritage policies of the Upper West Side Secondary Plan.

3.1 Collection and Review of Background Information

Existing natural heritage information was collected and reviewed to identify key ecological features, habitats, and species that have the potential to occur in the Study Area. Background

information was gathered and reviewed for the preparation of the TOR. Sources reviewed included:

- Natural Heritage Information Centre (NHIC) database (MNRF 2023a);
- Species at Risk (SAR) listings at the federal and provincial levels (MECP 2023, Government of Canada 2023);
- NPCA Regulations Mapping (NPCA 2023);
- Aquatic Species at Risk Critical Habitat and Species at Risk Distribution Data (DFO 2023);
- Aquatic Resource Area (ARA) Data (MNRF 2023b);
- Significant Wildlife Habitat Technical Guide (SWHTG) and Criteria Schedules for Ecoregion 7E (OMNR 2000, MNRF 2015a);
- Atlas of the Breeding Birds of Ontario (BSC et al. 2006);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Butterfly Atlas (Macnaughton et al. 2023); and
- Ontario Odonata Atlas Database (OOAD 2023).
- Research-grade observations from online community databases (iNaturalist 2023, eBird 2023);
- City of Hamilton Urban Official Plan (UHOP) (2013);
- City of Hamilton Rural Official Plan (RHOP) (2012);
- Twenty Mile Creek Watershed Plan (NPCA 2006);
- City of Hamilton Natural Areas Inventory Project 3rd Edition (HCA 2014);
- Airport Employment Growth District (AEGD) Subwatershed Study and Stormwater Master Pan (Dillon Consulting & Aquafor Beech Ltd. 2011); and
- Airport Employment Growth District (AEGD) Subwatershed Study and Stormwater Master Plan Implementation Document (Aquafor Beech Ltd. 2017).

Requests for available background information were submitted by NRSI biologists as follows:

- An initial request for information was submitted to the MNRF (Guelph District) on March 1, 2018. A response was received from D. Denyes on May 8, 2018. Additional correspondence with the MNRF was also initiated regarding the status of wetlands within the Study Area on July 20, 2021. Details and the outcome of this additional

MNRF correspondence are provided in **Section 6.3** below; a copy of all correspondence with the MNRF to date is included in **Appendix III**;

- An initial request for information and work plan review was submitted to the MECP Species at Risk Branch on May 1, 2020. A response was received from J. Wedgewood on June 2, 2023. Additional correspondence with the MECP has taken place in 2023 regarding tree removals on the property located at 9751 Twenty Road West, within the Study Area and Participating Lands. Details and the outcome of this additional correspondence are provided in Section **Error! Reference source not found.**; a copy of all correspondence with the MECP to date is included in **Appendix IV**; and

- A request for information was submitted to the NPCA on March 1, 2018. A response was received by way of NPCA staff comments on the first submission of the Upper West Side Industrial Subdivision (City of Hamilton File Nos. UHOPA-18-016, ZAC-18-040, and 25T-201807). Earlier correspondence between NRSI and NPCA staff also occurred in 2017, regarding the classification of watercourses in the Study Area (A. Parks, pers. comm. 2017).

Initial species lists were compiled for plants and wildlife reported within a 10km radius of the Study Area using the wildlife atlases and research-grade community observations listed above. The atlases provide data based on 10x10km survey squares; information on species from the square overlapping the Study Area (17HN88) was compiled. An initial desktop review of potential Species at Risk (SAR), Species of Conservation Concern (SCC), and Significant Wildlife Habitat (SWH) was completed to guide the scope of work and field surveys presented in this report.

Based on the initial species lists, several SAR and SCC have records of occurrence near the Study Area. SAR are those listed on the Species at Risk in Ontario List that forms Ontario Regulation 230/08 under the ESA. These include species identified by the Committee on the Status of Species at Risk in Ontario (COSSARO) as provincially Threatened or Endangered. These species are protected by the ESA, which includes protection of their habitat.

SCC are those identified as:

- species designated provincially as Special Concern;
- species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the NHIC; and

- species that are designated federally as Threatened or Endangered by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC), but not provincially by the COSSARO. If these species are listed on Schedule 1 of the federal *Species at Risk Act* (SARA), they are protected by the federal Act, but not provincially by the ESA.

A desktop assessment was conducted to identify which SAR and SCC species have suitable habitat in the Study Area. This involved cross-referencing the preferred habitat for reported SAR and SCC against habitat characteristics that are present in the study area. This initial assessment ensures that the potential presence of all SAR and SCC in the study area is adequately assessed in this Master EIS. Full results of the Significant Species Screening assessment, which incorporates the results of field surveys completed to date by NRSI biologists, are provided in **Appendix V**.

The SWHTG is a guideline document that outlines the types of habitats that the MNRF considers significant in Ontario (OMNR 2000). Criteria to identify these habitats and their suitability are also defined by the province (MNRF 2015a). The SWHTG groups SWH into 4 broad categories: seasonal concentration areas, rare vegetation communities and specialized wildlife habitat, habitats of species of conservation concern, and animal movement corridors. Based on the results of the desktop assessment and field survey investigations, several confirmed and candidate SWH types occur in the Study Area. Full results of the SWH Screening assessment, which incorporate the results of field surveys completed to date by NRSI biologists, are provided in **Appendix VI**.

3.2 Field Surveys

A comprehensive field program was carried out by NRSI biologists within the Study Area between late 2017 and early 2021. Surveys were first initiated in late 2017 within the area shown on **Map 1** as the Central Survey Block, followed by the Western and Eastern Survey Blocks beginning in 2020. Natural features within the Study Area that were located on lands where direct property access was not available (i.e., within the Secondary Plan Boundary but outside of the Participating Lands) were assessed using a combination of property boundary and road right-of-way (ROW) investigations, as well as aerial imagery review and available background information.

Table 1 and **Table 2** provide a comprehensive summary of all terrestrial and aquatic surveys undertaken in the study area to date and the protocols for each survey type. In the absence of a specific agency-authored protocol for conducting certain types of surveys, professional experience and judgement were used by NRSI biologists. A description of the general methodology for these surveys is provided in each table; monitoring stations are shown on **Map** 3 and **Map 4**.

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
Vegetation				
Ecological Land Classification (ELC)	1 initial survey, with verification of results during subsequent on-site surveys.	Ecological Land Classification for Southern Ontario: A First Approximation and its Application (Lee et. al. 1998)	○ June 10, 2019	○ June 2, 2020
3-season vascular flora inventories	3 surveys: • Spring (May to early June) • Summer (July to August) • Fall (September to October) A comprehensive area search of all ELC vegetation community units to record all vascular plant species observed. The ELC code for each community was verified during inventories to make any necessary updates.	n/a- professional experience and judgement were used by NRSI staff in carrying out the surveys described in the column to the left.	○ May 28, 2018 ○ August 2, 2018 ○ September 28, 2018	○ June 2, 2020 ○ August 19, 2020 ○ September 22, 2020
Natural Feature Boundary Delineation	Significant Woodland Boundary Delineation and Agency Review	As per City of Hamilton EIS Guidelines Appendix 1 (March 2015), the Significant Woodland Boundary was delineated based on the dripline, which is considered the area immediately below the outer circumference of each tree crown that is located along the edge of the wooded feature being assessed.	○ December 8, 2017 Attendees: *NRSI* – N. Hardie, J. Lance *CLS* – N. Wood *City of Hamilton* – M. Kiddie	○ September 15, 2020 Attendees: *NRSI* – D. Frey, K. Richter *CLS* – N. Wood *GEO Morphix* – A. Baril

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
	Wetland Boundary Delineation Agency Review	Ontario Wetland Evaluation System (OWES) (MNRF 2014a) and City of Hamilton EIS Guidelines Appendix 1 (March 2015)	○ August 8, 2019 <u>Attendees:</u> *NRSI* – K. Richter, J. Pickering, M. Heyming *City of Hamilton* – M. Kiddie *NPCA* – L. Price	*R.J. Burnside* – J. Vandermeer *City of Hamilton* – M. Kiddie *NPCA* – A. Aldsworth
Tree Inventory	Assessment of all trees >10cm DBH by NRSI Certified Arborists. Information collected included: • Tag number (where applicable) • Species (common and scientific name) • DBH measurement (cm) • Crown radius (m) • General health (good, fair, poor, dead) • Potential for structural failure (improbable, possible, probable, imminent) • Tree location (e.g., subject site) • General comments (i.e., disease, aesthetic quality, development constraints)	City of Hamilton's Tree Protection Guidelines (Appendix "A" to Report PD02229 (f) (City of Hamilton 2010)	○ March 5-9, 13-15, 2018 ○ August 6, 9, 13, 16, 19, and 20, 2019 ○ September 11, 17, 19, 2019 ○ November 1, 2019 ○ December 3,4,11,17, 2019 ○ January 14, 2020 ○ February 6,7, 2020 ○ April 28, 2020 ○ May 7, 2020	○ August 20, 2020

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
Butternut Health Assessments	1 survey between May 15 and August 31	Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the *Endangered Species Act, 2007* (MNRF 2014b)	○ August 13, 14, 22, and 28, 2019 ○ August 25, 2020	○ August 28, 31, 2020
Birds				
Breeding Bird Surveys	2 surveys Conducted at least 10 days apart between May 24 and July 10 • 1st survey between May 24 and June 15 • 2nd survey between June 16 and July 10	Ontario Breeding Bird Atlas Guide for Participants (OBBA 2001)	○ June 4, 28 2018	○ June 5, 26 2020
Marsh Breeding Bird Surveys	2 surveys Conducted at least 10 days apart between May 20 and July 5	Marsh Monitoring Program Participant's Handbook for Surveying Marsh Birds (Bird Studies Canada 2009a)	○ June 5, 26, 2020	○ June 5, 26 2020
Amphibians				
Anuran Call Surveys	3 surveys: • April between the 15th and 30th, when air temperature is >5°C • May between the 15th and 30th, when air temperature is >10°C • June between the 15th and 30th, when air temperature is >17°C	Marsh Monitoring Program Participant's Handbook for Surveying Amphibians (Bird Studies Canada 2009b)	○ April 24, 2018 (10.5°C) ○ May 28, 2018 (23°C) ○ June 20, 2018 (18°C)	○ April 27, 2020 (8°C) ○ May 26, 2020 (25°C) ○ June 17, 2020 (18.5°C)

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
Snakes				
Artificial Cover Object (ACO) Surveys	4' x 4' wooden boards with the upper surface painted black have been placed throughout suitable snake habitat in the study area, including at potential hibernacula sites. Based on the MNRF 2016 protocol, a minimum of 5 checks should occur before July 1st, and a minimum of 10 checks should occur during the active season (April to October).	Survey Protocol for Ontario's Species at Risk Snakes (MNRF 2016a)	○ May 6, 12, 13, 25, 2020 ○ June 12, 2020 ○ September 11, 14, 17, 22, 24, 2020	○ April 27, 2020 ○ May 6, 12, 13, 22, 2020 ○ September 11, 14, 17, 22, 24, 2020
Turtles				
Emergence and Basking Surveys	5 surveys: Conducted on clear or partly cloudy days during sunny periods between 0800h and 1700h. Conducted in suitable aquatic habitat between early spring and June 15th in a minimum 3-week period. Suitable aquatic habitat was scanned with binoculars, with a particular focus on basking structures (e.g., fallen logs, rocks) and the perimeter of the feature. The species, number, and behaviour of any observed individuals were recorded.	Modified Visual Encounter Surveys based on the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2015b)	○ April 27, 2018 ○ May 2, 9, 17, 30, 2018	○ April 6, 25, 2020 ○ May 6, 13, 22, 2020

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
Nest and Nesting Surveys	6 surveys: Conducted between 18:00 and 22:00 hrs in appropriate weather conditions and commenced following the first reports of turtle nesting in the Hamilton area. Appropriately spaced transects were walked by biologists throughout all areas of suitable habitat (i.e., in areas within close proximity to wetlands, with high sun exposure and loose soil, sand or gravel substrates). All observations of turtles and evidence of nesting were documented, including evidence of digging, predated nests and nesting turtles.	MNRF Blanding's Turtle Nest and Nesting Survey Guidelines (MNRF 2016b) MNRF Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2015b)	○ June 10, 2019 *Candidate turtle nesting areas were surveyed on this date, and as no suitable habitat was observed, additional surveys were not conducted.*	○ June 3, 11, 12, 15, 17, 22, 2020
Species at Risk Bats				
Surveys for Habitat of Little Brown Myotis and Northern Myotis	1 survey during leaf-off conditions: Assess all isolated trees and trees in hedgerows for the presence of cavities or other features (e.g., loose bark, hollows) that may provide suitable roosting habitat for SAR bats. Determination of the use of candidate roost trees (through acoustic monitoring and exit surveys) will occur at a future development stage and was not included in this scope of work. Consultation with the MECP will determine the monitoring approach. The MECP may also require acoustic monitoring and exit surveys prior to the	Survey Protocol for Species at Risk Bats in Treed Habitats: Little Brown Myotis, Northern Myotis & Tri-Colored Bat (MNRF 2017)	○ May 7, 9, 2018	○ December 7, 20, 2020 ○ April 8, 15, 2021

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
	demolition of residences and outbuildings on site that have the potential to house bat maternity colonies.			
Surveys for Habitat of Tri-Colored Bat	During Tree Inventory surveys, all oak and maple trees ≥10cm DBH will be identified for further assessment as candidate habitat for Tri-colored Bat. Determination of the use of candidate roost trees (through acoustic monitoring and exit surveys) will occur at a future development stage and was not included in this scope of work. Acoustic monitoring is to be carried out in the same year as any tree removal is proposed, since the tendency of trees to form suitable leaf clusters varies yearly. Consultation with the MECP will determine the monitoring approach.	Survey Protocol for Species at Risk Bats in Treed Habitats: Little Brown Myotis, Northern Myotis & Tri-Colored Bat (MNRF 2017)	○ March 5-9, 13-15, 2018 ○ August 6, 9, 13, 16, 19, and 20, 2019 ○ September 11, 17, 19, 2019 ○ November 1, 2019 ○ December 3,4,11,17, 2019 ○ January 14, 2020 ○ February 6,7, 2020 ○ April 28, 2020 ○ May 7, 2020	○ August 20, 2020
Insects				
Surveys Targeting Butterflies, Dragonflies, and Damselflies	3 surveys: • June • July • August Systematic area searches were conducted by walking through all vegetation communities to capture the full range and diversity of habitat types. Each species was identified either on the wing	n/a- professional experience and judgement were used by NRSI staff in carrying out the surveys described in the column to the left.	○ July 16, 2019 ○ August 16, 2019 ○ June 26, 2020	○ June 26, 2020 ○ July 8, 2020 ○ August 27, 2020

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
	or in hand following capture with a mesh net. Surveys were conducted on sunny or partly-cloudy days when temperatures are 19°C or greater. Surveys did not occur if it was raining.			
Ecological Linkage Assessment[1]				
Winter Wildlife Movement Surveys	2 surveys within 24-48h of a fresh snow fall. The subject site was surveyed for wildlife tracks, travel corridors, and other evidence of use by wildlife, and mammal species in particular. Upon encountering tracks, the direction of movement, number of individuals, species, and behaviour was recorded where possible. Observations were mapped to identify wildlife movement patterns at a site-level scale. Surveys focused on areas mapped as Linkages on UHOP Schedule B and on the AEGD Secondary Plan Natural Heritage System Map B.8-2, and will address policies in Volume 1 – C.2.7.6 and F.3.2.1.11 of the UHOP.	n/a- professional experience and judgement were used by NRSI staff in carrying out the surveys described in the column to the left.	○ March 3, 2018 ○ March 1, 2020	○ February 11, 2020 ○ March 1, 2020
Significant Wildlife Habitat Assessment				
SWH Surveys	Conducted for the purpose of identifying candidate SWH based on the desktop assessment.	Significant Wildlife Habitat Technical Guide (OMNR 2000) and	Initial Survey: ○ April 11, 2018 Subsequent Surveys:	Initial Survey: ○ April 27, 2020 Subsequent Surveys:

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
	Surveys have and will include ongoing observations collected during all field surveys, following an initial site visit to identify areas of the subject site where candidate SWH may be located. Species or feature-specific surveys targeting candidate SWH are included in the field program outlined in this table and include: • Breeding Bird and Marsh Breeding Bird Surveys • Amphibian Call Surveys • Snake ACO Surveys • Turtle Emergence, Basking, Nest and Nesting Surveys • Insect Surveys All completed wildlife surveys will determine the presence of various SCC species and their habitats (habitat for SCC is considered SWH).	the Ecoregion Criteria Schedule for Ecoregion 7E (MNRF 2015a).	○ Completed during all site visits up to and including April 2021	○ Completed during all site visits up to and including April 2021

[1]In addition to Winter Wildlife Surveys, NRSI biologists will continue to assess the ecological linkage function of the mapped and candidate Linkages during all field surveys by recording incidental observations of wildlife and wildlife sign. Areas where wildlife appear to congregate and travel will be mapped to gain an understanding of how wildlife occupy and move through the site year-round. Completed field surveys have included these observations.

Table 2. Aquatic Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
Headwater Drainage Features				
HDF Assessments	3 surveys: • Early spring, in the period closely following the spring freshet and after frost has left the ground (typically, late March to early April) • Late spring, conducted after the melt/thaw-related interflow has ceased (typically, late May) and prior to full vegetation "leaf-out" (i.e., prior to reaching a height of approximately 5cm) so that vegetation growth does not impact findings • Summer, conducted during dry periods to observe areas of permanent flow (typically July or August) It is preferable that the late spring and summer surveys are conducted following at least 3 days without precipitation. Field work was completed by NRSI biologists in cooperation with staff of GEO Morphix Limited, the fluvial geomorphology consultant on the project team.	Evaluation, Classification and Management of Headwater Drainage Feature Guidelines (CVC and TRCA 2014) Ontario Stream Assessment Protocol (OSAP) Section 4: Module 11 Unconstrained Headwater Sampling (Gorenc and Stanfield 2017)[1]	○ April 2, 2020 ○ May 22, 2020 ○ August 14, 2020	○ April 2, 2020 ○ May 22, 2020 ○ August 14, 2020

Table 2. Aquatic Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Central Survey Block	Western & Eastern Survey Blocks
Aquatic Surveys				
Aquatic Habitat Assessments	1 survey: • Summer (between June and early September), during low flow / baseflow conditions NRSI biologists surveyed all HDFs within the Participating Lands. Riparian zone conditions, surrounding land use, bank stability, aquatic vegetation cover, in-stream habitat features, and water temperature were recorded. Information on the condition and connectivity of all features as well as barriers to fish passage in and adjacent to the study area (where possible) were also recorded. Any candidate habitat for significant fish species was described and mapped.	Modified version of the Ontario Stream Assessment Protocol (OSAP) Version 9.0 (Stanfield 2013)	○ August 15, 2020	○ August 15, 2020
Fish Community Sampling	1 survey: Electrofishing methods were used to determine the fish community composition in the pond features within the Participating Lands. Notes on the quality and character of aquatic habitat were also recorded for each pond.	Modified version of the Ontario Stream Assessment Protocol (OSAP) Version 9.0 (Stanfield 2013)	○ October 14, 2020	○ October 13, 2020

4.0 Terrestrial Environment Existing Conditions

4.1 Soil, Terrain, and Drainage

The Study Area is located within the Twenty Mile Creek watershed, which is under the jurisdiction of the NPCA. The Twenty Mile Creek watershed drains a catchment of approximately 291km^2 (NPCA 2006) and contains five subwatersheds, including the Main Channel of Twenty Mile Creek, Gavora Ditch, Spring Creek, North Creek, and Sinkhole Creek. The Study Area is in the Main Channel of Twenty Mile Creek subwatershed, in the headwaters of Twenty Mile Creek.

The Hydrogeology Investigation Report authored by C.F. Crozier and Associates Inc. (Crozier & Associates 2023) describes the topography of the Study Area as ranging in elevation from approximately 242 meters above sea level (masl) in the west (Glancaster Road) to approximately 218masl in the east (Upper James Street) The direction of surface water drainage follows topography, generally flowing west to east before entering the main stem of Twenty Mile Creek outside of the Study Area.

The Study Area is in the northern portion of the Haldimand Clay Plain region, which is characterized as a stratified clay plain that has a heavy texture and low drainage (Chapman and Putnam 1984). The Study Area is in a trough between two low-relief till moraines, which direct surface water along the generally eastwardly sloping plain between the features (Chapman and Putnam 1984). The surficial geology of the Study Area is composed of fine-textured glaciolacustrine deposits consisting of massive to well laminated silt and clay, with minor sand and gravel (OGS 2010).

The Study Area is underlain by bedrock belonging to the Guelph Formation (OGS 2011). Karstification is possible in areas in areas of thin cover or exposed bedrock due to the carbonate origin of the bedrock (Crozier & Associates 2023), and Study Area is identified as an area of potential karst (Brunton and Dodge 2008). However, geotechnical and hydrogeology investigations have not encountered bedrock in any borehole advanced to date (EXP 2018, Crozier & Associates 2023).

The soils in the subject sites provide good to imperfect drainage. Groundwater is semi-confined through the Study Area within a shallow silty sand and sandy silt water bearing layer. Portions of the Study Area have groundwater discharge potential and have low to medium vulnerability to groundwater contamination (NPCA 2006). Regional groundwater flow across the study area is

generally directed northwards towards Lake Ontario (located ~2km northeast of the subject site). Locally, shallow groundwater discharges to Twenty Mile Creek, although a portion of this shallow groundwater is interpreted to seep downwards into the regional aquifer system. Artesian conditions were noted within the Central Survey Block (Crozier & Associates 2023). These conditions are driven by a silty clay and silt layer of varying thickness partially confining the water bearing unit below.

4.2 Vegetation

4.2.1 Vegetation Communities

Lands within the Study Area are dominated by agricultural fields growing row and specialty crops (corn, soybeans, and sod). A network of HDFs, tributaries of Twenty Mile Creek, generally flows west to east across the block, and mature hedgerows border agricultural fields throughout. Natural vegetation communities within the Study Area are a combination of deciduous forest, swamp, thicket, marsh, and shallow aquatic ecosites. Culturally-influenced meadows, thickets, and savannahs are also present. An unmaintained and naturalizing orchard is in the middle of the Central Survey Block, and the former Glancaster Golf Course (which has been used to grow row crops since 2020) comprises the Western Survey Block. Vegetation communities within the Study Area are detailed in **Table 3** where site access permitted a thorough examination of plant species and community characteristics. All communities, including those that were characterized at a courser level from the roadside or property boundaries, are shown on **Map 5.**

Overall, natural communities such as woodlands, wetlands, thickets, and meadows are in good condition with some anthropogenic effects that are generally limited to edge effects and land management or encroachment. Invasive species such as Common Buckthorn (*Rhamnus cathartica*), Garlic Mustard (*Alliaria petiolata*), and Multiflora Rose (*Rosa multiflora*) have established in some areas, but the abundance of these species remains low and distribution is patchy. Several mature deciduous forest communities of high quality are present, particularly in the southern portion of the study area. Despite active agriculture and encroachment disturbance, wetlands likely provide high value as habitat for a variety of wildlife species at the landscape level, and some support regionally rare species.

Table 3. Vegetation Communities within the Upper West Side Secondary Plan Study Area.

ELC Code	ELC Description	Participating Lands			Non-Participating Lands		Environmental Characteristics
		Western Survey Block	Central Survey Block	Eastern Survey Block	Dickenson Draft Plan Study Area	Other Non-Participating Lands	
General Land Uses *Areas that are maintained and/or heavily modified by human activities and land uses.*							
Community Building (Church)				✓			Located at 2060 Upper James Street East, the Really Living Centre is a church and community event space.
Garden Centre						✓	Located at 2136 Upper James Street, Sharples Greenhouses Garden Gallery (now closed) was a garden centre and greenhouse business.
Transit Centre						✓	Located at 2200 Upper James Street, the Hamilton Street Railway (HSR) Mountain Transit Centre is a hub for public transportation.
Cemetery						✓	Located at 9050 Dickenson Road West, the North Glanford Cemetery is a small burial ground bordered by deciduous trees.
Res	Residential		✓		✓	✓	Occupied and vacant residential properties are present throughout the Study Area. Low density residential dwellings are most common along the perimeter of the Study Area, and are mostly located on Non-participating Lands. Several rural residential areas are present within the Participating Lands, most of which are currently unoccupied. These areas are characterized by some scattered trees, and overgrown but anthropogenically disturbed grounds with debris and old farm equipment throughout.
Ag	Agricultural (Row Crops & Sod)	✓	✓	✓	✓	✓	Agricultural fields characterize the majority of the Study Area. Most fields are planted annually with row crops including corn and soybeans. The Central Survey Block also includes sod fields that are regularly mowed.
Orchard	Naturalizing Orchard		✓				The Central Survey Block includes a naturalizing orchard community that has been unmanaged for many years. The orchard contains planted Common Apple (*Malus pumila*) and Common Pear (*Pyrus communis*) interspersed with a variety of naturally-succeeded vegetation species. The orchard is densely vegetated with grasses, forbs, and shrubs. Canopy cover is dominated by planted fruit trees, supplemented by Black Walnut (*Juglans nigra*), Black Cherry (*Prunus serotina*), Sugar Maple (*Acer saccharum*), Northern Red Oak (*Quercus rubra*), and other tree species. The naturalizing orchard also contains a relatively high concentration of the Species at Risk (SAR) Butternut (*Juglans cinerea*).
HD / HC	Deciduous Hedgerow (HD) and Coniferous Hedgerow (HC)	✓	✓		✓	✓	Hedgerow communities throughout the Study Area are comprised of native and non-native tree and shrub species and provide windbreaks between agricultural fields and natural corridors throughout the Study Area. Hedgerows are dominated by deciduous species, apart from two short coniferous hedgerows bordering the entrance to the former Glancaster Golf Course (Western Survey Block). Deciduous Hedgerows throughout the Study Area are notable due to the presence of abundant mature Northern Red Oaks and Sugar Maples.
Cultural Ecosites *Vegetation communities originating from, or maintained by, anthropogenic or cultural influences (e.g., planting, agriculture, clearing, recreation, mowing) (Lee et al. 1998).*							
CUW	Cultural Woodland		✓	✓	✓	✓	Cultural Woodland Ecosites are present throughout the Study Area, ranging in size from approximately 0.2ha to 3.5ha and generally having between 35% and 60% tree cover. Species composition within these communities varies throughout the Study Area. Within the Participating Lands, Cultural Woodland Ecosites contain a variety of native and non-native deciduous trees and shrubs, including (but not limited to): Black Walnut, Butternut, Black Cherry, Red Maple (*Acer rubrum*), Trembling Aspen (*Populus tremuloides*), American Elm (*Ulmus americana*), Red-osier Dogwood (*Cornus sericea),* Tatarian Honeysuckle (*Lonicera tatarica)*, Common Buckthorn (*Rhamnus cathartica*), and Staghorn Sumac (*Rhus typhina*).
CUW1	Mineral Cultural Woodland				✓	✓	
CUM	Cultural Meadow	✓	✓	✓			Cultural Meadow Ecosites are present throughout the Study Area, ranging in size from approximately 0.2ha to 3.2ha and generally having less than 25% tree or shrub cover. Species composition within these communities varies throughout the Study Area. Within the Participating Lands, Cultural Meadow Ecosites are dominated by a variety of native and non-native grasses and forbs, including (but not limited to): Smooth Brome (*Bromus inermis*), Kentucky Bluegrass (*Poa pratensis*), Common Timothy (*Phleum pratense*), Reed Canary Grass (*Phalaris arundinacea*), Foxtails (*Setaria* spp.), Crabgrasses (*Digitaria* spp.), Clovers (*Trifolium* spp.), Thistles (*Cirsium* spp.), Asters (*Symphyotrichum* spp.), and Goldenrods (*Solidago* spp., *Euthamia* spp.).
CUM1	Mineral Cultural Meadow	✓	✓		✓	✓	

ELC Code	ELC Description	Participating Lands			Non-Participating Lands		Environmental Characteristics
		Western Survey Block	Central Survey Block	Eastern Survey Block	Dickenson Draft Plan Study Area	Other Non-Participating Lands	
CUS1	Mineral Cultural Savannah				✓		A single Cultural Savannah Ecosite is present within the Dickenson Draft Plan Study Area (Non-Participating Lands). Characteristics of this vegetation community are described in the Scoped EIS prepared for 9236 and 9322 Dickenson Road West (Dougan & Associates 2022).
CUT	Cultural Thicket		✓			✓	Cultural Thicket Ecosites are present throughout the Study Area, ranging in size from approximately 0.2ha to 3.3ha and generally having less than 25% tree cover but more than 25% shrub cover. Within the Participating Lands, Cultural Thicket Ecosites are characterized as Gray Dogwood Cultural Thicket (CUT1-4) communities dominated by Gray Dogwood (*Cornus racemosa*). Species documented by NRSI biologists also include (but are not limited to): Kentucky Bluegrass, Hawthorn (*Crataegus* spp.), Tatarian Honeysuckle, Black Raspberry (*Rubus occidentalis*), Dame's Rocket (*Hesperis matronalis*), Canada Goldenrod (*Solidago canadensis*), and Spinulose Wood Fern (*Dryopteris carthusiana*). Within the Dickenson Draft Plan Study Area (Non-Participating Lands), Sumac Cultural Thicket (CUT1-1) communities are described as "non-native pussy willow cultural thickets" with exotic willows and dogwoods planted to produce ornamentals (Dougan & Associates 2022).
CUT1-1	Sumac Cultural Thicket				✓		
CUT1-4	Gray Dogwood Cultural Thicket		✓	✓		✓	
Deciduous Forest Ecosites *Treed vegetation communities of natural origin and/or are currently maintained by natural (non-anthropogenic) factors (Lee et al. 1998).*							
FOD4	Dry – Fresh Deciduous Forest			✓			Deciduous Forest Ecosites are present throughout the Study Area, ranging in size from approximately 0.5ha to 11.4ha and generally having more than 60% tree cover dominated by deciduous species. Within the Eastern Survey Block, two small forest communities identified as Dry-Fresh Deciduous Forest (FOD4) are present. Both areas contain a low diversity of vegetation species, and are dominated by American Basswood (*Tilia americana*). Northern Red Oak and Black Walnut also contribute to the canopy and sub-canopy layers. Grey Dogwood, Black Walnut, and American Basswood comprise the understorey, with groundcover provided by Canada Goldenrod, Canada Enchanter's Nightshade (*Circaea canadensis* ssp. *canadensis*), and other species. Two Dry – Fresh Sugar Maple – Beech Deciduous Forest (FOD5-2) communities are present in the southern portion of the Study Area near Dickenson Road. The characteristics of the smaller FOD5-2 community within the Dickenson Draft Plan Study Area are described in the Scoped EIS prepared for 9236 and 9322 Dickenson Road West (Dougan & Associates 2022). The larger FOD5-2 community in the southern portion of the Central Survey Block overlaps with Non-participating Lands to the west. The canopy and sub-canopy of this community are dominated by Sugar Maple, White Ash (*Fraxinus americana*), and American Beech (*Fagus grandifolia*). Sugar Maple, White Ash, and Choke Cherry (*Prunus virginiana*) comprise the understorey, with groundcover provided by Canada Enchanter's Nightshade, Virginia Waterleaf (*Hydrophyllum virginianum*), Sugar Maple saplings, and other species. A single Dry – Fresh Sugar Maple – Basswood Deciduous Forest (FOD5-6) community is present in the southeastern corner of the Central Survey Block (also overlapping with the Dickenson Draft Plan Study Area). While the community is coded by NRSI biologists as FOD5-6, some components of Dry – Fresh Sugar Maple – Beech Deciduous Forest (FOD5-2) were also noted; the Scoped EIS prepared for 9236 and 9322 Dickenson Road West coded this feature as FOD5-2 (Dougan & Associates 2022). The canopy and sub-canopy of this community are dominated by Sugar Maple, American Basswood, White Ash, and American Beech. Sugar Maple, White Ash, and Choke Cherry comprise the understorey, with groundcover provided by Garlic Mustard (*Alliaria petiolata*), Canada Enchanter's Nightshade, Virginia Waterleaf, and other species. A single Fresh – Moist Sugar Maple – Hardwood Deciduous Forest (FOD6-5) community is present within and adjacent to the Western Survey Block. Under existing conditions, the community is divided into five patches of variable size that are separated by open areas previously maintained as fairways during the operation of the former Glancaster Golf Course. The northern portions of these fairway areas are currently used to grow row crops, while the southern portions are naturalized Mineral Cultural Meadow (CUM1). Gaps in the canopy between patches are generally less than 30m wide, and the five patches are considered to function as a single FOD6-5 community. The canopy of this community is dominated by Sugar Maple, American Beech, Bitternut Hickory (*Carya cordiformis*), and Northern Red Oak. The sub-canopy is comprised mainly of Sugar Maple, Eastern Ho-hornbeam (*Ostrya virginiana*), and Black Cherry,
FOD5-2	Dry – Fresh Sugar Maple – Beech Deciduous Forest		✓		✓	✓	
FOD5-6	Dry – Fresh Sugar Maple – Basswood Deciduous Forest		✓		✓		
FOD6-5	Fresh – Moist Sugar Maple – Hardwood Deciduous Forest	✓				✓	

ELC Code	ELC Description	Participating Lands			Non-Participating Lands		Environmental Characteristics
		Western Survey Block	Central Survey Block	Eastern Survey Block	Dickenson Draft Plan Study Area	Other Non-Participating Lands	
FOD7-4	Fresh - Moist Black Walnut Lowland Deciduous Forest Type			✓		✓	with an understory of Choke Cherry and Gray Dogwood. Groundcover is provided by Canada Enchanter's Nightshade, Calico Aster (*Symphyotrichum lateriflorum*), Herb-Robert (*Geranium robertianum*), and other species. Two small Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7-4) communities are present within the Eastern Survey Block, one of which partially overlaps with Non-Participating Lands immediately to the south. The canopy and sub-canopy of these communities are dominated by Black Walnut and American Basswood. The understory is comprised of Tatarian Honeysuckle and Common Buckthorn, with groundcover provided by Kentucky Bluegrass, Canada Enchanter's Nightshade, and other species.
FOD8-1	Fresh-Moist Poplar Deciduous Forest Type	✓				✓	Two Fresh – Moist Poplar Deciduous Forest (FOD8-1) communities are present within Non-Participating Lands located between the Western Survey Block and Glancaster Road. The dripline of these communities extends slightly into the Western Survey Block. The canopy of these communities is dominated by Trembling Aspen, Green Ash (*Fraxinus pennsylvanica*), and Black Walnut. The sub-canopy is comprised mainly of Green Ash, Gray Dogwood, and Trembling Aspen, with an understorey of Gray Dogwood, Common Buckthorn, and Tatarian Honeysuckle. Groundcover is provided by Canada Enchanter's Nightshade, White Avens (*Geum canadense*), Canada Goldenrod, and other species.
FOD9	Fresh – Moist Oak-Maple – Hickory Deciduous Forest	✓				✓	A single Fresh – Moist Oak-Maple – Hickory Deciduous Forest (FOD9) community is present within the southern portion of the Western Survey Block (and extending slightly onto Non-Participating Lands to the south). The canopy of this community is dominated by Bitternut Hickory, Shagbark Hickory (*Carya ovata*), Sugar Maple, and Northern Red Oak. The sub-canopy is comprised mainly of Bitternut Hickory, Eastern Ho-hornbeam, and Green Ash, with an understorey of Choke Cherry, Common Buckthorn, and Gray Dogwood. Groundcover is provided by Canada Enchanter's Nightshade, Calico Aster, Large False Solomon's Seal (*Maianthemum racemosum*), and other species.
Wetland Ecosites *Vegetation communities where the water table seasonally or permanently rises above the substrate surface, standing water, pools, or vernal pooling accounts for more than 20% ground coverage, and where wetland plant species (those with a Wetness Index score or -5 or -4, per Oldham et al. 1995) represent at least 50% of total plant species cover (Lee et al. 1998).*							
MAM	Meadow Marsh					✓	Meadow Marsh Ecosites are the most common wetland vegetation communities within the Study Area, and are present throughout the Participating and Non-Participating Lands. Meadow marshes range in size from approximately 0.1ha to 3.2ha, are flooded seasonally during spring but are usually moist or dry by the summer, are dominated by herbaceous, hydrophytic emergent species, and generally have less than 25% cover from shrub species. Within the Study Area, Reed Canary Grass Mineral Meadow Marsh (MAM2-2) communities occur almost exclusively in association with the headwater drainage feature (HDF) network on site. Species composition within these communities is likely similar throughout the Study Area; within the meadow marshes of the Participating Lands, NRSI biologists documented a generally low diversity of species dominated by Reed Canary Grass (*Phalaris arundinacea*) and (to a lesser extent) Broad-leaved Cattail (*Typha latifolia*). Spotted Jewelweed (*Impatiens capensis*), Swamp Aster (*Symphyotrichum puniceum*), Red-stemmed Spikerush (*Eleocharis erythropoda*), Silky Dogwood (*Cornus obliqua*), Sandbar Willow (*Salix interior*), and a few other species were also present.
MAM2-2	Reed Canary Grass Mineral Meadow Marsh	✓	✓	✓	✓		
MAS2-1	Cattail Mineral Shallow Marsh Type	✓			✓	✓	Shallow Marsh Ecosites are present throughout the Study Area, ranging in size from approximately 0.1ha to 0.3ha. These communities contain flowing or standing water (up to 2m deep) for most of the growing season, are dominated by herbaceous, hydrophytic emergent species, and generally have less than 25% cover from shrub species. Cattail Mineral Shallow Marsh (MAS2-1) communities are present within the Western Survey Block, as well as within Non-Participating Lands between the Western Survey Block and Glancaster Road. A small MAS2-1 community is also present within the Dickenson Draft Plan Study Area (Dougan & Associates 2022). Within the Participating Lands, the MAS2-1 communities are online with the HDF network and are dominated by Broad-leaved Cattail and Reed Canary Grass. Eastern Cottonwood (*Populus deltoides*), Panicled Aster (*Symphyotrichum lanceolatum*), Spotted Jewelweed, Colt's-foot (*Tussilago farfara*), Fox Sedge (*Carex vulpinoidea*), and Curly-leaved Pondweed (Potamogeton crispus) were also documented within these areas. A single Broad-leaved Sedge Mineral Shallow Marsh is present within the Dickenson Draft Plan Study Area (Non-Participating Lands). Characteristics of this vegetation community are described in the Scoped EIS prepared for 9236 and 9322 Dickenson Road West (Dougan & Associates 2022).
MAS2-4	Broad-leaved Sedge Mineral Shallow Marsh				✓		

ELC Code	ELC Description	Participating Lands			Non-Participating Lands		Environmental Characteristics
		Western Survey Block	Central Survey Block	Eastern Survey Block	Dickenson Draft Plan Study Area	Other Non-Participating Lands	
SWD3-3	Swamp Maple Mineral Deciduous Swamp	✓				✓	Deciduous Swamp Ecosites are present throughout the Study Area, ranging in size from approximately 0.1ha to 0.7ha and generally having more than 75% canopy cover from deciduous tree species. These communities are subjected to variable flooding regimes but water depth tends to remain below 2m, and standing water or vernal pooling is present to some extent. A few small Swamp Maple Mineral Deciduous Swamp (SWD3-3) inclusions are present within the Fresh – Moist Sugar Maple – Hardwood Deciduous Forest (FOD6-5) and Fresh-Moist Poplar Deciduous Forest Type (FOD8-1) communities located between the Western Survey Block and Glancaster Road (overlapping slightly with the Western Survey Block). SWD3-3 areas occur due to complex microtopography and hummocks that intersperse the more upland portions of the FOD communities. Sensitive Fern () is abundant within the SWD3-3 inclusions, with occasional Common Lady Fern (*Athyrium filix-femina*), Heart-leaved Foam-flower (*Tiarella stolonifera*), Red-osier Dogwood, Fowl Mannagrass (*Glyceria striata*), and Herb-Robert throughout. A small SWD3-3 inclusion is also present within the Eastern Survey Block, within the boundary of a Dry – Fresh Deciduous Forest (FOD4) community. A single small Mineral Deciduous Swamp (SWD4) community was documented by others within the eastern portion of the Dickenson Draft Plan Study Area, and is described in the Scoped EIS prepared for 9236 and 9322 Dickenson Road West (Dougan & Associates 2022). A single mid-age Willow Mineral Deciduous Swamp (SWD4-1) community is present within the Central Survey Block, at the approximate centre of the naturalizing orchard area. Within the SWD4-1 community, a shallow pond is surrounded and shaded by Crack Willow (*Salix euxina*), Black Walnut, Gray Dogwood, and Common Buckthorn. Reed Canary Grass and Kentucky Bluegrass dominate the ground layer, with occasional Spotted Jewelweed, Common Burdock (*Arctium minus*), and other herbaceous species. Soil probe sampling within the community identified mottles to a depth of 26cm, confirming the area as a wetland (as opposed to a Fresh-Moist Forest Ecosite).
SWD4	Mineral Deciduous Swamp				✓		
SWD4-1	Willow Mineral Deciduous Swamp		✓				
SWT2-5	Red-osier Dogwood Mineral Thicket Swamp				✓		Thicket Swamp Ecosites are present throughout the Study Area, ranging in size from approximately 0.2ha to 0.7ha and generally having more than 25% canopy cover from hydrophytic shrub species (and less than 25% tree cover). These communities are subjected to variable flooding regimes but water depth tends to remain below 2m, and standing water or vernal pooling is present to some extent. Red-osier Dogwood Mineral Thicket Swamp (SWT2-5) communities are present along the perimeter of the large pond within the Dickenson Draft Plan Study Area, and is described in the Scoped EIS prepared for 9236 and 9322 Dickenson Road West (Dougan & Associates 2022). A single Silky Dogwood Mineral Thicket Swamp (SWT2-8) is present within FOD5-2 forest in the Central Survey Block. This community is online with the HDF network and is dominated by Silky Dogwood. Green Ash, Bitternut Hickory, Trembling Aspen, Spotted Jewelweed, Fox Sedge, Swamp Milkweed (*Asclepias incarnata*), Panicled Aster, and a few other species were also observed within the SWT2-8 area.
SWT2-8	Silky Dogwood Mineral Thicket Swamp		✓				
Shallow Water Ecosites *Permanently-flooded sites with water present year-round with generally less than 25% cover from emergent woody or herbaceous species; vegetation cover is usually absent, or provided by submerged or floating-leaved plant species (Lee et al. 1998).*							
SAF1	Floating-leaved Shallow Aquatic	✓				✓	Shallow Water Ecosites are present throughout the Study Area, ranging in size from approximately 0.1ha to 1.0ha and containing permanent standing water up to 2m deep. Submerged or floating leaved vegetation species are dominant, and tree or shrub cover is limited. Three Floating-leaved Shallow Aquatic (SAF1) communities are present within the Western Survey Block; one SAF1 community is also located on Non-Participating Lands, within the garden centre property at 2136 Upper James Street. Within the Western Survey Block, SAF1 communities are naturalized human-made ponds used historically for irrigation and aesthetics during the operations of the former Glancaster Golf Course. All three communities are currently online with the HDF network, and dominated by Northern Watermeal (*Wolffia borealis*), Colombia Watermeal (*Wolffia Columbiana*) and Lesser Duckweed (*Lemna minor*). Curly-leaved Pondweed, Water-plantain (*Alisma* sp.), Marshpepper Smartweed (*Persicaria hydropiper*), Marsh Seedbox (*Ludwigia palustris*), and other species were also observed within these communities.
SAF1-3	Duckweed Floating-leaved Shallow Aquatic				✓		

ELC Code	ELC Description	Participating Lands			Non-Participating Lands		Environmental Characteristics
		Western Survey Block	Central Survey Block	Eastern Survey Block	Dickenson Draft Plan Study Area	Other Non-Participating Lands	
							The largest pond within the Study Area is located within the Dickenson Draft Plan Study Area; the characteristics of this Duckweed Floating-leaved Shallow Aquatic (SAF1-3) community are described in the Scoped EIS prepared for 9236 and 9322 Dickenson Road West (Dougan & Associates 2022).

4.2.2 Vascular Flora

In total, 345 species of vascular flora were observed by NRSI biologists within the Study Area during inventories completed between 2018 and 2020. A list of all plant species reported from the Study Areas is included in **Appendix VII**.

Of the observed species, 26 are listed as regionally rare or uncommon in Hamilton (HCA 2014, Oldham 2017). A list of these significant plant species, and the vegetation communities they were observed in, is presented in **Table 4**. All species are considered to have secure, or apparently secure, populations in Ontario, and none are SAR or SCC.

Based on available records and the results of field surveys, three plant SAR and 11 plant SCC are reported from the vicinity of the Study Area (iNaturalist 2023, MNRF 2023a, this study). The results of the Significant Species Screening are provided in **Appendix V**.

During field surveys, NRSI biologists observed one plant SAR, and three plant SCC. A summary of the plant SAR and SCC observations made by NRSI biologists within the Participating Lands during field surveys is provided in **Table 5.**

4.2.3 Trees

In total, 4,668 trees ≥10cm in diameter-at-breast-height (DBH) were inventoried by NRSI Certified Arborists within the Participating Lands between 2018 and 2020. Of the trees inventoried, 3,287 (71%) are native species, 1,365 (29%) are non-native, and 16 trees (0.3%) are of undetermined origin. Nearly one-quarter (22%) of all trees inventoried are Black Walnut (*Juglans nigra*); the next most common were Common Apple (*Malus domestica*, 14%) and Hawthorn species (*Crataegus* spp., 11%). More than two-thirds (70%) of all trees inventoried were in fair to excellent condition. Full details are provided under separate cover in the Upper West Side Secondary Plan TPP (NRSI 2023).

Table 4. Vascular Flora Listed as Uncommon or Rare in Hamilton (per Oldham 2017 and HCA 2014) Observed by NRSI biologists in the Study Area

Scientific Name	Common Name	SRank[1]	Vegetation Community[2]
Ambrosia trifida	Great Ragweed	S5	Orchard, Hedgerow, FOD4, FOD7-4, MAM2-2
Bidens cernua	Nodding Beggarticks	S5	MAS2-1
Cyperus diandrus	Umbrella Flatsedge	S4	MAS2-1, SAF1
Cyperus erythrorhizos	Red-rooted Flatsedge	S4	MAS2-1
Cyperus strigosus	Straw-colored Flatsedge	S5	MAS2-1, SAF1
Echinochloa muricata var. microstachya	Western Barnyard Grass	S5	MAS2-1
Echinochloa muricata var. muricata	Rough Barnyard Grass	S4?	MAS2-1
Equisetum pratense	Meadow Horsetail	S5	Hedgerow
Erechtites hieraciifolius	Eastern Burnweed	S5	SAF1
Gratiola neglecta	Clammy Hedge-hyssop	S4	MAM2-2
Helianthus giganteus	Tall Sunflower	S4	CUW/CUW1
Hypericum majus	Larger Canadian St. John's-wort	S5	SAF1
Najas flexilis	Slender Naiad	S5	SAF1
Oxalis montana	Common Wood-sorrel	S4S5	Hedgerow, FOD4, FOD7-4
Phytolacca americana	Common Pokeweed	S5	FOD5-2
Picea mariana	Black Spruce	S4	Orchard
Pinus resinosa	Red Pine	S5	Hedgerow
Pycnanthemum virginianum	Virginia Mountain-mint	S5	Orchard, CUW/CUW1, CUT1-4
Ribes hirtellum	Smooth Gooseberry	S4	FOD4
Symphyotrichum ontarionis	Ontario Aster	S5	CUW/CUW1
Uvularia sessilifolia	Sessile-leaved Bellwort	S5	FOD6-5
Veronica catenata	Water Speedwell	S4	MAS2-1
Veronica peregrina ssp. peregrina	Purslane Speedwell	SU	CUM/CUM1
Viola sororia	Woolly Blue Violet	S5	FOD5-2, FOD6-5, MAS2-1
Wolffia borealis	Northern Watermeal	S5	SAF1
Wolffia columbiana	Columbia Watermeal	S5	SAF1

[1] Provincial Rank (SRank): S1 – critically imperiled; S2 – imperiled; S3 – vulnerable; S4 – apparently secure; S5 – secure; SU - unrankable.
[2] Vegetation communities are shown on **Map 5**

Table 5. Summary of Significant Vascular Flora Species Observations (2018-2020) within the Study Area.

Scientific Name	Common Name	Observation Details and Habitat Analysis
Species at Risk		
Juglans cinerea	Butternut	In total, 197 Butternut trees have been identified to date within the Study Area. Qualified Butternut Health Experts (BHEs) at NRSI have conducted health assessments on 193 of these Butternuts, and evaluated 78 as Category 1, 73 as Category 2, 19 as Category 3, and 23 as hybrids. A Butternut Health Assessment (BHA) Report was submitted to the MECP on October 30, 2023 (Appendix IV). Butternuts are located throughout the Study Area, however the majority of assessed individuals are within the Central Survey Block (with a high concentration in the naturalizing orchard area). Hedgerows and deciduous woodlands within the Study Area provide suitable and confirmed habitat for the species.
Species of Conservation Concern		
Elodea nuttallii	Nuttall's Waterweed	This species was observed on September 22, 2020 within the Floating-leaved Shallow Aquatic (SAF1) pond in the southwestern corner of the Western Survey Block. Suitable habitat for Nuttall's Waterweed includes lakes, pools, and rivers (Reznicek et al. 2011).
Gleditsia triacanthos	Honey-locust	In total, 32 Honey-locust trees have been identified to date within the Study Area. Almost all (29) of these individuals were documented on the currently-unoccupied residential area at 9285 Twenty Road West, and are therefore considered to have been planted for landscaping purposes. An additional two Honey-locust are located in a hedgerow immediately east of the property at 9575 Twenty Road West, and are similarly considered to have been planted. The remaining individual is located within the Dickenson Road right-of-way. Suitable habitat for Honey-locust typically includes river banks and floodplains, and shores of Lake Erie; the species is frequently planted for 'living fences', and regularly grows in naturalized areas as a result of anthropogenic activity (Reznicek et al. 2011).
Puccinellia nuttalliana	Nuttall's Alkaligrass	This species was observed on June 10, 2019 within the Reed Canary Grass Mineral Meadow Marsh (MAM2-2) vegetation community in the southern portion of the Central Survey Block. The location where Nuttall's Alkaligrass was observed corresponds to the Upper Twenty Mile Creek Provincially Significant Wetland (Map 5). Suitable habitat for Nuttall's Alkaligrass includes grassy areas with saline soils (Reznicek et al. 2011).

4.3 Wildlife

4.3.1 Birds

According to available data from background information sources and this study, 152 bird species are reported from the vicinity of the Study Area (BSC et al. 2006, MNRF 2023a, eBird 2023, iNaturalist 2023). In total, 90 bird species were observed by NRSI biologists during field surveys between 2018 and 2020. Most observed species are common in southern Ontario and have stable populations. A list of all bird species reported from the Study Area and nearby is included in **Appendix VIII**.

In total, 49 bird species were observed by NRSI biologists exhibiting evidence of breeding within the Participating Lands. Possible or probable evidence of breeding was indicated by observations including (but not limited to) singing males, courtship displays, or the presence of the species within a permanent territory. Confirmed breeding evidence was indicated by observations such as adults carrying food or occupying a nest, nests with eggs or young, or the presence of fledged young. Overall, 12 species were confirmed to be breeding in the Participating Lands:

- Spotted Sandpiper (*Actitis macularia*);
- Red-winged Blackbird (*Agelaius phoeniceus*);
- Mallard (*Anas platyrhynchos*);
- Cedar Waxwing (*Bombycilla cedrorum*);
- Red-tailed Hawk (*Buteo jamaicensis*);
- Killdeer (*Charadrius vociferus*);
- Northern Flicker (*Colaptes auratus*);
- Gray Catbird (*Dumetella carolinensis*);
- Barn Swallow (*Hirundo rustica*);
- Savannah Sparrow (*Passerculus sandwichensis*)
- European Starling (*Sturnus vulgaris*); and
- American Robin (*Turdus migratorius*).

Of the species observed within the Study Area by NRSI biologists, 24 are considered regionally uncommon and eight are considered regionally rare (HCA 2014). Regionally uncommon and rare bird species, and the evidence of breeding observed during field surveys, are summarized in **Table 6**. Most of these species are considered to have secure, or apparently secure,

populations in Ontario; however, six are considered SAR or SCC and are described in detail in **Table 7**.

Based on available records and the results of field surveys, nine bird SAR and 13 bird SCC are reported from the vicinity of the Study Area (BSC et al. 2006, MNRF 2023a, eBird 2023, iNaturalist 2023, this study). The results of the Significant Species Screening are provided in **Appendix V**.

During field surveys, NRSI biologists observed four bird SAR, and four bird SCC. A summary of the bird SAR and SCC observations made by NRSI biologists within the Participating Lands during field surveys is provided in **Table 7**.

Table 6. Bird Species Listed as Uncommon or Rare in Hamilton (HCA 2014) Observed by NRSI biologists in the Study Area

Scientific Name	Common Name	Srank[1]	Breeding Evidence		
			None[2]	Possible[3]	Probable[4]
Regionally Uncommon					
Accipiter cooperii	Cooper's Hawk	S4		✓	
Aix sponsa	Wood Duck	S5B, S3N	✓		
Ammodramus savannarum	Grasshopper Sparrow	S4B		✓	
Ardea herodias	Great Blue Heron	S4	✓		
Cathartes aura	Turkey Vulture	S5B, S3N			✓
Certhia americana	Brown Creeper	S5	✓		
Chaetura pelagica	Chimney Swift	S3B	✓		
Coccyzus erythropthalmus	Black-billed Cuckoo	S4S5B		✓	
Dolichonyx oryzivorus	Bobolink	S4B	✓		
Dryobates villosus	Hairy Woodpecker	S5		✓	
Dryocopus pileatus	Pileated Woodpecker	S5	✓		
Empidonax minimus	Least Flycatcher	S5B	✓		
Megaceryle alcyon	Belted Kingfisher	S5B, S4N	✓		
Melanerpes carolinus	Red-bellied Woodpecker	S5		✓	
Mniotilta varia	Black-and-white Warbler	S5B	✓		
Pooecetes gramineus	Vesper Sparrow	S4B		✓	
Porzana carolina	Sora	S5B	✓		
Riparia Carolina	Bank Swallow	S4B	✓		
Sayornis phoebe	Eastern Phoebe	S5B	✓		
Setophaga pensylvanica	Chestnut-sided Warbler	S5B	✓		
Setophaga ruticilla	American Redstart	S5B		✓	
Sturnella magna	Eastern Meadowlark	S4B, S3N	✓		
Toxostoma rufum	Brown Thrasher	S4B		✓	
Zonotrichia albicollis	White-throated Sparrow	S5	✓		
Regionally Rare					
Antigone canadensis	Sandhill Crane	S5B, S3N	✓		
Circus hudsonius	Northern Harrier	S5B, S4N	✓		
Coccyzus americanus	Yellow-billed Cuckoo	S4B		✓	
Corvus corax	Common Raven	S5	✓		
Falco columbarius	Merlin	S5	✓		
Haliaeetus leucocephalus	Bald Eagle	S4	✓		
Regulus satrapa	Golden-crowned Kinglet	S5	✓		
Setophaga caerulescens	Black-throated Blue Warbler	S5B	✓		

[1] Provincial Rank (SRank): S1 – critically imperiled; S2 – imperiled; S3 – vulnerable; S4 – apparently secure; S5 – secure; SU - unrankable.
[2] Species observed, no evidence of breeding.
[3] Species observed (or heard singing) in its breeding season in suitable nesting habitat.
[4] Pairs and/or individuals of the species observed (or heard singing) on permanent territory in the breeding season in suitable nesting habitat, courtships or displays, adults visiting probable nest sites, agitated behaviour, etc.

Table 7. Summary of Significant Bird Species Observations (2018-2020) within the Study Area.

Scientific Name	Common Name	Observation Details and Habitat Analysis
Species at Risk		
Chaetura pelagica	Chimney Swift	6 adults were observed flying over the Central Survey Block (in the vicinity of BMB-06 on Map X) on July 30, 2019. 1 adult was also observed foraging over Pond 4 on August 16, 2019. Suitable nesting habitat for the species (uncapped chimneys) is potentially present in vacant and occupied residences throughout the Secondary Plan Boundary and Study Area. No breeding evidence was observed by NRSI biologists during breeding bird surveys within the Participating Lands.
Dolichonyx oryzivorus	Bobolink	1 adult was observed flying over the Western Survey Block on August 27, 2020. The observed individual was likely travelling through the area. Suitable nesting habitat of an appropriate size for the species (open expansive grasslands >10ha with dense ground cover, hayfields, meadows or fallow fields, marshes) is not present within the Study Area. Meadow and marsh areas are too small and fragmented, and the species does not use row crops (soy, corn) or sod fields that are dominant in the study area. Bobolink was not observed by NRSI biologists during breeding bird surveys within the Participating Lands, nor was the species observed again during any other site visit completed between 2018 and 2020. Suitable grassland nesting habitat may be present immediately south of the Study Area, within the John C. Munro Hamilton International Airport lands. eBird records (eBird 2023) indicate that Bobolink are regularly observed in the vicinity of the airport during the breeding season (late May to early July).
Sturnella magna	Eastern Meadowlark	1 adult male was heard singing within the naturalized orchard area in the Central Survey Block on April 11, 2018. The observed individual was likely travelling through the area during migration. Suitable nesting habitat for the species (pastures, hayfields, old or abandoned fields, and native prairies and savannahs) may be present within the Secondary Plan Boundary and Study Area, in meadow and thicket areas and the naturalizing orchard. However, Eastern Meadowlark was not observed by NRSI biologists during breeding bird surveys within the Participating Lands, nor was the species observed again during any other site visit. Suitable grassland nesting habitat may also be present immediately south of the Study Area, within the John C. Munro Hamilton International Airport lands. eBird records (eBird 2023) indicate that Eastern Meadowlark are regularly observed in the vicinity of the airport during the breeding season (late May to early July).
Riparia grievous	Bank Swallow	1 adult was observed foraging over the pond located in the northeastern portion of the Western Survey Block (near BMB-02 on Map X) on June 5, 2020.

Table 7. Summary of Significant Bird Species Observations (2018-2020) within the Study Area.

Scientific Name	Common Name	Observation Details and Habitat Analysis
		Suitable nesting habitat for the species (natural or human-made vertical faces in silt and sand deposits) is not present within the Secondary Plan Boundary or Study Area. No breeding evidence was observed by NRSI biologists during breeding bird surveys within the Participating Lands.
Species of Conservation Concern		
Ammodramus savannarum	Grasshopper Sparrow	1 adult male was heard singing in the southern portion of the Western Survey Block on June 4, 2018. This observation indicates evidence of possible breeding. Suitable nesting habitat for the species (open grasslands >5ha with well-drained, sandy soils generally) is not present within the Secondary Plan Boundary or Study Area. Meadows are too small and fragmented. Grasshopper Sparrow was not observed by NRSI biologists during other breeding bird surveys within the Participating Lands, nor was the species observed again during any other site visit completed between 2018 and 2020.
Contopus virens	Eastern Wood-Pewee	Singing males were heard in suitable deciduous forest habitat within the Western, Central, and Eastern Survey Blocks throughout 2018-2020 breeding bird surveys. Observations indicate evidence of possible (singing males) or probable (occupying permanent territory) breeding. During breeding bird surveys, Eastern Wood-Pewee was observed at in 2018 at BMB-06, -09, and -11, and in 2020 at BMB-04, -14, and MBB-04 (Map X). The species was regularly observed during non-target field surveys within and near suitable deciduous forest breeding habitat between 2018 and 2020.
Haliaeetus leucocephalus	Bald Eagle	1 juvenile was observed flying over the Central Survey Block on June 8, 2019. The observed individual was likely travelling through the area. Suitable nesting habitat for the species (tall, supercanopy trees near shorelines and waterbodies) is not present within the Secondary Plan Boundary or Study Area. No breeding evidence was observed by NRSI biologists during breeding bird surveys within the Participating Lands.
Hirundo rustica	Barn Swallow	Numerous Barn Swallows were regularly observed foraging over ponds, wetlands, and agricultural fields within the Western, Central, and Eastern Survey Blocks throughout 2018-2020 surveys. Probable and confirmed breeding evidence was also documented in several locations. Suitable nesting habitat for the species (human-made structures) is present within the Secondary Plan Boundary and Study Area: • Within the Western Survey Block, Barn Swallow nest cups were observed on the clubhouse and maintenance shed prior to the removal of these structures in August 2020. As the species was protected under the ESA at the time, a compensation structure was installed near Pond 3 in the southern portion of the Western Survey

Table 7. Summary of Significant Bird Species Observations (2018-2020) within the Study Area.

Scientific Name	Common Name	Observation Details and Habitat Analysis
		Block. Subsequent monitoring has not detected any individuals using the compensation structure, and the species no longer receives protection under the ESA. • Barn Swallows were observed within the Central Survey Block visiting probable nest sites inside the vacant residence at 9285 Twenty Road West in 2018. • Vacant residences and outbuildings elsewhere within the Secondary Plan Boundary and Study Area have the potential to be used by Barn Swallows for nesting, although their use was not confirmed by NRSI biologists during 2018-2020 surveys.

4.3.2 Herpetofauna

According to available data from background information sources and this study, 28 herpetofauna species are reported from the vicinity of the Study Area (Ontario Nature 2019, MNRF 2023a, iNaturalist 2023). In total, 11 reptile and amphibian species were observed by NRSI biologists during field surveys between 2018 and 2020. A list of all herpetofauna species reported from the Study Area and nearby is included in **Appendix VIII.**

Based on available records and the results of field surveys, two SAR and three SCC amphibians and reptiles are reported from the vicinity of the Study Area (Ontario Nature 2019, MNRF 2023a, iNaturalist 2023). The results of the Significant Species Screening are provided in **Appendix V**.

Amphibians

Regionally significant amphibian species have been observed during field surveys, this includes one species designated as uncommon, American Bullfrog (*Lithobates catesbeianus*), in Hamilton and the surrounding area (HCA 2014).

Anuran Call Surveys

Evening anuran call surveys were conducted on April 24, May 28, and June 20, 2018 for features in the Eastern and Central Survey Blocks, and on April 27, May 26, and June 17, 2020 for features in the Western Survey Block. These surveys followed the methods outlined in the Marsh Monitoring Program (BSC 2009b). Monitoring station locations are shown on **Map 4**. All calling anurans heard during 3-minute call counts in a 100m radius were recorded to species and included an estimate of call intensity and number of individuals present. At each station, the survey time, air and water temperature, wind speed, and cloud cover were recorded.

In total, five anuran species were observed within the Study Area during anuran call surveys. In addition to those 5 species, a single American Bullfrog was heard calling from within Pond 2 in 2020 (Map 4). The results of these surveys are summarized in **Table 8**.

Table 8. Summary of Anuran Call Survey Results (2018, 2020) within the Study Area

Monitoring Station	Anuran Call Survey	Year	Total Number of Individuals Recorded				
			American Toad (*Anaxyrus americanus*)	Gray Treefrog (*Dryophytes versicolor*)	Spring Peeper (*Pseudacris crucifer*)	Green Frog (*Lithobates clamitans*)	Northern Leopard Frog (*Lithobates pipiens*)
ANR-01	1	2018	-	-	-	-	-
	2		-	-	-	-	-
	3		-	-	-	-	-
	1	2020	-	-	-	-	-
	2		-	4	2	-	-
	3		1	5	-	-	-
ANR-02	1	2018	-	-	-	-	-
	2		-	-	-	-	-
	3		-	-	-	-	-
	1	2020	3	-	-	-	-
	2		1	5	Call Code 3	-	-
	3		-	-	1	-	-
ANR-03	1	2018	-	-	-	-	-
	2		-	-	-	-	-
	3		-	-	-	-	-
	1	2020	1	-	1	-	1
	2		-	-	4	-	5
	3		-	-	-	10	-
ANR-04	1	2018	-	-	5	-	-
	2		-	-	-	6	-
	3		-	-	-	4	-
ANR-05	1	2020	4	-	Call Code 3	-	1
	2		-	Call Code 3	1 + Call Code 3	-	-
	3		-	-	-	-	-
ANR-06	1	2020	-	-	4	-	-
	2		-	-	2	4	-
	3		-	2	-	8	-
ANR-07	1	2020	-	-	Call Code 3	-	-
	2		-	-	5	8	-
	3		-	-	-	19	-
ANR-08	1	2020	-	-	-	-	-
	2		-	-	-	-	-
	3		-	-	-	-	-
ANR-09	1	2018	-	-	Call Code 3	-	-
	2		-	-	-	-	-
	3		-	-	-	-	-
ANR-10	1	2018	2	-	Call Code 3	-	-
	2		4	5	5	-	-
	3		-	5	-	4	-
ANR-11	1	2018	-	-	-	-	-
	2		-	1 + Call Code 3	-	-	-
	3		-	3	-	-	-
ANR-12	1	2018	-	-	3	-	-

Monitoring Station	Anuran Call Survey	Year	Total Number of Individuals Recorded				
			American Toad (*Anaxyrus americanus*)	Gray Treefrog (*Dryophytes versicolor*)	Spring Peeper (*Pseudacris crucifer*)	Green Frog (*Lithobates clamitans*)	Northern Leopard Frog (*Lithobates pipiens*)
	2		-	-	-	-	-
	3		-	4	-	-	-
ANR-13	1	2018	-	-	-	-	-
	2		-	-	-	-	-
	3		-	3	-	-	-
ANR-14	1	2018	-	-	4	-	-
	2		-	1	-	-	-
	3		-	-	-	-	-
	1	2020	-	-	Call Code 3	-	-
	2		-	7	6	-	-
	3		-	-	-	-	-
ANR-15	1	2018	-	-	-	-	-
	2		-	1	1	-	-
	3		-	-	-	-	-
	1	2020	-	-	-	-	-
	2		-	-	-	-	-
	3		-	-	-	-	-
ANR-16	1	2018	-	-	-	-	-
	2		-	-	-	-	-
	3		-	-	-	-	-
ANR-17	1	2020	1	-	Call Code 3	-	-
	2		-	-	-	-	-
	3		-	-	-	-	-

Egg Mass Surveys

Egg mass surveys were conducted on April 30 and May 30, 2018. During these surveys, egg masses and adult amphibians were observed by NRSI biologists within Pond 4; tadpoles were observed within a pool located at ANR-09 (**Map 4**).

Within Pond 4, 18 Northern Leopard Frog (*Lithobates pipiens*) egg masses were observed; adult Northern Leopard Frog and Spring Peepers (*Pseudacris crucifer*) were heard calling from within the pond during the survey. Egg masses varied in size between 6 and 15cm in length. Around 20 American Toad (*Anaxyrus americanus*) tadpoles were observed within a headwater drainage feature near ANR-09.

Reptiles

Field surveys have confirmed the presence of one SCC turtle, Common Snapping Turtle (*Chelydra serpentina*), in the Study Area. Regionally significant species have also been

observed during field surveys, including one species designated as uncommon, Dekay's Brownsnake (*Storeria dekayi*), and one species designated as rare, Red-bellied Snake (*Storeria occipitomaculata*), in Hamilton and the surrounding area.

Turtle Overwintering Surveys

Ponds 1 to 4 were identified as areas that may provide turtle overwintering habitat. Modified visual encounter surveys based on the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2015) targeting emerging and basking turtles of all species were conducted in 2018 (TBA-04) and 2020 (TBA-01 to -03) between April and June, once air temperatures were suitably warm. The first survey of each year was timed to document turtles emerging from their overwintering habitat, whereas all subsequent surveys focused on observing turtles basking and using the ponds. In total, 6 surveys were completed for each pond.

During surveys, biologists approached each pond quietly and walked the perimeter of the feature, scanning the open water and shoreline with binoculars to avoid disturbing any turtles that may have been using the area. Surveys were conducted on sunny, warm days; NRSI biologists also watched for turtles during all site visits within the study area. During each visual encounter survey detailed notes were taken that described the habitat searched, level of effort, weather conditions, and species observed.

Two turtle species were confirmed to being using the ponds as overwintering habitat, Common Snapping Turtle and Midland Painted Turtle (*Chrysemys picta marginata*). Midland Painted Turtles were observed in at TBA-01, -02 and -03; the highest number of individuals observed at one time was 16 individuals at TBA-03. Common Snapping Turtles were observed at all four monitoring stations during the turtle emergence seasons across 2018 and 2020.

Turtle Nesting Surveys

Where potential overwintering habitat is present, turtles may nest in suitable adjacent habitats within approximately 100m. Pond 4 (located in the Central Survey Block), was confirmed as turtle overwintering habitat in 2018. On June 10, 2019, an NRSI biologist surveyed the areas within approximately 100m of Pond 4 to determine if exposed, loose mineral (sand and gravel) soil areas were present where turtles may nest. No suitable turtle nesting habitat was observed. Soils were generally too wet, and local topography within 100m of this offsite pond was low-lying, thereby promoting moist conditions that are not suitable for turtle nesting. Based on the

absence of suitable habitat, no further surveys for nesting turtles were completed in the Central Survey Block.

On June 3, 2020, an NRSI biologist surveyed candidate turtle nesting areas in the Western Survey Block to determine if exposed, loose mineral (sand and gravel) soil areas were present where turtles may nest. Staff identified suitable turtle nesting habitats throughout the area, including several golf course sand pits, and surveys for nesting turtles were completed in these areas. Nesting habitat areas contained exposed sandy substrate with good sun exposure. Evidence of Snapping Turtle nesting activity was found within the Western Survey Block between June 3 and June 22, 2020 in the form of egg shells uncovered after tilling had occurred within the area. In September 2020, more fragments of turtle eggs were discovered confirming the presence of nesting activity within the area. Evidence of nesting Midland Painted Turtle activity within the Western Survey Block was observed during 2020 surveys in the form 4 'test digs' and resting turtles.

Snake Coverboard Surveys

Snake cover boards were initially installed on April 23, 2018 (Central Survey Block) and April 25, 2020 (Western and Eastern Survey Blocks); board locations are shown on **Map 4**. In total, 80 cover boards were deployed throughout the Participating Lands. Six cover board checks were completed in 2018 (Central Survey Block only), and 10 cover board checks in 2020 (Western, Central, and Eastern Survey Blocks).

Of the six snake species recorded within 10 km of the Study Area (Ontario Nature 2019), three species were observed by NRSI biologists: Dekay's Brownsnake, Northern Red-bellied Snake, and Eastern Gartersnake (*Thamnophis sirtalis sirtalis*). No SAR or SCC snakes were observed; however, the Northern Red-bellied Snake is noted as regionally rare and Dekay's Brownsnake is uncommon in the Hamilton Region (HCA 2014).

Through the results of the snake coverboard surveys, several areas that may contain reptile hibernacula were identified. Localized concentrations of snake observations occurred throughout the Eastern, Central and Western Survey Blocks. Many concentrations of individuals occurred near old stone structures, such as foundations or wells. Other groups of individuals were observed congregating near the edge of the forest along the southwestern non-participating lands in the Western Survey Block and the edges of the wetland communities within the Eastern Survey Block. The highest concentration of snakes observed under a single

coverboard was 15 juvenile Red-bellied snakes under SNK-44 on May 7, 2018. A summary and interpretation of the results of the snake coverboard surveys are provided in **Table 9**.

Table 9. Presence of candidate reptile hibernacula as determined by snake coverboard surveys in 2018 and 2020 within the Study Area.

Snake Board	Total number of snakes observed		Total number of snake species observed		Significant Wildlife Habitat - Reptile Hibernaculum		
	2018	2020	2018	2020	≥5 individuals observed at one time	≥2 species observed at one time	Possible Hibernaculum Present in Area
1	0	22	0	3	No	**Yes**	**Yes**
2	0	7	0	3	**Yes**	**Yes**	**Yes**
3	0	0	0	0	No	No	No
4	0	0	0	0	No	No	No
5	0	3	0	1	No	No	No
6	0	0	0	0	No	No	No
7	0	0	0	0	No	No	No
8	0	0	0	0	No	No	No
9	0	1	0	1	No	No	No
10	0	0	0	0	No	No	No
11	0	0	0	0	No	No	No
12	0	0	0	0	No	No	No
13	0	1	0	1	No	No	No
14	0	0	0	0	No	No	No
15	0	0	0	0	No	No	No
16	0	0	0	0	No	No	No
17	0	3	0	1	No	No	No
18	0	2	0	1	No	No	No
19	0	0	0	0	No	No	No
20	0	6	0	1	No	No	No
21	0	0	0	0	No	No	No
22	0	0	0	0	No	No	No
23	0	1	0	1	No	No	No
24	0	0	0	0	No	No	No
25	0	0	0	0	No	No	No
26	0	0	0	0	No	No	No
27	5	0	2	0	No	**Yes**	**Yes**
28	0	0	0	0	No	No	No
29	0	0	0	0	No	No	No
30	0	0	0	0	No	No	No
31	0	1	0	1	No	No	No
32	1	0	1	0	No	No	No
33	1	2	1	1	No	**Yes**	**Yes**
34	0	0	0	0	No	No	No
35	0	4	0	1	No	No	No
36	0	7	0	3	No	**Yes**	**Yes**
37	0	23	0	3	No	**Yes**	**Yes**
38	0	5	0	1	No	No	No
39	0	1	0	1	No	No	No
40	2	9	2	2	No	**Yes**	**Yes**
41	1	0	1	0	No	No	No
42	1	0	1	0	No	No	No

Snake Board	Total number of snakes observed		Total number of snake species observed		Significant Wildlife Habitat - Reptile Hibernaculum		
	2018	2020	2018	2020	≥5 individuals observed at one time	≥2 species observed at one time	Possible Hibernaculum Present in Area
43	0	0	0	0	No	No	No
44	15	0	1	0	**Yes**	No	**Yes**
45	3	8	2	2	No	**Yes**	**Yes**
46	0	4	0	2	No	**Yes**	**Yes**
47	0	8	0	2	No	**Yes**	**Yes**
48	0	1	0	1	No	No	No
49	1	0	1	0	No	No	No
50	0	1	0	1	No	No	No
51	0	1	0	1	No	No	No
52	3	0	2	0	No	**Yes**	**Yes**
53	0	0	0	0	No	No	No
54	1	0	1	0	No	No	No
55	0	0	0	0	No	No	No
56	0	0	0	0	No	No	No
57	0	6	0	2	No	**Yes**	**Yes**
58	1	0	1	0	No	No	No
59	0	0	0	0	No	No	No
60	0	0	0	0	No	No	No
61	0	15	0	2	No	**Yes**	**Yes**
62	1	0	1	0	No	No	No
63	0	19	0	3	No	**Yes**	**Yes**
64	0	1	0	1	No	No	No
65	0	11	0	2	No	**Yes**	**Yes**
66	0	0	0	0	No	No	No
67	0	2	0	2	No	**Yes**	**Yes**
68	0	22	0	2	No	**Yes**	**Yes**
69	0	8	0	1	No	No	No
70	0	5	0	2	No	**Yes**	**Yes**
71	0	12	0	3	**Yes**	**Yes**	**Yes**
72	0	1	0	1	No	No	No
73	0	0	0	0	No	No	No
74	0	3	0	1	No	No	No
75	0	6	0	2	No	**Yes**	**Yes**
76	0	3	0	1	No	No	No
77	0	4	0	1	No	No	No
78	0	0	0	0	No	No	No
79	0	6	0	2	No	**Yes**	**Yes**
80	0	1	0	1	No	No	No

4.3.3 Mammals

According to available data from background information sources and this study (Dobbyn 1994, MNRF 2023a, iNaturalist 2023), 42 mammal species are reported within or near the Study Area. NRSI biologists conducted targeted mammal surveys including winter wildlife surveys and bat habitat assessments in the Eastern, Central, and Western Survey Blocks. Surveys recorded

observations of a relatively high diversity of mammals, including 15 species in the study area, based on both signs (e.g., tracks, scat, dens) and direct observations. All species observed have apparently secure or secure (S4 or S5) populations in Ontario. One observed species, American Ermine (*Mustela richardsonii*), is listed as uncommon within the Hamilton region; all other observed mammal species are considered common in the region (HCA 2014). Recorded mammal species generally exhibited evidence of breeding, foraging, and movement throughout the Study Area.

A resident of the rural farm residence at 9575 Twenty Road West (Central Survey Block) communicated to NRSI biologists that Coyote (*Canis latrans*) and White-tailed Deer (*Odocoileus virginianus*) are particularly active in the Study Area. The resident described observations of Coyote denning on a yearly basis in or near a dilapidated shed to the south of his residence, directly adjacent to the naturalized orchard. Coyote has also been reported by another resident with the Study Area as regularly denning near the unoccupied residence at 9751 Twenty Road West (Central Survey Block). This resident also described observing groups of up to 15 White-tailed Deer at a time in the Study Area. During the 2018 and 2020 winter wildlife surveys, a high concentration of Coyote tracks was observed throughout the naturalizing orchard that indicated regular Coyote movement between the agricultural field in the east and the orchard areas. Wildlife signs in the Western Survey Block were scarce during 2020 winter wildlife surveys, consistent with the limited amount of cover available in that area.

Based on available records and the results of field surveys, six SAR and 1 SCC mammal species are reported from the vicinity of the study area (Dobbyn 1994, MNRF 2023a, HCA 2014, iNaturalist 2023). The results of the Significant Species Screening are provided in **Appendix V**. No mammal regulated SAR or SCC observed directly during field surveys between 2018 and 2020; however, suitable roosting, foraging, and travel corridor habitat for four SAR bats, including Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, and Tri-colored Bat, is present throughout the Study Area. Habitat for SAR bats is further discussed in **Section 6.1** below. A complete list of mammal species reported from and observed in the Study Area is provided in **Appendix X**.

4.3.4 Insects

NRSI biologists completed insect surveys targeting butterflies, odonates (dragonflies and damselflies), and bumble bees within the Study area. Field investigations included two surveys in the Central Survey Block in 2019, one survey in the Central Survey Block in 2020, and three surveys each in the Western and Eastern Survey Blocks in 2020. In total, 32 butterfly, 16

odonata, and five bumblebee species were observed by NRSI biologists. A list of all butterfly and odonata species reported from the Study Area and nearby are included in **Appendix XI** and **Appendix XII**, respectively. Bumblebee species are described below.

Based on available records and the results of field surveys, three insect SCC are reported from the vicinity of the Study Area (Macnaughton et al. 2023, OOAD 2023, HCA 2014, iNaturalist 2023, this study). The results of the Significant Species Screening are provided in **Appendix V**.

Butterflies

NRSI biologists observed 32 butterfly species in the Study Area. The majority of species are common in the Hamilton region and have secure (S5) or apparently secure (S4) populations in Ontario. One SCC butterfly species, Monarch (*Danaus plexippus*) was confirmed to be breeding and foraging within the Study Area. Wild Indigo Duskywing (*Erynnis baptisiae*) and American Snout (*Libytheana carinenta*) were also observed by NRSI biologists and are considered uncommon and regionally rare, respectively, within Hamilton and the surrounding area (HCA 2014).

Dragonflies and Damselflies

NRSI biologists observed 16 odonata species in the Study Area. The majority of species are common in the Hamilton region and have secure (S5) or apparently secure (S4) populations in Ontario. One SCC dragonfly species, Unicorn Clubtail (*Arigomphus villosipes*) was observed in suitable breeding habitat within the Study Area. Halloween Pennant (*Celithemis eponina*) was also observed by NRSI biologists and is considered uncommon within Hamilton and the surrounding area (HCA 2014).

Bumble Bees

NRSI biologists observed five bumblebee species in the study area: Lemon Cuckoo Bumblebee (*Bombus citrinus*), Common Eastern Bumble Bee (*Bombus impatiens*), Brown-belted Bumble Bee (*Bombus griseocollis*), Tri-colored Bumble Bee (*Bombus ternarius*), and Red-belted Bumble Bee (*Bombus rufocinctus*). Of the species confirmed to be present within the Study Area, only Lemon Cuckoo Bumble Bee is considered SCC.

5.0 Aquatic Environment Existing Conditions

5.1 Aquatic Species

5.1.1 Fish

According to available data from background information sources and this study, 17 fish species are reported from the vicinity of the Study Area (DFO 2023, MNRF 2023a, b, iNaturalist 2023). In total, 11 fish species were observed by NRSI biologists during field surveys between 2018 and 2020. All species are considered to have secure, or apparently secure, populations in Ontario, and none are SAR or SCC. Fish community sampling indicated that just over half (six) of these species prefer coolwater thermal regimes, with the other half (four) of species preferring warmwater thermal regimes (Holm et al. 2010). All observed species spawn during the spring period. A list of all fish species reported from the Study Area and nearby is included in **Appendix XII**. Species observed by NRSI biologists and their respective thermal regime preferences are summarized in **Table 10**.

Of the observed species, two are considered non-native and invasive: Common Carp (*Cyprinus carpio*) and Golden Shiner x Rudd hybrid (*Notemigonus crysoleucas x Scardinius erythrophthalmus*). Rudd is a non-native and invasive species in Ontario that is able to breed with Golden Shiner; hybrid offspring are also considered invasive. The presence of Rudd and Golden Shiner x Rudd hybrids can reduce the genetic diversity of the native Golden Shiner; juveniles complete with native species for their food and habitat, and adults can eat large amounts of aquatic plants along shorelines, thereby degrading spawning and nursery habitat for native fish (OFAH & MNRF 2021). Similarly, the introduced species Common Carp can negatively impact aquatic ecosystems where it becomes established; impacts can include increasing total suspended solids, sedimentation, erosion, and nutrients, decreasing submerged macrophyte abundance, zooplankton, and benthic invertebrates, and native species diversity and abundance, and competition with waterfowl for food resources (Badiou and Goldsborogh 2011). A few Common Carp were observed in Pond 1, and hundreds of Golden Shiner x Rudd hybrid were observed in Pond 1 and Pond 2, within the Western Survey Block.

Based on available records, one fish SCC, Grass Pickerel (*Esox americanus vermiculatus*) is reported from the vicinity of the Study Area (iNaturalist 2023, MNRF 2023a, b, DFO 2023). The results of the Significant Species Screening are provided in **Appendix V**.

Aquatic SAR mapping (DFO 2023) indicates that Grass Pickerel is found, or potentially found, within the Upper Twenty Mile Creek PSW and HDFs in the Study Area. In July 1996,

electrofishing completed by the Ministry of Transportation (MTO) at the culvert under Upper James Street first detected Grass Pickerel; however, seining surveys completed by the MNRF in August 2008 did not document the species (MNRF 2023b). Suitable Grass Pickerel habitat includes wetlands, ponds, slow-moving streams, and shallow bays of larger lakes with warm, shallow, clear water, and an abundance of aquatic plants (MECP 2023). This species can occupy aquatic habitats from the mouth of a river to its headwaters. The Upper Twenty Mile Creek PSW in the northeastern corner of the study area is considered suitable, candidate habitat for Grass Pickerel. Additional details on the type and quality of habitat within the HDF network in the Study Area are discussed in Section **Error! Reference source not found.**.

Table 10. Summary of Fish Species Observations (2018-2020) within the Study Area.

Scientific Name	Common Name	Thermal Regime[1]	Location(s) Observed[2]
Culaea inconstans	Brook Stickleback	Coolwater	TTMC 3-3
Cyprinus carpio	Common Carp	Warmwater	Pond 1
Hybognathus hankinsoni	Brassy Minnow	Coolwater	Pond 4
Lepomis cyanellus	Green Sunfish	Warmwater	Pond 1, Pond 2, Pond 3, Pond 4
Lepomis gibbosus	Pumpkinseed	Warmwater	Pond 1, Pond 2
Lepomis macrochirus	Bluegill	Warmwater	Pond 2, Pond 3, TTMC3-6
Micropterus salmoides	Largemouth Bass	Warmwater	Pond 1, Pond 2
Notemigonus crysoleucas	Golden Shiner	Coolwater	Pond 1, Pond 2
Notemigonus crysoleucas x Scardinius erythrophthalmus	Golden Shiner x Rudd hybrid	Coolwater	Pond 1, Pond 2
Notropis atherinoides	Emerald Shiner	Coolwater	Pond 2
Umbra limi	Central Mudminnow	Coolwater	Pond 2, Pond 3

[1]As per Holm et al. 2010
[2]Ponds and HDF reaches are shown on Map 4 and Map 6, respectively

5.1.2 Mussels

According to available data from background information sources, 7 freshwater mussel species are reported from the vicinity of the Study Area (iNaturalist 2023). No mussel species or their shells were observed within the Study Area by NRSI Biologists during field surveys; however, targeted mussel surveys were not undertaken within the Study Area. A list of all freshwater mussel species reported from the Study Area and nearby is included in **Appendix XIV**.

Based on available records, two mussel SAR and two mussel SCC are reported from the vicinity of the Study Area (iNaturalist 2023). Suitable habitat is not present within the Study Area for any of these species; the results of the Significant Species Screening are provided in **Appendix V**.

5.1.3 Crayfish

Crayfish are included in the definition of 'fish' according to Section 34 of the federal *Fisheries Act* (1985). Terrestrial crayfish are hydrologically sensitive species that moves through soils and create chimneys in wet environments. Two species of terrestrial crayfish are known within Ontario, Chimney Crayfish (*Creaserinus fodiens*) and Devil Crayfish (*Lacunicambarus diogenes*). These species tend to move to where conditions are most suitable, and therefore their range changes each year with seasonal and annual changes in hydrology. Little is known about these species and their hydrological requirements. Chimney and Devil Crayfish are rare in Ontario, and although neither species is a regulated SAR or SCC, their habitat is considered SWH. Terrestrial crayfish and their habitats are discussed further in **Section 6.4**.

Chimney structures belonging to terrestrial crayfish were observed in the Central and Western Survey Blocks during field investigations by NRSI biologists between 2018 and 2020. With few exceptions, chimneys were observed in areas corresponding to the Upper Twenty Mile Creek PSW complex, which represents suitable wet meadow habitat or terrestrial crayfish species. In reference to **Map 6**, chimneys were observed within the following HDF reaches: TTMC3-3, TTMC3-3-2, TTMC3-3-3, TTMC3-5, TMC 2-10, and TTMC2-10-2.

5.2 Headwater Drainage Features

Headwater drainage features (HDFs) are defined in the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (TRCA and CVC 2014) document (Headwater Guideline) as:

- *Non-permanently flowing drainage features that may not have defined bed or banks; they are first-order and zero-order intermittent and ephemeral channels, swales and connected headwater wetlands*, but do not include rills or furrows.*
- **Wetlands that are connected downstream through surface flow are considered to be headwater drainage features for the purposes of this guideline. […] Wetland size does not matter with regard to this wetland definition.*

The TRCA and CVC note that this definition may present overlap with the accepted definition of a watercourse as defined within Section 28 (5) of the *Conservation Authorities Act,* (CAA, R.S.O. 1990). A watercourse, per Section 28 (5) of the CAA, is defined as:

- *An identifiable depression in the ground in which a flow of water regularly or continuously occurs*.

The Study Area is in the headwaters of the Twenty Mile Creek Watershed. Several headwater tributaries of Twenty Mile Creek are in the Study Area, flowing in a general west to east direction to join the main stem of Twenty Mile Creek in the northeastern corner of the Study Area. These tributaries are mapped as regulated features by the NPCA (NPCA 2023). Field analysis by NRSI biologists and GEO Morphix Ltd. fluvial geomorphologists indicated that these features align with the definition of HDFs, and that applying the Headwater Guideline within the Study Area is most appropriate. During the agency site visit on September 15, 2020, NPCA staff (A. Aldsworth) confirmed that the regulated stream features within the Study Area are considered HDFs.

All HDF reaches and aquatic habitats assessed in the Study Area are shown on **Map 6**. The HDF reaches in the Central and Eastern Survey Blocks were assessed over three site visits in 2019. The HDF reaches in the Western Block were assessed over three site visits in 2020. All assessments were conducted in accordance with the Headwater Guideline (TRCA and CVC 2014). All the reaches were simultaneously assessed for aquatic habitat.

The HDF component of this Master EIS has been prepared in collaboration with fluvial geomorphologists from GEO Morphix Ltd. Detailed technical descriptions of all reaches (e.g., length, substrates, channel form) are provided under separate cover in the *Upper West Side Secondary Plan Area Fluvial Geomorphological Assessment and Natural Channel Design* report prepared by GEO Morphix Ltd. (2023). The following sections expand upon the latter report, summarizing the ecological function and value of each HDF. Management recommendations for each reach are also discussed.

5.2.1 TTMC2

The primary branch of TTMC2 originates along the edge of the Significant Woodland at the southeast border of the Western Survey Block and is conveyed east through an agricultural field before entering another Significant Woodland. The feature then enters wetlands that are a part of the Upper Twenty Mile Creek PSW complex before flowing east through another agricultural within the Central Survey Block. TTMC2 enters non-participating lands within the Dickenson Draft Plan Area (referred to as ‘HDF1’ in Dougan & Associates 2022), entering another portion of the PSW complex and Significant Woodland before being conveyed east towards Upper James Street. Flow is directed under Upper James Street to the feature’s confluence with additional PSW units outside of the Study Area.

Within the Central Survey Block, the riparian corridor of TTMC2 is dominated by deciduous forest and meadow marsh habitats. These areas provide habitat for a diversity of terrestrial species and contribute nutrients and sediment to downstream habitats. However, connectivity between upstream and downstream habitats is limited where TTMC2 passes through row crop agricultural fields, due to the absence of naturalized vegetation communities within the riparian corridor in these locations (e.g. TTMC2-9). As such, in the upstream portion of TTMC2, reaches provide habitat for plants and wildlife within the Significant Woodland and Upper Twenty Mile Creek PSW complex, but under existing conditions do not likely function as movement corridors. Terrestrial crayfish chimneys were noted some reaches during field surveys (including TTMC2-10 and TTMC2-10-2), indicting that soil moisture conditions were appropriate at the time to provide habitat for this species.

No direct fish habitat is present within any reach upstream of TTMC2-8. No electrofishing surveys were completed in the spring to confirm the absence of fish, however, a barrier to the upstream movement of fish was observed, where TTMC2-8 drains into a catchbasin and the feature becomes closed until TTMC2-6 (**Map 6**). multiple barriers to fish movement were observed from the upstream reaches to the downstream, off-property PSW to the east making direct fish habitat unlikely. TTMC2 provides indirect, contributing fish habitat to downstream aquatic habitats in the form of food sources, allochthonous materials, and sediments that are conveyed downstream during seasonal flows.

5.2.2 TTMC3

Headwater feature TTMC3 originates within the Central Survey Block and flows generally in a northeast direction towards the intersection of Twenty Road West and Upper James Street. The feature contains reaches that flow through a meadow marsh and swamp communities, an online pond (Pond 4 on **Map 4**), and agricultural fields prior to its connection with the Upper Twenty Mile Creek PSW Complex (i.e., reach TTMC3-3). The riparian corridor of upstream reaches (TTMC3-10 to TTMC3-7) are primarily non-PSW meadow marsh and deciduous swamp wetland communities (**Map 6**). These riparian conditions are beneficial to the overall habitat of the upstream extent of the HDF and can possibly act as a refuge for amphibians and other low-mobility species. Downstream reaches may also act as movement corridors, through the agricultural fields, to the downstream PSW.

The upstream wetland communities contain a pond within TTMC3-9 which was found to provide direct, permanent fish habitat. While this reach provides permanent fish habitat in the form of

woody debris and deciduous trees along the banks that provide shade and cover, fish movement upstream and downstream from the pond is potentially restricted by two barriers. Upstream of the pond, a corrugated steel pipe connects the pond to reach TTMC 3-10 under an informal crossing. This culvert was not perched during field investigations. The berm at the downstream end of the pond is a barrier to fish movement into and out of the pond as well.

Riparian conditions of the downstream reaches (TTMC3-3-2 to TTMC3-3) are dominated by the PSW and Significant Woodlands present in the northeast corner of the Study Area. These areas likely act as animal movement corridors and refuges for low-mobility species. Terrestrial crayfish chimneys were noted in some of the downstream reaches during field surveys, indicting that soil moisture conditions were appropriate at the time to provide habitat for this species.

TTMC3-3-2, TTMC3-3-1 and TTMC3-2 are identified as candidate habitat for Grass Pickerel, a SCC fish. Dense, emergent vegetation present within the reach and riparian areas provide potentially suitable habitat for spawning Grass Pickerel. Direct, seasonal fish habitat for other common fish species was identified within these reaches through the observation of a Brook Stickleback (*Culaea inconstans*) near the upstream end of TTMC3-3.

Seasonal fish habitat was observed in some reaches downstream of the pond (TTMC3-9) as fish were observed stranded in two small pools within TTMC3-6 on August 15, 2019. Numerous (approximately 60) small-bodied, unknown fish species and a Bluegill (*Lepomis macrochirus*) were observed in the pooled water. Together with the observation of Brook Stickleback in TTMC3-3, these survey results confirm that direct, seasonal habitat for common fish species is likely present throughout most of TTMC3.

5.2.3 TTMC5

This HDF originates from a small meadow marsh at the western edge of the former Glancaster Golf Club in the Western Survey Block. The feature passes through the former golf course lands (which have been planted with row crops since 2020), through an online pond (Pond 1 on **Map 4**) prior to entering the southwest corner of the Central Survey Block. The feature extends northeast towards Twenty Road West and exits the study area near the northeast corner of the Eastern Block. From Twenty Road West, the feature continues into a series of stormwater ponds and through a subdivision, before draining to an off-site portion of Twenty Mile Creek PSW Complex.

Multiple upstream reaches are bordered by grassy wetland communities that act as limited buffers from the surrounding agricultural fields. While HDFs can typically act as movement

corridors for many species, some reaches, such as TTMC5-6 and TTMC5-8, are periodically ploughed through; this limits the ecological connectivity of upstream and downstream reaches for some parts of the year.

The majority of this HDF provides indirect habitat that supports downstream but localized (i.e., within the Study Area only) aquatic habitat. Barriers to fish movement upstream are likely present in the stormwater ponds and through the pipes and culverts that connect them.

Direct, permanent fish habitat is present in the pond reach (TTMC5-10), and seasonal fish habitat is present throughout (confirmed with observations of stranded fish in reach TTMC5-6). Outside of the pond, fish habitat is of very poor quality within on-site reaches. Prior to connecting with downstream aquatic habitats, water flows through stormwater management (SWM) facility in subdivision to north. While this is considered connected from a fish habitat perspective, most other HDF functions (e.g. allochthonous and sediment transport) contributing to downstream aquatic habitats are negated by presence of the SWM facility.

5.2.4 TTMC6

This headwater feature originates in the Central Survey Block and flows eastward through agricultural fields and an abandoned orchard where it then enters the roadside ditch at Twenty Road West and joins with TTMC5. As the feature flows through a small woodlot and naturalizing orchard, forest riparian conditions are present along the feature (TTMC6-4 and TTMC6-2), potentially increasing the ecological value of these reaches for various species that would otherwise avoid the surrounding agricultural fields. A vernal pool was observed in TTMC6-4 in 2019, potentially indicating a wider habitat corridor within the woodlot. However, connectivity to downstream habitat is limited, limiting this feature's value as a movement corridor. In addition, evening anuran call surveys did not detect the presence of any frogs or toads using the vernal pool as breeding habitat.

The entire HDF does not provide direct or indirect fish habitat. Limited aquatic habitat is present in this reach during the spring. This feature may provide a food source and allochthonous to downstream aquatic habitat, however, similarly to TTMC5, flows from this feature ultimately flow into a downstream SWM facility, limiting the feature's contribution for downstream aquatic habitats.

5.2.5 TTMC7

The feature, TTMC7, originates in the northeastern corner of the Central Survey Block and flows eastward through a residential property where it then enters the roadside ditch at Twenty Road West and joins with TTMC6 and TTMC5. The downstream end, closer to Twenty Road West, is a grassed swale through the hydro corridor. Similar to TTMC6, this entire HDF does not provide direct fish habitat and is upstream of the SWM facility. The feature's ability to provide a food source and allochthonous to downstream aquatic habitat is likely limited.

5.2.6 TTMC8

Feature TTMC8 originates within the former Glancaster Golf Course (Western Survey Block) and flows through the Central Survey Block and a residential property, then runs parallel to Twenty Road West for approximately 40m. It then flows under Twenty Road West through a culvert and into a small woodlot and eventually into a residential SWM facility through underground piping. From the SWM facility, it flows into the large hydro corridor north of the study area.

Reaches within the Study Area are primarily surrounded by agricultural crops. Ecologically valuable riparian habitat is limited or absent for all reaches, which also limits the overall value of TTMC8 as terrestrial and corridor habitat for wildlife within the area. The feature provides no direct fish habitat; the feature's ability to provide a food source and allochthonous to downstream aquatic habitat is likely limited by the underground nature of the system downstream (north of Twenty Road West).

5.2.7 TTMC9

This feature, TTMC9, originates within a Significant Woodland within the southern extent of the Central Block, then runs southeast to a ditch along the north side of Dickenson Road West and is conveyed under the road to the south through a culvert. Flows are conveyed into agricultural fields on the south side of the road. The upstream reach of the feature (TTMC9-2) is dominated by deciduous trees throughout its riparian corridor. Due to the proximity of the roadside and culvert, terrestrial habitat and corridor function is limited within the downstream reach (TTMC9-1).

No direct fish habitat was observed within the HDF but it is possible that the feature is connected to downstream aquatic habitats and thus offers indirect and contributing habitat in the form of food sources and allochthonous that are conveyed downstream during seasonal flow.

5.2.8 TTMC10

TTMC10 originates off-property to the west before entering the Western Survey Block where it is conveyed through a series of two ponds (Pond 2 and Pond 3 on Map 4) and a Significant Woodland. The HDF exits the Study Area through a residential property before being conveyed under Dickenson Road West through a culvert to residential properties and agricultural fields to the south.

Most reaches within the HDF offer ecologically valuable habitat for species due to the presence of ponds and significant forest habitat within the riparian corridor. These reaches likely act as important habitat for species in the surrounding area. Low-mobility species, such as amphibians, can utilize the vegetated reaches as movement corridors between the ponds and woodlots.

Direct fish habitat was observed within the pond reaches (TTMC1-1-2a and TTMC10-1-4). There is potential for seasonal (early spring) direct fish habitat to be present within up and downstream reaches but this was not confirmed with electrofishing surveys. Woody debris, instream hydrophytic vegetation and overhead shaded cover were observed within some reaches within the Significant Woodland. Downstream reaches likely offer indirect and contributing habitat to any potential downstream aquatic habitat in the form of food sources and allochthonous that are conveyed downstream during seasonal flow.

5.2.9 TTMC11

TTMC-11 consists of a single reach within the Study Area, Reach TTMC11-1, which conveys flows northeast through the north end of the Western Survey Block to the roadside ditch at Twenty Road West. The feature was poorly defined, with agricultural fields making up the riparian buffer and adjacent landscape. Similarly to TTMC8, this feature is piped underground below the subdivision to the north, limiting its contributions to any potential downstream habitats. No direct or seasonal fish habitat is present in the feature.

5.2.10 Management Recommendations

The classification results for each reach were determined in collaboration with GEO Morphix Ltd., as summarized in **Table 11** and shown on **Map 6**. The management recommendations are defined as follows:

- Protection – The feature serves an important function to all criteria
- Conservation – The feature serves a valued function to all criteria

- Mitigation – The feature serves a contributing function to all criteria
- Recharge protection – The feature serves a groundwater recharge function in which flow is absent over sandy or gravelly soils
- Maintain or replicate terrestrial linkage – for features with terrestrial function only
- No management required – for features with limited or no function

'Modifiers' in Table 11 reflect local details that alter the form, function, or importance of the feature, such as downstream conditions or local anthropogenic influences. The management recommendations identified via strict application of the Headwater Guideline decision matrix have been adjusted to account for the modifiers. For instance, for those features that are located immediately upstream of pipes and/or stormwater management facilities, professional judgement was used to alter the classification recommendations to reflect the lack of downstream connectivity. The Headwater Guideline allows for these modifications through the following statement*: "Classification should consider the influence of modifiers and professional judgement to determine the appropriate classification, where applicable. The results of the process need to be clearly articulated within the table*" (TRCA and CVC 2014). Further detail on the analysis and evaluation of each reach is provided in the *Upper West Side Secondary Plan Area Fluvial Geomorphological Assessment and Natural Channel Design* report prepared by GEO Morphix Ltd. (2023).

On Map 6, Reach TTMC2-7 corresponds to HDF 1, which is described in the Dickenson Draft Plan Area (Dougan & Associates 2022). The final management recommendation for HDF 1 was determined by Dougan & Associates to be 'Mitigation'; NRSI and GEO Morphix Ltd. staff determined that the management of this reach (and all reaches downstream of TTMC2-11) should be 'Protection' (GEO Morphix Ltd. 2023, **Table 11**). Under the approved draft plan, HDF 1 will remain on the landscape as an open channel within an approximately 20m-wide corridor within the Dickenson Road Draft Plan Area (Dougan & Associates 2022). Based on the Linkage Assessment and corridor analyses completed for this Master EIS (see Section 7.0), a 50m-wide linkage corridor is recommended to ensure ongoing connectivity between Core Areas in this location (Map 8).

Table 11. Headwater Drainage Feature Classification and Management Recommendations (determined in collaboration with GEO Morphix Ltd.)

HDF Reach	Hydrology	Modifier	Riparian Conditions	Fish and Fish Habitat	Terrestrial Function	Original Management	Adjusted Management	Notes
TTMC2								
TTMC2-8	Important	Modified drainage at downstream end (flows enter a catchbasin-like structure). Feature may receive flows from tile drain system (circular concrete structure built at field edge upstream, possibly to limit flooding within agricultural field)	Important	Contributing	Valued	Protection	No Adjustment	
TTMC2-9	Valued	Tile drain outlet located at upstream end	Limited	Contributing	Limited	Mitigation	Protection	Upgraded to Protection due to upstream and downstream Protection reaches.
TTMC2-10	Valued	None	Important	Contributing	Important	Protection	No Adjustment	
TTMC2-10-1	Valued	None	Valued	Contributing	Important	Conservation	Protection	Upgraded to Protection due to upstream and downstream Protection reaches.
TTMC2-10-2	Valued	None	Important	Contributing	Important	Protection	No Adjustment	
TTMC2-11	Valued	None	Important	Contributing	Important	Protection	No Adjustment	
TTMC2-12	Valued	None	Important	Contributing	Contributing	Conservation	No Adjustment	
TTMC2-12-1	Valued	None	Important	Contributing	Contributing	Conservation	No Adjustment	
TTMC2-12-1a	Contributing	None	Important	Contributing	Contributing	Conservation	No Adjustment	
TTMC2-12-1b	Contributing	None	Important	Contributing	Contributing	Conservation	No Adjustment	
TTMC3								
TTMC3-2	Valued	None	Important	Important	Important	Protection	No Adjustment	
TTMC3-3	Valued	None	Important	Important	Important	Protection	No Adjustment	
TTMC3-3-1	Valued	Feature originates from tile drain at property edge	Important	Valued	Important	Protection	No Adjustment	
TTMC3-3-2	Valued		Important	Valued	Important	Protection	No Adjustment	
TTMC3-3-3	Valued		Limited	Valued	Limited	Conservation	No Adjustment	
TTMC3-3-4	Important		Important	Valued	Limited	Protection	Conservation	Protection classification result of hydrology and riparian conditions. Hydrology and vegetation communities sustained by artificial tile drain contributions. Management downgraded to Conservation.
TTMC3-4	Contributing	None	Limited	Valued	Contributing	Conservation	No Adjustment	
TTMC3-4-1	Valued	Regularly tilled	Limited	Contributing	Limited	Mitigation	No Adjustment	
TTMC3-5	Contributing	None	Valued	Valued	Contributing	Conservation	No Adjustment	
TTMC3-6	Valued	None	Limited	Valued	Contributing	Conservation	No Adjustment	
TTMC3-7	Contributing	None	Important	Valued	Valued	Protection	Conservation	Feature classifications downgraded to Conservation to allow flexibility in location of these reaches to preserve and enhance overall habitat and maintain connectivity with downstream reaches that are candidate for realignment/enhancement. Opportunity to create more connected system with morphological and habitat diversity.
TTMC3-8	Contributing	None	Important	Valued	Valued	Protection	Conservation	
TTMC3-9	Important	Feature is an online anthropogenic pond	Important	Important	Important	Protection	Conservation	Reach downgraded to Conservation due to anthropogenic pond constructed to support historic orchard activities. Poor quality habitat, thermal impacts downstream, and disruption to sediment regime presents opportunity for enhancement.

HDF Reach	Hydrology	Modifier	Riparian Conditions	Fish and Fish Habitat	Terrestrial Function	Original Management	Adjusted Management	Notes
TTMC3-10	Valued	None	Important	Valued	Valued	Protection	Conservation	Feature classifications downgraded to Conservation to allow flexibility in location of these reaches to preserve and enhance overall habitat and maintain connectivity with downstream reaches that are candidate for realignment/enhancement. Opportunity to create more connected system with morphological and habitat diversity.
TTMC5								
TTMC5-5	Contributing	Flows from these reaches must pass through SWM ponds north of Twenty Road West prior to entering downstream aquatic habitats.	Important	Valued	Limited	Protection	Conservation	Feature classifications modified to Conservation to preserve linkage function. Protection statuses were the result of riparian and/or fish habitat. No connection to natural system downstream (flows enter existing SWM infrastructure). Benefit in allowing flexibility in location of these reaches to preserve and enhance overall habitat and maintain connectivity with Twenty Mile Creek downstream of subject lands (in association with TTMC3 and proposed natural corridor design).
TTMC5-6	Valued		Limited	Valued	Limited	Conservation	No Adjustment	
TTMC5-7	Valued		Important	Valued	Important	Protection	Conservation	
TTMC5-8	Valued		Limited	Valued	Contributing	Mitigation	Conservation	
TTMC5-9	Important		Important	Valued	Important	Protection	Conservation	
TTMC5-9-1	Valued		Limited	Valued	Limited	Mitigation	Mitigation	
TTMC5-10	Important	Feature is an online anthropogenic pond, and flows from this reach must pass through SWM ponds north of Twenty Road West prior to entering downstream aquatic habitats.	Valued	Important	Important	Protection	Conservation	Reach downgraded to Conservation due to anthropogenic pond constructed to support historic golf course activities. Poor quality habitat, thermal impacts downstream, and disruption to sediment regime presents opportunity for enhancement.
TTMC5-11	Valued	Flows from these reaches must pass through SWM ponds north of Twenty Road West prior to entering downstream aquatic habitats.	Important	Valued	Important	Protection	Conservation	Feature classifications modified to Conservation to preserve linkage function. Protection statuses were result of riparian and/or fish habitat. No connection to natural system downstream (flows enter existing SWM infrastructure). Benefit in allowing flexibility in location of these reaches to preserve and enhance overall habitat and maintain connectivity with Twenty Mile Creek downstream of subject lands (in association with TTMC3 and proposed natural corridor design).
TTMC5-12	Important		Important	Valued	Important	Protection	Conservation	
TTMC6								
TTMC6-1	Limited	No connection to a downstream watercourse (flows are piped through subdivision north of Twenty Road West and presumably enter the municipal sewer system).	Limited	None	Limited	No Management Required	Mitigation	Feature upgraded to Mitigation given upstream Mitigation reaches.
TTMC6-2	Contributing		Important	None	Limited	Conservation	Mitigation	Feature downgraded to Mitigation given lack of connection to natural downstream system.
TTMC6-3	Contributing		Limited	None	Limited	Conservation	Mitigation	
TTMC6-4	Contributing		Important	None	Limited	Conservation	Mitigation	
TTMC7								
TTMC7-1	Limited	Flows from this reach must pass through a roadside ditch and SWM ponds north	Valued	None	Limited	No Management Required	No Adjustment	

HDF Reach	Hydrology	Modifier	Riparian Conditions	Fish and Fish Habitat	Terrestrial Function	Original Management	Adjusted Management	Notes
		of Twenty Road West prior to entering downstream aquatic habitats.						
TTMC8								
TTMC8-3-3	Valued	Regularly tilled, no connection to a downstream watercourse (flows are piped through subdivision north of Twenty Road West and presumably enter the municipal sewer system)	Limited	None	Limited	Mitigation	No Adjustment	
TTMC8-3-4	Valued		Limited	None	Limited	Mitigation	No Adjustment	
TTMC8-7	Limited		Limited	None	Limited	No Management Required	Mitigation	Feature upgraded to Mitigation given downstream Mitigation reaches.
TTMC8-9	Valued		Limited	None	Limited	Mitigation	No Adjustment	
TTMC8-9-1	Limited		Limited	None	Limited	No Management Required	No Adjustment	
TTMC8-10	Valued		Limited	None	Limited	Mitigation	No Adjustment	
TTMC9								
TTMC9-1	Contributing	Feature also functions as a roadside ditch	Important	Contributing	Contributing	Conservation	No Adjustment	
TTMC9-2	Valued	None	Important	Contributing	Contributing	Conservation	No Adjustment	
TTMC10								
TTMC10-1-1	Valued	None	Important	Contributing	Valued	Conservation	No Adjustment	
TTMC10-1-2	Valued	None	Important	Contributing	Contributing	Conservation	No Adjustment	
TTMC10-1-2a	Important	Feature is an online anthropogenic pond	Important	Important	Important	Protection	No Adjustment	
TTMC10-1-2b	Valued	Feature originates from tile drain at property edge	Important	Contributing	Contributing	Conservation	No Adjustment	
TTMC10-1-3	Valued	Regularly tilled	Limited	Contributing	Limited	Mitigation	Conservation	Upgraded to Conservation to preserve linkage function between reaches. Existing habitat poor quality and feature is regularly tilled.
TTMC10-1-4	Important	Feature is an online anthropogenic pond	Limited	Important	Important	Protection	Conservation	Reach downgraded to Conservation due to anthropogenic pond constructed to support historic golf course activities. Poor quality habitat, thermal impacts downstream, and disruption to sediment regime presents opportunity for enhancement.
TTMC10-1-5	Valued	None	Valued	Contributing	Limited	Mitigation	No Adjustment	
TTMC11								
TTMC11-1	Limited	Regularly tilled, no connection to a downstream watercourse (flows are piped through subdivision north of Twenty Road West and presumably enter the municipal sewer system)	Limited	None	Limited	Limited	No Adjustment	

6.0 Designated Natural Areas

For the purposes of this report, designated natural areas are defined as the ecological features or their functions that receive protection through municipal, provincial, or federal policies and legislation. A particular focus is placed on features that are currently designated, or may meet criteria for designation, as Core Areas of the City of Hamilton NHS. The UHOP defines Core Areas as "*key natural heritage features, key hydrologic features, and local natural areas*", which are further clarified as follows in Chapter G of the UHOP:

- Key natural heritage features include

    a) Significant habitat of endangered and threatened species;
    b) Fish habitat;
    c) Wetlands;
    d) Life Science Areas of Natural and Scientific Interest (ANSIs)
    e) Significant valleylands;
    f) SWH;
    g) Sand barrens, savannahs, and tallgrass prairies;
    h) Significant Woodlands; and
    i) Alvars

- Key hydrologic features include

    a) Permanent and intermittent streams;
    b) Lakes (and their littoral zones);
    c) Seepage areas and springs; and
    d) Wetlands.

- Local natural areas include

    a) Environmentally Significant Areas (ESAs) as identified by the City of Hamilton;
    b) Unevaluated wetlands; and
    c) Earth Science Areas of Natural and Scientific Interest (ANSI).

Several key natural heritage features and key hydrologic features are present within the Study Area. These features are summarized and described in the following sections.

6.1 Habitat of Endangered and Threatened Species

Field surveys completed by NRSI biologists between 2018 and 2020 identified potential habitat within the Study Area for five SAR listed as Endangered or Threatened in O. Reg. 230/08: Species at Risk in Ontario List of the provincial ESA. Species include four SAR bats, and one SAR tree.

The MECP categorizes SAR habitat into three categories as follows:

- Category 1: highly sensitive habitats with low tolerance to alteration;
- Category 2: moderately sensitive habitats with moderate tolerance to alteration; and
- Category 3: habitats with high tolerance to alteration.

The following sections discuss the preferred habitats of SAR confirmed or with the potential to occur within the Study Area.

6.1.1 Species at Risk Bats

Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, and Tri-colored Bat are all listed as Endangered provincially and are afforded general habitat protection under the ESA (2007). The latter three species are also listed as Endangered on Schedule 1 of the federal SARA. Category 1 (highly sensitive) habitats for these species include maternity colony, male, and/or dispersal/migratory day-roosts. Foraging habitats are considered Category 2 (moderately sensitive), and travel corridors or flyways are considered Category 3 (minimally sensitive).

Eastern Small-footed Myotis primarily roosts in open, sunny, rocky habitats, including cracks and crevices in cliffs and boulders, in talus slopes, beneath stones on rock barrens and in rock outcrops containing crevices (Humphrey 2017). Roosting habitat for this species is not present within the On-site or Off-site Study Areas. Little Brown Myotis and Northern Myotis typically roost in tree cavities, hollows, under loose bark, and in buildings (OMNR 2000; MNRF 2017). Tri-colored Bat roosts in clusters of live or dead tree foliage in or below the canopy; oak species are often preferred to other tree species, although maple species are also used.

Candidate roosting habitat (Category 1) is potentially present for Little Brown Myotis, Northern Myotis, and Tri-colored Bat within all deciduous forest and swamp ecosites in the Study Area, as well as in hedgerows and isolated trees (Map 5). Roosting habitat for Eastern Small-footed Myotis is not present within the Study Area. Foraging (Category 2) and/or movement corridor (Category 3) habitat for Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, and Tri-colored Bat may also be present within the Study Area. All four species forage within or along the edges of forested vegetation communities, and may also forage over waterbodies

such as the ponds within the Study Area. Forest edges and clearings may also be used as flyways by SAR bats travelling between roosting and foraging habitats.

In summary, candidate habitat for SAR bats within the Study Area includes roosting (Category 1), foraging (Category 2), and flyway (Category 3) habitats. Additional studies, including acoustic monitoring, is necessary to confirm the presence of SAR bats and determine specific features within the Study Area that are providing suitable habitat and being used to carry out important life processes for the listed species.

6.1.2 Butternut

Butternut is listed as Endangered both provincially and federally (MECP 2023, Government of Canada 2023). Butternut is a member of the walnut family and is native to, and widespread in eastern Canada. The species is listed as Endangered because it is rapidly declining due to a fungus called Butternut Canker (*Sirococcus clavigignenti-juglandacearum*). This species receives general habitat protection under the ESA. General habitat is an area on which a species depends, directly or indirectly, to carry out its life processes (MECP 2023). With regards to Butternut, all suitable areas within 50 m of an individual Butternut tree are protected under the Act. This includes the area within 25 m of the individual within which the individual would require for root protection at its greatest size, and the area within 50 m of an individual within which the individual could seed additional individuals to maintain the population (i.e., seed dispersal area).

If a proposed development or site alteration may result in harming or killing a Butternut, the proposed works will require a permit or authorization under the ESA to proceed. Note, harming or killing an individual applies to not only direct impacts to the tree, but also impacts to the habitat, including within 50 m of an individual.

Some proposed activities that will result in impacts to Butternut may be eligible for conditional exemptions to permitting under O. Reg. 242/08 or O. Reg. 830/21 that would otherwise be required under Section 17(2)(c) of the ESA. These exemptions apply to those activities that propose to kill (i.e., remove) or harm trees that are in advanced stages of disease (Category 1), for up to a maximum of 15 Category 2 and up to a maximum of 5 Category 3 trees as identified during a Butternut Health Assessment.

In total, 197 Butternut trees have been identified to date within the Study Area. Butternuts are located throughout the Study Area, however the majority of assessed individuals are within the

Central Survey Block (with a high concentration in the naturalizing orchard area). Hedgerows and deciduous woodlands within the Study Area provide suitable and confirmed habitat for the species.

Qualified Butternut Health Experts (BHEs) at NRSI have conducted health assessments on 193 of these Butternuts, and evaluated 78 as Category 1, 73 as Category 2, 19 as Category 3, and 23 as hybrids. A Butternut Health Assessment (BHA) Report was submitted to the MECP on October 30, 2023 (**Appendix IV**). Due to the minimum 10cm DBH threshold and area scope of the completed tree inventory, 62 of these Butternuts are represented in the inventory data assessed in the Preliminary TPP (NRSI 2023). In total, 50 of these inventoried, >10cm DBH Butternuts are anticipated to require removal in order to implement the Upper West Side Infill Community Land Use Plan. Of these, 19 Category 2 Butternut and 14 Category 3 Butternut (all assumed to be pure, and not hybrids) are expected to require removal as part of the future community development. As the 30-day MECP review period has passed, the Category 1 "non-retainable" butternuts identified in the Preliminary TPP can be killed or harmed without contravention of the ESA, but pending other restrictions (e.g., municipal tree by-laws, planning approvals).

Due to the extent of proposed removals of Category 2 (i.e., >15 individuals) and Category 3 (i.e., >5 individuals) Butternut, the project will not be eligible for a conditional exemption under O. Reg. 830/21. In order to carry out the proposed Butternut removals, a C-Permit (Overall Benefit Permit) authorization under the ESA will be required. The next steps in the ESA permitting process will involve the completion of an Information Gathering Form (IGF), Avoidance Alternatives Form (AAF), and C-Permit Application Form (C-PAF) (**Appendix III**).

6.2 Fish Habitat

Permanent fish habitat is present within the Study Area in Ponds 1, 2, 3, and 4, corresponding to HDF reaches TTMC5-10, TTMC10-1-4, TTMC10-1-2a, and TTMC3-9 on **Map 6**, respectively. Direct, seasonal fish habitat is present throughout TTMC3, TTMC5, and TTMC10. In the City of Hamilton, fish habitat is considered a key natural heritage feature, and as such, UHOP policies related to Core Areas apply to the above-noted aquatic habitats.

The AEGD Subwatershed Study categorized the HDFs within the Study Area into two categories: Support / Indirect Fish Habitat / Marginal Habitat and Seasonal / Warmwater Watercourse / Important-Marginal Habitat, all supporting a tolerant, warmwater fish community

(Dillon Consulting & Aquafor Beech Ltd. 2011). These classifications are similar to the evaluations completed for this Master EIS.

The NPCA has identified the HDFs flowing through the Study Area as Type 2 Important Fish Habitat (A. Parks, pers. comm.). This habitat type is moderately sensitive to development and is not considered critical habitat. Any in-water and channel works will require review by, and/or permits from, the NPCA, MNRF, and DFO. Timing windows established by MNRF will restrict the timing of in-water work to protect local fish communities during spawning, migrations, and other critical life stages. Given the thermal regime and the spring-spawning fish community identified by NRSI within the Study Area, in-water works are restricted between March 15 and July 15. The in-water timing window will need to be confirmed with agencies prior to any construction.

Under the updated federal *Fisheries Act,* fish are protected through two core prohibitions: Section 34.4(1) the death of fish by means other than fishing, and Section 35(1) the harmful alteration, disruption, or destruction of fish habitat. Any proposed work, undertaking, or activity should aim to avoid causing the death of fish, or the harmful alteration, disruption or destruction of fish habitat through the course or as a result of any proposed undertaking., with fish habitat defined 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"*.

Based on the proposed Land Use Plan (Appendix I), the following alterations to fish habitat are proposed:

- Realignment and consolidation of TTMC5 and TTMC3 into a single channel within a central, 75m-wide corridor (Map 8). Regarding conceptual channel design, GEO Morphix Ltd. (2023) provides strong rationale for the proposed realignment as follows:

  "Tributaries of Twenty Mile Creek (Branch TTMC3 and TTMC5) are proposed for realignment, which provides an opportunity to replace the existing morphologically limited and historically impacted drainage features with a dynamically stable channel containing naturalized morphology, with cross sectional dimensions closer to that of a naturalized watercourse-type feature conveying similar flows. The natural corridor design will offer significant improvements to aquatic and terrestrial habitat through an open channel, wetland communities and terrestrial habitat features. The natural

corridor design will offer significant improvements to channel form and function per unit length. It should be noted that the most important aspect of restoration is to improve environmental and physical function. The proposed design will provide an increased level of function than what is currently on the landscape. It may have geometric deficiencies (e.g., overall stream length replication). However, given the size of the corridor and the available sources of flow (i.e., adjacent back yard lots), additional opportunities may be reviewed and developed as the design concept is advanced to provide additional stream length that better mimics the existing system."

- Removal of Pond 1, Pond 2, and Pond 4 and their replacement by multiple permanent pools within the central corridor, shown in the Conceptual Channel Design Drawings (Appendix E of GEO Morphix Ltd. 2023) as 'overwinter pools'.

As the proposed channel works have the potential to cause the death of fish or the harmful alteration, disruption, or destruction of fish habitat, the project will require DFO review, which may result in a decision by DFO that an Authorization under the *Fisheries Act* is required. However, the death of native fish species can generally be avoided by following best management practices (e.g., completing instream works during low-flow or dry conditions, conducting fish relocations prior to in-water works). Submission of a DFO Request for Review Application is recommended to be initiated following the approval of the Upper West Side Secondary Plan, and only when sufficient design details are available to inform the review.

6.3 Wetlands

Wetlands are important for many reasons, including collecting and storing surface water and groundwater and providing habitat for plants, wildlife, and fish. Wetlands operate on a water budget, where the hydrologic character of the wetland is determined by the combination of water inflow/outflow, topography, and groundwater conditions (Mitsch and Gosselink 1993). Wetlands receive water through precipitation, surface inflow, groundwater inflow, and lose water through evapotranspiration, surface and groundwater outflow. Several wetlands that are part of the Upper Twenty Mile Creek PSW complex are present within the Study Area (**Map 2**). Additional, non-PSW wetlands (denoted as 'other wetlands' on **Map 2**) are also present, typically in association with the network of HDFs. In 2021, NRSI biologists completed a Wetland Complexing Evaluation to determine if these other wetlands should be included in the overall complex, as per the Ontario Wetland Evaluation System (OWES) in place at that time. The results of the Wetland Complexing Evaluation indicated that the Study Area contained 21

wetlands (considered unevaluated at the time), 14 of which were within 750m of the Upper Twenty Mile Creek PSW complex. A single wetland unit was recommended for inclusion with the PSW complex, while the remaining units were recommended to be considered non-PSW based on the rationale provided in the evaluation (a copy of which is included in Appendix III). The MNRF accepted the findings of the Wetland Complexing Evaluation on October 21, 2021 by way of the following statement: *"The Ministry accepts the findings of your assessment and your recommendation that Unit 15 be included within the Upper Twenty Mile Creek PSW Complex and that the remaining wetland units be considered non-PSW"* (Appendix III).

In the City of Hamilton, provincially and locally significant wetlands are considered key natural heritage and key hydrologic features, and as such, UHOP policies related to Core Areas will apply. For the purposes of this study, and in keeping with the interpretation of NPCA policies (described below), locally significant wetlands are those with an area greater than 0.5ha (NPCA 2022).

All wetlands and their associated areas of interference (120m) are regulated by NPCA under O. Reg. 155/06. Any development or interference within a wetland or development within an area of interference requires a permit from the NPCA. No PSW is proposed for removal, however several non-PSW wetland areas (including two locally significant wetlands) are proposed for removal based on the proposed Land Use Plan (**Appendix I, Map 8**, GEO Morphix Ltd. 2023).

The Policy Document (NPCA 2022) outlines policies for the administration of O. Reg. 155/06. Section 8.1.2.3 requires the formal assessment of unevaluated wetlands prior to any proposed development or site alteration, which is accomplished through this Master EIS (see above and **Appendix III**). Wetland limits were established following policies in Section 8.1.3.1 of the Policy Document (2022) and in accordance with OWES, and later verified by NPCA and MNRF staff (**Table 1**, **Appendix III**). Section 8.2.2.1 of the Policy Document (2022) stipulates that "*unless otherwise stated […], no development and/or interference shall be permitted within PSWs and any other wetland greater than 0.5 hectares in size*". The latter policy has guided the definition of 'locally significant wetlands' used in this Master EIS, which is 'any non-PSW wetland that is greater than 0.5ha in area'. No policies preclude the removal of non-PSW wetlands less than 0.5ha in area (NPCA 2022). Of the non-PSW wetland areas proposed for removal based on the proposed Land Use Plan (Appendix I), two are considered locally significant based on size; both wetlands (a 1.13ha Reed-canary Grass Mineral Meadow Marsh [MAM2-2] and a 0.67ha Willow Mineral Deciduous Swamp [SWD4-1]) are located within the Central Survey Block, and are

associated with the naturalizing orchard south of Garth Street. These two wetlands, and other smaller unregulated non-PSW wetlands throughout the Participating Lands, are proposed to be realigned and consolidated into a 75m-wide corridor as described above in **Section 6.2**. Although older (2018) NPCA policies permitted the removal and replacement of non-PSW wetlands, the proposed Land Use Plan for the Upper West Side Infill Community is not consistent with current (2022) policies. Additional discussions with the NPCA will be initiated to determine if the Conceptual Channel Design (GEO Morphix Ltd. 2023) will meet the intent of the current wetland policies. Within the central 75m-wide corridor, the total area of designed wetlands is between 7ha and 8ha (GEO Morphix Ltd. 2023), which represents a replacement ratio of more than three times the area of the non-PSW wetlands >0.5ha proposed for removal.

6.4 Significant Wildlife Habitat

Based on background information review, desktop analyses, and the results of field surveys, several confirmed and candidate SWH types are present within the study area (**Table 12**). 'Confirmed' SWH means that the habitat has been subject to detailed study and assessed as significant based on meeting discrete significance criteria established by the MNRF for Ecoregion 7E where the Study Area is located (OMNR 2000, MNRF 2015). To be confirmed as SWH, a habitat not only needs to meet the established criteria, but also qualify as providing important ecological function(s) on a landscape scale and be considered in the context of the abundance and availability of alternative habitats that may provide similar functions. 'Candidate' SWH means that suitable habitat has been detected, but additional studies or analyses are necessary to determine significance and the confirmed presence or absence of the ecological functions of the SWH type. In some cases, a SWH may meet some or all of the discrete significance criteria established by the MNRF for Ecoregion 7E (OMNR 2000, MNRF 2015a) but remain designated as candidate due to unknown factors or data gaps that prevent a confident determination of presence or absence.

Of the 35 SWH types that have the potential to occur within Ecoregion 7E, 10 may be present (or have already been confirmed) within the Study Area. **Table 12** summarizes and describes these SWH types; additional analyses and the results of the SWH screening are provided in **Appendix VI**.

Table 12. Summary of Confirmed and Candidate Significant Wildlife Habitat Types Within the Study Area.

Significant Wildlife Habitat (SWH)Type	Participating Lands			Non-Participating Lands		SWH Characteristics and Criteria
	Western Survey Block	Central Survey Block	Eastern Survey Block	Dickenson Draft Plan Area[1]	Other Non-Participating Lands	
Bat Maternity Colonies	Candidate	Candidate	Candidate	Candidate	Candidate	Candidate Bat Maternity Colony SWH is typically identified in mature deciduous or mixed forested habitats when the density of large-diameter (>25 cm DBH) candidate roost trees exceeds a threshold of 10/ha. This SWH type is confirmed when studies document the presence of maternity colonies consisting of >10 Big Brown Bats (*Eptesicus fuscus*) or >5 Silver-haired Bats (*Lasionycteris noctivagans*) (MNRF 2015a).
Turtle Wintering Area	Confirmed	Confirmed	Not SWH	Candidate	Candidate	Generally, turtle overwintering sites are the only known sites in the area. Sites with the highest number of individuals are the most significant. For most turtle species, wintering areas are in the same general area as their core habitat and water has to be deep enough not to freeze and have soft mud substrates. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen levels. Human-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. For a site to be considered significant, the presence of a minimum of five over-wintering Midland Painted Turtles or one Northern Map Turtle or Snapping Turtle must be confirmed.
Reptile Hibernaculum	Confirmed	Confirmed & Candidate	Confirmed & Candidate	Candidate[2]	Candidate	In southern Ontario, snakes overwinter in subterranean habitats where areas below the frost line can be accessed. Reptile hibernacula can be accessed via features such as old mammal burrows, rock fissures, old wells, crumbling foundations or stone walls, rock piles or slopes, and bridge abutments. Wetlands can also be important overwintering habitat. Congregations of snakes emerge from hibernacula in the early spring and are typically found basking near the feature for a period following emergence. Sites for hibernation possess specific habitat parameters (e.g., temperature, humidity) and are frequently used annually, often by many of the same individuals of a local population. Other critical life processes (e.g., mating) often take place near hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWH. This SWH type is confirmed when studies document the presence of a hibernaculum feature confirmed to be used by a minimum of five individuals of the same snake species, or individuals of two or more snake species (MNRF 2015a).
Turtle Nesting Area	Confirmed	Not SWH	Not SWH	Candidate	Candidate	Suitable turtle nesting habitats are rare, and when identified will often be the only breeding site for local populations of turtles. The best nesting habitat for turtles is close to water and away from roads, and in areas with less risk of predation from skunks, raccoons or other animals. For an area to function as a turtle nesting area, it must provide suitable substrates that allow turtles to easily dig into, such as sand and gravel, and have suitable sun exposure for egg incubation (i.e., located in open, sunny areas). Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. For a site to be considered significant, the presence of five or more nesting Midland Painted Turtles or one or more nesting Northern Map Turtle or Snapping Turtle must be confirmed.
Seeps and Springs	Not SWH	Not SWH	Not SWH	Candidate	Candidate	Seeps and springs are areas where ground water comes to the surface. They are typical of headwater areas within forested habitats and are often at the source of coldwater streams. Seeps and springs provide valuable wildlife habitat, especially in the winter as they typically do not freeze and therefore provide a source of drinking water and access to winter greens and seeds. In the spring, they are also one of the first areas where vegetation grows and as a result, provide a food source at a critical time of year when other food sources are depleted. Seeps and springs may also contribute to fish habitat.
Amphibian Breeding Habitat (Woodland)	Not SWH	Not SWH	Not SWH	Candidate	Candidate	Wetlands, ponds, and vernal pools within or adjacent (within 120 m) to a woodland are important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations. Breeding pools within a woodland are more significant because they provide better cover and are more likely to be used due to reduced risk to migrating amphibians. Sites with several ponds and/or ponds close to watercourses are particularly valuable. The criteria for confirming woodland amphibian breeding habitat includes documenting the presence of a breeding population of one or more of the indicator amphibian species as described in the Ecoregion 7E Criteria Schedule (MNRF 2015a).
Amphibian Breeding Habitat (Wetland)	Confirmed	Confirmed	Not SWH	Candidate[2]	Candidate	Like wetlands, ponds, and vernal pools within or adjacent to (<120 m) a woodland, swamps, marshes, fens, bogs, and open and shallow aquatic wetland ecosites separated from woodland ecosites by more than 120 m may also provide breeding habitat for amphibian species. These features are also important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations. Sites with abundant vegetation and woody debris (e.g., shrubs, fallen logs and branches) are particularly valuable for some species because of the availability of structure for calling, foraging, and avoiding predators. Some species, such as American Bullfrog, require permanent waterbodies with abundant emergent vegetation for breeding. When confirmed, the MNRF defines the habitat as the suitable wetland ELC Ecosite and its shoreline. The criteria for confirming woodland amphibian breeding habitat includes documenting the presence of a breeding population of one or more of the indicator amphibian species as described in the Ecoregion 7E Criteria Schedule (MNRF 2015a).
Terrestrial Crayfish	Not SWH	Confirmed	Confirmed	Candidate[2]	Candidate	Ontario has two species of burrowing crayfish, the Digger Crayfish (*Fallicambarus fodiens*) and the Meadow Crayfish (*Cambarus diogenes*). These crayfish live in wetlands, creek beds, ditches, and in dry areas where they can burrow below the water table.

Significant Wildlife Habitat (SWH)Type	Participating Lands			Non-Participating Lands		SWH Characteristics and Criteria
	Western Survey Block	Central Survey Block	Eastern Survey Block	Dickenson Draft Plan Area[1]	Other Non-Participating Lands	
						These species are found only in southwestern Ontario and are uncommon throughout their range. They often live in small patches of high-quality habitat. Terrestrial crayfish are threatened by habitat loss and competition with non-native crayfish. The criteria for confirming terrestrial crayfish habitat includes documenting the presence of one or more individuals either species or their chimneys (burrows) in suitable marsh meadow or swamp habitats as described in the Ecoregion 7E Criteria Schedule (MNRF 2015a).
Habitat for Species of Conservation Concern	Confirmed	Confirmed	Candidate	Candidate	Candidate	Important habitats of terrestrial plant and species designated as SCC are considered SWH. The MNRF defines the habitat as the area of the finest ELC scale that protects the habitat form and function as delineated through detailed field studies (MNRF 2015a). The designated area also needs to cover an important life stage component for the species. SCC species with confirmed or candidate habitat within the study area include: • Nuttall's Waterweed • Nuttall's Alkaligrass • Grasshopper Sparrow • Eastern Wood-Pewee • Barn Swallow • Snapping Turtle • Monarch • Unicorn Clubtail • Lemon Cuckoo Bumble Bee A few of these species are considered to have confirmed habitat covering important life stages within the study area (Nuttall's Waterweed, Nuttall's Alkaligrass, and Snapping Turtle), while additional information being needed for the other listed species, which were observed during field surveys but not confirmed as having important habitat on site.
Amphibian Movement Corridors	Candidate	Candidate	Not SWH	Candidate[2]	Candidate	Amphibians move seasonally between breeding habitats, summer foraging habitats, and overwintering habitats. When Amphibian Breeding Habitat (Wetland) habitat is confirmed, the presence of associated movement corridors should be considered (MNRF 2015a).

[1]Determination of SWH presence completed by Dougan & Associates (2022)
[2]SWH candidacy updated from Dougan & Associates (2022) based to reflect an updated interpretation of the habitats present

6.5 Significant Woodlands

The Natural Heritage Reference Manual (MNR 2010) provides guidance for assessing the ecological function of woodlands. It outlines criteria for determining the significance of woodlands within Ontario considering four broad categories: woodland size, ecological function, uncommon characteristics, and economic and social values. Woodlands identified as 'significant' according to the criteria outlined in the Natural Heritage Reference Manual are considered within the PPS (OMMAH 2020). The PPS states that development and site alteration shall not be permitted in significant woodlands and development and site alteration shall not be permitted on adjacent lands to significant woodlands unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions. The Natural Heritage Reference Manual and the policies of the PPS can also be used by municipalities to further refine local policies, objectives, and evaluation criteria for woodlands.

In the City of Hamilton, Significant Woodlands are considered key natural heritage features, and as such, UHOP policies related to Core Areas apply. Chapter G of the UHOP defines Significant Woodlands as "those areas that are ecologically important in terms of:

a) Features such as species composition, age of trees, stand history;
b) Functional importance due to their contribution to the broader landscape because of location, size, or due to the amount of overall forest cover in the planning area; and
c) Economically important due to site quality, species composition or past management history.

Significant Woodlands are determined using a set of criteria (see **Table 13**). Any woodland that meets 2 or more of these criteria is considered significant. The criteria were developed by City of Hamilton staff in conjunction with 4 Conservation Authorities in the municipality. Within the Study Area, several features are currently designated as Significant Woodlands on UHOP Schedule B and AEGD Secondary Plan Map B.8-2. Additional features within the Study Area have been recently identified as meeting the criteria for designation as Significant Woodland: two within the Dickenson Draft Plan Area (evaluated in Dougan & Associates 2022), and one within the Western Survey Block (evaluated in this study).

The Significant Woodlands within the southwestern corner and along the northeastern edge of the Dickenson Draft Plan Area were determined to meet the size, proximity/connectivity, proximity to water, age, and/or rare species criteria (Dougan & Associates 2022). These areas are now shown on **Map 8** as Significant Woodlands.

Within the Western Survey Block, a Fresh – Moist Sugar Maple – Hardwood Deciduous Forest (FOD6-5) community is present in the southern extent. Under existing conditions, the community is divided into five patches of variable sizes that are separated by open areas previously maintained as fairways during the operation of the former Glancaster Golf Course. The northern portions of these fairway areas are currently used to grow row crops, while the southern portions are naturalized Mineral Cultural Meadow (CUM1). Gaps in the canopy between patches are generally less than 30m wide, and the five patches are considered to function as a single FOD6-5 community. This forest community was evaluated as part of this Master EIS to determine if it meets the criteria for designation as Significant Woodland. Results of the evaluation, summarized in **Table 13**, indicate that the FOD6-5 community meets at least three criteria for Significant Woodlands; the community is also now shown on **Map 8** as Significant Woodland.

Table 13. Criteria for Significant Woodlands (City of Hamilton 2013) and Evaluation of Western Survey Block Fresh-Moist Sugar Maple-Hardwood Deciduous Forest (FOD6-5)

Criterion	Description		Fresh – Moist Sugar Maple – Hardwood Deciduous Forest (FOD6-5)
Size	The minimum size criteria are presented below.		Yes: community is approximately 7.5ha (>2ha)
	Forest Cover (by watershed-urban and rural portions)	Minimum patch size for significance	
	<5%	1ha	
	5-10%*	**2ha**	
	11-15%	4ha	
	16-20%	10ha	
	21-30%	15ha	
Interior Forest	Interior forest habitat is defined as 100m from edge		No: interior forest is not present
Proximity/Connectivity	Woodlands located within 50m of a significant natural area (defined as wetlands 0.5ha or greater in size, ESAs, PSWs, and Life Science ANSIs)		No: wetlands within 50m are <0.5ha, and no ESAs, PSWs, or Life Science ANSIs are present within 50m.
Proximity to Water	Woodlands where any portion is within 30m of any hydrological feature, including all streams, headwater areas, wetlands, and lakes		Yes: a headwater drainage feature (TTMC10) flows through the community. A pond (Floating-leaved Shallow Aquatic [SAF1] community) is also present in the centre of the feature.
Age	Woodlands with 10 or more native trees/hectare greater than 100 years old.		Possible: tree age and density were not assessed, but trees >100 years old, including Sugar Maples and American Beech, may be present.
Rare Species	Woodlands containing threatened, endangered, special concern, provincially or locally rare plant or wildlife species		Yes: Sessile-leaved Bellwort, Woolly Blue Violet, and several aquatic macrophytes (within the central pond) are present and considered uncommon or rare in Hamilton (Oldham 2017, HCA 2014). SCC and regionally uncommon or rare wildlife species were also observed by NRSI biologists in the community, including (but not limited to) Eastern Wood-Pewee, Grasshopper Sparrow, Red-bellied Snake, Pileated Woodpecker, and Snapping Turtle.

*The NPCA reports that the Upper Twenty Mile Creek watershed has 10% Forest Cover (2007-2011) (NPCA 2006)

6.6 Headwater Drainage Features

Several HDFs within the Study Area are considered intermittent streams. These features have received management recommendations of 'Protection' or 'Conservation' based on the criteria summarized in the Headwater Guideline (TRCA and CVC 2014) and the professional judgement of NRSI biologists and GEO Morphix fluvial geomorphologists (see **Table 11** and **Map 6**). Other HDFs form part of the stream network, but are best described as ephemeral features with limited hydrological or ecological functions and have received management recommendations of 'Mitigation' or 'No Management Required' (**Table 11**). For the purposes of this Master EIS, HDFs with 'Protection' and 'Conservation' management outcomes are recommended to be considered key hydrologic features within the study area. In the City of Hamilton, intermittent streams (in this study, inclusive of TTMC2, TTMC3, TTMC5, and TTMC10 on **Map 6**) are considered key hydrologic features, and as such, UHOP policies related to Core Areas apply to the above-noted features.

HDFs within the Study Area are regulated by the NPCA under O. Reg. 155/06. Section 9.1.1 of the Policy Document (NPCA 2022) states that "*Headwater drainage features (HDFs) within NPCA's watersheds shall be identified and managed in accordance with NPCA's Procedural Manual, as may be updated from time to time.*" For the purposes of this Master EIS, HDFs are assumed to be considered as watercourses for the interpretation of applicable policies. Section 9.2.3.1 stipulates that the NPCA may allow the alteration of a watercourse for channel realignments, storm sewer outlets, enclosures greater than 20m, and other works. Section 9.2.3.2 states that "*The following policies apply to the alteration of a watercourse:*

a) *The need for the watercourse alteration has been demonstrated to the satisfaction of the NPCA;*
b) *The watercourse has been evaluated under NPCA's Procedural Manual and the alteration would be supported;*
c) *The proposed works are in accordance with NPCA standards;*
d) *Any proposed channel realignment shall only be allowed such that any required riparian buffer will not cross any property lines;*
e) *The proposed watercourse alteration does not increase flood plain elevations, flood frequency, erosion rates or erosion frequency along either side of the watercourse, upstream and/or downstream of the proposed works;*

f) *The works will not adversely affect the ecological and hydrologic function of the watercourse and riparian zone; g) Adequate erosion protection measures are utilized when required; and*

g) *Sediment control measures are incorporated during the construction phase to the satisfaction of the NPCA."*

7.0 Linkage Assessment

The term “Linkage” describes natural areas in the landscape that connect or support the function of Core Areas via an ecologically important corridor on a local or landscape scale (City of Hamilton 2015b). The UHOP states that:

> [Linkages] are avenues along which plants and animals can propagate, genetic interchange can occur, populations can move in response to environmental changes and life cycle requirements, and species can be replenished from other natural areas.

Linkages mapped as part of the UHOP may include woodlands, other natural vegetation types, and streams and watercourses that connect Core Areas (City of Hamilton 2012, 2013). Woodland Linkages are any natural or planted wooded area greater than 0.5ha that either connects Core Areas or lies within 100m of a Core Area. Other natural vegetation type Linkages are defined as meadows, thickets, and old fields that are at least 0.5ha and connect Core Areas or are within 100m of a Core Area. Streams and watercourses can function as Linkages when they connect Core Areas. Hedgerows can also provide a linkage function, especially where:

- The hedgerow is comprised of mature, healthy trees and generally provides a wide, unbroken linkage;
- There is evidence that wildlife regularly uses them as movement corridors or habitat;
- They contain tree species that are threatened, endangered, special concern, provincially or locally rare; or
- Groupings of trees are greater than 100 years old (City of Hamilton 2013).

The UHOP also states, in Policy C.2.4.7, that linkages are best enhanced and protected through larger-scale planning processes, Secondary Plans shall identify and evaluate Linkages in greater detail, including Linkages currently identified in Schedule B – Natural Heritage System and those that may be newly identified through the planning process. Linkages shall be mapped in Secondary Plans and policies for their protection and enhancement included.

A Linkage Assessment (LA) is required for any development proposed in a Linkage as mapped on Schedule B of the Official Plan (City of Hamilton 2015b). The AEGD Secondary Plan and Map B.8-2 provides the refined Linkage mapping for the Study Area. Linkages included on

these OP schedules are illustrated on Error! Reference source not found.. The following sections present the results of the Linkage Assessment for each.

7.1 Linkage Characterization

A description of each Linkage is provided below. The cumulative results of numerous, multi-season field surveys conducted by NRSI biologists were used to ascertain wildlife presence, abundance, and movement patterns and to inform this LA. For full details on the specific species observed, see **Section 4.3**. For full details and species composition of the vegetation communities comprising the Linkages, see **Section 4.2**.

Linkage 1

Linkage 1 (L1) appears to be associated with a hydro transmission corridor running east to west parallel with Twenty Road West (Error! Reference source not found.). For the purposes of this LA, the full length of this feature within the Study Area is addressed although only a portion of it is mapped in the OP Schedule B or B.8-2. Adjacent lands to this Linkage include road infrastructure, residential subdivisions, rural residences, agricultural fields, the naturalizing golf course lands, and a few small meadow and wetland areas. The hydro corridor is approximately 25m wide and has poor (0-10%) natural vegetative cover in the study area. The corridor is predominantly either mowed as part of infrastructure or lawn maintenance or cropped with row crops. Small inclusions of meadow habitat are present. Pockets of the invasive Common Reed (*Phragmites australis*) are also present. L1 terminates at Glancaster Road on the western edge of the Study Area. To the east, L1 connects to L4 (see description below and Error! Reference source not found.). Vegetated features are present northeast of the eastern edge of L1 across Twenty Road West. Significant traffic noise from Twenty Road West was observed by NRSI biologists. Signs and direct observations of wildlife by NRSI biologists during field surveys conducted between 2018 and 2020 were very limited in L1. It is likely that the proximity to a busy road and a residential subdivision cause wildlife to avoid this area.

As large portions are manicured or planted with crops and as little evidence of wildlife use, natural habitat, or native plants were observed, L1 does not provide much function as a linkage, but may be best described as a relatively ‘permeable’ land use which would allow for wildlife movement similar to the surrounding agricultural lands.

Linkage 2

Linkage 2 was identified in the AEGD Secondary Plan and appears to be associated with a Silky-Dogwood Mineral Thicket Swamp. It is surrounded on 3 sides by significant woodland and is itself part of a PSW confirmed in the field by NRSI and NPCA staff. This feature is therefore part of features that have been assessed as Significant/Core Area, as discussed elsewhere in this report. Therefore, this feature is not a Linkage and is not further discussed in the Linkage Analysis.

Linkage 3

Linkage 3 (L3) is a cluster of small forest pockets interspersed between cultural meadow habitat, and adjoining a Core Area to the west (**Map 7**). Considered a single vegetation community, this area has been assessed in this Master EIS and meets criteria for designation as a Significant Woodland (see **Section 6.5**). As such, the area is considered a Core Area, not a Linkage, and is therefore not further discussed in this Linkage Analysis.

Linkage 4

Linkage 4 (L4a, L4b) is comprised of 2 naturalized areas consisting of deciduous woodland and thicket habitats, located on each side of a Core Area within the northeastern corner of the Study Area (Error! Reference source not found.). Lands adjacent to L4 are agricultural fields (row crop), low-density residential properties, and PSW. L4 is approximately 5.5ha. Vegetative cover is high (60-100%), and is comprised of mainly deciduous shrubs, scattered trees, and some small meadow areas. A network of mowed, off-road vehicle / ATV trails is present throughout L4, creating several narrow corridors between the naturalized thicket areas.

L4 provides direct connective habitat to Core Area. L4 is part of the AEGD Secondary Plan NHS and a holding provision is in place for this property that requires an EIS to be prepared prior to any development occurring in this area. L4 is also connected to the eastern end of the hydro transmission corridor and provides a connection between PSWs north of Twenty Road West and Upper James Street to the east. L4 provides a supportive and connective function for the PSWs in the northeast corner of the Study Area. The Linkage likely provides foraging, resting, and dispersal habitat for wildlife and plant propagation opportunities.

Observations of wildlife within L4 were limited by property access during most field surveys conducted by NRSI biologists.

Linkage 5

Linkage 5 (L5) is identified on **Map 7** as a woodland outside of the participating lands. This feature was identified by Dougan & Associates (2022) as meeting criteria to be considered a Significant Woodland, and therefore is a Core Area rather than a Linkage, and is not further discussed in the Linkage Analysis.

Linkage 6

Linkage 6 (L6) is a mature, mostly deciduous hedgerow that runs north to south near the center of the Study Area (Error! Reference source not found.). Lands adjacent to L6 include agricultural fields, rural residences and outbuildings, a naturalizing orchard, and a small marsh (Error! Reference source not found.). The hedgerow itself is approximately 5-20m wide, gaining width towards the south and is, in general, a single row of trees. Vegetative cover is moderate (30-50%), and is comprised of mainly deciduous trees with an herbaceous understory.

L6 connects to 2 non-PSW wetland and HDF features and to PSW at its southern end, and therefore it has the potential to provide some habitat connectivity on a local scale. L6 contains a cluster of Honey-locust (a SCC) near its north end. These trees were likely planted, or originated from planted individuals given their proximity to a residential dwelling, and so would not be considered provincially significant individuals. Butternut (a SAR) is present within the central and south portions of the Linkage (Map 7). More information on Butternut in the Study Area is provided in **Section 6.1.2**. The southernmost portion near the south Core Area is the widest, at nearly 20m across, and consists of dense deciduous hedgerow trees.

Wildlife was observed using L6 and the adjacent naturalizing. Bird and small mammal species dominated wildlife observations. There was no evidence of established wildlife trails or pathways running parallel to L6. Information from a local landowner in combination with observations of abundant tracks and established movement pathways suggested that a Coyote den may be present in or near an abandoned shack next to L6 (Error! Reference source not found.). A den was not confirmed by NRSI biologists; however, seasonally-elevated Coyote activity observed during field surveys in the immediate vicinity and elsewhere in the overall study area (including several live sightings) indicates that this species is potentially breeding in the study area. Coyote movement patterns were generally perpendicular to L6 (i.e., east to west), showing that Coyote cross this Linkage to access other nearby habitats rather than using the hedgerow as a linear corridor to access other parts of the Study Area.

Linkage 7

Linkage 7 (L7) is comprised of 3 narrow deciduous hedgerows; 1 that runs north to south through the Study Area and 1 that runs east to west near the eastern end of the Study Area (**Error! Reference source not found.**), with a small additional portion extending south into non-participating lands. These hedgerows are approximately 5-20m wide and generally a single row of trees. Lands adjacent to L7 are comprised almost entirely of row crop agriculture. A Significant Woodlot is located at the eastern extent of L7, and Linkage 5 (L5) is present at the south end of the north-south portion of the hedgerow. Vegetative cover is moderate (20-50%), and is comprised of mainly deciduous trees with an herbaceous understory. The boundaries of L7 were adjusted based on NRSI field surveys.

These hedgerows connect two Core Areas and may provide limited opportunities for wildlife movement and plant dispersal. Signs and direct observations of wildlife by NRSI biologists during field surveys conducted between 2017 and 2019 were very limited within L7. Significant plant species (uncommon in Hamilton) were observed by Dougan and Associates (2012) within the north-south hedgerow sections adjacent to their development parcel, and Butternuts were observed at the eastern end of the east-west portion.

Linkage 8

Linkage 8 (L8) was revied based on desktop and roadside information as it is not located within the participating lands and property access was not permitted. L8 is a short hedgerow projecting eastwards from Core Area 4 (**Map 7**). It appears to be a single row of woody vegetation, terminating part way through the adjacent agricultural field, and is surrounded by agricultural and industrial usage. Although field surveys could not be completed, it is not expected this feature is providing any linkage function based on the above characteristics.

7.2 Linkage Analysis

As per Section 5.0(c) of Hamilton's Linkage Assessment Guidelines, the LA must assess the ecological function, condition, viability, and integrity of each Linkage (City of Hamilton 2015b). Several factors are part of this evaluation. Each of these factors is summarized in **Table 14**Table 14**.** In general, the Linkages present in the Study Area are narrow, provide limited wildlife or movement habitat, and primarily connect only local features.

Management recommendations for each linkage and rationale are provided in **Table 15**. It is anticipated that the current function of the Linkages within the Study Area will be

accommodated within corridors defined as new Linkages under the proposed Land Use Plan (Appendix I and Map 8). A comprehensive enhancement and restoration plan for this corridor will include a mosaic of habitats and plantings of native trees, shrubs, and herbaceous species.

Table 14. Linkage Analysis Summary

Hamilton Linkage Assessment Considerations	Linkage				
	L1	L6	L7	L4	L8
Does the linkage currently connect Core Areas or other natural features?	N	Y	Y	Y	N
Does the linkage currently function as a wildlife movement corridor?	N	N	N	N	N
Is there evidence of widespread daily or seasonal use of the linkage by wildlife?	N	N	N	N	N/A
Does the linkage provide supporting habitat to Core Areas (e.g., foraging, resting, dispersal) for species living in Core Areas?	N	N	Y	Y	N
Are uncommon or rare species using the linkage for any part of their life cycle?	N	Y	Y	N	N/A
Is the linkage largely free from degradation by anthropogenic activities?	N	N	N	N	N
Is the linkage wide enough to accommodate a meaningful ecological corridor?	N	N	N	Y	N
Is the linkage more or less continuous vegetation cover not subject to repeated anthropogenic disturbance/maintenance?	N	Y	Y	Y	Y
Does the linkage currently function on more than a very localized a scale?	N	N	N	Y	N
Is the linkage located along a corridor such as a stream, escarpment, or lakeshore?	N	N	N	Y	N
Is the linkage important habitat by itself?	N	N	Y	N	N/A
Can the surrounding land uses mitigate for negative impacts and potential stressors to the ecological functions of the linkage?	N	N	N	Y	N

Table 15. Linkage Management Recommendations

Linkage	Management Recommendation	Rationale
L1	None	This feature is not functioning as a linkage per se due to its extremely patchy naturalized cover (vs the predominance of crops and manicured lawn). It is continuous and wide enough to accommodate a meaningful ecological corridor, but the results of field surveys indicate that plants and wildlife do not currently use the transmission line to facilitate movement and propagation.
L4	Replicate and Enhance Function	This feature is directly adjacent to a Core Area (PSW and Significant Woodland) and provides an interrupted (road) connection to other Core Areas or natural habitats (e.g., across Upper James St). Within the Study Area, the Linkage likely functions mostly as supporting habitat (i.e., foraging, resting, dispersal) for species using the adjacent Core Area. Management recommendations are to replicate and enhance the linkage function within the Secondary Plan natural heritage system.

Linkage	Management Recommendation	Rationale
L6	Replicate and Enhance Function	This feature provides a direct connection between Core Areas (HDF, PSW, woodland). It is continuous but too narrow to represent a meaningful ecological corridor when considered on its own. Use of the feature by wildlife was observed by NRSI biologists due to the proximity of the naturalizing orchard where wildlife activity was significantly elevated. However, wildlife movements were generally perpendicular to the hedgerow feature rather than parallel, and there is no evidence it functions as a wildlife movement corridor. Therefore, the management recommendation is to replicate and enhance the linkage function within the Secondary Plan natural heritage system.
L7	Replicate and Enhance Function	This feature connects two Core Areas (Significant woodland) and provides habitat for rare or uncommon plant species, but there is no evidence it is used as a wildlife movement corridor. Management recommendations are to replicate and enhance the linkage function within the Secondary Plan natural heritage system.
L8	None / Assess at future development stages	This feature is not functioning as a linkage but should be investigated further during adjacent development applications, as relevant.

8.0 Natural Heritage Constraints to Development

Future development within the Upper West Side Secondary Plan area is recommended to be directed outside of important natural heritage features and their Vegetation Protection Zones (VPZs). The following sections summarize the different types of ecological constraints that will require consideration at future development stages.

Based on the results of field surveys completed by NRSI biologists between 2018 and 2020, as well as available background information, the following natural heritage features and functions are present within the Study Area and may constrain future development based on municipal, provincial, and federal policies and legislation:

- Habitat of Endangered and Threatened Species, particularly for Butternut and SAR bats;
- Direct, permanent and seasonal fish habitat supporting a tolerant, warm-coolwater and spring-spawning fish community;
- Portions of the Upper Twenty Mile Creek PSW complex;
- Other, non-PSW wetlands larger than 0.5ha;
- Several types of confirmed and candidate SWH;
- Significant Woodlands
- Other woodlots larger than 0.2ha, which are regulated by the City of Hamilton Urban Woodland By-Law 2014-212 (City of Hamilton 2014);
- HDFs, inclusive of several online ponds;
- VPZs established for any of the above-noted features, as per UHOP policies, the AEGD Subwatershed Study Implementation Document (Aquafor Beech Ltd. 2017), and/or the recommendations of this study; and
- Ecological Linkages.

8.1 Vegetation Protection Zones (VPZs)

VPZs are required for natural heritage features such as woodlands, wetlands, SWH, watercourses, and ponds to protect them from indirect and induced impacts resulting from development and land use changes. **Table 16** summarizes the recommended VPZ widths for natural heritage features within the Upper West Side Secondary Plan Area. The VPZ widths presented have been determined based on current UHOP and NPCA policies, the results of the

AEGD Subwatershed Study, and site-specific information and insight into the significance and sensitivity of the natural heritage features requiring long-term protection.

8.2 Ecological Corridors

Under existing conditions, natural habitats in the UWS community are highly fragmented. Wildlife currently use a matrix of agricultural fields and patches of natural vegetation to move between higher quality habitats within Core Areas. The proposed NHS for the Upper West Side Secondary Plan (shown on Map 8) will consolidate these habitat patches into one 'Main Corridor' and several 'Secondary Corridors', and will represent an enhancement to the overall connectivity between Core Areas (particularly in combination with the creation of new habitats in the corridors). Constraints to development associated with ecological linkage corridors include corridor width, location and number.

The successful functioning of ecological corridors is dependent on the interaction of a number of variables including width, length, topography, habitat and vegetation, and the particular target species. At present, there are no fixed standards for minimum ecological corridor widths, although guidelines are available and there are many municipalities and counties that have established required minimum widths. It is generally accepted that the wider the corridor, the better. This is due in large part to the impact that edge effects can have on species survival, predation and competition rates. Wider corridors mitigate edge effects (such as noise and light pollution, invasive plant proliferation, predation and harassment of wildlife by domestic pets) more effectively, and allow for the creation of ecologically valuable habitat that is further removed from adjacent human activity. A very narrow corridor has a high ratio of edge (high mortality for certain species) to interior (low mortality) habitat. The overall corridor length to width ratio is also an important consideration; corridor width should generally increase with corridor length (OMNR 2010).

The general consensus in the scientific literature pertaining to ecological corridors is that widths should be a minimum of 50m to 100m (Croonquist and Brooks 1993; Henry et al. 1999; Stephenson 1999; OMNR 2010; Environment Canada 2013). Appropriate corridor width is, however, highly site-specific. NRSI biologists have considered the following key components that are unique to the Upper West Side Secondary Plan Study Area:

1. Context of the proposed intensification of land use, particularly for the lands immediately adjacent to the corridors intended to function as linkages:

- Transition from rural agricultural fields with a network of small habitat patches to residential subdivisions, mixed use and commercial blocks, and a road network.

    - Corridor width needs to be wide enough to mitigate the effects of traffic noise & road-related pollution, and induced impacts from residential land use (e.g., domestic pets, yard waste dumping, unauthorized trails, light pollution).
    - Assuming the entire corridor won't be fenced to prevent some of the above-noted impacts, corridor width needs to incorporate a certain buffer between the edges and the core of the corridor.

2. Landscape scale at which each corridor is intended to function

    - Corridors are intended to connect Core Areas (Map 8)

        - This results in a ~2km length for the Main Corridor in the UWS; this distance is much greater than many of the resident wildlife species daily movement distances, and so the corridor needs to be wide enough to ensure that the habitat needs of these lower-mobility 'corridor dwellers' are met.
        - Recommended width to length ratios in the literature vary, although several sources cite 1:2 or 1:3 as the target. For a 2km long corridor, this equates to widths of 1km (1:2) or 660m (1:3). A higher ratio of approximately 1:25 (based on a width of 75m), is, however, anticipated to be acceptable in the context of the Study Area.

3. Habitat considerations for resident wildlife species (mammals, reptiles, amphibians and birds) within the Study Area

    - The majority of wildlife species observed during NRSI field surveys are common, habitat generalists with a generally high tolerance to urbanization.
    - Habitat requirements for significant species (e.g., Species at Risk), and those more sensitive species known to be intolerant of land use intensification, have factored into this analysis. For example:

        - Snapping Turtles prefer waterbodies and wetland habitats that are surrounded by forested areas and may avoid or abandon habitats that are too close to residential lands (Ryan et al. 2013). Widening the corridor within which

Snapping Turtles are expected to move between habitats post-development will help to mitigate impacts to this species.

- Forest-dwelling bird species such as nuthatches and woodpeckers will avoid moving between habitat patches when corridors are narrow (<10m wide), even when these corridors are fully forested (St. Clair et al. 1998). A wider corridor with increased options for travel routes and cover opportunities will help to mitigate impacts on population dynamics of these species from development intensification.
- Large mammals such as White-tailed Deer and Coyote generally require wider corridors to facilitate movement between habitat patches.

Based on the analysis presented above, current existing conditions within the Study Area, and site-specific considerations, the following minimum overall ecological corridor widths (inclusive of VPZs for features to be created within new corridors) are recommended for the Upper West Side Secondary Plan, and have been incorporated into the Land Use Plan (**Appendix I, Map 8**):

- Main Corridor (denoted as Core Area C2, C3, and C4 on Map 8) – 75m
- Secondary Corridors (denoted as Linkages on Map 8) – 50m

Table 16. Recommended Vegetation Protection Zones for Natural Features within the Upper West Side Secondary Plan Study Area.

Natural Feature	Recommended Minimum Vegetation Protection Zone (VPZ) Width[1]	Evaluation of Consistency with Applicable Municipal Policies and Studies			Site-Specific Considerations for Natural Features Within the Participating Lands
		UHOP Section C.2.5.10	Section 6.2: Natural Heritage Plan of the AEGD Subwatershed Study (Dillon Consulting & Aquafor Beech Ltd. 2011)	Niagara Peninsula Conservation Authority (NPCA) Policy Document (2022)	
Habitat of Endangered and Threatened Species and Significant Wildlife Habitat (SWH)	Minimum VPZ width to be determined through future site-specific Environmental Impact Statements (EISs), dependent on the sensitivity of the species and/or habitat and the requirements set out by the Ministry of the Environment, Conservation, and Parks (MECP) and the *Endangered Species Act* (ESA), and/or the MNRF (2015a)	✓	✓ (Minimum 30m buffers around Core Areas, inclusive of Species at Risk Habitat)	N/A	Numerous Butternut trees (*Juglans cinerea*) are present; naturalized habitats within 50m of each individual (or any size) are protected under the ESA. Several SAR bat species may have potential roosting, foraging, and travel corridor habitat within the Participating Lands. VPZs established from confirmed SAR bat habitat that will be retained long-term will need to consider the location and abundance of candidate or confirmed roost trees at the forest edge. Several types of confirmed and candidate SWH types are or may be present; site-specific EIS will determine required setbacks from SWH being retained post-development.
Fish Habitat and Headwater Drainage Features (HDFs)	15m, on each side of the feature, as measured from the bankfull channel.	✓	✓	✓	Fish Habitat within the Participating Lands is generally categorized as Seasonal / Warmwater Watercourses with Important / Marginal Fish Habitat. For HDFs being realigned but retained as open channels (i.e., features with a 'Conservation' management recommendation), the VPZ is to be applied to the realigned feature.
Upper Twenty Mile Creek Provincially Significant Wetland (PSW) Complex	30m, as measured from the NPCA-reviewed boundary of the wetland	✓	✓ (Minimum 30m buffers around Core Areas, inclusive of PSW)	✓	PSWs within the Participating Lands were delineated by NRSI biologists and reviewed by NPCA and City of Hamilton staff in 2019 and 2020; re-delineation and re-review may be required at future development stages to confirm that boundaries have not changed.
Locally Significant Wetlands (non-PSW Wetlands >0.5ha)	30m, as measured from the NPCA-reviewed boundary of the wetland, and subject to the results of site-specific EISs and as approved by the NPCA	✓ (Minimum 15m VPZ from unevaluated and locally significant wetlands)	✓ (Minimum 30m buffers around Core Areas, inclusive of Locally Significant Wetlands)	✓	Minimum buffers from Locally Significant Wetlands retained under the current Upper West Side Land Use Plan should not be less than 15m, if the results of a site-specific EIS indicate that a VPZ less than 30m is appropriate.
Other Wetlands (non-PSW Wetlands <0.5ha)	15m, as measured from the NPCA-reviewed boundary of the wetland, and subject to the results of site-specific EISs and as approved by the NPCA	✓ (Minimum 15m VPZ from unevaluated and locally significant wetlands)	✓	N/A	Current NPCA policies do not preclude the removal of non-PSW wetlands <0.5ha. The minimum recommended VPZ is to be applied when these wetlands will be retained post-development and will require protection from direct and indirect impacts (as determined through the site-specific EIS).
Significant Woodlands	30m, as measured from the dripline (edge) of the feature	✓ (Minimum 15m buffers from unevaluated and locally significant wetlands)	✓ (Minimum 30m buffers around Core Areas, inclusive of Significant Woodlands)	N/A	All Significant Woodlands within the Participating Lands will require a 30m VPZ, with the exception of the northern boundary of the newly-designated Significant Woodland within the southern portion of the former Glancaster Golf Course. Due to the existing fragmented character of the woodland, a 15m VPZ is appropriate for this feature along its northern boundary only (a 15m VPZ meets the policies of the UHOP). A site-specific EIS should be completed to confirm the reduced VPZ width.
Other Woodlots	10m, as measured from the dripline (edge) of the feature	✓	✓	N/A	Woodlots >0.2ha are subject to the City of Hamilton Urban Woodland By-Law 2014-212; a permit is required in order to remove trees from within these features. The minimum recommended VPZ is to be applied when other woodlots will be retained post-development and will require protection from direct and indirect impacts (as determined through the site-specific EIS).

[1]Subject to Section 2.5.11 of the UHOP, which states that "*Vegetation protection zone widths greater or less than those specified […] may be required if ecological features and functions warrant it, as determined through an approved Environmental Impact Statement. Widths shall be determined on a site-specific basis, by considering factors such as the sensitivity of the habitat, the potential impacts of the proposed land use, the intended function of the vegetation protection zone, and the physiography of the site.*"

9.0 Recommended Natural Heritage System

The recommended Natural Heritage System (NHS) for the Secondary Plan is provided on Map 8. The system consists of 3 elements – Core Areas, Linkages, and Enhancement Areas. The recommended NHS protects the significant natural features of the Study Area while significantly strengthening connections amongst them.

9.1 Core Areas

Proposed Core Areas include the existing Significant Woodlands, Upper Twenty Mile Creek PSW, and HDFs, along with their 15m or 30m VPZs. In addition, a 75m-wide Main Corridor (discussed above in **Section 8.2**), running west-east through the Study Area, is proposed as a new Core Area with the primary goal to accommodate the relocation, replication and enhancement of HDF and other habitat features (including the existing pond feature currently identified as Core Area, C3 on Map 7). This feature is also proposed to provide terrestrial habitat functions; a more detailed analysis and description of this feature is provided in **Section 12.1**.

9.2 Linkages

Proposed Linkages connecting Core Areas within the Study Area or to features outside of the Study Area are shown on Map 8. Linkages are proposed that provide connections between Core Areas and to natural features outside the Study Area. The proposed Secondary Corridor (50m-wide) linkage near the central south portion of the Study Area connects several Core Areas within the Study Area with those outside the Study Area. It also incorporates existing drainage features and therefore provides an additional opportunity to enhance existing hydrological functions. In addition, the southern portion of the existing L7 (Map 7) will be retained. Linkages proposed along the eastern edge of the Study Area align with existing drainage/crossings and natural areas directly east of Upper James Street. Overall, the proposed linkages provide an improvement in the connectivity of the features in the Study Area compared to existing conditions.

9.3 Enhancement Areas

Enhancement Areas are proposed throughout the Study Area. These have been recommended primarily to fill gaps immediately adjacent to and widen existing Core Areas, including portions of lands where development would not be feasible due to the geometry of the existing NHS boundaries.

10.0 Development Proposal

The proposed development concept includes residential & mixed uses, a road network, and existing AEGD designations. The Upper West Side Secondary Plan Land Use Plan is provided in Appendix I. The plan also provides preliminary locations for stormwater management (SWM) facilities. The road network consists of the Garth Street extension, Collector Roads A, B and C, and internal residential road networks. The Parks and Open space designation includes the proposed NHS as well as proposed neighbourhood and community parks. A key part of the proposed land use is re-alignment of HDF features and establishment of a central Core Area corridor generally located to the north of the proposed Collector Road C.

10.1 Stormwater Management Approach

Urbantech Consulting (2022) prepared a Servicing and SWM report detailing the overall approach to managing runoff from future development in the overall Study Area, with refined details for the Urban Expansion Areas (which are shown on Map 1). Urbantech has also prepared a Subwatershed Study and Stormwater Master Plan Overview Report for the Upper West Side Secondary Plan (Urbantech 2023). The reader is directed to those reports for detailed information on the proposed management strategies and information on the SWM targets and criteria used for the proposed SWM strategy design. The information provided in this section summarizes the proposed SWM strategy for the Study Area and provides details relevant to the ecological existing conditions, function, and impact assessment provided in this EIS.

The proposed drainage system incorporates an innovative dual drainage concept involving minor and major systems that is consistent with City of Hamilton Criteria and Guidelines for Stormwater Infrastructure Design (Philips Engineering 2007). The major and minor drainage systems for the UWS block have been designed to convey storm runoff to the proposed flood control/dry SWM facilities prior to discharging to the various Twenty Mile Creek outlets (see Figure 500, Urbantech 2022). Storm drainage subsystems will include:

- Low Impact Development (LID) conveyance controls (minor system); and
- Overland flow routes, stormwater management (SWM) dry ponds, etc. (major system).

The LID conveyance controls comprising the minor system will take the form of enhanced grass swales within the road right of ways (ROWs) and will be designed to remove excess surface

runoff produced by more frequent storms from lot-level source controls and ROWs, delivering it to end-of-pipe facilities. Side Swales, at key locations, will convey road drainage from the LIDs into the NHS, which will ensure that the major storm system and road LID swales do not exceed their conveyance capacities (Urbantech 2022, 2023). This method will also help to maintain the water balance of the site and specific natural features. The LID system will be designed to match pre-development infiltration, evapotranspiration, and runoff wherever possible. Detailed information related to locations and sizing of LID BMP features will be provided at future design stages.

Runoff flows in excess of the minor system LID swales will be conveyed via overland flow routes. This major system is largely comprised of roadways but may also include features such as swales, ditches, natural channels, drainage easements, and end-of-pipe SWM facilities. The proximity of the Hamilton International Airport requires that all SWM ponds on site be dry.

Under existing conditions, several HDFs flow towards Twenty Road West, with culvert outlets along the length of the UWS block. Some of these features are directed into underground pipes, while others are directed to roadside ditches. In the proposed development condition, drainage to these culverts and the areas downstream will be maintained and surface water will continue to be conveyed to the adjacent landowners, albeit with reduced contributing catchment areas. All of the remaining drainage at the north end of the UWS block will be consolidated into one major storm outlet, at SWM Pond 7 (see Figure 500, Urbantech 2022) that will service the UBE subject sites, and a total drainage area of 97.2ha. This approach is in accordance with the AEGD Stormwater Management Plan (Urbantech 2022, 2023).

Due to the need to use dry SWM facilities in the UWS block, runoff will first be treated in a LID feature or on-site with an OGS/filter system prior to discharge to the dry facilities to address water quality control requirements. In general, LID features that include subdrains will be connected to a storm sewer and then to the dry SWM facilities.

The Impacts Analysis Section below provides information on potential ecological impacts resulting from the proposed stormwater management system, and discusses recommended mitigation measures to reduce or eliminate impacts. Section 11.3.1 provides details on the proposed water balance and potential impacts to the form and function of ecological features, as well as mitigation measures to reduce or eliminate impacts.

It is important to note that changed or additional recommendations may be made at future development stages, depending on site-specific requirements and/or the final results of the secondary planning process and associated reports.

11.0 Impact Analysis

11.1 Approach to Impact Analysis

Potential impacts arising from the proposed conceptual development are determined by comparing the details of the proposed undertaking with existing natural features and their ecological and hydrologic functions. Where the proposed undertaking nears/overlaps with the natural features or their VPZs, impacts may arise. The impact analysis provided here is based on the land use plan; refinements will occur at subsequent project phases when additional details are available. At this time, only high-level studies have been completed for hydrology, hydrogeology, geotechnical, and stormwater management. Where possible, information from these studies has been integrated into this impact analysis.

The following is a description of the types of impacts that will be discussed:

- Direct impacts to natural features in the Study Area associated with disruption or displacement caused by the proposed 'footprint' of the undertaking;
- Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality; and
- Induced impacts associated with post-development demand on natural resources created by increased habitation and use of the land and surrounding areas.

11.2 Direct Impacts

The land use plan outlines an NHS that provides a new Core Area corridor for re-alignment and restoration of natural features currently present in the Study Area (**Error! Reference source not found.**). Two (2) HDFs will need to be re-aligned within this corridor. At this time, the proposed re-alignment will impact several small unevaluated wetlands along TTMC5. These features are proposed for removal and re-creation within the NHS corridor. Further discussions will be held with the NPCA and City Natural Heritage Planner for the proposed HDF re-alignment and wetland reconfiguration.

Vegetation removal and grading will be required to construct the Core Area corridor. Vegetation removal will need to occur outside of core bird nesting and bat active windows, and sediment and erosion controls will be required to protect the adjacent natural features. Permeable surfaces should be considered for trail design, where possible, to reduce impacts arising from changes to infiltration and runoff adjacent to natural features.

All trees in Study Area been inventoried by NRSI Certified Arborists and a Preliminary TPP has been prepared under separate cover to address potential future tree removals (NRSI 2023). Tree compensation for any removed trees will be provided in the Study Area, where feasible. As per the City of Hamilton's Tree Protection Guidelines (2010), street trees planted as part of the proposed development will also be credited as compensation plantings. The Preliminary TPP and compensation details will be updated as more information on project footprints becomes available.

To date, 197 Butternuts have been documented by NRSI biologists and Certified Arborists within the Participating Lands. Based on the proposed land use plan, it is assumed that at least 19 Category 2 Butternut and 14 Category 3 genetically pure Butternut (all >10cm DBH) will require removal as part of the future community development. As detailed in this report and the Preliminary TPP, Butternut Health Assessments have been completed for 193 of the Butternuts within the Participating Lands. Additional assessments, and re-assessment of existing Butternuts, will be necessary at future development stages. **Section 6.1.2** summarizes anticipated ESA permitting requirements for Butternut within the Study Area. Tree buffers, removal, and potential compensation will factor in to studies and recommendations at future development stages and as the analysis of Butternuts, and other trees, continues.

Potential bat habitat is present throughout the Study Area. This includes trees that have potentially suitable cavities, cracks, or other habitat features used by tree-roosting bat species, and oak and maple trees with the potential to form leaf clusters potentially used by Tri-colored Bat. Existing structures within the Study Area may also provide habitat for bats. These potential habitats will be directly impacted by the proposed development. A detailed assessment of SAR bats, inclusive of acoustic monitoring surveys and/or building exit surveys, will be necessary to identify which trees and buildings are being used by SAR bats. Seasonal timing windows will be required for tree removal (i.e., no removal of potential bat habitat trees within the bat active period of April 1-September 30) to ensure that no SAR bats are accidentally harmed during removal.

11.2.1 Linkage Impact Assessment

The LA detailed in this Master EIS provides a framework for discussing relevant impacts to, and mitigation measures for, any of the City-mapped Linkages providing an ecological function within the study area.

Several City-identified Linkages overlap with development designations in the Upper West Side Secondary Plan Land Use Plan and will require removal. However, given the poor condition and lack of landscape-level functionality in the assessed Linkages, opportunities to replicate, reconfigure, and restore the linkages elsewhere within the Study Area are likely to result in a net ecological benefit. **Error! Reference source not found.**8 and the Land Use Plan (Appendix I) incorporates an NHS designed to provide movement and propagation opportunities for vegetation and wildlife within the Study Area. The establishment of a 75m-wide east-west Main Corridor enhanced with restoration plantings and other habitat features (e.g., brush piles, turtle nesting mounds, wetland areas), as well as the new proposed Linkages (Map 8, 50m-wide Secondary Corridors), will replicate any existing linkage function and improve the ecological connectivity between Core Areas in the Study Area.

11.3 Indirect Impacts

Indirect impacts are identified as effects that are not a direct result of a proposed development footprint and are often produced in areas surrounding or adjacent to the development footprint or as a result of complex impact pathways. Potential sources of indirect impacts associated with the proposed development may include:

- Changes to the local water balance;
- Changes to surface water flow patterns;
- Changes to groundwater recharge and discharge;
- Changes to water quality;
- Erosion and sedimentation during construction; and
- Indirect impacts to wildlife and vegetation communities.

Most of these indirect impacts will be addressed at future development stages when specific details about the development (e.g., detailed grading, a refined and detailed stormwater management plan, servicing) become available. Due to the high-level scope of the relevant engineering reports and plans prepared for the current study, a general overview of anticipated indirect impacts is provided below.

11.3.1 Water Balance

Urbantech prepared a high-level water balance analysis that is outlined in the preliminary FSR for the Urban Expansion Areas (Urbantech 2022) and the Subwatershed Study and Stormwater Master Plan Overview Report (Urbantech 2023). The water balance establishes existing

drainage conditions and patterns across the Study Area using detailed topographic field surveys, site reconnaissance, and background information, including drainage reports provided by the City.

The water balance presents a block-wide annual analysis of water inputs and outputs to the hydrological system including total runoff and recharge estimates based on pre- and post-development calculations for the imperviousness of different land uses. Five (5) Natural Features (NFs) are shown on Figure 700 in the preliminary FSR (Urbantech 2022). A preliminary monthly runoff analysis has been prepared for the 5 features for the pre- and post-development conditions. An analysis of the hydrological sensitivity of natural feature areas within the Study Area is provided below, where information and data are available, to enhance the discussion of potential impacts to the form and function of these features from the proposed water balance.

Natural Feature Hydrological Sensitivity Analysis

NRSI's Ecohydrologist reviewed the sensitivity of vegetation communities, vascular flora, wildlife and their habitats for NF1, NF2, NF3, NF4, and NF5 as mapped by Urbantech (2022). This review included cross-referencing the hydrologically sensitive species and ELC lists in the appendices of the Toronto and Region Conservation Authority's Wetland Water Balance Risk Evaluation guide (TRCA 2017), and reviewing the tolerance of specific vascular flora to hydrological change using the United States Environmental Protection Agency (US EPA) National Database of Wetland Sensitivities to Enrichment and Hydrologic Alteration (Adamus and Danielson 2000). The NFs were reviewed to identify vegetation communities, vascular plant species, fauna species, and SWH contained within the features that are sensitive to hydrological changes. Particular attention was given to lowland communities in the natural features. Since these areas collect runoff from surrounding upland communities and are typically more connected to the groundwater system (if the groundwater table is near the surface), hydrologic changes are expected to have the greatest impact in these communities. The TRCA has identified species, habitats and ELC types with varying ranges of sensitivities, from high to low, that are relevant to their jurisdiction. These species, habitats and ELC types are generally sensitive to hydrological changes and this assessment allows for a more robust review of potential impacts to the form and function of natural features and habitats from proposed changes to the subject sites water balance. The US EPA database includes data gathered from a detailed literature review and provides tolerance ranges for specific vascular flora to increases and decreases in water depth and duration. The tolerance data ranges from

“intolerant" (IT) to “Very Tolerant” (VT) and also identified species that are “unaffected” (U) to hydrological changes. The information and data pulled from these two (2) sources was incorporated into the below discussions of specific NF areas, to enhance the discussion of potential water balance impacts.

NF1

This NF consists of several ELC communities, including:

- Upland communities
  - Dry – Fresh Sugar Maple – Beech Deciduous Forest (FOD5-2)
  - Mineral Cultural Meadow (CUM1)
  - Hedgerows
- Lowland communities
  - Silky Dogwood Mineral Thicket Swamp (SWT2-8)
  - Reed Canary Grass Mineral Meadow Marsh (MAM2-2)

While it is important to maintain the existing hydrology of all components of this NF in the post-development water balance, the TRCA guideline does not include information relevant to upland vegetation communities. In addition, information gathered from the Ecohydrology team, consisting of TRCA and CVC staff, that created the Wetland Water Balance document (TRCA 2017), indicates that no information is currently available to support ecological analysis for water balance related to woodlands (J. Ruppert, TRCA, pers. comm.). As such, a sensitivity analysis specific to the upland portions of NF1 could not be completed at this time.

Several MAM communities are listed in Appendix 2 of the TRCA guideline as being sensitive, to some degree, to hydrological change. MAM2-2, found in NF1, is identified as having a low sensitivity to hydrological change. Several SWT communities are also listed, ranging from high to low sensitivity. SWD2-8 is listed in Appendix 2 as being moderately sensitive to hydrological change (TRCA 2017). Within NF1, no vascular flora species are identified has having a high sensitivity to hydrological change, 10 as having a moderate sensitivity, and two as having a low sensitivity (Appendix 3, TRCA 2017).

Within NF1, two herpetofauna are identified as having some sensitivity to hydrological change: Gray Treefrog (*Dryophytes versicolor*) (high sensitivity; late Apr – early Oct) and Spring Peeper

(high sensitivity; early April – end of September) (Appendix 3, TRCA 2017). SWH assessments and other field surveys within NF1 indicate that habitat for Terrestrial Crayfish is present in portions of NF1 associated with HDF reaches. Terrestrial Crayfish is a hydrologically sensitive species as it moves through soils and creates chimneys in wet environments. This species tends to move to where conditions are most suitable, and therefore their range changes each year with seasonal and annual changes in hydrology. Little is known about this species and its hydrological requirements.

NF2

NF2 is located north of Twenty Road West and is outside of the Study Area. As such, NRSI has not surveyed this feature and has no original data to inform the water balance analysis. According to NPCA's ELC data, NF2 consists of an FOD/FOC community. The TRCA's ELC sensitivity list does not include FOD or FOC communities. The UHOP (2013) identifies the wooded features as Parks and General Open Space and Core Area (Schedule B) and Significant Woodland (Schedule B-2). As mentioned above, the TRCA guideline does not include upland vegetation communities; rather it focuses on communities, plants, and wildlife that require consistent water for at least part of their life cycle. While it is important to maintain the existing hydrology of this NF in the post-development water balance, the TRCA guideline does not include information relevant to woodlands and upland areas. As such, a sensitivity analysis for NF2 could not be completed at this time.

NF3

NF3 is located in the southwest corner of the Dickenson Draft Plan Area. NRSI biologists assessed the feature from the property boundary or roadside where possible; detailed assessments of this feature were completed by Dougan & Associates (2022). Based on information from the EIS prepared for the Dickenson Draft Plan Area, This NF consists of one upland community, a Dry – Fresh Sugar Maple – Beech Deciduous Forest (FOD5-2), and one lowland community, a Cattail Mineral Shallow Marsh (MAS2-1). Only the MAS2-1 community can be evaluated for sensitivity to hydrological change at this time, as described in the sections above. The TRCA's ELC sensitivity list indicates that MAS2-1 communities have a medium sensitivity to hydrological change (Appendix 3, TRCA 2017). Surveys completed by NRSI biologists from the property boundary did not detect the presence of any wildlife species or SWH types within NF3 that are sensitive to hydrological change.

NF4

This NF consists of several ELC communities, including:

- Upland Communities
  - Cultural Meadow (CUM);
  - Cultural Woodland (CUW);
  - Gray Dogwood Cultural Thicket (CUT1-4);
  - Cultural Thicket/Cultural Woodland (CUT/CUW);
  - Dry-Fresh Deciduous Forest (FOD4);
  - Dry-Fresh Sugar Maple – Basswood Deciduous Forest (FOD5-6); and
  - Hedgerows.
- Lowland Communities
  - Meadow Marsh (MAM);
  - Reed-Canary Grass Mineral Meadow Marsh (MAM2-2);
  - Deciduous Swamp (SWD); and
  - Swamp Maple Mineral Deciduous Swamp (SWD3-3).

Several MAM communities are listed in Appendix 2 of the TRCA guideline as being sensitive, to some degree, to hydrological change. MAM2-2, found in NF4 is identified as having a low sensitivity to hydrological change. Several SWD communities are also listed, ranging from high to low sensitivity. SWD3-3 is listed in Appendix 2 as being moderately sensitive to hydrological change (TRCA 2017). Within NF4, no vascular flora species are identified has having a high sensitivity to hydrological change, five as having a moderate sensitivity, and one as having a low sensitivity (Appendix 3, TRCA 2017).

Within NF4, two herpetofauna are identified as having some sensitivity to hydrological change: Northern Spring Peeper (*Pseudacris crucifer*) (high sensitivity; early April – end of September) and American toad (*Anaxyrus americanus*) (medium sensitivity; late April – mid September) (Appendix 3, TRCA 2017). One bird species, Swamp Sparrow (*Melospiza georgiana*), and one mammal species, Star-nosed Mole (*Condylura cristata*) are identified as having a low sensitivity to hydrological change, and are present or potentially present within NF4. SWH assessments and other field surveys within NF4 indicate that habitat for Terrestrial Crayfish is present in portions of NF4 associated with HDF reaches. Terrestrial Crayfish is a hydrologically sensitive species as it moves through soils and creates chimneys in wet environments. This species

tends to move to where conditions are most suitable, and therefore their range changes each year with seasonal and annual changes in hydrology. Little is known about this species and its hydrological requirements.

NF5

This NF consists of several ELC communities, including:

- Upland communities
  - Fresh – Moist Sugar Maple – Hardwood Deciduous Forest (FOD6-5)
  - Fresh – Moist Oak-Maple – Hickory Deciduous Forest (FOD9)
  - Mineral Cultural Meadow (CUM1)
  - Hedgerows
- Lowland communities
  - Reed Canary Grass Mineral Meadow Marsh (MAM2-2)
  - Swamp Maple Mineral Deciduous Swamp (SWD3-3).
- Aquatic communities
  - Floating-leaved Shallow Aquatic (SAF1)

Several MAM communities are listed in Appendix 2 of the TRCA guideline as being sensitive, to some degree, to hydrological change. MAM2-2, found in NF5 is identified as having a low sensitivity to hydrological change. Several SWD communities are also listed, ranging from high to low sensitivity. SWD3-3 is listed in Appendix 2 as being moderately sensitive to hydrological change (TRCA 2017). Several SAF1 communities are also listed, ranging from medium to low sensitivity to hydrological change. SAF1-3, which is the closest listed community to the pond habitat present within NF5, has a medium sensitivity to hydrological change. Within NF5 (and the SAF1 community in particular) one vascular flora species is identified has having a high sensitivity to hydrological change, 15 as having a moderate sensitivity, and seven as having a low sensitivity (Appendix 3, TRCA 2017).

Within NF5, four herpetofauna are identified as having some sensitivity to hydrological change: Common Snapping Turtle (high sensitivity; all year), Midland Painted Turtle (high sensitivity; all year), Green Frog (*Lithobates clamitans*) (medium sensitivity; all year), and Spring Peeper

(Appendix 3, TRCA 2017). One bird species, Canada Goose (*Branta canadensis*), is identified as having a low sensitivity to hydrological change, and are present or potentially present within NF5. SWH assessments and other field surveys within NF5 indicate that SWH for overwintering turtles is present within NF5, a SWH type that is sensitive to hydrological changes. No monthly water balance estimates are provided for this feature as part of the UBE Servicing and SWM Report (Urbantech 2022). Based on the sensitive species and functions of the components of NF5, it is important to maintain the existing hydrology of this NF in the post-development water balance.

Infiltration

Annual infiltration rates/volumes are anticipated to match or exceed existing rates/volumes in the post-development condition. The proposed infiltration measures, outlined in the Servicing and SWM report (Urbantech, 2022), result in an average annual infiltration deficit of 147,255 m^3/year across the Study Area. The water balance does not provide specific infiltration rates/volumes pre- and post-development for the NF areas. The proposed post-development infiltration is approximately 15% lower than pre-development levels. This deficit is observed mainly during the winter, when the ground is frozen, and vegetation is dormant and is expected to have limited to no impact on the vegetation communities, vascular flora, and wildlife in the NFs.

11.4 Induced Impacts

Induced impacts are described as those that are not directly related to the construction or operation of a particular development, but rather arise from the use of the natural areas as a result of the development. The simplest example is an increase in the use of natural areas adjacent to a residential development by residents, feral and human-subsidized wildlife and pets, and unauthorized trail/pathway construction. Natural areas and wildlife can be affected by the presence of residences and their occupants. Effects can include vegetation trampling, plant removal, dumping of refuse, creation of unauthorized trails, tree damage, introduction of non-native plant species and wildlife predation and harassment by domestic pets. Dense plantings of native trees and shrubs within Vegetation Protection Zones (VPZs) will help to discourage human intrusion into natural features.

The NHS currently incorporates a trail system (**Appendix I**). The trail design and specific locations will be refined at future development stages. It is recommended that the trail be located within the outer edge of the NHS as much as possible. Providing specific areas such as

trails that people can access and enjoy helps to reduce the amount of unauthorized access to natural features and areas. The use of physical barriers such as dense vegetation plantings and/or permanent fencing may also be considered to reduce unauthorized access to significant natural features. Education with respect to the value and function of the neighbouring natural areas is another tool that can be used to avoid induced impacts. Interpretive, educational signage should be used for natural features and areas adjacent to future proposed development.

Road salt use and the draining of pool water directly into the storm sewers can results in high concentrations of chloride in wetlands and watercourses. At the appropriate time in the design stage of future development, a Salt Management Plan should be developed that provides guidance and management recommendations for mitigating potential chloride impacts. Specific to the residential portions of the Secondary Plan Area, a homeowner's brochure should also be developed for distribution to residences located next to the NHS. These brochures will provide information to homeowners on best management practices to follow when living next to a natural area.

11.5 Cumulative Impacts

To evaluate the potential for cumulative impacts resulting from proposed development, it is necessary to look beyond the boundaries of the Study Area to the neighbouring lands. This approach looks at the character and potential changes that are occurring or may occur in the future on surrounding lands in vicinity. It is important to recognize the ecological significance of the natural features within the study area in the larger landscape context and identify potential cumulative effects from the proposed development.

Currently, NRSI is aware of several development applications within 2km of the study area. Portions of the St. Elizabeth Mills residential complex, 1km north of the study area on Rymal Road West, are proposed for re-development, and stormwater management infrastructure upgrades within that community are anticipated. The re-development of the Bishop A. Tonnos Stations of the Cross Park on Rymal Road West is also underway. A review of aerial imagery indicates that subdivision planning may also be underway for the property located southwest of the Upper James Street and Dickenson Road intersection, east of the airport. No cumulative impacts are anticipated due to any of the above-listed developments.

To the north, lands within 2km of the study area are highly developed with residential subdivisions. South of the study area, the airport dominates the landscape alongside a few rural residences and active agricultural fields; natural features are limited. The proposed change in land use is not expected to result in cumulative impacts to natural features at a broad scale based on implementation of the recommended NHS within the Study Area lands.

12.0 Mitigation Measures

12.1 Restoration and Enhancement Opportunities

Potential restoration and enhancement opportunities were considered throughout the Secondary Plan process. The Twenty Mile Creek Watershed Plan (NPCA 2006) identifies several objectives and goals for natural feature and watercourse enhancement in the headwaters of the watershed. These objectives and goals have been reviewed and incorporated, where possible, into the NHS, particularly for riparian area enhancement. Other general goals or guiding principles include opportunities to enlarge and/or fill gaps in Core Areas, provide a diversity of habitat features supporting the needs of wildlife (e.g., cover objects and brush piles for snakes and small mammals, snags, and bird nesting structures), and to provide targeted habitat types for specific wildlife.

Proposed Restoration and Enhancement Opportunities

Several components of the NHS, stormwater management approach, and Open Space designations may provide opportunities to strengthen the ecological features and functions within the Study Area. These include:

- Creation of the 75m-wide Main Corridor
- Other identified Enhancement Areas (Map 8)
- VPZ and Linkage planting/restoration
- Naturalization of stormwater facilities
- Naturalized areas within community parks
- Wildlife passage

Central NHS Core Area Corridor

The proposed central NHS Core Area corridor is designed primarily to provide compensation habitat required for HDF and wetland removal/re-alignment. The conceptual channel design concepts have been prepared by GEO Morphix Ltd. (2023) and are anticipated to consist of meandering channel, bottomland marsh and meadow marsh wetlands (offline and on-line), and habitat features such as turtle nesting mounds and overwintering pools for both fish and overwintering turtles and amphibians. Details on the specifics of aquatic habitat compensation are provided within that report.

The corridor is also intended to provide some woodland habitat and it is anticipated native tree and shrub plantings will be included. However, the canopy cover and woodland and/or swamp

targets through all or parts of the corridor will be developed and refined as part of a full restoration & enhancement plan at later stages of the project.

Identified Enhancement Areas

Identified enhancement areas (Map 8) have generally been located to provide additional supporting habitat to the Core Areas and their associated VPZs. Existing meadow and thicket areas are proposed to remain relatively undisturbed but enhanced through measures such as invasive species management, selective seeding or planting to increase species diversity, and debris removal. Habitat features such as rock/brush piles and artificial structures (e.g., bat boxes) to provide wildlife cover and/or lifecycle habitat components can also be included, where appropriate.

VPZs and Linkages

Quickly establishing a dense woodland cover is the primary recommendation for the majority of the VPZs as they are intended to provide a buffering function on the Core Areas from adjacent development land uses. Appropriate woodland restoration plans for these areas will be created, and consideration of dense edge treatments to inhibit unauthorized access should be a key feature where appropriate.

The proposed NHS Linkages are envisioned to be planted towards woodland cover in order to increase overall woodland cover in the Study Area, but a buffering function is not a requirement of these features. Therefore, they present more opportunities for habitat heterogeneity and inclusions of different habitat types can be incorporated. Some Linkages are proposed along existing drainage courses and any restoration plan for these areas should consider the enhancement of riparian function.

Naturalization of stormwater facilities & community parks

Consideration should be given to naturalization opportunities within stormwater facility locations or in the community park, particularly where they abut portions of the NHS. Establishment of native meadow, thicket, or woodland and associated habitat features should be considered where appropriate.

Wildlife Passage

Several road crossings are proposed throughout the Study Area. Where these intersect components of the NHS, particularly the new central Core Area corridor, the road and culvert

design at these locations should consider and incorporate wildlife passage opportunities. Several guidance and Best Management Practice documents exist on this topic.

13.0 Implementation Plan

13.1 Future Natural Heritage Study Recommendations

Site- and activity-specific scoped EIS and TPP studies should be completed at future Draft and/or Site Plan Approval development stages. Studies should follow guidelines established by the City of Hamilton (City of Hamilton 2010, 2015a, b), rely on field survey and tree inventory data that is no more than five years old, address detailed design elements (including grading plans, specific stormwater management approach, lot layout and design) and integrate additional or updated studies completed by fluvial geomorphologists, hydrogeologists, and water resources engineers. The type and extent of field surveys should be developed through the TOR process and in consultation with the City of Hamilton, NPCA, MECP, and DFO as applicable; this Master EIS should also be used as a source of background information and to guide the scope of field surveys; **Section 13.3** presents the recommended ecological monitoring framework, inclusive of pre-, during-, and post-construction monitoring field studies. The completion of the pre-construction surveys listed in **Section 13.3** will ensure the collection of high quality and comprehensive baseline data that can be compared with monitoring data collected during construction and post-development to determine if mitigation measures are functioning as intended and if additional action is required to ensure the appropriate long-term ecosystem protection and management. Scoped EISs, TPPs, and LAs (as needed) are recommended to be completed to inform the development of:

- Individual Draft and/or Site Plans within the Study Area;
- The recreational trail system within and adjacent to the proposed NHS; and
- SWM ponds located within or adjacent to the NHS (if the construction of these facilities proceeds separately from the typical Draft or Site Plan process).

The ongoing Integrated EA for the Garth Street extension and collector road network will address the natural heritage components of the roads proposed in the Land Use Plan. As part of this study, a fulsome analysis and suite of recommendations will need to be prepared to address key ecological features and functions, including wildlife road crossings and ecopassage design, and adjacency and overlap with the proposed NHS.

13.2 Construction Phasing Considerations

Vegetation Protection Zones should be established and protected through Erosion and Sediment Controls and/or tree hoarding prior to individual lot developments. It is also expected

the central NHS Core Area corridor containing the re-aligned aquatic features and compensation habitat will be established in its entirety rather than piecemeal as each development site proceeds. This will ensure the continuity of the function of the ecological features it is providing.

13.3 Ecological Monitoring Framework

As development progresses and land use changes within the Study Area, ecological monitoring can detect and evaluate changes and unanticipated impacts potentially caused by development. Ensuring that a comprehensive monitoring program is carried out will aid in the early detection of irreversible ecosystem changes and provide an opportunity to recommend additional corrective mitigation measures. The development community will be responsible for carrying out the monitoring program; it is anticipated that, at the City's sole discretion, the requirement for pre-construction monitoring will be implemented through the pre-consultation and TOR processes, and the requirement for during- and post-construction monitoring will be included as a condition of Draft or Site Plan Approval. Regarding pre-construction monitoring, studies completed within five years of the start of construction (defined as the onset of any construction activities, inclusive of vegetation clearing and grading) will be acceptable to inform baseline conditions. Where the City does not require specific surveys (for instance, benthic invertebrate community monitoring) be completed to inform the scoped EIS, supplemental surveys completed after Draft or Site Plan Approval has been issued, but before the start of construction, may be completed to meet pre-construction monitoring requirements.

The time period covered by the ecological monitoring framework presented in **Table 17** will commence between one and five years prior to development, and extend until five years after the development has reaches 90% build-out.

Table 17. Recommended Pre-, During- and Post-Construction Ecological Monitoring Framework for the Upper West Side Secondary Plan Study Area.

Monitoring Parameter	Pre-construction Monitoring *To be completed prior to the start of construction*	During Construction Monitoring *Commences with the onset of any construction activities.*	Post-Construction Monitoring *Commences following 90% build-out.*	Details
Aquatic Habitat Monitoring				
Aquatic Habitat Assessment *Seasonal Timing:* Mid-July-early September	The pre-construction period will establish the initial monitoring reaches. Surveys will target all proposed stormwater outlets across the Subject Lands. Reference stations will be selected within the retained natural features. *Frequency*: once in one year	Surveys will continue at stations established during pre-construction monitoring. Additional stations will be added to monitoring reaches to incorporate newly constructed SWM ponds as they are developed. Upstream and downstream of each outlet will be targeted. *Frequency:* annually; once per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; once per year in Years 1, 3, and 5 post-construction.	The character and condition of aquatic habitats in the retained natural features within the Subject Lands will be monitored. Habitat data will be collected for each monitoring reach. In accordance with OSAP protocols (Stanfield 2017), the following information will be collected for each reach: • General watercourse morphology • Water depth • Hydraulic head • Instream cover and type • Substrates • Bank morphology • Instream and riparian vegetation Monitoring reaches will be selected to sample near all proposed stormwater outlets across the Subject Lands. Each monitoring reach will cover the area upstream and downstream of each SWM discharge point. Appropriate reference stations will be selected within the retained natural features. Data will be used to gain an understanding of the causes of possible changes in the fish and/or benthic communities that may be development-related.
Benthic Invertebrate Community Monitoring *Seasonal Timing:* Spring (May-June)	The pre-construction period will establish the initial monitoring reaches. Surveys will target all proposed stormwater outlets across the Subject Lands. Reference stations will be selected within the retained natural features. *Frequency*: once in one year	Surveys will continue at stations established during pre-construction monitoring. Additional stations will be added to monitoring reaches to incorporate newly constructed SWMFs as they are developed. Upstream and downstream of each outlet will be targeted. *Frequency:* annually; once per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; once per year in Years 1, 3, and 5 post-construction.	Data will be used to assess the general health of the aquatic habitats using the benthos as indicators of water quality. Surveys will follow Ontario Benthos Biomonitoring Network (OBBA) traveling kick-and-sweep methodology (Jones et al. 2007), and will be completed once in the spring (May-June). Samples will be processed and invertebrates will be identified to the lowest practical taxonomic level. Data will be analyzed using several metrics and indices (as recommended by OBBN protocols) to assess water quality at each monitoring station. Monitoring reaches will be selected to sample near all proposed stormwater outlets across the Subject Lands. Each SWMF monitoring location will consist of three stations: upstream and downstream of each SWM discharge point and a relative reference station. Appropriate reference stations will be selected within the retained natural features.
Fish Community Assessment *Seasonal Timing:* Spring (May-June)	The pre-construction period will establish the initial monitoring reaches. Surveys will target all proposed stormwater outlets across the Subject Lands. Reference stations will be selected within the retained natural features. *Frequency*: once in one year	Surveys will continue at stations established during pre-construction monitoring. Additional stations will be added to monitoring reaches to incorporate newly constructed SWMFs as they are developed. Upstream and downstream of each outlet will be targeted. *Frequency:* annually; once per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; once per year in Years 1, 3, and 5 post-construction.	The fish community composition of the aquatic habitats in the retained natural features within the Subject Lands will be monitored. Monitoring reaches will be sampled using standard, single-pass electrofishing techniques following the Ontario Stream Assessment Protocol (OSAP) fish community sampling procedures (Stanfield 2017). The number and species of fish observed will be recorded. Sampling will target the spring when baseflow is elevated. Monitoring reaches will be selected to sample near all proposed stormwater outlets across the Subject Lands. Each monitoring reach will cover the area upstream and downstream of each SWM discharge point. Appropriate reference stations will be selected within the retained natural features.

Monitoring Parameter	Pre-construction Monitoring *To be completed prior to the start of construction*	During Construction Monitoring *Commences with the onset of any construction activities.*	Post-Construction Monitoring *Commences following 90% build-out.*	Details
Terrestrial Habitat Monitoring				
Vegetation Surveys				
Vegetation Communities and Natural Feature Boundaries *Seasonal Timing:* June to September	*Frequency*: once in one year	*Frequency:* annually; once per year; continuing until 90% build-out is complete	*Frequency:* semi-annually; once per year in Years 1, 3, and 5 post-construction.	Vegetation communities within and immediately adjacent to the Subject Lands will be verified and refined using the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al. 1998). All retained natural features will be walked once a year to review their boundaries. Special attention will be placed on reporting the establishment of invasive species (e.g. European Common Reed (*Phragmites australis*)) or other problematic plant species (e.g. Giant Hogweed (*Heracleum mantegazzianum*)). Wetland boundaries and woodland driplines will be re-delineated to allow comparisons with baseline data. Post-restoration, any newly created wetland and woodland areas will be included as part of delineation surveys. Wetland boundaries will be delineated following the criteria outlined in the Ontario Wetland Evaluation System (OWES) (MNRF 2014a).
Vegetation Monitoring Transects *Seasonal Timing:* Late May to early August	The pre-construction period will establish the initial monitoring stations. Surveys will target natural features that are to be retained. *Frequency*: once in one year	Surveys will continue at stations established during pre-construction monitoring. Additional stations will be added to incorporate newly constructed natural areas as they are developed. *Frequency:* annually; once per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; once per year; in Years 1, 3, and 5 post-construction.	Permanently-marked, 10m-long transects will be used to monitor the pre-construction state of the natural areas within the Subject Lands and to note any changes within the features across the timeline of the development. Transect locations will be adjacent to retained natural features. Transects should be positioned along the edge of natural features adjacent to development locations and should be oriented north/south whenever possible. Additional transects can be added throughout the during construction phase at the newly established natural areas as they are developed. During surveys, quadrats ($0.5m^2$) will be placed at intervals along each transect on centre at 1, 3, 4, and 8m. Each quadrat will be divided into 9 subplots. Within subplots, plant species will be inventoried for presence and abundance (stem count, percent cover, and frequency of presence within subplot). Dominant vegetation along the entire 10m transect will be recorded (including all trees, shrubs, and herbaceous vegetation). The overall health and condition of the vegetation community, evidence of disturbance, and the presence of standing water will be noted. Photographs will be taken at each end of the transect. Inventoried species will be characterized by their Coefficient of Conservatism (CC) and Coefficient of Wetness (CW), and a Floristic Quality Index (FQI) for each transect will be calculated to allow comparisons with baseline data.
Herpetofauna Surveys				
Anuran Call Surveys *Seasonal Timing:* April, May, and June	The pre-construction period will establish the initial monitoring stations. Surveys will target wetland features that are to be retained. *Frequency*: three times in one year	Surveys will continue at stations established during pre-construction monitoring and incorporate newly constructed wetland areas following their construction. *Frequency:* annually; three times per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; three times per year in Years 1, 3, and 5 post-construction.	Anuran call surveys will be utilized as one indicator of wetland health and integrity throughout the development timeline. Breeding anurans will be monitored following the Marsh Monitoring Protocol (MMP) (BSC 2009b). Surveys will be conducted three times per year, with Survey 1 between April 15-30, Survey 2 between May 15-31, and Survey 3 between June 15-30. Surveys will be conducted when night time air temperature is greater than 5˚C (Survey 1), 10˚C (Survey 2) and 17˚C (Survey 3). During surveys, each station will be surveyed for three minutes. Species, call code, and number of individuals (if possible) will be recorded. Surveys will be completed between 30 minutes after sunset and midnight. Monitoring stations will be initially positioned around each retained wetland feature. Additional stations will be established around the proposed wetland creation and enhancement areas following their construction.

Monitoring Parameter	Pre-construction Monitoring *To be completed prior to the start of construction*	During Construction Monitoring *Commences with the onset of any construction activities.*	Post-Construction Monitoring *Commences following 90% build-out.*	Details
Snake Emergence Surveys *Seasonal Timing:* Early Spring (late March to mid-May)	The pre-construction period will establish the initial monitoring areas. Surveys will target areas identified as candidate reptile hibernacula. *Frequency*: five times in one year	Surveys will continue at stations established during pre-construction monitoring until they are removed. Monitoring will transition to any retained hibernaculum habitat and newly constructed artificial hibernacula as they are developed. *Frequency:* annually; five times per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; five times per year in Years 1, 3, and 5 post-construction.	Snake emergence surveys will be completed in all areas identified as candidate reptile hibernaculum through the significant wildlife habitat analysis within the Master EIS. Emergence surveys will utilize visual encounter survey (VES) methodologies as well as the use of artificial cover object (ACO) surveys in the form of snake coverboards. Surveys will follow those outlined in the Survey Protocol for Ontario's Species at Risk Snakes (MNRF 2016a). Five VES will be conducted on sunny days when air temperature is > 5 ºC or on days with a mix of sun and cloud when air temperature is >10 ºC. Surveyors should slowly walk through candidate habitats while watching for basking and foraging snakes, as well as searching under cover objects such as logs, rocks, etc. ACOs should be placed in the late fall, prior to the survey year. The most commonly accepted design for snake coverboards in Southern Ontario is a flat, 120cm by 120cm piece of 2.5cm thick plywood, painted black. Coverboards will be placed near candidate hibernacula in open and semi-open areas that receive ample sun exposure. Coverboards will be checked during concurrently with the VES in early spring. Generally, coverboards should be checked in the morning or early evening when air temperature >10 °C. Across all surveys, all evidence of snakes will be recorded including observed species, behaviour, age class and sheds. Initial surveys will target all areas identified as candidate reptile hibernaculum habitat within the Master EIS (NRSI 2023). Pre-construction surveys will attempt to confirm the specific location of the hibernaculum within the candidate habitat locations. Monitoring will continue throughout the development timeline in all retained natural features that contain candidate reptile hibernaculum. Prior to the removal of any candidate reptile hibernaculum during construction, it is recommended that the construction of artificial hibernacula should occur within the newly developed natural areas. Artificial hibernaculum construction should follow the considerations outlined in the Best Management Practices for Identifying, Managing and Creating Habitat for Ontario's Species at Risk Snakes (MNRF 2018b). Following the implementation of exclusion fencing around the existing hibernacula that are to be removed, snakes from existing hibernacula should be relocated to the artificial hibernacula prior to their documented hibernation period. Subsequent monitoring years should include these newly constructed artificial hibernacula in all emergence surveys through the end of the post-construction period.
Turtle Nesting Surveys *Seasonal Timing:* Late May to early July	The pre-construction period will establish the initial monitoring areas. Surveys will target areas identified as candidate turtle nesting habitat. *Frequency*: six times in one year	Surveys will continue at stations established during pre-construction monitoring until they are removed. Monitoring will transition to any retained nesting habitat and any probable habitat within newly constructed natural areas as they are developed. *Frequency:* annually; six times per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi- annually; six times per year in Years 1, 3, and 5 post-construction.	Turtle nesting surveys will be conducted throughout all areas identified as candidate turtle nesting habitat through the significant wildlife habitat analysis within the Master EIS. Surveys will follow the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2015b). Nesting surveys will occur throughout the known turtle nesting period in Southern Ontario, between late May and early July. Surveys will commence upon the first reports of nesting activity within the region for a given year. Six nesting surveys will be conducted between 1800hr and 2200hr. Nesting surveys can occur in any weather with an air temperature >14°C, but should target evenings after rainfall or during period of light rain. Nesting surveys will consist of areas searches within candidate turtle nesting habitats. All evidence of turtle nesting activity will be recorded including observed species, tracks, confirmed nests, predated nests, egg shells and abandoned nest holes. Initial surveys will target all areas identified as candidate turtle nesting habitat within the Master EIS. The first survey of each season should be utilized to establish the appropriate areas to be surveyed. Survey locations will need to be adjusted as exclusion fencing is implemented and as newly developed natural areas are constructed. All surveys following the commencement of construction activities should be

Monitoring Parameter	Pre-construction Monitoring *To be completed prior to the start of construction*	During Construction Monitoring *Commences with the onset of any construction activities.*	Post-Construction Monitoring *Commences following 90% build-out.*	Details
				adjusted and targeted to retained candidate habitats and any new areas of increased nesting activity observed in previous years.
Turtle Overwintering Surveys *Seasonal Timing:* Early Spring (late March to mid-May)	The pre-construction period will establish the initial monitoring areas. Surveys will target areas identified as candidate turtle overwinter habitat. *Frequency*: five times in one year	Surveys will continue at stations established during pre-construction monitoring until they are removed. Monitoring will transition to any retained overwintering habitat and any probable habitat within newly constructed natural areas as they are developed. *Frequency:* annually; five times per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; five times per year in Years 1, 3, and 5 post-construction.	Turtle overwintering surveys (i.e. spring basking surveys) will be conducted at all open water features identified as candidate turtle overwinter habitat through the significant wildlife habitat analysis within the Master EIS. Surveys will follow the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2015b) for open water habitats. Five surveys will be carried out between 800hr and 1700hr throughout the turtle emergence season reported for Southern Ontario. Surveys will be conducted during sunny periods when the air temperature is warmer than water temperature and is > 5 °C. Surveys can be carried out on partially cloudy or overcast days only when air temperature is >15 °C and is higher than water temperature. Turtle overwintering surveys will consist of binocular-assisted area searches. Surveyors should focus on any basking sites within the targeted habitats including hummocks, floating logs, rocks and sunlit shorelines, but attention should be given to scan the water's surface and within aquatic vegetation for aqua-basking turtles. Initial surveys will target all areas identified as candidate overwintering habitat within the Master EIS. All surveys following the commencement of construction activities should be adjusted and targeted to retained candidate habitat and any newly developed open water areas that are likely to support turtle overwintering.
Additional Wildlife Surveys				
Breeding Bird Surveys *Seasonal Timing:* May 24-July 10	The pre-construction period will establish the initial monitoring stations. Surveys will target natural features that are to be retained. *Frequency*: twice in one year	Surveys will continue at stations established during pre-construction monitoring and incorporate new constructed natural areas as they are developed. *Frequency:* annually; twice per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; twice per year in Years 1, 3, and 5 post-construction.	Surveys targeting breeding birds will be completed in or adjacent to all natural features. Two early morning, ten-minute point-count surveys will be completed at least ten days apart between May 24 and July 10. Surveys will follow the Ontario Breeding Bird Atlas (OBBA) protocol (OBBA 2001). The presence, abundance, and level of breeding evidence will be recorded for each species during surveys. Bird species observed outside of point counts (but during breeding bird site visits) will be recorded; location, behaviour and breeding evidence will be documented. Monitoring stations will be initially positioned within retained natural features. Additional stations will be established throughout newly developed natural areas following their construction.
Road Mortality Surveys *Seasonal Timing:* Spring (March-May) and Summer (July-August)	The pre-construction period will target existing roads where wildlife is likely to cross between two natural features. *Frequency*: six times in one year	Surveys will continue at stations established during pre-construction monitoring, with new stations added as road construction is completed. *Frequency:* annually; six times per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; six times per year in Years 1, 3, and 5 post-construction.	Road mortality surveys will focus on resident herpetofauna and small mammal species; however, observations of other taxa will also be recorded. Road mortality surveys will be modelled after those outlined in the Survey Protocol for Ontario's Species at Risk Snakes (MNRF 2016a) but will target all taxa. Surveys will involve walking the designated road segment during the late evening (between 30 minutes after sunset and before midnight) or during early morning hours when weather is suitable. Surveys will be completed three times in the spring (March-May) and three times in summer (June-August). The location, number, species, sex (if known) and status (alive, dead, injured) will be recorded for all wildlife mortalities observed. The number of vehicles observed using the road during each survey will also be recorded. Road mortality surveys will occur along roads where wildlife is likely to cross between natural features. These locations should include all areas where natural features exist, or will exist, on either side of the road. Initial surveys will focus on pre-existing roads around the Subject Lands. Additional road surveys will be added throughout the during construction phase as roads are constructed.

Monitoring Parameter	Pre-construction Monitoring *To be completed prior to the start of construction*	During Construction Monitoring *Commences with the onset of any construction activities.*	Post-Construction Monitoring *Commences following 90% build-out.*	Details
Wildlife Camera Monitoring *Seasonal Timing:* Spring (April-May) to late-Summer (August-September)	The pre-construction period be used to identify locations where monitoring will be needed. Areas where wildlife is likely to cross between two natural features will be targeted. *Frequency*: once in one year	Surveys will continue at stations chosen during pre-construction monitoring, with new stations added as culver installation is completed. *Frequency:* annually; once per year; continuing until 90% build-out is complete	Surveys will continue at stations finalized during construction monitoring. *Frequency:* semi-annually; once per year in Years 1, 3, and 5 post-construction.	Wildlife cameras will be utilized to monitor wildlife usage of certain road crossings and wildlife corridors. Movement-triggered wildlife cameras will be placed at key culvert crossing following their construction. Culverts that are likely to be utilized by wildlife, culverts that connect two natural features (retained or newly constructed), should be targeted. Cameras will be installed, one at each end of the culvert. Cameras will be in operation from mid-spring to late-summer to capture the activity of the largest number of taxa. Captured images will be analyzed for wildlife species, number, behaviour, and direction of movement. Additional cameras should be placed along the proposed constructed natural areas along the central corridor of the Subject Lands following its construction. Analysis of these cameras will be used to quantify the usage of the feature by wildlife through to the end of the post-construction period. The number and placement of the wildlife cameras will continuously need to be adjusted across monitoring years as culverts and natural areas are constructed. Once a monitoring location has been established, monitoring should continue at that location until the end of the monitoring period.
Winter Wildlife Surveys *Seasonal Timing:* January to February	Surveys will target natural features that are to be retained. *Frequency*: once in one year	Surveys will continue to target retained natural features and incorporate newly constructed natural areas as they are developed. *Frequency:* annually; once per year; continuing until 90% build-out is complete	Surveys will continue in all natural features finalized during construction monitoring. *Frequency:* semi-annually; once per year in Years 1, 3, and 5 post-construction.	To assess general wildlife usage throughout the natural areas, an annual winter wildlife survey will be conducted within the natural areas. Surveys will be conducted following >2cm of fresh snowfall to ensure all animals tracks are visible to biologists. All animals, calls, tracks, scat, browse and all other signs of over-wintering habitat use within the natural areas will be documented. Any changes in the edge habitats along the natural features will be noted. Initial surveys will target retained natural features. Constructed natural corridors and natural areas will be included following their development.
Artificial Bat Roosting Structure Monitoring *Seasonal Timing:* Mid-June to late July	The pre-construction period will be used to identify areas where artificial bat roosting structures are likely to be required. *Frequency*: twice in one year	Monitoring at artificial bat roosting structures will commence following their deployment. *Frequency:* annually; twice per year; continuing until 90% build-out is complete	Surveys will continue at structures installed during construction monitoring. *Frequency:* semi-annually; twice per year in Years 1, 3, and 5 post-construction.	It is anticipated that the proposed development will require the installation of artificial bat roosting structures. Artificial roosting structures will be installed to provide interim roosting habitat until buffer and restoration plantings have matured. They will be installed after site grading is complete, and prior to May 1 of the year following vegetation removal within the feature. The number of structures required is yet to be determined. Monitoring and maintenance of the artificial roosting structures will be conducted following their installation. Maintenance of the structures will be conducted as-needed in each of the first 5 years post-installation. Monitoring for use of the structures by bats will be conducted twice a year between mid-June and the end of July. Monitoring will continue at each structure in each of Year 1, Year 3, and Year 5 post-installation
Qualitative Surveys for Enhancement and Management Needs				
Fixed Photo Plot Monitoring *Seasonal Timing:* Spring (May-June) and late summer/early fall (August-September)	The pre-construction period will establish the initial monitoring stations. Surveys will target natural features that are to be retained. *Frequency*: twice in one year	Surveys will continue at stations established during pre-construction monitoring, with new stations added at newly constructed natural areas as they are developed. *Frequency:* annually; twice per year; continuing until 90% build-out is complete	Surveys will continue in all stations finalized during construction monitoring. *Frequency:* semi-annually; twice per year in Years 1, 3, and 5 post-construction.	A qualitative inventory of natural features, buffers, and restored areas will be completed by capturing images in the same location and orientation. Photographs will be used to establish baseline conditions and document future sources of disturbance, restoration success, and other changes over time. Initial surveys will target retained natural features. Constructed natural corridors and natural areas will be included following their development. Monitoring will occur twice per year in spring (May-June) and late summer/early Fall (August-September), and will be completed simultaneously with Natural Feature and Buffer Integrity Monitoring.

Monitoring Parameter	Pre-construction Monitoring *To be completed prior to the start of construction*	During Construction Monitoring *Commences with the onset of any construction activities.*	Post-Construction Monitoring *Commences following 90% build-out.*	Details
Natural Feature and Buffer Integrity Monitoring *Seasonal Timing:* June to September	*Frequency*: twice in one year	*Frequency:* annually; twice per year; continuing until 90% build-out is complete	*Frequency:* semi-annually; twice per year in Years 1, 3, and 5 post-construction.	Area inspections within and adjacent to retained natural features and buffers will be completed twice per year between June and September, simultaneously with Fixed Photo Plot Monitoring. Surveys will identify general biophysical conditions and areas that may require additional enhancement or management measures. Information collected will include: • Site changes (e.g., vandalism, unauthorized footpaths, waste dumping, invasive species establishment and/or proliferation) • Encroachment into natural areas and buffers (e.g., fence removal, dumping of leaf litter, construction debris) • General condition and continued presence of existing regionally rare vegetation species Following the construction of new natural areas, surveys will incorporate these new buffer areas through to the end of the post-construction period.
Reporting				
Monitoring Reports	The Pre-Construction Monitoring Report will focus on synthesizing existing survey data from the Master EIS with the results of the pre-construction surveys that are to be completed (as detailed above). This report will describe the pre-development, baseline conditions of the natural features on site, and will be the reference for interpreting survey results in future monitoring years.	During Construction Monitoring Reports will be prepared at the end of each monitoring year. These reports will document any temporary impacts to the retained and newly constructed natural features from construction activities, and the corrective actions and any additional mitigation measures taken by the proponent to remedy any identified issues.	Post-Construction Monitoring Reports will be prepared at the end of each monitoring year (Years 1, 3, and 5 following 90% subdivision build-out). These reports will interpret monitoring data in the context of baseline conditions, provide potential rationale for any observed changes or impacts, and detail any remaining mitigation measures that may be necessary.	Monitoring Reports will be prepared following the completion of surveys in each year during which monitoring surveys are conducted. Survey methodologies, dates and results will be summarized in each report. Interpretations of monitoring data will be provided as per the descriptions in the columns to the right. Maps showing the location of monitoring stations and any notable results (e.g., significant species sightings) will be provided along with a list of all plant and wildlife species observed. Monitoring reports will be prepared for the Proponent, and submitted to agency staff upon request.

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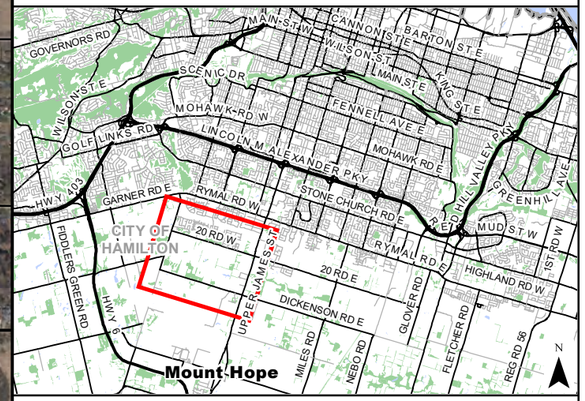
Maps

Map 1

Upper West Side Secondary Plan

Study Area



Legend

- Study Area
- Primary Road
- Secondary Road
- Participating Lands
- Urban Expansion Areas
- Western Survey Block
- Eastern Survey Block
- Central Survey Block
- Non-Participating Lands
- Dickenson Draft Plan Study Area

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1974E Date: November 14, 2023	NAD83 - UTM Zone 17 Size: 11x17" **1:12,000**

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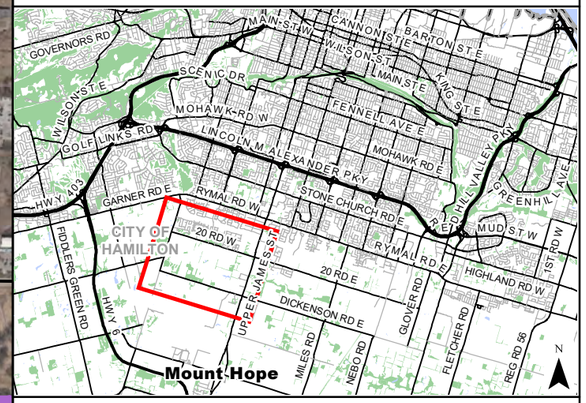
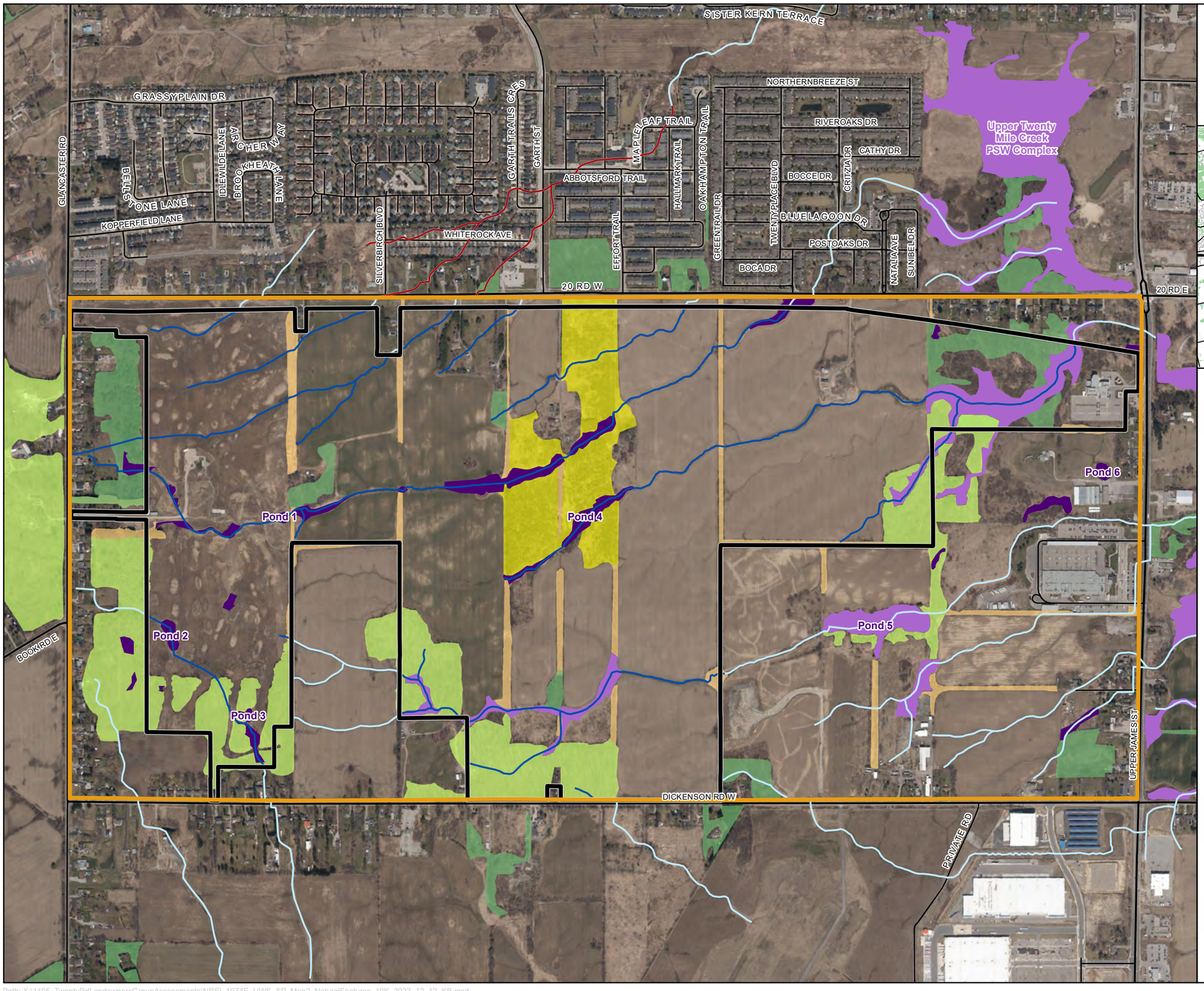
Map 2

Upper West Side Secondary Plan

Existing Natural Features





Legend

- Study Area
- Participating Lands
- Primary Road
- Secondary Road
- Headwater Drainage Feature (HDF)
- Drainage Feature (outside Participating Lands)
- Piped Drainage Feature (outside Study Area)
- Provincially Significant Wetland (PSW)
- Other Wetland
- Significant Woodlot
- Other Woodlot
- Naturalizing Orchard
- Hedgerow

Natural Resource Solutions Inc.
Aquatic, Terrestrial and Wetland Biologists

Project: 1974E
Date: December 12, 2023

NAD83 - UTM Zone 17
Size: 11x17"
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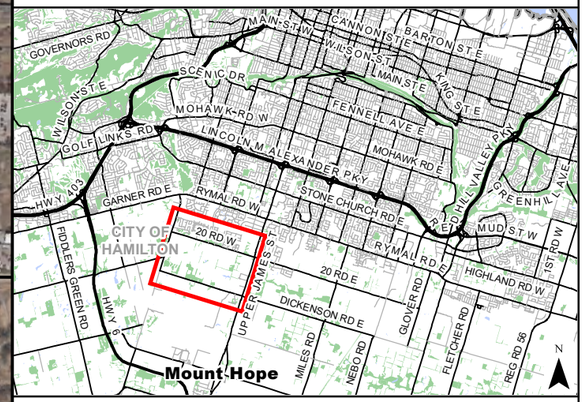
Map 3

Upper West Side Secondary Plan

Bird Monitoring Stations



Legend

- Upper West Side Community
- Participating Lands
- Primary Road
- Secondary Road
- 2018 Breeding Bird Monitoring (BMB)
- 2020 Breeding Bird Monitoring (BMB)
- 2020 Marsh Breeding Bird Monitoring (MBB)

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1974E Date: December 13, 2023	NAD83 - UTM Zone 17 Size: 11x17" **1:10,000**

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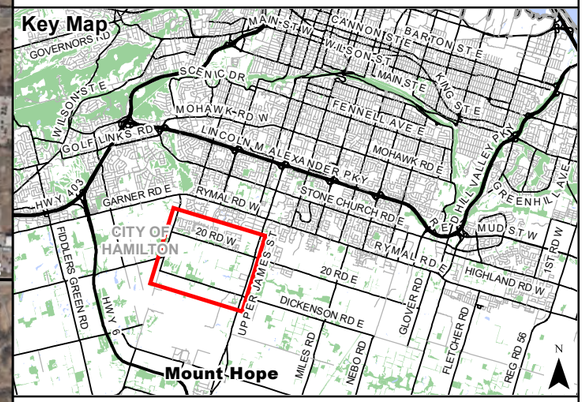
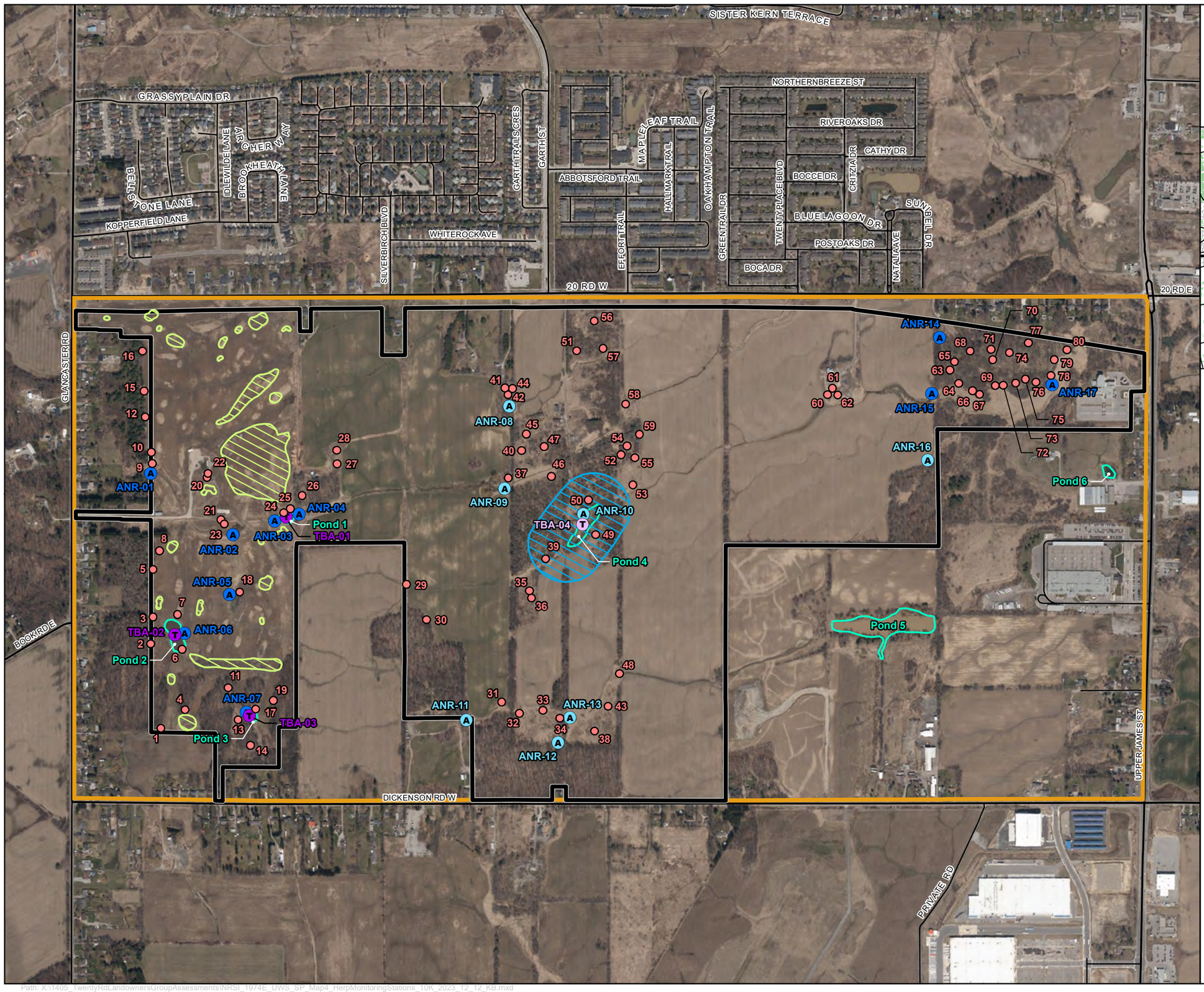
Map 4

Upper West Side Secondary Plan

Herpetofauna Monitoring Stations





Legend

- Study Area
- Participating Lands
- Primary Road
- Secondary Road
- Snake Coverboard (#)
- Pond
- Turtle Nesting Habitat Assessment Area (2018)
- Turtle Nest and Nesting Survey Area (2020)

Anuran Call Station (ANR)

- 2018
- 2020

Turtle Overwintering Monitoring Station (TBA)

- 2018
- 2020

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Aquatic, Terrestrial and Wetland Biologists

Project: 1974E
Date: December 12, 2023

NAD83 - UTM Zone 17
Size: 11x17"
1:10,000

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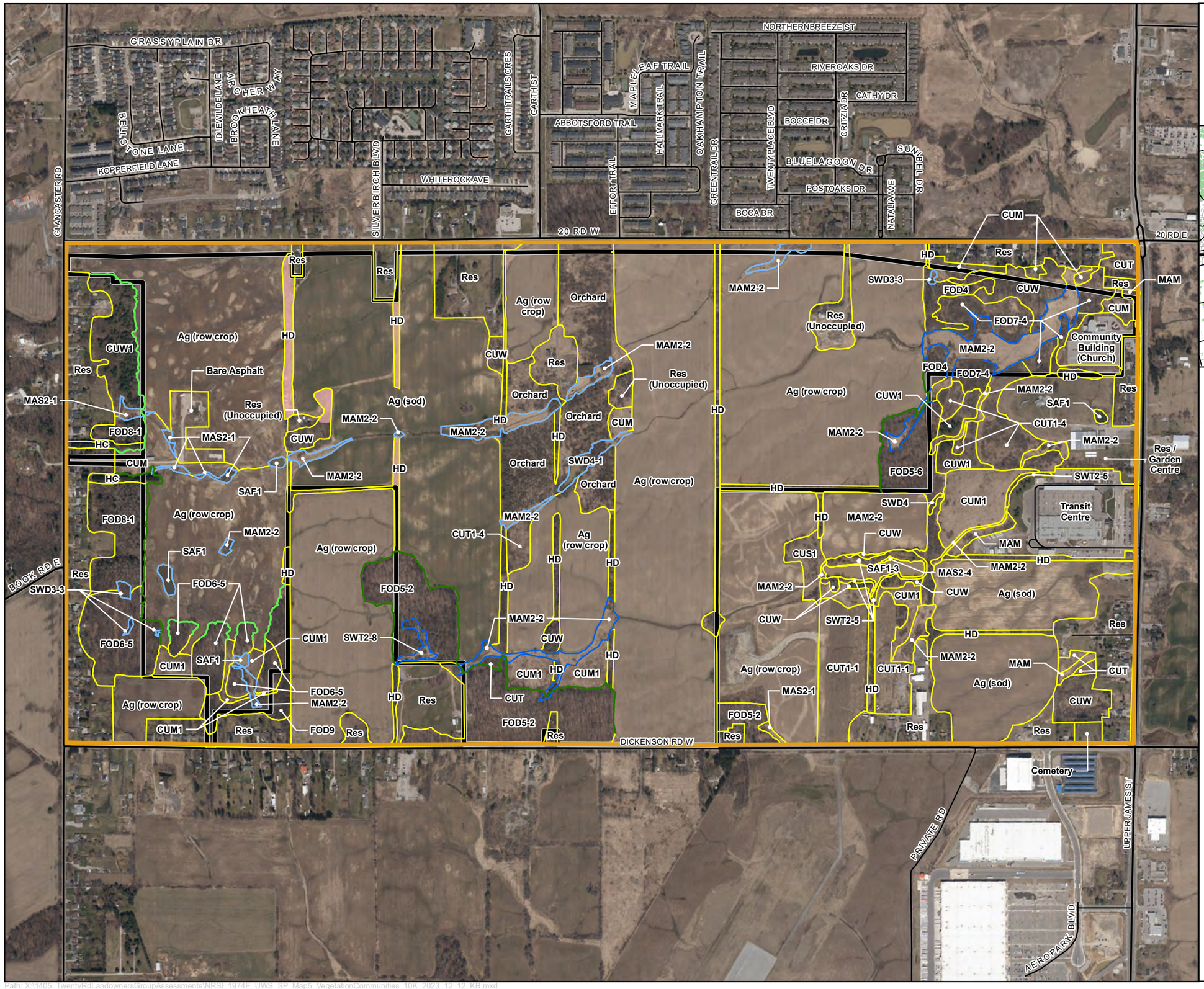
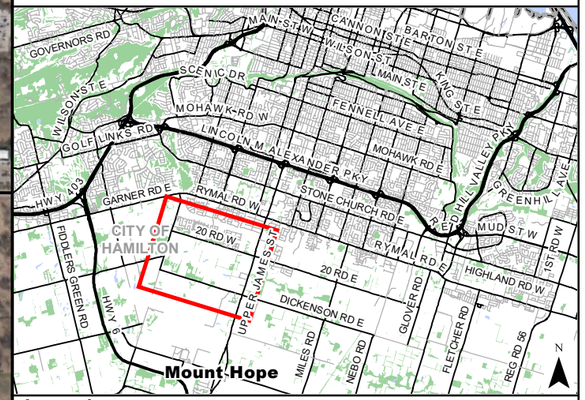
Map 5

Upper West Side Secondary Plan

Vegetation Communities





Legend

- Study Area
- Participating Lands
- Removed Spring 2023
- Significant Woodland - Reviewed by NPCA and City of Hamilton Staff on December 8, 2017 and September 15, 2020
- Vegetation Edge
- Upper Twenty Mile Creek PSW - Reviewed by NPCA and City of Hamilton Staff on August 8, 2019 and September 15, 2020
- Other Wetland - Reviewed by NPCA and City of Hamilton Staff on August 8, 2019 and September 15, 2020
- Ecological Land Classification (ELC)

(Ag) Agriculture
(CUM) Cultural Meadow
(CUM1) Mineral Cultural Meadow Ecosite
(CUS1) Mineral Cultural Savannah Ecosite
(CUT) Cultural Thicket
(CUT1-1) Sumac Cultural Thicket Type
(CUT1-4) Gray Dogwood Cultural Thicket Type
(CUW) Cultural Woodland
(CUW1) Mineral Cultural Woodland Ecosite
(FOD4) Dry - Fresh Deciduous Forest Ecosite
(FOD5-2) Dry - Fresh Sugar Maple - Beech Deciduous Forest Type
(FOD5-6) Dry - Fresh Sugar Maple - Basswood Deciduous Forest Type
(FOD6-5) Fresh - Moist Sugar Maple - Hardwood Deciduous Forest Type
(FOD7-4) Fresh - Moist Black Walnut Lowland Deciduous Forest Type
(FOD8-1) Fresh - Moist Poplar Deciduous Forest Type
(FOD9) Fresh - Moist Oak-Maple - Hickory Deciduous Forest Ecosite
(HC) Coniferous Hedgerow
(HD) Deciduous Hedgerow
(MAM) Meadow Marsh
(MAM2-2) Reed-canary Grass Mineral Meadow Marsh Type
(MAS2-1) Cattail Mineral Shallow Marsh Type
(MAS2-4) Broad-leaved Sedge Mineral Shallow Marsh Type
(Orchard) Naturalizing Orchard
(Res) Rural Residential Dwelling
(SAF1) Floating-leaved Shallow Aquatic Ecosite
(SAF1-3) Duckweed Floating-leaved Shallow Aquatic Type
(SWD3-3) Swamp Maple Mineral Deciduous Swamp Type
(SWD4) Mineral Deciduous Swamp Ecosite
(SWD4-1) Willow Mineral Deciduous Swamp Type
(SWT2-5) Red-osier Dogwood Mineral Thicket Swamp Type
(SWT2-8) Silky Dogwood Mineral Thicket Swamp Type

Note: Vegetation communities outside of the Participating Lands were assessed by NRSI biologists from property boundaries and/or through a review of aerial imagery. ELC designations applied in these areas represent course-level approximations only.

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1974E
Date: December 12, 2023

NAD83 - UTM Zone 17
Size: 11x17"
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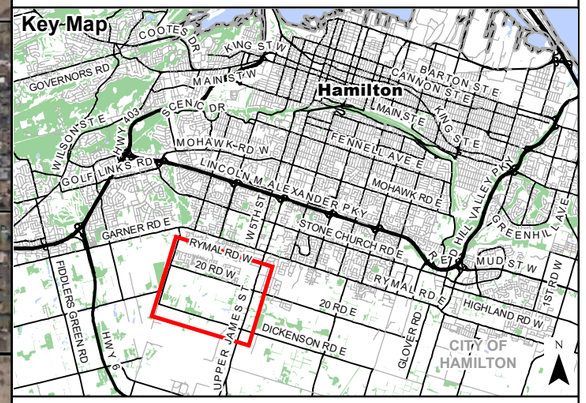
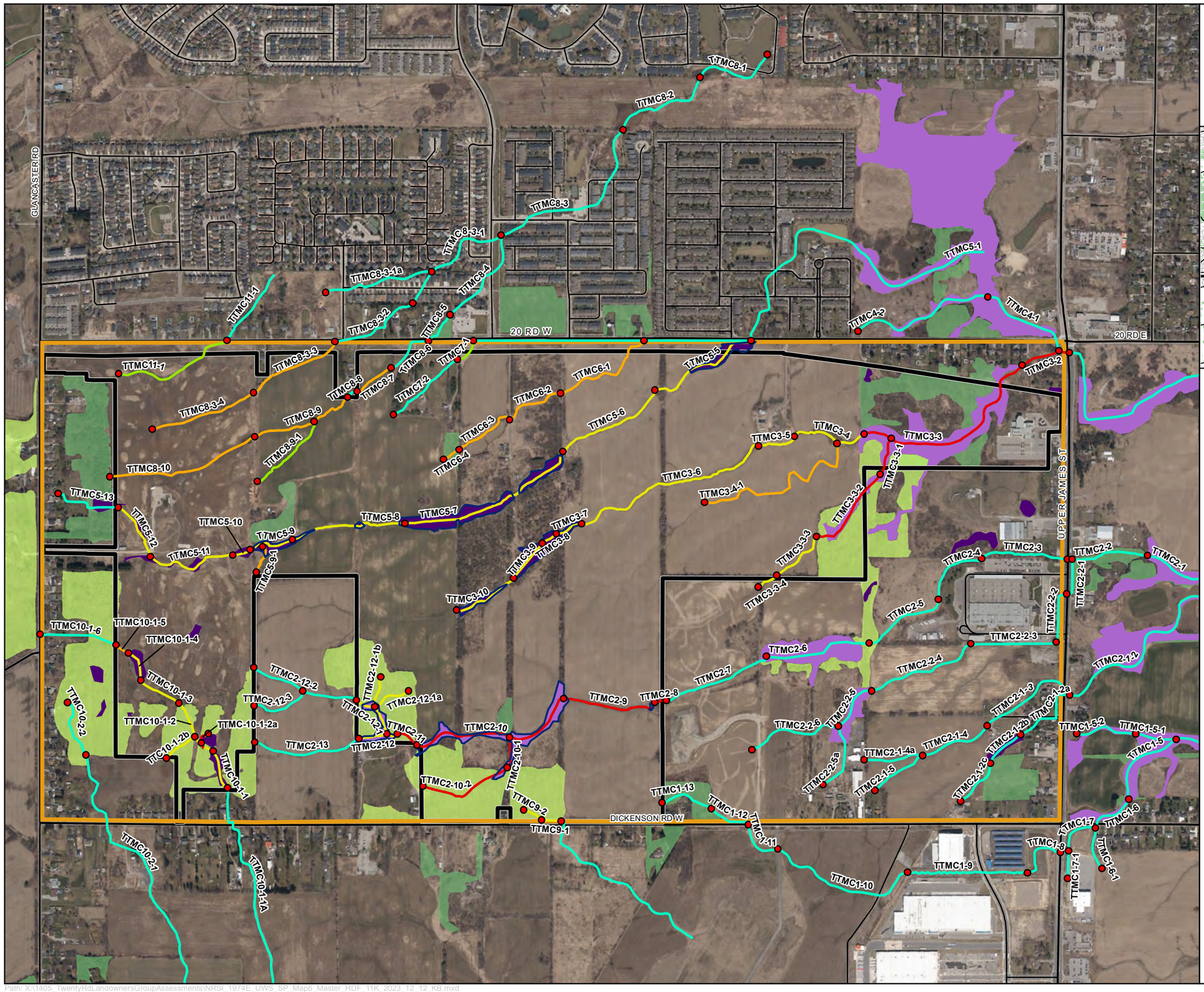
Map 6

Upper West Side Secondary Plan

Headwater Drainage Features





Legend

- Participating Lands
- Primary Road
- Secondary Road
- Surveyed Wetlands (NRSI 2019)
- Provincially Significant Wetland (PSW)
- Other Wetland
- Significant Woodlot
- Other Woodlot

Headwater Drainage Feature Management (GEO Morphix & NRSI 2023)

- Protection
- Conservation
- Mitigation
- Management Recommendations to be Determined
- No Management Required
- Reach Break

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Project: 1974E
Date: December 12, 2023

NAD83 - UTM Zone 17
Size: 11x17"
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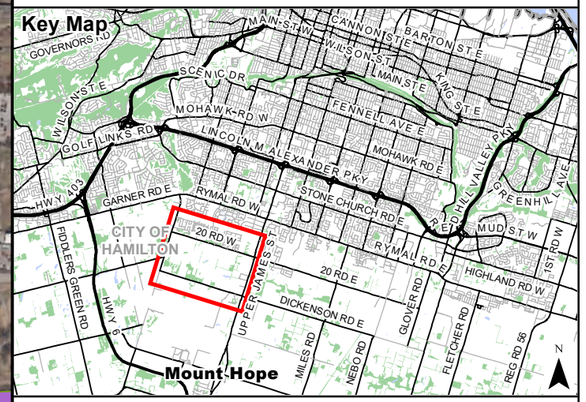
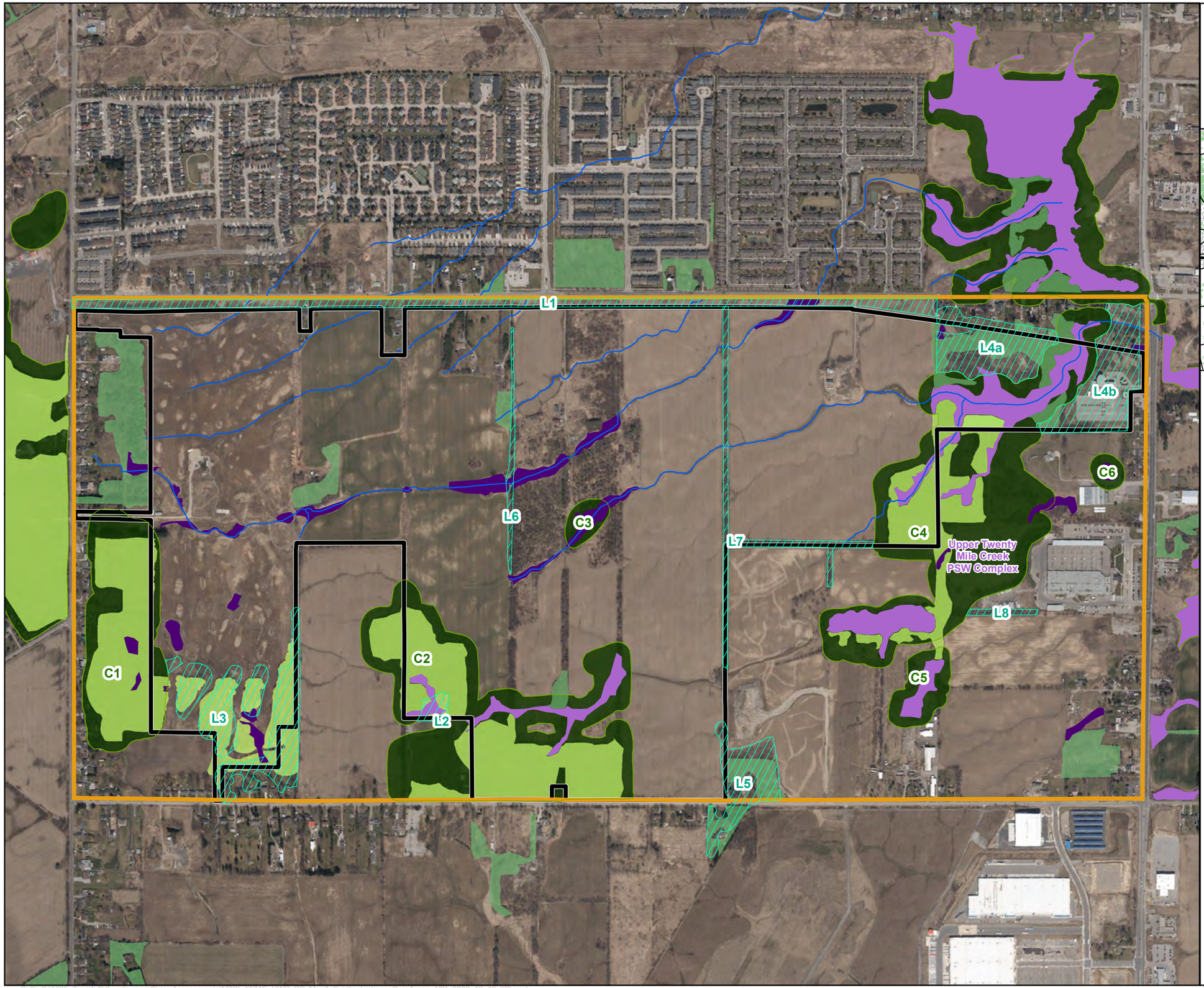
Upper West Side Secondary Plan

Existing Mapped Linkages and Core Areas

Map 7





Legend

- Study Area
- Participating Lands
- Streams
- Other Wetland
- Provincially Significant Wetland (PSW)
- Significant Woodlot
- Other Woodlot
- Linkages
- Core Area*

*As per City of Hamilton Urban and Rural Official Plan (2012, 2013) Schedule B and AEGD Secondary Plan Map B-8.2

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1974E
Date: December 13, 2023

NAD83 - UTM Zone 17
Size: 11x17"
1:10,000

0 200 400 600 Metres

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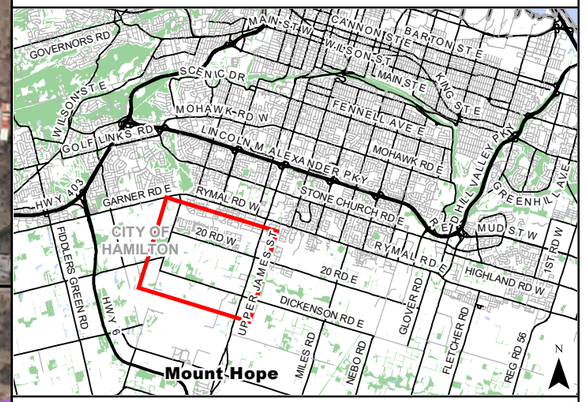
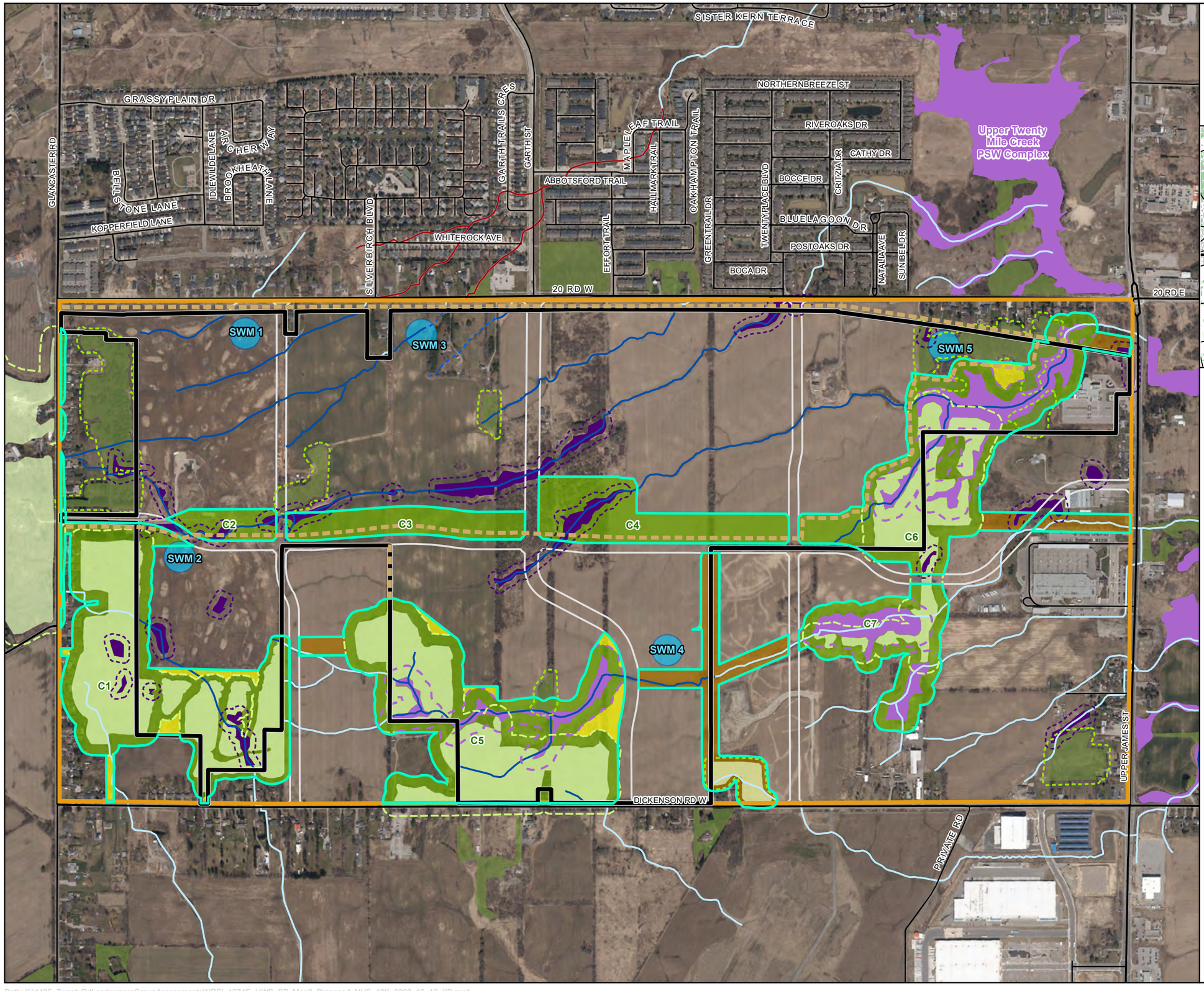
Map 8

Upper West Side Secondary Plan

Proposed Natural Heritage System





Legend

- Upper West Side Community
- Participating Lands
- Primary Road
- Secondary Road
- Headwater Drainage Feature (HDF)
- Drainage Feature (not assessed)
- Drainage Feature (outside Participating Lands)
- Piped Drainage Feature (outside Study Area)
- Provincially Significant Wetland (PSW)
- PSW VPZ (30m)
- Other Wetland
- Other Wetland VPZ (15m)
- Significant Woodlot
- Significant Woodlot VPZ (15-30m)
- Other Woodlot
- Other Woodlot VPZ (10m)

Proposed Land Use Plan

- Garth Street Extension and Collector Road Network
- Walking Trail
- Stormwater Management (SWM)

Proposed Natural Heritage System

- Natural Heritage System
- Core Area
- Linkage
- Enhancement Area

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Aquatic, Terrestrial and Wetland Biologists

Project: 1974E
Date: December 13, 2023

NAD83 - UTM Zone 17
Size: 11x17"
1:10,000

0 100 200 300 400 500 600 Metres

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Appendix I
Upper West Side Secondary Plan – Land Use Plan

GARTH STREET

TWENTY ROAD WEST

SWM 1

SWM 3

COLLECTOR ROAD A

GARTH STREET EXTENSION

ES

COLLECTOR ROAD B

SWM 5

COLLECTOR ROAD C

COLLECTOR ROAD C

COLLECTOR ROAD C

SWM 2

ES

SWM 4

COLLECTOR ROAD A

COLLECTOR ROAD B

COLLECTOR ROAD C

GLANCASTER ROAD

UPPER JAMES STREET

DICKENSON ROAD

Legend

Residential Designations

- Low Density Residential
- Low Density Residential 2
- Medium Density Residential
- High Density Residential

Parks and Open Space Designations

- Neighbourhood Park
- Community Park
- Natural Open Space

Other Designations

- Institutional
- Mixed Use
- ES — Elementary School
- SES — Separate Elementary School
- Utility
- SWM — Conceptual Storm Water Management Pond Location

Other Features

- Urban Expansion Areas
- Airport Employment Growth District Secondary Plan (Designations not Proposed to Change)
- Secondary Plan Boundary
- Proposed Walking Trail
- Conceptual Pedestrian Crossing Location
- John C. Munro Hamilton International Airport
- Urban Boundary
- Study Area Limits

Council Adopted: MONTH XX, YEAR
Ministerial Approval: MONTH XX, YEAR
Effective Date: MONTH XX, YEAR

Urban Hamilton Official Plan

Upper West Side Secondary Plan

Land Use Plan

Map XX-X

Scale: N.T.S.

Date: Nov 2023

Prepared By: HA

Reviewed By: NW

UPPER WEST SIDE

Appendix II

Upper West Side Secondary Plan Master EIS, LA, and TPP Terms of Reference
(July 17, 2023)

From: Desta Frey <dfrey@nrsi.on.ca>
Sent: May 8, 2018 3:57 PM
To: Nyssa Hardie
Subject: Fwd: RE: Background Information Request- Twenty Road West, Hamilton (1974A)
Attachments: Hamilton.pdf; InfoRequest_GlanbrookIndustrialPark.pdf; NRSI_1974A_Guelph_NH_InfoRequest_2018_03_01.pdf; NRSI_1974A_Study Area_Glanbrook IP EIS and EA_2018_03_01.jpg

Sent from TypeApp
On May 8, 2018, at 1:37 PM, "ESA Guelph (MNRF)" <esaguelph@ontario.ca> wrote:

> Hello Desta,
>
> Please accept the attached response letter to your information request. If you have any questions or require further assistance, please don't hesitate to contact me.
>
> Best Regards,
>
> David
>
> **David Denyes**
> Management Biologist
> Ministry of Natural Resources and Forestry
> Vineland Field Office
> 4890 Victoria Avenue North
> Vineland Station ON, L0R 2E0
> Tel: 905 562-1196 Fax: 905 562-1154
> david.denyes@ontario.ca
>
> **From:** Desta Frey [mailto:dfrey@nrsi.on.ca]
> **Sent:** March 1, 2018 4:34 PM
> **To:** ESA Guelph (MNRF)
> **Cc:** Nyssa Hardie
> **Subject:** Background Information Request- Twenty Road West, Hamilton (1974A)

Good afternoon,

I am emailing to request background information for a group of properties located in Hamilton on Twenty Road West. NRSI has been retained to complete an EIS for a Draft Plan of Subdivision application and the environmental component of a Class C EA for a collectors road network within the block bounded by Twenty Road West to the north, Upper James Street to the east, Dickenson Road to the south, and Glancaster Road to the west. Please find a completed background information request form and a map of the study area attached to this email.

If any additional information is required at this time, please let me know. I look forward to receiving this information at your earliest convenience.

Thank you very much,

Desta

--

Desta Frey M.Sc.
Terrestrial and Aquatic Biologist
Natural Resource Solutions Inc.
225 Labrador Drive, Unit 1
Waterloo, ON N2K 4M8
(p) 519-725-2227 (f) 519-725-2575
(w)www.nrsi.on.ca (e) dfrey@nrsi.on.ca

Ministry of Natural Resources And Forestry

Ministère des Richesses naturelles et des Forets

Box 5000
4890 Victoria Ave. N.
Vineland Station, Ontario
LOR 2E0

Telephone: (905) 562-4147
Facsimile: (905) 562-1154

05/08/2018

Desta Frey M.Sc.
Natural Resource Solutions Inc.
225 Labrador Drive, Unit 1
Waterloo, ON N2K 4M8
dfrey@nrsi.on.ca

RE: Glanbrook Industrial Park Draft Plan of Subdivision and Integrated Schedule "C" Class EA for Collectors Road Network
9511 Twenty Road West, City of Hamilton, ON

Dear Desta Frey,

The Ministry of Natural Resources and Forestry (MNRF), Guelph District – Vineland Field Office, has reviewed the natural heritage information available for the above-noted property and surrounding area (the "study area"), and offers the following comments:

WETLANDS

The Ministry notes that the following provincially significant wetland (PSW) is located on the subject property:

- Upper Twenty Mile Creek Wetland Complex

AREAS OF NATURAL AND SCIENTIFIC INTEREST

The Ministry notes that there are no Areas of Natural and Scientific Interest (ANSIs) within the study area.

FISHERIES

Restricted activity timing windows are applied to protect fish from impacts of undertakings in and around water during critical life cycle stages. The recommended timing restriction for Twenty Mile Creek within the study area is March 1st to June 30th. (Note: dates represent when work should be avoided).

The MNRF notes that the following fish species have been documented in Twenty Mile Creek above the escarpment: *banded killifish, black bullhead, black crappie, bluegill, bluntnose minnow, brown bullhead, central mudminnow, common carp, creek chub, fathead minnow, golden shiner, grass pickerel, green sunfish, johnny darter, largemouth bass, northern pike, pumpkinseed, rainbow darter, rock bass, sand shiner, tadpole madtom, white crappie, white sucker, and yellow perch*

SPECIES AT RISK

There are records in the area for the following species at risk (SAR):

- Snapping Turtle *(Chelydra serpentina)* (Special Concern)
- Barn Swallow *(Hirundo rustica)* (Threatened)
- Wood Thrush *(Hylocichla mustelina)* (Special Concern)
- Eastern Wood-Pewee *(Contopus virens)* (Special Concern)
- Eastern Meadowlark *(Sturnella magna)* (Threatened)
- Grass Pickerel *(Esox americanus vermiculatus)* (Special Concern)

Threatened and Endangered Species receive both individual species and habitat protection under the *Endangered Species Act, 2007* (ESA). SAR habitat prescribed under regulation is listed in Ont. Reg. 242/08 (https://www.ontario.ca/laws/regulation/080242).

Please be advised that because the province has not been surveyed comprehensively for the presence of listed species, the absence of a record does not necessarily indicate the absence of SAR from an area. To determine the presence of SAR for a given study area, the District's recommended approach is as follows:

I. Habitat Inventory

The Ministry recommends undertaking a comprehensive botanical inventory of the entire area that may be subject to direct and indirect impacts from the proposed activity. The vegetation communities should be classified as per the "Ecological Land Classification (ELC) for Southern Ontario" system, to either the "Ecosite" or "Vegetation Type" level. For aquatic habitats in the study area, we recommend that you collect data on the physical characteristics of the waterbodies and inventory the riparian zone vegetation, so that these habitats can be classified as per the Aquatic Ecosites described in the ELC manual.

II. Potential SAR within the Study Area

A list of SAR that have the potential to occur in the area can be produced by cross-referencing the ecosites described during the habitat inventory with the habitat descriptions of SAR known to occur within the planning area. The list of SAR known to occur in the **City of Hamilton** is attached for your reference. The species-specific COSEWIC status reports (https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html) are a good source of information on habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the Species at Risk in Ontario (SARO) List is a living document that is periodically amended as a result of species assessment and re-assessments conducted by the Committee on the Status of Species at Risk in Ontario (COSSARO). The SARO List can be accessed on the following webpage: https://www.ontario.ca/environment-and-energy/species-risk-ontario-list.

COSSARO also maintains a list of species to be assessed in the future. It is recommended that you take COSSARO's list of anticipated assessments into consideration, especially when the proposed start date of an activity is more than 6 months away, or the project will be undertaken over a period greater than 6 months. This list can be viewed at: https://www.ontario.ca/page/how-comment-protecting-species-risk.

III. SAR Surveys

The Ministry recommends that each potential SAR identified under Step II is surveyed for, regardless of whether or not the species has been previously recorded in the area. The survey report should describe how each SAR was surveyed for, and provide a rationale for why certain species were not afforded a survey (e.g., habitat within the study area is not suitable for a specific SAR). Please note that some targeted surveys may require provincial authorizations (e.g., ESA permit or Wildlife Scientific Collector's Permit).

ADDITIONAL INFORMATION

Natural heritage features (e.g. wetlands, ANSIs) can be viewed for a given study area through the MNRF's "Make a Map" web application: https://www.ontario.ca/page/make-natural-heritage-area-map. Digital data layers can be obtained through the Land Information Ontario (LIO) geowarehouse https://www.ontario.ca/page/land-information-ontario.

Additionally, the MNRF recommends contacting the municipality and the conservation authority to determine if they have any additional information or records of interest for the study area.

Please be advised that it is your responsibility to comply with all other relevant provincial or federal legislation, municipal by-laws, other MNRF approvals or required approvals from other agencies. If your investigations reveal the presence of Threatened or Endangered species, please contact the MNRF at esa.guelph@ontario.ca for further direction.

I trust that the above information is of assistance.

Sincerely,

David Denyes
Management Biologist

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

July 20, 2021 1974D

David Denyes
Management Biologist
Ministry of Natural Resources and Forestry,
Guelph District- Vineland Field Office
4890 Victoria Ave N, PO Box 5000
Vineland, ON L0R 2E0

Dear Mr. Denyes,

RE: Upper West Side, Hamilton
Wetland Complexing Evaluation: Upper Twenty Mile Creek Provincially Significant Wetland

Natural Resource Solutions Inc. (NRSI) was retained by the Upper West Side Landowners Group (UWSLG), care of Corbett Land Strategies (CLS) to complete natural heritage studies in support of several development applications for the lands referred to as the Upper West Side (UWS) in Hamilton, Ontario. The UWS lands are bounded by Twenty Road West to the north, Upper James Street to the east, Dickenson Road to the south, and Glancaster Road to the west (Map 1). The lands are in the Twenty Mile Creek watershed, which falls under the jurisdiction of the Niagara Peninsula Conservation Authority (NPCA) and the Ministry of Natural Resources and Forestry Guelph District – Vineland Field Office.

The UWSLG has initiated the following development and planning processes, and applications:

- A Municipal Comprehensive Review (MCR) GRIDS 2 Process Employment Lands Review;
- A Schedule 'C' Class Environmental Assessment (EA) for the extension of Garth Street and associated Collector Road Network;
- Urban Boundary Expansion applications; and
- Draft Plan of Subdivision for the central Garth Street corridor.

The UWSLG intends to initiate the following additional development and planning processes and applications:

- Secondary planning and Official Plan Amendment submissions for the urban boundary expansion areas; and
- Several Draft Plan of Subdivision applications for the remaining lands in the UWS block.

NRSI was retained to complete natural heritage studies in support these various processes and applications. Detailed field investigations have been carried out by NRSI biologists between 2018 and 2020 within the lands owned by the UWSLG (referred to as the 'participating lands', as shown on Map 1). These studies have informed the determination of environmental opportunities and constraints to development, including those related to wetlands.

Portions of the Upper Twenty Mile Creek Provincially Significant Wetland (PSW) Complex are identified both on and adjacent to the UWS, with the majority of the complex occurring to the east of the study area. On July 30 and August 6, 2019, and on June 2, 2020, NRSI biologists certified in the Ontario Wetland Evaluation System (OWES) delineated wetland boundaries within the participating lands of the UWS. These wetland boundaries, shown on Map 1, were field-verified by NPCA ecologists and City of Hamilton Natural Heritage Planning staff on August 8, 2019 and September 15, 2020.

During the site investigations, 2 wetland units were surveyed that are mapped as belonging to the PSW complex (Map 1). In total, 21 small (<0.5 ha) to medium-sized unevaluated and unmapped wetland units were also identified during the site investigations including 3 units that are outside of the participating lands of the study and were assessed from the road or property line and through aerial imagery interpretation (Map 1). In order to determine how NPCA policies apply to the subject property, NRSI conducted a wetland complexing exercise to determine if the newly identified wetland units should be included in the Upper Twenty Mile Creek PSW complex. This letter summarizes the results of the complexing exercise carried out in accordance with the OWES Manual for Southern Ontario (MNRF 2014).

The OWES manual provides guidance for determining when and if wetland polygons should be included in a wetland complex. Those factors include: watershed, distance from the PSW complex (<750m), size (>2ha) and ecological benefits of wetlands <2ha. The wetlands in question are all within the headwaters of the Upper Twenty Mile Creek watershed.

The participating lands contain 18 unevaluated wetland units with an additional 2 units beyond the southwest boundary and 1 unit to the southeast, near the intersection of Upper James Street and Dickenson Road West. Characteristics of the 21 unevaluated wetlands are outlined in Table 1, attached. There are 14 unevaluated wetlands within 750m of the PSW complex. The remaining 7 vary from 789m to 1075m away from nearest PSW unit (see Map 1), and therefore these units exceed the maximum distance between units of a complex based on the OWES criteria.

Wetland Unit 15 is approximately 70m west of a PSW unit and is connected by intermittent flow in a west to east direction. Butternut (*Juglans cinerea*), a Species at Risk (SAR), is not dependent upon wetland habitat, but was found growing in saturated soils at the edge of the wetland. Despite the wetland being only 0.38ha in size, the surrounding mature forest offers complimentary habitat to the wetland and the assemblage of vegetation is of higher quality than many other wetland units within the site. Due to the proximity and connection to PSW, the riparian cover, the quality of the wetland vegetation and the presence of a SAR associated with the wetland, there is justification for Unit 15 to be added to the PSW complex.

If Unit 15 was to be considered PSW, the proximity of many unevaluated wetland units in the western portion of the subject lands is increased. Despite their proximity, there is a drainage divide that exists between Unit 15 and all other units to the west and north. Units 16, 18, 19, 20 and 21 all drain south towards Dickenson Road in a sub-catchment that is somewhat removed from the rest of the subject lands. The collective group of Units 1-8 all drain toward Unit 9 near Twenty Road West. The headwater drainage feature that connects Units 1-9 includes three sections of conveyance through tilled agricultural field (150m, 150m and 500m respectively). For these reasons, we do not see reason to extend the PSW Complex beyond Unit 15.

Of the 21 wetland units within the participating lands, 19 are less than 0.5ha in size, and most are less than 0.2ha. Guidance in the OWES manual states that these small wetlands should

only be included as part of a complex when they provide important ecological benefit to the complex. During site investigations it was determined that the majority of these wetlands are long, narrow features dominated by Reed-canary Grass (*Phalaris arundinacea*) on clay-loam soil, which indicates low quality wetland habitat with limited recharge and flood attenuation capacity. Many of these features have a history of channel excavation and being mowed or cleared of vegetation as part of golf course maintenance or farming activities. These wetland pockets all appear to be a result of historical agricultural activities and human disturbance such as tilling, resulting in a lack of drainage at the edge of fields, fill placement for a laneway and other minor earthmoving activities.

Wetland Unit 10, Unit 19, Unit 20 and Unit 21 are all isolated features with no defined outflow; topography and silt-clay soils generally suggest that accumulated precipitation is held within these features where it evaporates or infiltrates. Although Units 17 and 18 are considered palustrine wetlands with topography that indicates periodic outflow, it is anticipated that outflow occurs very rarely and both essentially function as isolated features. Unit 19, located within forested areas, comprises a few small isolated features providing vernal pool conditions in the spring. The hydroperiod of these isolated features is insufficient to support breeding amphibians.

Common Reed (*Phragmites australis* ssp. *australis*) is present in Unit 3, Unit 11 and Unit 17. This aggressive invasive species can overtake wetlands and riparian areas, which typically leads to a reduction in biodiversity and the value of the feature as wildlife habitat. The remaining wetland units are free of aggressive invasive species with the understanding that although Reed-canary Grass is naturalized in Ontario, the genotype found in southern Ontario is of European origin and this species is considered to be introduced and invasive in the Hamilton area (Catling and Mitrow 2005).

Based on survey work completed by NRSI, it was determined that Units 4, 10, 15, 16, 18, 19, 20 and 21 provide confirmed Significant Wildlife Habitat (SWH). The SWH types include habitat for 3 species of conservation concern (SCC): Snapping Turtle (*Chelydra serpentina*), Eastern Wood-Pewee (*Contopus virens*) and Unicorn Clubtail (*Arigomphus villosipes*), turtle overwintering habitat, and anuran breeding habitat (wetland). NRSI is working with the project team and the UWSLG to preserve and enhance these SWH types where possible. However, for the aforementioned reasons (i.e., size <0.5ha, drainage divides, habitat quality) we do not feel that the inclusion of any of these wetland units in the PSW is warranted.

Unit 13, located in an area of naturalizing orchard in the central portion of the study area, is a 0.67ha deciduous swamp unit that includes an area of open water. It meets the criteria for designation as SWH based on the presence of habitat for SCC, turtle overwintering habitat, and amphibian breeding habitat (wetland), as summarized in the appended Table 1. The OWES manual notes that features less than 2ha in size may be included where they provide important ecological benefit.

Despite Unit 13 being only 310m from the PSW unit to the south, the unit exists within a separate drainage system. The lands between Unit 13 and the PSW unit to the south are comprised of annual row cropped fields and hedgerows. These features do not represent a functional link between the wetland units. Although the OWES manual indicates that units within headwater areas can be complexed across drainage divides, the agricultural lands that separate these two units do not present adequate natural cover that justifies complexing across this field. In addition, a portion of the agricultural lands that separate Unit 13 from the nearest

PSW unit are identified for development, which would significantly alter the potential connectivity between the features.

The nearest PSW unit within the Unit 13 drainage system occurs approximately 815m to the east, near Unit 10. The area between Unit 13 and this eastern PSW unit is comprised entirely of annual row cropped fields, and the 2 wetland units are connected via a headwater drainage feature (HDF). The HDF is regularly tilled and/or sprayed with herbicide resulting in little to no persistent vegetation along the length of the feature. As a result of the small size (<2ha) of Unit 13, its drainage division and distance from PSW units, and the agricultural lands that separate it from other areas of natural cover, we do not feel that this feature should be included in the PSW complex. The current development plan proposes to re-align some of the HDFs on site, including the HDF connecting Unit 13 and the eastern PSW unit, in a manner that will enhance the connectivity of Unit 13 with Units 7 and 8 to the north, thereby preserving and improving the SWH associated with the Unit 13.

In addition to Butternut, NRSI biologists have confirmed the presence of 1 other SAR within the participating lands: Barn Swallow (*Hirundo rustica*). This species typically uses open habitats that provide a good source of flying insects for foraging, including grassy fields, meadows, pastures, open bodies of water, and woodland edges. The wetlands on site form a small portion of the foraging habitat for this species; however, Barn Swallow is not considered a wetland-dependent SAR. No wetland-dependent SAR were documented in any of the wetland habitats within the UWS participating lands during extensive surveys conducted by NRSI biologists.

Based on our assessment, we suggest that Unit 15 be considered for inclusion with the Upper Twenty Mile Creek PSW Complex. We also suggest that the remaining wetland units be considered non-PSW based on the provided rationale as to why they do not warrant inclusion in the PSW complex.

The UWSLG is developing a community framework plan for the UWS block that may require the realignment or removal and replacement of several of the unevaluated wetlands. These features, the majority of which are low diversity marsh habitats, will be re-created within the overall Natural Heritage System that forms part of the framework plan, and therefore will be compensated for in a manner that enhances corridors of natural cover across the UWS. This letter has been provided for your review and approval of our assessment of wetland significance in the UWS. If you require any further information please do not hesitate to contact me.

Sincerely,
Natural Resource Solutions Inc.

Desta Frey, M.Sc., P.Biol.
Terrestrial and Aquatic Biologist
Project Manager

References

Catling P.M. & Mitrow G. 2005. A prioritized list of the invasive alien plants of natural habitats in Canada. CBA/ABC Bull., 38(4): 55-57.

Ministry of Natural Resources and Forestry (MNRF). 2014. Ontario Wetland Evaluation System: Southern Manual. 3rd Edition, Version 3.3.

Table 1. PSW Complexing Assessment

Wetland polygon #	1	2	3	4	5	6	7	8	9	10	11
ELC Codes	MAM2-2	MAS2-1	MAS2-1	SAF1	MAM2-2	MAM2-2	MAM2-2	MAM2-2	MAM1-3	SWD3-3	MAM
Distance from PSW (m)	1075	949	793	715	681	594	508	543	382	110	36
Wetland Area (ha)	0.2187	0.0879	0.2618	0.1025	0.3150	0.0331	1.1329	0.3979	0.4163	0.0550	0.2304
Rarity of wetland within landscape (7E-5)*	60/80	60/80	60/80	60/80	60/80	60/80	60/80	60/80	60/80	60/80	60/80
Site Type	Palustrine	Palustrine	Palustrine	Palustrine	Palustrine	Palustrine	Palustrine	Palustrine	Palustrine	Isolated	Palustrine
Wetland Type	Marsh	Marsh	Marsh	Marsh	Marsh	Marsh	Marsh	Marsh	Marsh	Swamp	Marsh
Rarity of wetland type*	20/80	20/80	20/80	20/80	20/80	20/80	20/80	20/80	20/80	0/80	20/80
# of vegetation communities	1	1	1	1	1	1	1	1	1	1	1
Presence of natural corridors	Yes, within large treed feature and part of narrow riparian corridor.	Yes, part of narrow riparian corridor.	Yes, part of narrow riparian corridor.	Yes, part of narrow riparian corridor.	Yes, part of narrow riparian corridor.	No, situated along drainage feature but isolated.	Yes, part of riparian corridor.	Yes, part of riparian corridor.	No, situated along drainage feature but isolated.	Yes, isolated hydrologically but within large treed feature.	Yes, within large treed feature and part of riparian corridor.
Open water present?	No	No	No	Yes	No	No	No	No	No	Yes (seasonally)	No
Substrate	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam
SAR or SWH present?	No	No	No	Turtle over-wintering habitat	No	No	No	No	No	Habitat for SCC	No
Provincially rare species present?	No	No	No	Snapping Turtle habitat	No	No	No	No	No	Eastern Wood-pewee habitat	No
Invasive species?	No	No	Common Reed	No	No	No	No	No	No	No	Common Reed
Notes	Largely outside of subject lands.	Feature has been degraded by machinery rutting.	Low plant diversity. An informal machinery crossing at east end impedes flow.	Pond appears to be 2m+ deep and contains submerged vegetation. Minimal buffer vegetation.	Dominated by Reed-canary Grass.	Dominated by Reed-canary Grass. Isolated by agricultural tilling.	Dominated by Reed-canary Grass with naturalizing orchard to north and south.	Dominated by Reed-canary Grass with naturalizing orchard to north and south.	Dominated by Reed-canary Grass.	Swamp with standing water during spring.	Adjacent to Upper James Street

* Score based on OWES manual

(Table 1 continued)

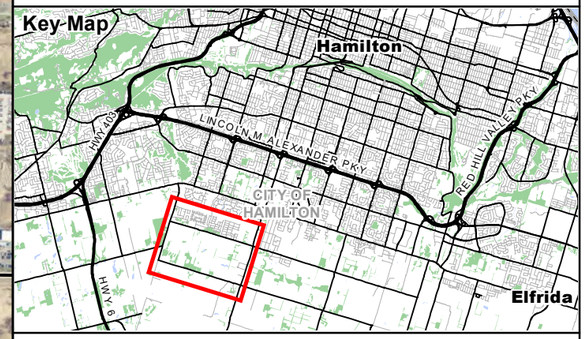
Wetland polygon #	12	13	14	15	16	17	18	19	20	21
ELC Codes	MAM	SWD4-1	MAM2-2	MAM2-2	MAM2-2	MAM2-2	SAF1	SWD3-3	SWD3-3	SWD3-3
Distance from PSW (m)	125	310	303	61	548	686	789	902	882	805
Wetland Area (ha)	0.2392	0.6708	0.2053	0.3938	0.236	0.1004	0.242	0.1342	0.0502	0.0134
Rarity of wetland within landscape (7E-5)*	60/80	60/80	60/80	60/80	60/80	60/80	60/80	60/80	60/80	60/80
Site Type	Palustrine	Palustrine	Palustrine	Palustrine	Palustrine	Palustrine	Palustrine	Isolated	Isolated	Isolated
Wetland Type	Marsh	Swamp	Marsh	Marsh	Marsh	Marsh	Marsh	Swamp	Swamp	Swamp
Rarity of wetland type*	20/80	0/80	20/80	20/80	20/80	20/80	20/80	0/80	0/80	0/80
# of vegetation communities	1	1	1	1	1	1	1	1	1	1
Presence of natural corridors	No, isolated between residences and agricultural field.	Potentially, isolated section of riparian corridor with connection to corridor to north through orchard.	Potentially, isolated section of riparian corridor with connection to corridor to north through orchard.	No, within large treed feature but somewhat isolated.	Yes, within large treed feature and part of riparian corridor.	No, isolated.	Potentially, connected to drainage feature but natural vegetation is limited.	Yes, within large treed feature.	Yes, within large treed feature.	Yes, within large treed feature.
Open water present?	No	Yes	No	No	Yes	Yes (seasonally)	Yes	No	No	Yes (seasonally)
Substrate	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam	Clay-loam
SAR or SWH present?	No	Amphibian breeding habitat (wetland), turtle over-wintering habitat, habitat for SCC	No	Butternut habitat, habitat for SCC	Butternut habitat, amphibian breeding habitat (wetland), turtle over-wintering habitat, habitat for SCC	No	Turtle over-wintering habitat	Butternut habitat	Butternut habitat	Butternut habitat
Provincially rare species present?	No	Unicorn Clubtail and Snapping Turtle habitat	No	Eastern Wood-pewee habitat	Snapping Turtle and Eastern Wood-pewee habitat	No	Unicorn Clubtail habitat, Snapping Turtle habitat	Eastern Wood-pewee habitat	Eastern Wood-pewee habitat	Eastern Wood-pewee habitat
Invasive species?	No	No	No	No	No	Common Reed	No	No	No	No
Notes	At rear of residential lots and likely cleared/regularly mowed in the past 25 years.	Swamp with deep standing water throughout the year. Naturalizing orchard to north and south.	Dominated by Reed-canary Grass with naturalizing orchard to north and meadow to south.	Trails throughout. Surrounded by fringe of thicket and deciduous forest.	Early successional vegetation following golf course closure. Channelized drainage with 2m+ deep pond online.	Appears to rarely convey flow to northeast. Few trees/shrubs, may have been mowed when golf course was in operation.	Pond appears to be 2m+ deep and contains submerged vegetation. No buffer vegetation.	No defined drainage within feature.	No defined drainage within feature.	Appears to hold water through spring (vernal pool).

* Score based on OWES manual

Map 1

Upper West Side

Unevaluated Wetland Assessment



Legend

- Study Area
- Participating Lands
- Distance to Nearest PSW (m)
- Surveyed Wetland Boundary (Confirmed with NPCA and City of Hamilton staff on August 8, 2019 and September 15, 2020)
- Headwater Drainage Feature (HDF)
- Drainage Feature (outside Participating Lands)
- Piped Drainage Feature (outside study area)
- Upper Twenty Mile Creek Provincially Significant Wetland (PSW)
- Unevaluated Wetland (ha)

Natural Resource Solutions Inc.
Aquatic, Terrestrial and Wetland Biologists

Project: 1974D
Date: December 17, 2020

NAD83 - UTM Zone 17
Size: 11x17"
1:10,000

0 100 200 300 400 500 600 Metres

Path: X:\1405_TwentyRdLandownersGroupAssessments\NRSI_1974D_Map1_UnevaluatedWetlandAssessment_10K_2020_12_17_MV.mxd

Subject: RE: Upper West Side, Hamilton: Wetland Complexing Evaluation (proj1974D)
From: "Denyes, David (NDMNRF)" <David.Denyes@ontario.ca>
Date: 2021-10-21, 1:54 p.m.
To: "dfrey@nrsi.on.ca" <dfrey@nrsi.on.ca>

Hello Desta,

I've had the opportunity to review your wetland complexing assessment for the Upper West Site, in the City of Hamilton, ON. It's understood that NRSI biologists certified in the Ontario Wetland Evaluation System (OWES) delineated wetland boundaries within the participating lands and completed a wetland complexing exercise to determine if these identified wetland units should be included in the nearby Upper Twenty Mile Creek Provincially Significant Wetland Complex.

The Ministry accepts the findings of your assessment and your recommendation that Unit 15 be included within the Upper Twenty Mile Creek PSW Complex and that the remaining wetland units be considered non-PSW.

In order to move forward on these revisions, please provide me with a shapefile of the staked boundaries of Wetland Unit 15. I will also need the name, mailing address and email contact for the impacted landowner(s) so that I can provide our notification letter.

Thanks,
David

David Denyes
Management Biologist
Ministry of Northern Development, Mines, Natural Resources and Forestry
Vineland Field Office
4890 Victoria Avenue North
Vineland Station ON, L0R 2E0
Tel: (289) 241-6872
david.denyes@ontario.ca

From: Desta Frey <dfrey@nrsi.on.ca>
Sent: July 20, 2021 12:34 PM
To: Denyes, David (MNRF) <David.Denyes@ontario.ca>
Cc: Nyssa Hardie <nhardie@nrsi.on.ca>; Nick Wood <nick@corbettlandstrategies.ca>
Subject: Upper West Side, Hamilton: Wetland Complexing Evaluation (proj1974D)

Good afternoon David,

A few years ago (in 2018), we were in contact regarding my request for background natural heritage information for a group of properties located on Twenty Road West in Hamilton. This block of lands is now referred to as the Upper West Side (UWS), and is bounded by Twenty Road West to the north, Upper James Street to the east, Dickenson Road to the south, and Glancaster Road to the west. NRSI has been working with the landowners group as various development and planning processes have moved forward over the past few years. Within the UWS, there are several Unevaluated wetlands, as

well as portions of the Upper Twenty Mile Creek Provincially Significant Wetland (PSW). As part of our natural heritage studies, we have undertaken a detailed Wetland Complexing Evaluation based on the criteria outlined in the Ontario Wetland Evaluation System, as well as extensive field studies that NRSI biologists completed between 2018 and 2020. I have attached this Evaluation for your review and comment.

The landowners group is currently working towards the submission of both a Draft Plan of Subdivision for a subset of the UWS, and is developing an overall community framework for the full block. The proposed framework and Draft Plan concepts may require the realignment or removal and replacement of several wetland units currently identified as Unevaluated. To move ahead with these concepts and determine if the Unevaluated wetland units can be altered/removed/replaced, we are looking for the MNRF's input and guidance on this matter.

Once you have had a chance to review the attached Wetland Complexing Evaluation (which includes applicable mapping), perhaps we could set up a call to discuss if the MNRF can support the analysis we've completed and any other comments you may have.

Thank you very much, and I look forward to hearing from you soon!

Kind regards,

Desta

--

Desta Frey M.Sc. P.Biol.
Terrestrial and Aquatic Biologist
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@nrsinews Natural Resource Solutions Inc.
Over 20 years of environmental consulting excellence

Attachments:

RXMMxf2JZiWosc09.png	0 bytes
CS2MyzgrlbhBuBEB.png	0 bytes
OCLPLekTwwtCSPqO.png	0 bytes
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image003.png	0 bytes
image005.png	0 bytes

Appendix III

Ministry of Natural Resources and Forestry (MNRF) Correspondence

From: Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>
Sent: December 4, 2020 1:25 PM
To: Desta Frey
Cc: Ryan Archer; Nick Wood
Subject: RE: Upper West Side, Hamilton SAR: Request for MECP Review (proj1974)

Hi Desta,

Due to a high volume of requests received during the transition of the Endangered Species Act from the Ministry of Natural Resources and Forest (MNRF) to the Ministry of Environment, Conservation and Parks (MECP) some requests which came into our office during that time may not have been followed up on. I am working though some of these requests to ensure that someone has reached out to you and if not to check to see if your request for review is still active.

My apologies if no one from our office has reached out to you sooner.

Regards,

Shamus Snell
A/ Management Biologist
Species at Risk Branch
Ministry of the Environment, Conservation and Parks
Email: shamus.snell@ontario.ca

From: Desta Frey <dfrey@nrsi.on.ca>
Sent: May 1, 2020 6:07 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: Ryan Archer <rarcher@nrsi.on.ca>; Nick Wood <nick@corbettlandstrategies.ca>
Subject: Upper West Side, Hamilton SAR: Request for MECP Review (proj1974)

Good afternoon,

NRSI is completing natural heritage studies within the Upper West Side (UWS) block of lands, located in southwestern Hamilton, as part of several ongoing planning and development processes. Based on the analysis of background information and field data collected to date, NRSI biologists have a good understanding of confirmed and potential SAR and their habitats in the UWS block.

The attached memo summarizes the results of the background review, existing field data analysis, and an up-to-date SAR screening for MECP staff review. The screening was prepared by comparing a list of SAR known from background sources against the habitat found on-site. Our proposed field work program and protocols are also listed.

We would ask that MECP review and provide their comments on our study approach, as well as guidance on next steps. Please let me know if you have any questions or require any additional information.

Thank you,

Desta

--

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(w) www.nrsi.on.ca (e) dfrey@nrsi.on.ca
@nrsinews

From: Wedgewood, Jamie R. (MECP) <Jamie.R.Wedgewood@ontario.ca>
Sent: June 2, 2023 2:37 PM
To: dfrey@nrsi.on.ca
Cc: Placko, Joanne (MECP); Lesko, Joe (MECP); Shepherd, Mandy (MECP)
Subject: Upper West Side Species at Risk Screening Review
Attachments: 2022_Treed Habitats - Maternity Roost Surveys.pdf; Bat Survey Standards Note 2022.pdf

Good afternoon Desta,

The Species at Risk Branch (SARB) has conducted a review of the Upper West Side Species at Risk Screening.

The following additional species are within the vicinity of the site and were not listed in the species at risk screening:

Spotted Wintergreen *(Chimaphila maculate)*

No other species at risk occurrences were detected which were not already identified in the submission.

While this review represents MECP's best currently available information, it is important to note that a lack of information for a site does not mean that SAR or their habitat are not present. There are many areas where the Government of Ontario does not currently have information, especially in areas not previously surveyed. On-site assessments will better verify site conditions, identify and confirm presence of species at risk and/or their habitats.

It is the responsibility of the proponent to ensure that SAR are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the proposed activities to be carried out on the site. If the proposed activities can not avoid impacting protected species and their habitats then the proponent will need to apply for a authorization under the Endangered Species Act.

In the species at risk screening you also requested the following:

- The requirement for and timing of additional surveys for Barn Swallow;
  - As Barn Swallow has been downlisted to Special Concern, no further surveys are necessary
- The preferred approach for acoustic monitoring and/or exit surveys targeting SAR bats going forward in the planning process; and
  - Please see the attached draft protocol for SAR Bat surveys
- The preferred approach to testing the genetics of and planning for the large Butternut population.
  - It is not necessary to genetically test the entire Butternut population. There is a section in the butternut health assessment which outlines a guidance to test hybridity in the field. Butternut assessment guidelines | ontario.ca

Kind regards,
Jamie Wedgewood

Jamie Rose Wedgewood
A/ Management Biologist, Permissions Section
Species at Risk Branch
Ministry of Environment, Conservation and Parks
Jamie.r.wedgewood@ontario.ca

From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: November 1, 2023 1:08 PM
To: Sophia Munoz; Species at Risk (MECP)
Cc: Desta Frey; Jeremy Bannon
Subject: RE: Upper West Side lands, Hamilton - Butternut report submission (proj1974E)

Hi Sophia,

Thank you for submitting your Butternut Health Assessment (BHA) to the Species at Risk Branch (SARB). Please use this email as receipt of your submission, dated October 30, 2023.

If you are proposing to rely on Part 5 of the Ontario Regulation 830/21 for the category 1 trees identified in the BHA, then you are eligible to do so 30-days following the date that the BHA was submitted to the SARB.

Because you anticipate to remove more than 15 category 2 trees and 5 category 3 trees, you would not be eligible for a conditional exemption in Part V of Ontario Regulation 830/21. This means that in order to carry out the proposed activities you must apply for a c-permit (overall benefit permit).

If butternut are the only species affected by your activities, you can submit all 3 forms that are required in the permitting process to us which include the Information Gathering Form (IGF), Avoidance Alternatives Form (AAF), and C-Permit application form (C-PAF).

Please let us know if you have any other questions or require further assistance, as we would be happy to help.

Thank you,
SAR Ontario

From: Sophia Munoz <smunoz@nrsi.on.ca>
Sent: October 30, 2023 4:29 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: Desta Frey <dfrey@nrsi.on.ca>; Jeremy Bannon <jbannon@nrsi.on.ca>
Subject: Upper West Side lands, Hamilton - Butternut report submission (proj1974E)

Good afternoon,

I am emailing to submit Butternut Health Assessment documentation for 193 trees within a subset of the lands known as the Upper West Side community in Hamilton.

The Upper West Side lands are generally bounded by Twenty Road West to the north, Glancaster Road to the west, Dickenson Road to the south, and Upper James Street to the east. The 193 Butternuts considered in this submission are on the properties located at 555 Glancaster Road, and 9751, 9625, 9511, 9445, and 9285 Twenty Road West.

These properties form most of the Upper West Side Secondary Plan area, with residential, mixed use, and commercial developments envisioned for the future. Due to the high-level nature of the development concepts for the Upper West Side, impacts to individual trees have not been comprehensively determined at this time. However, it is anticipated that more than 15 Category 2 Butternuts, and more than 5 Category 3 Butternuts, will require removal to accommodate future development. The purpose of this submission is therefore to provide information regarding the number and condition of Butternuts evaluated to date within the Upper West Side lands, and to initiate next steps for addressing anticipated impacts to Butternut and resultant Endangered Species Act, 2007 permitting requirements.

In early spring 2023, trees were cleared on the property at 9751 Twenty Road West. Correspondence with MECP staff (Joanne Placko and Joe Lesko) is ongoing in relation to the property and impacts to Butternut are described in the report.

All assessments were completed during leaf-on conditions in August 2019 and August 2020. Hybridity testing was completed for a subset of 63 trees, 40 were determined to be pure, and 23 were determined to be hybrid.

Supporting documentation includes scans of the butternut health collection forms, a map of the butternut locations and a spreadsheet of the butternut health assessment summary data. Note that due to the limitations of the BHE report PDF, the 193 Butternuts are split into 2 separate files.

Please let us know if any additional information is requested. Thank you.

--

Sophia Munoz M.Sc Certified Arborist
Terrestrial and Wetland Biologist
Natural Resource Solutions Inc.
Proudly Indigenous-owned
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 444 (f) 519-725-2575
(w) www.nrsi.on.ca (e) smunoz@nrsi.on.ca
@nrsinews Natural Resource Solutions Inc.
Over 25 years of environmental consulting excellence

From: Nick Wood <nick@corbettlandstrategies.ca>
Sent: April 11, 2023 2:07 PM
To: Joanne.Placko@ontario.ca
Cc: Joe.Lesko@ontario.ca; John Corbett; Desta Frey
Subject: Re: Twenty Road West Development Lands Species At Risk (SAR) inquiry
Attachments: NRSI_1974D_9751 Twenty Rd W_Woodland Assessment Letter_2023_03_31.pdf

Hi Joanne,

Thank you for your email. Myself and John Corbett are the land use planners who are working with the property owner and others on the development of the subject lands. We've been working with the City on various land use applications for some time. NRSI (Desta Frey CC'd on this email) has been responsible for all environmental and ecological work including the completion of species and vegetation surveys and tree protection plans across the subject property and adjacent properties.

The Client had NRSI prepare a Woodland Assessment (attached) which provides a background on works conducted to date as well as an assessment of the City's Urban Woodland By-law.

It may be beneficial to set up a time to meet with yourselves, us and NRSI to go over in detail the works conducted to date and our action items for the property owner and group. Please kindly advise on your earliest availability.

Nick

Nick Wood
Corbett Land Strategies Inc.
(416) 420-5544

From: "Placko, Joanne (MECP)" <Joanne.Placko@ontario.ca>
Date: April 5, 2023 at 10:24:12 AM MDT
To: joahn@cls.group
Cc: "Lesko, Joe (MECP)" <Joe.Lesko@ontario.ca>
Subject: Twenty Road West Development Lands Species At Risk (SAR) inquiry

Good afternoon John,

The ministry has become aware of an article in the Hamilton Spectator regarding a development at Twenty Road West between Dickenson Road, Glancaster Road and Upper James in Hamilton Ontario. The ministry has concerns that there are potential Species at Risk (SAR) on the lands to be developed.

Under the Endangered Species Act, 2007, species that are listed as threatened or endangered receive protection that prohibits the harming, killing, or harassing of the species, and this protection extends to protect their habitat from damage and destruction. Species at Risk in Ontario can be found online: Species at Risk in Ontario List. However, there are

authorizations that can be obtained to proceed with work, that would otherwise be prohibited, that outline conditions that must be met to minimize impacts to species. Information on the Endangered Species Act authorization process can be found at: https://www.ontario.ca/page/how-get-endangered-species-act-permit-or-authorization. General inquiries or questions about authorizations under the Endangered Species Act, 2007, can be directed to SAROntario@ontario.ca.

Additional information on the requirements for developers can be found here: Development and infrastructure projects and endangered or threatened species | ontario.ca

Can you please let me know if any assessments pertaining to Species At Risk have been completed for the development lands, and if so, can you please provide me with a copy of the SAR assessment/report.

If you have any questions or concerns, please feel free to contact me at (905) 541-2804, or Joe Lesko at (905) 541-5220.

Regards,

Joanne

Ontario

Ministry of the Environment, Conservation and Parks

Joanne Placko
Sr. Environmental Officer | Provincial Officer #978
Hamilton District Office
119 King Street West, 9th Floor | Hamilton ON L8P 4Y7
☎ (905) 541-2804 | 🖷 (905) 521-7806 | ✉ joanne.placko@ontario.ca

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

May 23, 2023 Project No. 1974H

Joanne Placko
Senior Environmental Officer
Ministry of Environment Conservation and Parks
Hamilton District Office
119 King Street West, Hamilton ON
L8P 4Y7

RE: 9751 Twenty Road West, Hamilton Species at Risk Technical Memo

Natural Resource Solutions Inc. (NRSI) was retained in 2017 by the Upper West Side Landowner's Group (UWSLG) to complete natural heritage studies on the participating lands within the Upper West Side (UWS) block. The UWS block includes the property located at 9751 Twenty Road West in Hamilton, Ontario (the "subject property"), owned by Starward Homes Limited (the "Landowner"). NRSI staff have been completing ecological surveys within the UWS block since 2017.

On March 16, 2023, the Landowner was issued an Order to Discontinue Contraventions by the City of Hamilton, in response to tree removal activities occurring within the subject property during February-March 2023. These activities occurred within a small treed area, and thus were thought to be in violation of the City of Hamilton Urban Woodland By-Law 2014-212 (City of Hamilton 2014). In addition to the removal of trees within this feature, removal activities occurred along three hedgerows within the subject property (Map 1). Natural heritage data previously collected by NRSI for the subject property indicates that several regulated Species at Risk (SAR) Butternut (*Juglans cinerea*) individuals were identified within these features, along with candidate SAR bat habitat trees (Maps 2a-2c).

As requested by the Ministry of Environment, Conservation and Parks (MECP; J. Placko and J. Lesko, pers. comm. to Corbett Land Stategies and NRSI, April 17, 2023), the following technical memo summarizes SAR survey efforts to date on the subject property and tree removal activities in early 2023. The memo also outlines the results of a woodland assessment completed by NRSI in response to the Order, and findings from a site visit to the subject property on April 20, 2023.

As discussed further below, principal findings of the April 2023 site assessment included the following:

- No Butternut trees were removed as a result of the tree removal activities, although some disturbance to the soil immediately surrounding these trees occurred as a result of the removal activities.
- A total of 15 out of 41 candidate SAR bat habitat trees on the subject property were removed. However, these trees were removed outside of the bat active period (April 1-September 30), so no impacts to individual SAR bats are expected to have occurred.

Recommendations have been provided to mitigate impacts associated with the tree removal activities as discussed below.

For the purposes of this assessment, SAR are defined as those listed on the Species at Risk in Ontario List (MECP 2023) and identified by the Committee on the Status of Species at Risk in Ontario (COSSARO) as provincially Endangered or Threatened. Species listed as Endangered or Threatened by COSSARO are regulated and protected under the *Endangered Species Act* (ESA) 2007.

Summary of Survey Efforts to Date

Butternuts

Butternuts are considered provincially and federally Endangered. A total of 193 Butternuts have been identified and assessed by NRSI Certified Butternut Health Assessors across the UWS Lands in 2019 and 2020. These assessments were carried out in accordance with the Butternut Assessment Guidelines (Ministry of Natural Resources and Forestry (MNRF) 2011, amended 2014), which was considered current at the time of assessment. The locations of the Butternuts were collected with a SXBlue II GNSS GPS unit with sub-meter accuracy. Each assessed tree was marked with white flagging tape. The locations of the Butternuts are shown in Map 2a-2c.

Butternut health assessments on the UWS block were completed on August 13, 14, 22, and 28, 2019, and August 25, 28, and 31, 2020. Field hybridity tests were not conducted in 2019, but a subsample of 17 trees was genetically tested. Genetic analysis found that all 17 samples submitted from across the UWS Block were considered genetically pure Butternuts, including one sample from within the subject property. Field hybridity tests were conducted for all trees surveyed in 2020. All trees without field or genetic hybridity testing are assumed pure for the purposes of this assessment, but further genetic or field hybridity testing may find that these are hybrid trees which are not afforded protection under the ESA. Butternut Health Expert's Reports are yet to be submitted for these assessed trees.

Bat Habitat Assessments

Background screenings indicated that 3 SAR bats may have candidate habitat within the study area. These species include Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*), all of which are listed as Endangered provincially and are afforded general habitat protection under the ESA.

Bat habitat assessments were conducted across the UWS block in conjunction with the tree inventory. The tree inventory was conducted throughout 2018, 2019, and 2020. NRSI's Certified Arborists visually scanned all trees ≥10cm DBH for the presence of cavities and other features that may provide bat maternity colony habitat, as per the protocols outlined in *Survey Protocol for Species at Risk Bats within Treed Habitats for Little Brown Myotis, Northern Myotis & Tri-Colored Bat* (MNRF 2017).

Other Species at Risk Survey Efforts

In order to determine the presence of other SAR in the study area, the following additional survey types were completed on UWS block from 2017-2020:

- 3-season vascular flora inventories
- Tree inventory
- Breeding bird surveys

- Marsh breeding bird surveys
- Anuran call surveys
- Turtle basking and emergence surveys
- Turtle nesting surveys
- Artificial cover object surveys for snakes
- Insect surveys for butterflies, dragonflies, and damselflies
- Winter wildlife movement surveys
- Significant Wildlife Habitat assessments
- Aquatic habitat assessments
- Fish community sampling

Other surveys completed on the UWS block include: Ecological Land Classification, headwater drainage feature assessments, wetland delineations, and woodland dripline boundary delineations. A summary of survey efforts on the UWS block from 2017-2020 is appended.

Other regulated SAR observed in the UWS block during field surveys include:

- Bank Swallow (*Riparia riparia*)
- Chimney Swift (*Chaetura pelagica*)
- Eastern Meadowlark (*Sturnella magna*).

These species are not expected to have been impacted by the tree removal activities that took place in 2023.

Findings from April 2023 Site Visit

Butternuts

Within the subject property, 8 Butternut individuals were identified and assessed. Results of these assessments are provided in Table 1. It was found during the April 20, 2023 site visit by NRSI staff that these Butternuts were left standing amidst the tree clearance activities. Three of these individuals are located within the treed area, where no tree removal activities occurred within their vicinity (Map 2a-2c).

Table 1. Butternut Health Assessments Results

Butternut Identifier	Assessment Date	Category	Hybridity Testing Method	Hybridity Result	Removed in 2023
JUG-028	2019/08/13	2	None	Unknown	No
JUG-120	2019/08/28	2	None	Unknown	No
JUG-121	2019/08/22	2	None	Unknown	No
JUG-122	2019/08/22	2	Genetic	Pure	No
JUG-137	2019/08/28	1	None	Unknown	No
JUG-138	2019/08/22	1	None	Unknown	No
JUG-139	2019/08/28	1	None	Unknown	No
JUG-140	2019/08/28	2	None	Unknown	No

Bat Habitat Trees

Bat habitat assessments found that candidate roosting trees for each species are present throughout the study area. Buildings that may be used by Little Brown Myotis and Northern Myotis are also present across the UWS Block. All oak and maple trees >10cm DBH are

considered candidate habitat for Tri-Colored Bat. Within the subject property, 41 potential bat habitat trees were identified, 15 of which were removed during February-March 2023. Among these removed bat habitat trees, 1 was located in the treed area, while the remaining trees were located in the surrounding hedgerows. The location and status of potential bat habitat trees found within the subject property are detailed in Table 2, and shown on Map 1.

Table 2. Bat Trees within the Subject Property

Tree Identifier	Location	Removed in 2023
2564	Treed Area	No
2566	Treed Area	No
2567	Treed Area	No
2568	Treed Area	No
2569	Treed Area	No
2570	Treed Area	No
2571	Treed Area	No
2573	Treed Area	No
2581	Treed Area	No
2585	Treed Area	No
2590	Treed Area	No
2612	Treed Area	No
2614	Treed Area	No
2615	Treed Area	No
2617	Treed Area	No
2618	Treed Area	No
2622	Treed Area	No
2635	Treed Area	No
2644	Treed Area	No
2646	Treed Area	No
2650	Treed Area	No
2659	Treed Area	No
2691	Treed Area	No
2719	Treed Area	No
2742	Treed Area	Yes
2763	Hedgerow	Yes
2767	Hedgerow	Yes
2768	Hedgerow	Yes
2769	Hedgerow	Yes
2772	Hedgerow	Yes
2787	Hedgerow	Yes
2795	Hedgerow	Yes
2797	Hedgerow	Yes
2800	Hedgerow	Yes
2802	Hedgerow	Yes
2805	Hedgerow	Yes
2806	Hedgerow	Yes
2807	Hedgerow	Yes
2811	Hedgerow	Yes
2961	Treed Area	No
ia	Treed Area	No

Next Steps

Butternuts

As detailed in Section 25.1 of Ontario Regulation 830/21, the ESA does not apply to Butternut trees that have been confirmed to be Category 1 through a Butternut Health Expert Report, provided 30 days have elapsed since the submission of the Report. It is understood that since a Butternut Health Expert Report is yet to be submitted for these trees, removal activities in the vicinity of Category 1 and 2 Butternut trees on the subject property are not currently exempted by Ontario Regulation 830/21.

While no Butternut individuals were removed as a result of vegetation clearance activities in 2023, removals were completed in close proximity to these trees. Section 10(1) of the ESA prohibits the damage and destruction of SAR habitat, and Section 31(1) of Ontario Regulation 830/21 also prohibits disturbance (i.e., in the form of heavy equipment, soil excavation, and removal of vegetation in a manner that destabilizes soil) within the root harm prevention zone of protected Butternuts. As shown in Photos 8-23 in the Photo Log, vegetation removal and soil destabilization activities have occurred within the root zones of Butternuts on the subject property.

We propose that the following steps be taken to ensure the protection of the Butternuts and compliance with the ESA and Ontario Regulation 830/21 unless or until such time that their removal is authorized in accordance with these legal instruments:

- A Butternut Health Expert Report will be submitted to the MECP. The report will detail the assessment results for the Butternut individuals found within the UWS Block, including those found within the subject property. The report will identify Butternuts that may be killed, harmed, or taken as a result of proposed development activities on the UWS Block. A site visit with the MECP may occur during this time. Following a 30-day period, a Notice of Butternut Impact form will be submitted to the Minister of Environment, Conservation and Parks in accordance with Ontario Regulation 830/21.

- A seed mix comprised of native meadow species will be hand-applied to the disturbed lands surrounding the Butternuts as an interim soil restoration measure during spring 2023;

- The health and condition of the Butternuts will be monitored by NRSI's trained Butternut Health Experts, at an interval approved by the MECP; and,

- Any portion of the 50m habitat zone around the Butternuts that is not actively used for agriculture will be staked to ensure no further site alteration or work is completed in this zone; and

Bat Habitat Trees

Removal of potential bat habitat trees occurred outside of the bat active season (defined as April 1-September 30 in Southern Ontario) (MECP 2022), and thus it is expected that no SAR bats were directly killed, harmed or harassed as a result of the removal activities. We propose the following steps be taken to ensure compliance with the ESA and maintain habitat availability for SAR bats:

- The installation of at least 1 bat roosting structure, with consideration for the future land development plans and timeline for the subject property.

Should you have any questions or comments regarding this letter, please do not hesitate to contact the undersigned.

Sincerely,
Natural Resource Solutions Inc.

Hashveenah Manoharan, B.E.S.
Terrestrial & Wetland Biologist, Certified Arborist

Ryan Archer, M.Sc.
Senior Terrestrial & Aquatic Biologist, Project Advisor

Encl.
Map 1. 9751 Twenty Road, Glanbrook – 2023 Tree Removals Key Map
Maps 2a-2c. 9751 Twenty Road, Glanbrook – 2023 Tree Removals
Photo Log
Summary of Field Surveys

References

City of Hamilton. 2014. City of Hamilton By-Law No. 14-212 To Promote the Conservation and Sustainable Use of Woodlands on Private Property within the Urban Boundary of the City of Hamilton. August 15, 2014.

Government of Ontario. 2021. *O. Reg. 830/21: Exemptions – Barn Swallow, Bobolink, Eastern Meadowlark and Butternut.* December 9, 2021 under Endangered Species Act, 2007, S. O. 2007, c. 6.

Government of Ontario. 2007. *Endangered Species Act*. Page S.O. 2007, c. 6.

Ontario Ministry of the Environment, Conservation and Parks. 2022. Species at Risk Bats Survey Note 2022.

Ontario Ministry of the Environment, Conservation and Parks. 2023. Species at Risk in Ontario List. Last updated April 5, 2023. https://www.ontario.ca/page/species-risk-ontario

Ontario Ministry of Natural Resources and Forestry. 2014. Butternut Assessment Guidelines. Assessment of Butternut Tree Health for the Purposes of the *Endangered Species Act, 2007.* Published May 2011. Amended December 2014.

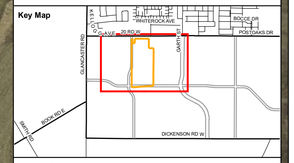
Ontario Ministry of Natural Resources and Forestry (MNRF). 2017. Survey Protocol for Species at Risk Bats Within Treed Habitats: Little Brown Myotis, Northern Myotis & Tri-colored Bat. Guelph District, April 2017.

Map 1

9751 Twenty Road, Glanbrook

2023 Tree Removals

Key Map



Legend

- Subject Property
- Inventoried Tree (Crown to Scale)
- Inventoried Tree Removed in April (Crown to Scale)
- Potential Bat Roost Tree (Crown to Scale)
- Potential Bat Roost Tree Removed in April (Crown to Scale)
- Butternut
- Cedar Hedgerow
- Primary Road
- Secondary Road
- Proposed Street

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 19748
Date: May 12, 2023

NAD83 - UTM Zone 17
Size: 24x36"
1:1,300

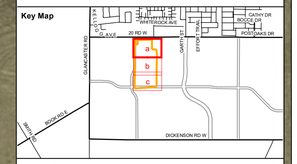
0 20 40 60 80 100 Meters

Map 2a

9751 Twenty Road, Glanbrook

2023 Tree Removals

Key Map



Legend

- Subject Property
- Inventoried Tree (Crown to Scale)
- Inventoried Tree Removed in April (Crown to Scale)
- Potential Bat Roost Tree (Crown to Scale)
- Potential Bat Roost Tree Removed in April (Crown to Scale)
- Butternut
- Cedar Hedgerow
- Proposed Street

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 19748
Date: May 12, 2023

NAD83 - UTM Zone 17
Size: 24x36"
1:425

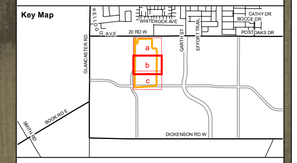
0 5 10 15 20 25 30 Meters

Map 2b

9751 Twenty Road, Glanbrook

2023 Tree Removals

Key Map



Legend

- Subject Property
- Inventoried Tree (Crown to Scale)
- Inventoried Tree Removed in April (Crown to Scale)
- Potential Bat Roost Tree (Crown to Scale)
- Potential Bat Roost Tree Removed in April (Crown to Scale)
- Butternut
- Proposed Street

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 19748
Date: May 12, 2023

NAD83 - UTM Zone 17
Size: 24x36"
1:425

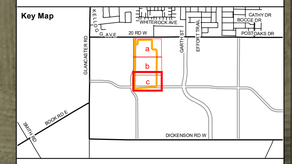
0 5 10 15 20 25 30 Meters

Map 2c

9751 Twenty Road, Glanbrook

2023 Tree Removals

Key Map



Legend

- Subject Property
- Inventoried Tree (Crown to Scale)
- Inventoried Tree Removed in April (Crown to Scale)
- Potential Bat Roost Tree (Crown to Scale)
- Potential Bat Roost Tree Removed in April (Crown to Scale)
- Butternut
- Proposed Street

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 19748
Date: May 12, 2023

NAD83 - UTM Zone 17
Size: 24x36"
1:425

0 5 10 15 20 25 30 Meters

Project No. 1974H

Photo Log

Photo 1: Tree removals at northwestern corner of subject property, looking south from Twenty Road West.

Photo 2: Tree removals along western hedgerow, looking south.

Photo 3: Removed materials piled along former western hedgerow, looking south.

Photo 4: Mulch piles stored towards south end of former western hedgerow, looking south.

Photo 5: Tree removals at north end of cultural woodland, looking east.

Photo 6: Tree removals south of cultural woodland, looking north.

Photo 7: Partial tree removal of hedgerow at south edge of subject property, looking east.

Photo 8: Tree removals in eastern hedgerow, looking north. Standing Butternut trees visible.


Photos 9-10: JUG-138 (Category 1) with advanced canker, surrounded by debris pile.


Photos 10-11: JUG-137 (Category 1) with advanced canker, basal rot, and failed structural branches.


Photos 12-13: JUG-139 (Category 1) within the cultural woodland, with no adjacent removal activities. Extensive canopy dieback, wood-boring insect damage, and exposed cambium.


Photos 14-15: JUG-140 (Category 2) within the cultural woodland, with no adjacent removal activities. Some canopy dieback evident.


Photos 16-17: JUG-028 (Category 2) left standing with adjacent Black Walnut tree. Mechanical tearing of upper branch. Advanced canker along stem.


Photos 18 and 19: Proximity of vegetation clearance to JUG-028 (left) and JUG-120 (right).


Photos 20 and 21: JUG-120 (Category 2) in relatively good condition with few to no visible cankers. Mechanical damage (torn branch) observed. Removals occurred in close proximity to stem.


Photos 22 and 23: JUG-122 (Category 2) in relatively good condition with few to no visible cankers. Mechanical damage (torn branch) observed. Removals occurred in close proximity to stem.

Table 1. Summary of Terrestrial Field Surveys

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
Garth Street Draft Plan Area and Urban Boundary Expansion Central and East Blocks							
2017							
December 8, 2017	Significant Woodland Boundary Delineation and Agency Review	City of Hamilton EIS Guidelines Appendix 1 (March 2015)	-2	None	100	3-4	N. Wood (CLS) N. Hardie (NRSI) J. Lance (NRSI) M. Kiddie (City of Hamilton)
2018							
3 March, 2018	Winter Wildlife Survey	n/a[1]	-2 to 1	None	0	2 to 3	D. Frey A. Cantwell
March 5 to 9, 13 to 15, 2018	Tree Inventory Bat Habitat Assessment (Leaf-off)	City of Hamilton Tree Protection Guidelines – City Wide (2010)	-3 to +3	Light snow and snow flurries	0 to 100	1 to 4	J. Lance J. Bannon E. Bannon T. Brenton D. Stephenson D. Frey D. Riley A. Buse L. Knopf L. Hockley
May 28, 2018	Ecological Land Classification (ELC) Spring, Summer, and Fall Vegetation Inventory	Lee et. al 1998	24	None	0	3	P. Deacon K. Ellis
August 2, 2018			27	None	100	2	K. Ellis R. Young
September 28, 2018			12	None	5	1	B. Woodman
April 24, 2018	Anuran Call Surveys	BSC 2009	10.5	Light rain	100	1	D. Frey A. Cantwell L. Hockley S. Hofstetter
May 28, 2018			23	None	20	0	A. Reinert

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
							S. Hofstetter K. Martin R. Young
June 20, 2018			19.5	None	60	0	D. Frey J. Bannon J. Pickering T. Larking
April 27, 2018	Turtle Emergence and Basking Surveys	MNRF 2015	13	None	30	1	G. MacVeigh
May 2, 2018			23	None	15	4	A. Cantwell N. Schueder
May 9, 2018			24	None	20	2	G. MacVeigh C. Poulsen
May 17, 2018			25	None	0	2	A. Cantwell K. Martin
May 30, 2018			27	None	25	2	A. Cantwell
June 7, 2018			23	None	30	1	A. Cantwell R. Young
April 30, 2018	Snake Cover Board Surveys	MNRF 2016	19	None	0	2	D. Frey N. Schueder
May 7, 2018			14.5	None	<1	6	J. McCarter J. Pickering
May 28, 2018			24 to 29	None	0 to 10	3	P. Deacon K. Ellis
June 4, 2018			16	None	80	3	T. Brenton K. Martin C. Poulsen
June 28, 2018			18	Fog	100	0	E. Gosnell J. Pickering T. Larking R. Young
August 2, 2018			27	None	100	2	K. Ellis R. Young
June 4, 2018		OBBA 2001	15	None	100	3 to 4	T. Brenton

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
	Breeding Bird Surveys						K. Martin C. Poulsen
June 28, 2018			18	Fog	100	0 to 1	E. Gosnell J. Pickering T. Larking R. Young
May 7, 2018	Bat Habitat Assessment (Leaf-off)	OMNR 2011, MNRF 2017	11.5	None	<1	6	J. McCarter J. Pickering
2019							
June 10, 2019	Ecological Land Classification (ELC) Vegetation Inventory Turtle Nesting Habitat Assessment	Lee et al. 1998	23	Rain at 16:30	80-100	1	P. Deacon
June 17, 2019	Snake Cover Board Survey	MNRF 2016	16	None	60-90	2	T. Brenton
June 17, 2019	Marsh Breeding Bird Survey	BSC 2009a	14	None	60	0	T. Brenton
July 16, 2019	Insect Surveys	n/a[1].	29	None	0 to 80	0 to 1	C. Teat D. Frey
August 16, 2019			20	None	80	1	C. Teat D. Riley M. Zago
July 30, 2019	Wetland Delineation Flagging	MNRF 2013	25	None	10	2	K. Richter J. Pickering
August 6, 2019			24	None	80	2	K. Richter M. Heyming
August 8, 2019	Wetland Boundary Review and Verification	MNRF 2013	24	Light rain	80	2	K. Richter (NRSI) J. Pickering (NRSI) M. Heyming (NRSI) M. Kiddie (City of Hamilton) L. Price (NPCA)

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
August 6, 9, 13, 16, 19, 20, September 11, 17, 19, 2019	Tree Inventory	City of Hamilton Tree Protection Guidelines – City Wide 2010	12-28	None and light rain	0-100	0 -3	K. Ellis J. Lance T. Brenton J. Bannon J. Pickering M. Zago D. Riley O. Foster M. Heyming J. Phillips
2020							
March 1, 2020	Winter Wildlife Survey	n/a[1]	-10	None	0	1	D. Riley A. Reinert
June 2, 2020	Ecological Land Classification (ELC) Confirmation Spring Vegetation Inventory	Lee et al. 1998	26	None	5	1	P. Deacon B. Woodman
June 5, 2020	Marsh Breeding Bird Surveys	BSC 2009	18	None	100	1	R. Archer K. Belliveau
June 26, 2020			17	None	10	1	K. Burrell S. Catry
May 6, 2020	Snake Cover Board Surveys	MNRF 2016	14	None	30	2-3	D. Frey K. Belliveau
May 12, 2020			8	None	100	3-4	S. Hofstettor K. Belliveau
May 13, 2020			13	None	0	1	K. MacLellan J. Pederson
May 25, 2020			22	None	5	3	H. Fotherby J. McCarter
June 12, 2020			18	None	10	3	H. Fotherby D. Frey
September 11, 2020			17	None	0	3	E. Bannon S. Turner

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
September 14, 2020			16	None	40	1	A. Reinert D. Scott
September 17, 2020			19	None	60	2	T. Brenton D. Scott
September 22, 2020			20	None	50	2	E. Milne D. Scott
September 24, 2020			23	None	50	3	E. Bannon M. Gibson
June 26, 2020	Insect Survey	n/a[1]	31	None	40	1-2	D. Frey T. Brenton
Golf Course Area (Includes Urban Boundary Expansion West Block)							
2020							
February 11, 2020	Winter Wildlife Surveys	n/a[1]	0	None	85	1	D. Frey A. Cantwell
March 1, 2020			-1	None	10	3	D. Riley A. Reinert
June 2, 2020	Ecological Land Classification (ELC) Spring Vegetation Inventory Wetland Delineation Flagging	Lee et al. 1998 MNRF 2013	26	None	5	1	P. Deacon B. Woodman
August 19, 2020	Summer Vegetation Inventory	n/a[1]	23	None	25	1	J. Ferguson J. Bannon
June 5, 2020	Breeding Bird Surveys	OBBA 2001	18	None	100	1	R. Archer K. Belliveau
June 26, 2020	Marsh Breeding Bird Surveys		17	None	10	1	K. Burrell S. Catry
April 27, 2020	Anuran Call Surveys	BSC 2009	8	None	60	1	D. Frey H. Fotherby
May 26, 2020			25	None	10	0	G. MacVeigh S. Burgin
June 17, 2020			18	None	10	1	S. Burgin

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
							S. Catry
April 6, 2020	Turtle Emergence and Basking Surveys	MNRF 2015	18	None	5	1	D. Frey
April 25, 2020			13	None	15	3-4	D. Frey
May 6, 2020			12	None	30	2-3	C. Teat E. Voogjarv
May 13, 2020			15	None	5	2	R. Archer S. Turner
May 22, 2020			22	None	15	2	J. McCarter
May 25, 2020			25	None	5	3	H. Fotherby J. McCarter
June 3, 2020	Turtle Nesting Surveys	MNRF 2015	25	None	30	2-3	A. Reinert J. McCarter
June 11, 2020			22	None	20	1	A. Cantwell S. Catry
June 12, 2020			17	None	5	3	H. Fotherby D. Frey
June 15, 2020			19	None	5	4	E. Bannon S. Catry
June 17, 2020			24	None	10	2	S. Burgin S. Catry
June 22, 2020			28	None	98	0-1	H. Fotherby D. Frey
April 27, 2020	Snake Cover Board Surveys	MNRF 2016	15	None	20	3	H. Fotherby D. Frey
May 6, 2020			13	None	40	2	C. Teat E. Voogjarv
May 12, 2020			8	None	80	3	C. Teat S. Hofstettor
May 13, 2020			10	None	0	1	R. Archer S. Turner
May 22, 2020			22	None	15	2	J. McCarter
September 11, 2020			14	None	90	3	E. Milne S. Hofstettor
September 14, 2020			14	None	30	1	S. Hofstettor K. Maclellan

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
September 17, 2020			20	None	50	3	E. Bannon J. Lance
September 22, 2020			20	None	50	2	D. Frey
September 24, 2020			23	None	50	3	E. Milne S. Hofstettor
June 26, 2020	Insect Surveys	n/a[1]	27	None	50	2-3	D. Frey T. Brenton
July 8, 2020			24	None	70	3	D. Frey H. Fotherby
August 27, 2020			26	None	5	2	N. Miller
August 20, 2020	Tree Inventory	City of Hamilton Tree Protection Guidelines – City Wide 2010	26	None	10	3	E. Bannon K. Belliveau
2060 Upper James Street Parcel							
2020							
February 11, 2020	Winter Wildlife Surveys	n/a[1]	0	None	85	1	D. Frey A. Cantwell
March 1, 2020			-1	None	10	3	D. Riley A. Reinert
June 2, 2020	Ecological Land Classification (ELC) Spring Vegetation Inventory Wetland Delineation Flagging	Lee et al. 1998 MNRF 2013	26	None	5	1	P. Deacon B. Woodman
August 19, 2020	Summer Vegetation Inventory	n/a[1]	23	None	25	1	J. Ferguson J. Bannon
June 5, 2020	Breeding Bird Surveys	OBBA 2001	18	None	100	1	R. Archer K. Belliveau
June 26, 2020	Marsh Breeding Bird Surveys		17	None	10	1	K. Burrell S. Catry
April 27, 2020	Anuran Call Surveys	BSC 2009	8	None	60	1	D. Frey

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
							H. Fotherby
May 26, 2020			25	None	10	0	G. MacVeigh S. Burgin
June 22, 2020			28	None	98	0-1	D. Frey H. Fotherby
May 6, 2020	Snake Cover Board Surveys	MNRF 2016	13	None	40	2	C. Teat E. Voogjarv
May 12, 2020			8	None	80	3	C. Teat S. Hofstettor
May 13, 2020			10	None	0	1	R. Archer S. Turner
May 25, 2020			22	None	5	3	J. McCarter H. Fotherby
June 3, 2020			24	None	15	2	J. McCarter A. Reinert
September 11, 2020			13	None	60	3	E. Milne S. Hofstettor
September 14, 2020			16	None	20	1	S. Hofstettor K. Maclellan
September 17, 2020			21	None	20	3	E. Bannon J. Lance
September 22, 2020			20	None	50	2	D. Frey
September 24, 2020			23	None	50	3	E. Milne S. Hofstettor

[1]In the absence of a specific protocol to conduct these surveys professional experience and judgement was used by NRSI biologists.

Table 2. Summary of Aquatic Field Surveys

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
Garth Street Draft Plan Area and Urban Boundary Expansion Central and East Blocks							
2019							
April 3, 2019	Headwater Drainage Feature Assessment	Ontario Stream Assessment Protocol (V10.S4.M11) Unconstrained Headwater Sampling (Gorenc and Stanfield 2017)	3 to 7	None	70	3 to 4	G. MacVeigh A. Cantwell A. Baril (Geomorphix)
June 8, 2019			16 to 20	None	60	2	D. Frey A. Cantwell
August 15, 2019			22	None	50 to 100	1	D. Frey A. Cantwell J. Pickering A. Baril (Geomorphix)
April 3, 2019	Aquatic Habitat Assessment	Modified Ontario Stream Assessment Protocol	3 to 7	None	70	3 to 4	G. MacVeigh A. Cantwell A. Baril (Geomorphix)
August 15, 2019			22	None	50 to 100	1	D. Frey A. Cantwell J. Pickering A. Baril (Geomorphix)
Golf Course Area (Includes Urban Boundary Expansion West Block)							
2020							
April 2, 2020	Headwater Drainage Feature Assessment	Ontario Stream Assessment Protocol (V10.S4.M11) Unconstrained Headwater Sampling (Gorenc and Stanfield 2017)	14	None	10	2	D. Frey H. Fotherby A. Baril (Geomorphix)
May 22, 2020			21	None	10	1	D. Frey A. Reinert A. Baril (Geomorphix)
August 14, 2020			12	None	10	2	D. Frey H. Fotherby A. Baril (Geomorphix)

Date	Field Survey	Protocol	Weather Conditions				Staff
			Air Temp. (°C)	Precipitation	Cloud Cover (%)	Wind (Beaufort Scale)	
May 22, 2020	Aquatic Habitat Assessment	Modified Ontario Stream Assessment Protocol	21	None	10	1	D. Frey A. Reinert A. Baril (Geomorphix)
2060 Upper James Street Parcel							
2020							
April 2, 2020	Headwater Drainage Feature Assessment	Ontario Stream Assessment Protocol (V10.S4.M11) Unconstrained Headwater Sampling (Gorenc and Stanfield 2017)	14	None	10	2	D. Frey H. Fotherby A. Baril (Geomorphix)
May 22, 2020			21	None	10	1	D. Frey A. Reinert A. Baril (Geomorphix)
August 14, 2020			12	None	10	2	D. Frey H. Fotherby A. Baril (Geomorphix)
May 22, 2020	Aquatic Habitat Assessment	Modified Ontario Stream Assessment Protocol	21	None	10	1	D. Frey A. Reinert A. Baril (Geomorphix)

From: Placko, Joanne (MECP) <Joanne.Placko@ontario.ca>
Sent: June 13, 2023 1:32 PM
To: Ryan Archer
Cc: Desta Frey; Nick Wood; Candice Hood Corbett Land Strategies; Hashveenah Manoharan; jcolyer@starwardhomes.com; Lesko, Joe (MECP)
Subject: RE: 9751 Twenty Road West- SAR (proj1974H)

Good afternoon Ryan,

The MECP Hamilton District Office received an email on May 23, 2023 which contained a technical memo. The technical memo summarized the results of the tree removal activity that took place at 9751 Twenty Road West during February-March 2023, the results of NRSI's April 2023 site investigation, how the activities affected Butternuts and candidate SAR bat roosting trees that were on the property and recommendations on how to address any noted impacts. The MECP reviewed the technical memo and offers the following comments for your consideration:

Section 10 of the Endangered Species Act, 2007 states:

> **Prohibition on damage to habitat, etc.**
>
> **10** (1) No person shall damage or destroy the habitat of,
>
> (a) a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species; or
>
> (b) a species that is listed on the Species at Risk in Ontario List as an extirpated species, if the species is prescribed by the regulations for the purpose of this clause. 2007, c. 6, s. 10 (1).

Based on the photos submitted it looks like most of the butternut were retained as noted. However, apart from section 9 of the ESA, the owner has contravened section 10 by damaging and destroying the habitat around each butternut in the areas where trees were removed. The ministry recommends that the exact area of habitat damaged/destroyed be determined and documented.

The ministry recommends that the owner replaces any category 2 trees that die as a result of the impact within the monitoring of health and condition assessment.

One bat box is not sufficient for the removal of 15 potential roost trees. The ministry recommends a minimum of three bat boxes. The maximum number of bat boxes can be determined by the NRSI biologist/specialist. The location of the bat boxes should be documented, including their location, and the tree species that they are attached to.

The technical memo states that no butternut trees were removed as a result of the tree removal activities, however the ministry has noted during a previous conversation that it was assumed that potentially 4 butternut trees had been removed from the site, one of which had been a dead butternut tree. Can you please clarify this contradiction? Moving forward, the ministry recommends that any trees that are cut on the property are documented, including the species of tree, a GPS of its location, and the condition of the tree (Class 1, 2, 3, etc.), and any other appropriate information.

Can you please provide the ministry with an updated map which demarcates the location of the butternut trees.

If you have any questions or concerns, please let me know.

Regards,

Joanne

Ontario

Ministry of the Environment, Conservation and Parks

Joanne Placko
Sr. Environmental Officer | Provincial Officer #978
Hamilton District Office
119 King Street West, 9th Floor | Hamilton ON L8P 4Y7
☎ (905) 541-2804 | 🖷 (905) 521-7806 | ✉ joanne.placko@ontario.ca

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From: Ryan Archer <rarcher@nrsi.on.ca>
Sent: May 23, 2023 10:36 AM
To: Placko, Joanne (MECP) <Joanne.Placko@ontario.ca>; Lesko, Joe (MECP) <Joe.Lesko@ontario.ca>
Cc: Desta Frey <dfrey@nrsi.on.ca>; Nick Wood <nick@corbettlandstrategies.ca>; Candice Hood Corbett Land Strategies <candice@corbettlandstrategies.ca>; Hashveenah Manoharan <hmanoharan@nrsi.on.ca>; jcolyer@starwardhomes.com
Subject: Re: 9751 Twenty Road West- SAR (proj1974H)

Hi Joanne and Joe,

On behalf of the owner of 9751 Twenty Road West, Hamilton, please find attached a technical memo that summarizes the results of the tree removal activity that took place on the property during February-March 2023, the results of NRSI's April 2023 site investigation and how these activities affected Butternuts and candidate SAR bat roosting trees that were earlier documented on the property. NRSI has provided recommendations on how to address any noted impacts for consideration by MECP.

We look forward to your response on this. Please let me know if you have any questions or if there is need to arrange an additional call to discuss.

Regards,

Ryan Archer M.Sc.
Senior Terrestrial and Wetland Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 414 (f) 519-725-2575
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(w) www.nrsi.on.ca (e) rarcher@nrsi.on.ca
@nrsinews Natural Resource Solutions Inc.
Over 20 years of environmental consulting excellence

Hi Joanne and Joe,

Please see below for some of the initial information requested.

Contact information for the landowner at the subject property:

Jeff Colyer
Development Manager
Starward Homes Limited
201-2000 Garth Street
Hamilton, ON L9B 0C1
office: (905) 667-8800 ;811
fax: (905) 667-8801
jcolyer@starwardhomes.com
www.starwardhomes.com

Additional Information:

Please access the following materials at this link

- *https://portal.nrsi.on.ca/s/KNiNx2YcizyQpP9*
- *Password: NRSI2023*

- Existing Conditions Report for the entire Upper West Side block, prepared for a proponent-led road network Integrated EA for a road network
- Upper West Side SAR Screening (a memo prepared and sent to MECP in 2020) and copies of email correspondence between NRSI and MECP to date
- Candidate Bat Habitat map (shared during our April 17 call)
- Butternut Map (shared during our April 17 call)

We are working on the summary technical memo regarding the tree removals that have occurred recently on the subject property. I will be out of the office for the next several weeks, so please reach out to Ryan and Hashveenah regarding the techncial memo and any questions you have.

Thank you,

Desta

Desta Frey M.Sc. P.Biol. (she/her/hers)
Terrestrial and Aquatic Biologist
Natural Resource Solutions Inc.
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@nrsinews Natural Resource Solutions Inc.
Over 20 years of environmental consulting excellence

Hi Joanne and Joe,

Thank you for meeting with myself and the team this past Monday about the tree removals and SAR-related issues at 9751 Twenty Road West. We appreciated the opportunity to bring you up to speed on the project, and to receive your guidance.

Just a quick update to let you know that we anticipate being able to provide the requested materials by May 1, within the 2-week time-frame you requested. Should we encounter anything that prevents us from meeting this timeline, we'll follow up and let you know. Also, by the end of this week you can expect to receive the following:

- Contact information for the landowner at the subject property
- Existing Conditions Report for the entire Upper West Side block, prepared for a proponent-led road network Integrated EA for a road network
- Upper West Side SAR Screening (a memo prepared and sent to MECP in 2020) and copies of email correspondence between NRSI and MECP to date
- Candidate Bat Habitat map (shared during our Monday call)
- Butternut Map (shared during our Monday call)

Going forward, we will also be providing (by May 1) a summary technical memo regarding the tree removals that have occurred recently on the subject property; once you've had a chance to review, we'd be happy to arrange a site visit as well.

As recommended on our call, we'll also be working on pulling together an Information Gathering Form for the overall UWS lands, and continuing the consultation process to address SAR within the block/all participating lands moving forward.

Please let me know if you have any questions, and I'll be in touch again soon.

Thank you,

Desta

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NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

October 31, 2023 Project No. 1974H

Joanne Placko
Senior Environmental Officer
Ministry of Environment Conservation and Parks
Hamilton District Office
119 King Street West, Hamilton ON
L8P 4Y7

RE: 9751 Twenty Road West, Hamilton Species at Risk
Response to MECP Comments and Mitigation Measures Update

Natural Resource Solutions Inc. (NRSI) was retained in 2017 by the Upper West Side Landowner's Group (UWSLG) to complete natural heritage studies on the participating lands within the Upper West Side (UWS) block. The UWS block includes the property located at 9751 Twenty Road West in Hamilton, Ontario (the "subject property"), owned by Starward Homes Limited (the "Landowner"). In February and March 2023, tree removals were completed within a treed feature and several hedgerows on the subject property. Natural heritage data previously collected by NRSI for the subject property indicates that several regulated Species at Risk (SAR) Butternut (*Juglans cinerea*) individuals were identified within these features, along with candidate SAR bat habitat trees.

NRSI prepared a technical memo addressed to the Ministry of Environment, Conservation and Parks (MECP) Hamilton District Office, dated May 23, 2023, to summarize the tree removal activities and SAR survey efforts to date on the subject property. The memo outlined the following key findings:

- No Butternut trees were removed as a result of the tree removal activities, although some disturbance to the soil immediately surrounding these trees occurred as a result of the removal activities; and

- A total of 15 out of 41 candidate SAR bat habitat trees on the subject property were removed. However, these trees were removed outside of the bat active period (April 1-September 30), so no impacts to individual SAR bats are expected to have occurred.

The May 23, 2023 memo also outlined five mitigation measures (or next steps) proposed to offset potential impacts to SAR bats and to ensure the protection of Butternuts and compliance with the ESA and Ontario Regulation 830/21 unless or until such time that their removal is authorized in accordance with these legal instruments:

Measure 1 – Butternut Health Expert Report

A Butternut Health Expert Report will be submitted to the MECP. The report will detail the assessment results for the Butternut individuals found within the UWS Block, including those found within the subject property. The report will identify Butternuts that may be killed, harmed, or taken as a result of proposed development activities on the UWS Block. A site visit with the MECP may occur during this time. Following a 30-day

period, a Notice of Butternut Impact form will be submitted to the Minister of Environment, Conservation and Parks in accordance with Ontario Regulation 830/21.

Measure 2 – Seed Mix Application

A seed mix comprised of native meadow species will be hand-applied to the disturbed lands surrounding the Butternuts as an interim soil restoration measure during spring 2023.

Measure 3 – Butternut Health Monitoring

The health and condition of the Butternuts will be monitored by NRSI's trained Butternut Health Experts, at an interval approved by the MECP.

Measure 4 – Butternut Habitat Staking

Any portion of the 50m habitat zone around the Butternuts that is not actively used for agriculture will be staked to ensure no further site alteration or work is completed in this zone.

Measure 5 – Artificial Bat Roosting Structure Installation

The installation of at least 1 bat roosting structure, with consideration for the future land development plans and timeline for the subject property.

On June 13th, 2023, the MECP Hamilton District Office provided comments in response to the technical memo (J. Placko, pers. comm. via e-mail to Corbett Land Strategies, Starward Homes Limited, and NRSI). The following memo outlines NRSI's responses to these comments. An update on the status of the five proposed mitigation measures is also provided, including the results of Butternut health monitoring completed during the 2023 growing season.

Responses to MECP Comments

MECP Comment 1: *Based on the photos submitted it looks like most of the butternut were retained as noted. However, apart from section 9 of the ESA, the owner has contravened section 10 by damaging and destroying the habitat around each butternut in the areas where trees were removed. The ministry recommends that the exact area of habitat damaged/destroyed be determined and documented.*

NRSI Response 1: It is acknowledged that Section 10 of the *Endangered Species Act* (*ESA*)*,* 2007 was contravened by the Landowner through tree removal activities within the habitat of Butternuts. Map 1 shows a 50m Habitat Zone applied to all protected Category 2 Butternuts on or adjacent to the subject property. Agricultural operations are active within the Habitat Zones of all Category 2 Butternut trees on the subject property. These agricultural areas are not considered Butternut habitat. As such, it is estimated that approximately 0.39ha of Butternut habitat was damaged during the tree removal activities.

The Habitat Zones of the following on-property Category 2 trees were damaged as a result of the tree removals: JUG-122, JUG-121, JUG-120, and JUG-028. No tree removals occurred within the Habitat Zone of JUG-140. Tree removals also occurred within the outer portions of the Habitat Zones of JUG-161, JUG-027, and JUG-026, which are Category 2 Butternuts found south of the subject property boundary (shown on Map 1). However, tree clearing did not occur within 20m of these individuals, and the

seed zone for these trees is now being left to re-naturalize. As a result, these three off-property Butternuts were not included in the monitoring program since no short-term or long-term harm occurred.

MECP Comment 2: *The ministry recommends that the owner replaces any category 2 trees that die as a result of the impact within the monitoring of health and condition assessment.*

NRSI Response 2: The Landowner is prepared to replace any Category 2 trees that die as a result of the tree removals and associated disturbance. Based on the results of monitoring in 2023, no Category 2 trees have died as a result of these activities.

MECP Comment 3: *One bat box is not sufficient for the removal of 15 potential roost trees. The ministry recommends a minimum of three bat boxes. The maximum number of bat boxes can be determined by the NRSI biologist/specialist. The location of the bat boxes should be documented, including their location, and the tree species that they are attached to.*

NRSI Response 3: To offset potential impacts to SAR bats, NRSI recommends the installation of three Super Rocket Roost (8" x 56") Artificial Tree Bat Roosts from Bat Conservation and Management (BCM). These free-standing roost structures are preferred to smaller tree-mounted bat boxes and offer a variety of benefits:

- The core of the roost mimics a dead tree, with both 'wedge'-type crevices and traditional vertical baffles;
- Suitable for small colonies of a wide range of species, including the main target for this site, Little Brown Myotis (*Myotis lucifugus*);
- A heavy-duty custom outdoor UV-resistant plastic shell protects the roost and minimizes maintenance;
- The larger mass of the roost retains heat longer into the night and provides more roost crevices for bats; and
- Performs better than many other designs, and Little Brown Myotis has been documented using the structures.

Additional information (including photographs and measurement details) is available at: *https://batmanagement.com/products/bcm-super-rocket-roost*

Future development is expected to occur throughout the subject property; the placement of the roost structures within the subject property is therefore not recommended. However, since the Landowner is part of the UWSLG, there are no anticipated barriers to installing the structures off-property on lands owned by others. The three Super Rocket Roosts will therefore be placed in or adjacent to natural features that will be retained in the long-term, within approximately 1km of the subject property. A description and preliminary map of the proposed locations is provided in Appendix I. The Landowner will install the roost structures prior to May 1, 2024, under the guidance of NRSI biologists. This proposed approach will ensure that the structures will not require relocation when development proceeds in the future, enables their placement within higher-quality habitat than what is currently available within the subject property, and minimizes the time-lag between tree removal and artificial roost installation.

Monitoring of the Super Rocket Roosts will also be completed. Visual inspections will occur twice at each of the three structures between mid-June and the end of July, in post-installation Years 1 (2025), 3 (2027) and 5 (2029). Visual inspections may confirm the presence of bats and/or guano. Visual inspections will involve direct observations through the open bottom of the artificial roosting structures and will be completed by qualified

biologists who are highly experienced in the identification of Ontario's SAR bat species and their guano. Any guano present can be identified as either the common Big Brown Bat (*Eptesicus fuscus*) or as belonging to one of the four Ontario SAR bats, which includes Little Brown Myotis. Any maintenance required to keep the bat houses functioning correctly will be completed on an as-needed basis for the first five years post-installation. Maintenance will correspond with visual inspection site visits whenever possible. Following the completion of the two visual inspections, a memo will be prepared outlining the methods, including survey dates, weather conditions, and observers, and the monitoring results.

MECP Comment 4: *The technical memo states that no butternut trees were removed as a result of the tree removal activities, however the ministry has noted during a previous conversation that it was assumed that potentially 4 butternut trees had been removed from the site, one of which had been a dead butternut tree. Can you please clarify this contradiction? Moving forward, the ministry recommends that any trees that are cut on the property are documented, including the species of tree, a GPS of its location, and the condition of the tree (Class 1, 2, 3, etc.), and any other appropriate information.*

NRSI Response 4: At the time of the April 17, 2023 meeting with the MECP, NRSI staff had not yet completed on-site verification of conditions, and were only aware of the approximate area that tree removal activities occurred. At that time, it was assumed that all Butternut trees within this impacted area were removed. Following the discussion with the MECP, NRSI staff conducted a site visit on April 20, 2023 to verify the locations and conditions of Butternut trees within the subject property. At that time, it was determined that no living or dead Butternut trees (of any category) were removed, and that there were eight (8) Butternuts in total on the subject property. The following Butternuts were monitored in 2023:

- JUG-122 (Category 2)
- JUG-121 (Category 2)
- JUG-137 (Category 1, dead in 2023)
- JUG-138 (Category 1, dead in 2023)
- JUG-139 (Category 1)
- JUG-140 (Category 2)
- JUG-120 (Category 2)
- JUG-028 (Category 2)

MECP Comment 5: *Can you please provide the ministry with an updated map which demarcates the location of the butternut trees.*

NRSI Response 5: Please refer to Map 1 for the locations of all Butternut trees on and adjacent to the subject property, including the eight individuals within the property that are included in the monitoring program, as well as the three individuals off-property to the south where it was determined that no impacts occurred (see NRSI Response 1).

Mitigation Measures Update

Measure 1 - Butternut Health Expert Report

Status: Complete

A Butternut Health Expert Report including information for all trees within the UWS block, including the eight Butternuts located within the subject property, was submitted to SAROntario@ontario.ca on October 30, 2023.

Measure 2 – Seed Mix Application

Status: Scheduled to occur prior to November 15, 2023

Due to scheduling issues, this measure was not carried out as planned in spring 2023. However, 5kg of *Short Upland Trail Native Seed Mixture 8255* has been purchased on behalf of the landowner from the Ontario Seed Company (OSC) and will be hand-applied to the disturbed lands surrounding the Butternuts as an interim soil restoration measure prior to November 15, 2023.

Measure 3 – Butternut Health Monitoring

Status: Ongoing (complete for 2023, planned for 2024)

Survey Methods

To detect any immediate decline in health resulting from habitat disturbances around eight Butternuts within the subject property, four monitoring surveys are proposed over the 2023 and 2024 growing seasons. Surveys were conducted in June and August 2023, and will be repeated in June and August 2024.

A modified Butternut Health Assessment monitoring protocol was developed to identify whether these trees are exhibiting signs of decline as a result of the tree removal activities. This protocol was adapted from the MECP's Butternut Assessment Guidelines (2021). Impacts from the tree removal activities may include direct mechanical damage such as broken branches, wounded stems, and torn roots, or indirect damage such as soil compaction or increased wind exposure. The protocol involved assessing symptoms of decline and vigour such as crown dieback, twig dieback, branch dieback, seeding, defoliation, discolouration, and other physical damage. The presence of fungal cankers was also documented and photos were taken of each tree.

This monitoring was completed by a Certified Arborist and Registered Professional Forester, both trained in Butternut Health Assessment for the purposes of the *Endangered Species Act* (2007) (MECP 2021). The data gathered during the monitoring surveys on June 29, 2023 and August 15th, 2023 is provided in Appendix II. A photo log is also included (Appendix III).

Results

JUG-139 (Photo 1) and **JUG-140** (Photo 2) are located within a treed feature on the subject property, and no removals occurred within their 50m Habitat Zones. While both trees exhibit signs of decline in the form of canopy dieback, it is expected that this decline is a result of Butternut Canker.

JUG-137 (Photo 3) and **JUG-138** (Photo 4) were found dead and standing within the cleared area. It is likely that JUG-137 and JUG-138 died as a result of Butternut Canker prior to any removal activities. These trees show extensive evidence of historical canker.

JUG-028, JUG-120, JUG-121, and JUG-122 and were found standing in an isolated hedgerow along the eastern border of the subject property. JUG-028 (Photo 5 and 6) and JUG-120 (Photos 7 and 8) have relatively healthy crowns with some signs of dieback. These trees appear to have experienced mechanical damage from tree removal machinery in the form of torn structural branches. JUG-122 (Photos 9 and 10) and JUG-121 (Photos 11 and 12) appear to be in good health with minor dieback,

defoliation, and discoloration. Among these latter four trees, only JUG-028 appears to have any visible signs of Butternut Canker (Photo 13). JUG-028 was also the only Butternut tree to show any evidence of advancing dieback (<5%) between the first and second monitoring visit. Except for JUG-028, there were no significant changes in dieback, seeding, defoliation, cankers, and mechanical damage for each tree between the June and August surveys. It was noted that during the August survey, an increased number of trees were exhibiting signs of yellowing or chlorosis in the crown. It is expected that this yellowing is due to the natural senescence of the leaves near the end of the Butternut leaf-on season. Yellowing of the leaves may also be a response to soil disturbance. It is expected that any disturbance-related responses in the crown will be detected during the 2024 monitoring efforts.

Measure 4 – Butternut Habitat Staking

Status: Complete

On August 18th, 2023, any portion of the 50m Habitat Zone around the Butternuts that is not actively used for agriculture was staked to ensure no further site alteration or work is completed in this zone (Photos 14-16). NRSI staff installed 6ft 2x2" wooden stakes at 6m to 10m intervals along the perimeter of the Habitat Zones. The tops of the stakes were painted with blaze-orange to increase visibility, and signs noting "Butternut Habitat Protection Zone" were fixed to every 10 posts (approximately). The stakes serve to demarcate the boundary of the protection Habitat Zone and visibly limit any future disturbance on the subject property.

Measure 5 - Artificial Bat Roosting Structure Installation

Status: Scheduled for spring 2024, prior to May 1

Please refer to NRSI Response 3, which provides the details associated with this measure. Appendix I provides preliminary mapping and location descriptions for the three Super Rocket Roosts.

Should you have any questions or comments regarding this letter, please do not hesitate to contact the undersigned.

Sincerely,
Natural Resource Solutions Inc.

Hashveenah Manoharan, B.E.S.
Terrestrial & Wetland Biologist, Certified Arborist

Desta Frey, M. Sc.
Terrestrial & Aquatic Biologist, Project Manager

Encl.

Map 1. 9751 Twenty Road West – Butternut Locations
Appendix I. Preliminary Artificial Bat Roosting Structure Installation Plan
Appendix II. 2023 Butternut Health Monitoring Results
Appendix III. Photo Log

References

Government of Ontario. 2007. *Endangered Species Act*. Page S.O. 2007, c. 6.

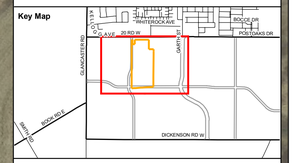
Ontario Ministry of the Environment, Conservation and Parks. 2021. Butternut assessment guidelines. Last updated December 2021. https://www.ontario.ca/page/butternut-assessment-guidelines

Map 1

9751 Twenty Road West

Butternut Locations

Key Map



Legend

- Subject Property
- Primary Road
- Secondary Road

Butternut *(Juglans cinerea)*

- Category 1
- Category 2
- Butternut Habitat Zone (50m)

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1974H
Date: October 23, 2023

NAD83 - UTM Zone 17
Size: 24x36"
1:1,300

0 20 40 60 80 100 Meters

JUG-122
JUG-121
JUG-137
JUG-138
JUG-139
JUG-140
JUG-120
JUG-028
JUG-027
JUG-026

Appendix I. Preliminary Artificial Bat Roosting Structure Installation Plan

Proposed locations for the three Super Rocket Roost structures are shown on Figure 1 below; exact structure placement will consider the *Criteria for Successful Bat Houses* published by Bat Conservation International (BCI 2012). Each structure will be placed within natural features or their buffers (i.e., areas where grading will not be required during future construction activities and that are part of the future Upper West Side Natural Heritage System). A distance of at least 7-8m away from tree branches, aerial wires, or other aerial predator perches will be maintained.

Super Rocket Roost #1 will be placed in the southern portion of the 555 Glancaster Road property (former Glancaster Golf Course). This area is characterized by a combination of natural meadow vegetation and row crop agriculture, with an adjacent pond feature and deciduous woodland.

Super Rocket Roost #2 will be placed in a swamp thicket inclusion within a deciduous woodland at 9625 Twenty Road West.

Super Rocket Roost #3 will be placed in a cultural meadow near a deciduous woodland at 9511 Twenty Road West.

Figure 1. Proposed locations of three Super Rocket Roost (8" x 56") Artificial Tree Bat Roosts from Bat Conservation and Management (BCM), as shown on Google Earth (imagery date: November 2021). The 9751 Twenty Road West subject property is shown in blue.

Appendix II. 2023 Butternut Health Monitoring Results

	Visit 1	Visit 2	Visit 3	Visit 4
Observer(s):	Hashveenah Manoharan, Jack Richard	Hashveenah Manoharan		
Date:	2023-06-29	2023-08-15		
Precipitation:	None	Rained earlier		
Temp (°C):	22	18		
Cloud Cover (%)	20	100		
Wind Speed & Direction:	1, NW	3, NW		

Butternut ID	DBH (cm)		Live Crown (%)		Twig Dieback (Y/N)		Branch Dieback (Y/N)		Seed (Y/N)		Defoliation (Y/N)		Discolouration (Y/N)		Cankers						Physical Damage		Notes	
															At or below 2m		Above 2m		At Root Flare					
	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2	Visit 1	Visit 2
JUG140	17.9	17.9	20.0	20.0	Y	Y	Y	Y	N	N	Y - minor	Y - minor	N	N	Sooty: 2 Open: 2	Sooty: 2 Open: 2	Sooty: 2 Open: 3	Sooty: 2 Open: 3	Sooty: 3 Open: 2	Sooty: 3 Open: 2	N/A - not within tree removal area	N/A - not within tree removal area		
JUG139	6	6	20.0	20.0	Y	Y	Y	Y	N	N	Y - minor	Y - minor	N	Y - minor	Sooty: 1 Open: 4	Sooty: 1 Open: 4	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 2 Open: 1	Sooty: 2 Open: 1	N/A - not within tree removal area	N/A - not within tree removal area		Necrosis, galls on leaves
JUG138	N/A - dead	N/A - dead	0.0	0.0	Y	Y	Y	Y	N	N	N/A	N/A	N/A	N/A	Sooty: Open:	Sooty: Open:	Sooty: Open:	Sooty: Open:	Sooty: Open:	Sooty: Open:	N/A - dead	N/A - dead	Dead	
JUG137	N/A - dead	N/A - dead	0.0	0.0	Y	Y	Y	Y	N	N	N/A	N/A	N/A	N/A	Sooty: Open:	Sooty: Open:	Sooty: Open:	Sooty: Open:	Sooty: Open:	Sooty: Open:	N/A - dead	N/A - dead	Dead	
JUG120	17.7	17.7	85.0	80.0	Y	Y	Y	Y	N	N	Y	Y	N	Y	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Yes - branch at 1.5m height removed		Leaves wilting	Epicormic shoots, necrosis, chlorosis
JUG028	20.2	20.2	85.0	85.0	Y	Y	Y	Y	Y	Y	Y	Y - minor	Y - minor	Y	Sooty: 3 Open: 4	Sooty: 3 Open: 4	Sooty: 0 Open: >10	Sooty: 0 Open: >10	Sooty: 1 Open: 6	Sooty: 1 Open: 6	Yes - lateral branch dead and hanging			Hanger, recent dieback, chlorosis
JUG121	14.6+5.8+7.2+4.9+13.6	14.6+5.8+7.2+4.9+13.6	95.0	95.0	Y - minor	Y	Y - minor	Y	Y	Y	Y - minor	Y - minor	Y - minor	Y	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	None		Grape in crown	Chlorosis
JUG122	23.5	23.5	95.0	95.0	Y	Y	N	N	Y	Y	Y	Y	Y - minor	Y	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	Sooty: 0 Open: 0	None		Grape in crown, leaves wilting, necrotic	Chlorosis

Appendix III. Photo Log

Photo 1. Canopy decline of **JUG-139**, located within a treed feature. No tree removals occurred within the Habitat Zone of this tree (June 29, 2023).

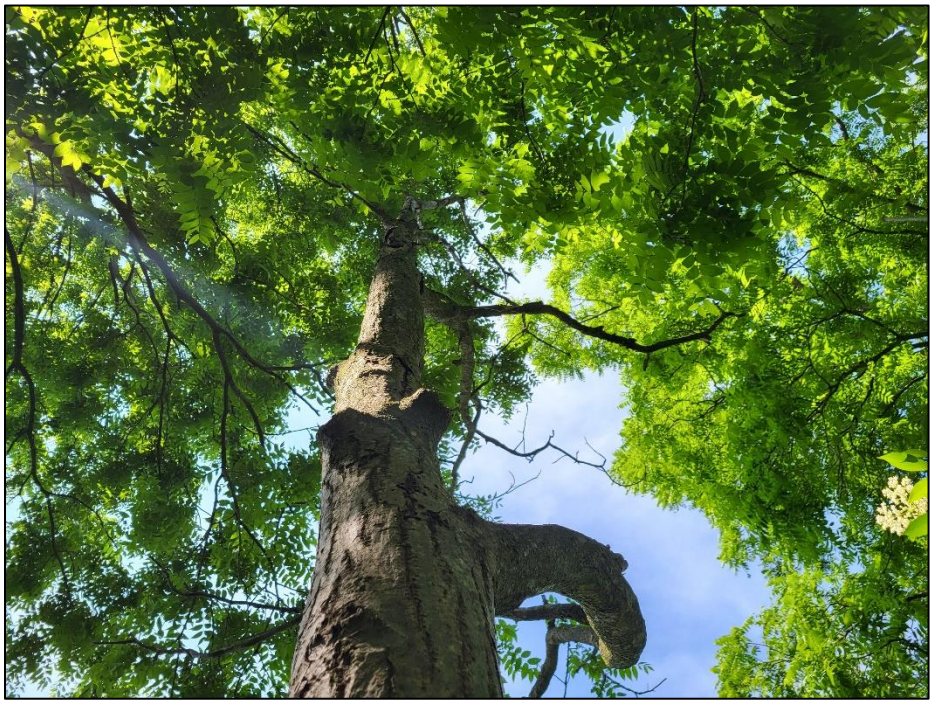


Photo 2. Canopy decline of **JUG-140**, located within a treed feature. No tree removals occurred within the Habitat Zone of this tree (June 29, 2023).

Photo 3. JUG-137, dead and standing within cleared area (June 29, 2023).

Photo 4. JUG-138, dead and standing within cleared area (June 29, 2023).

Photo 5 (left, June 29, 2023) and **Photo 6** (right, August 15, 2023). **JUG-028** with minor crown dieback and mechanical damage resulting in a broken structural branch. A small amount of advancing dieback was observed in the lower right of the image during the August 2023 visit.

Photo 7 (left, June 29, 2023) and **Photo 8** (right, August 15, 2023). **JUG-120** with minor crown dieback. Apparent progression of dieback in photo is due to senescence of grapevine in canopy.

Photo 9 (left, June 29, 2023) **and Photo 10** (right, August 15, 2023). **JUG-122** with minor crown discolouration.

Photo 11 (left, June 29, 2023) and **Photo 12** (right, August 15, 2023). **JUG-121** with minor crown discolouration.

Photo 13. Butternut canker on **JUG-028** (August 15, 2023).

Photo 14. Butternut Habitat Zone stakes in front of **JUG-028** and **JUG-120** (August 18, 2023).

Photo 15. Stakes at the southern extent of the Butternut Habitat Zone of **JUG-140** (August 18, 2023).

Photo 16. Stakes within the treed Butternut Habitat Zone of **JUG-140** (August 18, 2023).

From: Desta Frey <dfrey@nrsi.on.ca>
Sent: November 27, 2023 9:37 AM
To: Placko, Joanne (MECP)
Cc: Nick Wood; Candice Hood Corbett Land Strategies; Hashveenah Manoharan; jcolyer@starwardhomes.com; Ryan Archer; Nicole Charlton; Clarke, Mackenzie (MECP); Lesko, Joe (MECP); Sophia Munoz
Subject: Re: 9751 Twenty Road West- SAR (proj1974H)

Good morning Joanne,

Thank you for your email. In response to your comments:

1. I can confirm that the seed mix was applied to the disturbed area within the Butternut habitat zones on November 6, 2023. Notes from our field staff who completed the application are as follows: *5kg of upland seed mix ('Short Upland Trail Native Seed Mixture 8255' sourced from Ontario Seed Company) was applied to the target area of the Butternut habitat zones. At the time of application, the areas were roughly 25% bare ground, 25% woody debris, and 50% vegetated. The mix was applied across the entire target area, but concentrated in bare and sparsely-vegetated patched.*

If requested, we can also provide photo documentation of the seed mix application and ground conditions- please let me know.

2. NRSI will be recommending to the landowners that surveys for SAR bats be completed, inclusive of habitat assessments (to update aging field data and accurately identify candidate habitats) and acoustic monitoring. We understand that an IGF speaking to SAR bats and Butternuts will be required, and will continue to work with the Upper West Side Landowner's Group to establish a time frame for submission of the IGF depending on the stage of the overall project and when development / tree removals are anticipated to move forward.

If you have any other questions, please let us know.

Thank you,

Desta

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Over 25 years of environmental consulting excellence

On 2023-11-24 9:07 a.m., Placko, Joanne (MECP) wrote:

Good morning Desta,

The ministry's SAR branch has reviewed the responses you had submitted, and offers the following comments:

1. The memo noted that a seed mix would be applied around the disturbed area this November. Can you please let me know if this has been completed?

2. Depending on the extent of further tree removal to take place the ministry continues to recommend that surveys for SAR bats are conducted. If SAR bats may be impacted the ministry recommends that you submit an IGF for SAR bats and Butternut.

If you have an questions or concerns, please let me know.

Regards,

Joanne

Ontario

Ministry of the Environment, Conservation and Parks

Joanne Placko
Sr. Environmental Officer | Provincial Officer #978
Hamilton District Office
119 King Street West, 9th Floor | Hamilton ON L8P 4Y7
☎ (905) 541-2804 | 🖷 (905) 521-7806 | ✉ joanne.placko@ontario.ca

---

From: Desta Frey <dfrey@nrsi.on.ca>
Sent: October 31, 2023 3:39 PM
To: Placko, Joanne (MECP) <Joanne.Placko@ontario.ca>; Lesko, Joe (MECP) <Joe.Lesko@ontario.ca>
Cc: Nick Wood <nick@corbettlandstrategies.ca>; Candice Hood Corbett Land Strategies <candice@corbettlandstrategies.ca>; Hashveenah Manoharan <hmanoharan@nrsi.on.ca>; jcolyer@starwardhomes.com; Ryan Archer <rarcher@nrsi.on.ca>; Nicole Charlton <ncharlton@nrsi.on.ca>
Subject: Re: 9751 Twenty Road West- SAR (proj1974H)

Good afternoon Joanne,

NRSI has now prepared a letter summarizing our responses to your comments from earlier this year regarding SAR at the above-noted property in Hamilton. The letter also summarizes the results of the Butternut monitoring and other mitigation measures that NRSI biologists carried out on behalf of the landowner in 2023. Due to the inclusion of a photo log, the file is quite large; it can be downloaded via the following fileshare link:

1. https://portal.nrsi.on.ca/s/KNiNx2YcizyQpP9

Please let us know if you have additional questions or comments.

Thank you,

Desta

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On 2023-06-14 5:08 p.m., Desta Frey wrote:

> Hi Joanne,
>
> Thank you for your email and detailed comments. Our team will review and circle back shortly with the additional clarifications requested.
>
> Regards,
>
> Desta

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On 2023-06-13 1:32 p.m., Placko, Joanne (MECP) wrote:

Good afternoon Ryan,

The MECP Hamilton District Office received an email on May 23, 2023 which contained a technical memo. The technical memo summarized the results of the tree removal activity that took place at 9751 Twenty Road West during February-March 2023, the results of NRSI's April 2023 site investigation, how the activities affected Butternuts and candidate SAR bat roosting trees that were on the property and recommendations on how to address any noted impacts. The MECP reviewed the technical memo and offers the following comments for your consideration:

Section 10 of the Endangered Species Act, 2007 states:

> **Prohibition on damage to habitat, etc.**
>
> **10** (1) No person shall damage or destroy the habitat of,
>
> (a) a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species; or
>
> (b) a species that is listed on the Species at Risk in Ontario List as an extirpated species, if the species is prescribed by the regulations for the purpose of this clause. 2007, c. 6, s. 10 (1).

Based on the photos submitted it looks like most of the butternut were retained as noted. However, apart from section 9 of the ESA, the owner has contravened section 10 by damaging and destroying the habitat around each butternut in the areas where trees were removed. The ministry recommends that the exact area of habitat damaged/destroyed be determined and documented.

The ministry recommends that the owner replaces any category 2 trees that die as a result of the impact within the monitoring of health and condition assessment.

One bat box is not sufficient for the removal of 15 potential roost trees. The ministry recommends a minimum of three bat boxes. The maximum number of bat boxes can be determined by the NRSI biologist/specialist. The location of the bat boxes should be documented, including their location, and the tree species that they are attached to.

The technical memo states that no butternut trees were removed as a result of the tree removal activities, however the ministry has noted during a previous conversation that it was assumed that potentially 4 butternut trees had been removed from the site, one of which had been a dead butternut tree. Can you please clarify this contradiction? Moving forward, the ministry recommends that

any trees that are cut on the property are documented, including the species of tree, a GPS of its location, and the condition of the tree (Class 1, 2, 3, etc.), and any other appropriate information.

Can you please provide the ministry with an updated map which demarcates the location of the butternut trees.

If you have any questions or concerns, please let me know.

Regards,

Joanne

Ontario

Ministry of the Environment, Conservation and Parks

Joanne Placko
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---

From: Ryan Archer <rarcher@nrsi.on.ca>
Sent: May 23, 2023 10:36 AM
To: Placko, Joanne (MECP) <Joanne.Placko@ontario.ca>; Lesko, Joe (MECP) <Joe.Lesko@ontario.ca>
Cc: Desta Frey <dfrey@nrsi.on.ca>; Nick Wood <nick@corbettlandstrategies.ca>; Candice Hood Corbett Land Strategies <candice@corbettlandstrategies.ca>; Hashveenah Manoharan <hmanoharan@nrsi.on.ca>; jcolyer@starwardhomes.com
Subject: Re: 9751 Twenty Road West- SAR (proj1974H)

Hi Joanne and Joe,

On behalf of the owner of 9751 Twenty Road West, Hamilton, please find attached a technical memo that summarizes the results of the tree removal activity that took place on the property during February-March 2023, the results of NRSI's April 2023 site investigation and how these activities affected Butternuts and candidate SAR bat roosting trees that were earlier documented on the property. NRSI has provided recommendations on how to address any noted impacts for consideration by MECP.

We look forward to your response on this. Please let me know if you have any questions or if there is need to arrange an additional call to discuss.

Regards,

Ryan Archer M.Sc.
Senior Terrestrial and Wetland Biologist
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Over 20 years of environmental consulting excellence

Hi Joanne and Joe,

Please see below for some of the initial information requested.

Contact information for the landowner at the subject property:

Jeff Colyer
Development Manager
Starward Homes Limited
201-2000 Garth Street
Hamilton, ON L9B 0C1
office: (905) 667-8800 ;811
fax: (905) 667-8801
jcolyer@starwardhomes.com
www.starwardhomes.com

Additional Information:

Please access the following materials at this link

1. *https://portal.nrsi.on.ca/s/KNiNx2YcizyQpP9*
2. *Password: NRSI2023*

1. Existing Conditions Report for the entire Upper West Side block, prepared for a proponent-led road network Integrated EA for a road network
2. Upper West Side SAR Screening (a memo prepared and sent to MECP in 2020) and copies of email correspondence between NRSI and MECP to date
3. Candidate Bat Habitat map (shared during our April 17 call)

4. Butternut Map (shared during our April 17 call)

We are working on the summary technical memo regarding the tree removals that have occurred recently on the subject property. I will be out of the office for the next several weeks, so please reach out to Ryan and Hashveenah regarding the techncial memo and any questions you have.

Thank you,

Desta

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Hi Joanne and Joe,

Thank you for meeting with myself and the team this past Monday about the tree removals and SAR-related issues at 9751 Twenty Road West. We appreciated the opportunity to bring you up to speed on the project, and to receive your guidance.

Just a quick update to let you know that we anticipate being able to provide the requested materials by May 1, within the 2-week time-frame you requested. Should we encounter anything that prevents us from meeting this timeline, we'll follow up and let you know. Also, by the end of this week you can expect to receive the following:

1. Contact information for the landowner at the subject property
2. Existing Conditions Report for the entire Upper West Side block, prepared for a proponent-led road network Integrated EA for a road network
3. Upper West Side SAR Screening (a memo prepared and sent to MECP in 2020) and copies of email correspondence between NRSI and MECP to date
4. Candidate Bat Habitat map (shared during our Monday call)
5. Butternut Map (shared during our Monday call)

Going forward, we will also be providing (by May 1) a summary technical memo regarding the tree removals that have occurred recently on the subject property; once you've had a chance to review, we'd be happy to arrange a site visit as well.

As recommended on our call, we'll also be working on pulling together an Information Gathering Form for the overall UWS lands, and continuing the consultation process to address SAR within the block/all participating lands moving forward.

Please let me know if you have any questions, and I'll be in touch again soon.

Thank you,

Desta

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Appendix IV

Ministry of the Environment, Conservation, and Parks (MECP) Correspondence

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

July 17, 2023 Project No. 1974E

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Re: Upper West Side Secondary Plan: Natural Heritage Studies Terms of Reference

On behalf of the Upper West Side Landowners Group (UWSLG), Corbett Land Strategies (CLS), and Natural Resource Solutions Inc. (NRSI), I am pleased to provide a Terms of Reference (TOR) for a Master Environmental Impact Statement (EIS), Linkage Assessment (LA), and Tree Protection Plan (TPP) in support of the Upper West Side (UWS) Secondary Planning Study.

Project Background

The UWS community is generally defined as the lands bounded by Twenty Road West to the north, Upper James Street to the east, Dickenson Road to the south, and Glancaster Road to the west. Lands owned by the UWSLG, referred to as 'Participating Lands', are shown on Map 1. The subject lands include the Twenty Road West Urban Expansion Area and are within the Airport Employment Growth District (AEGD) Secondary Plan area.

The property located at 9511 Twenty Road West is the subject of an active *Planning Act* (R.S.O. 1990) application referred to as the Garth Street Industrial Subdivision Draft Plan and submitted in July 2018 (City of Hamilton File Nos. UHOPA-18-016, ZAC-18-040, and 25T-201807). To meet the needs of this proposed development as well as future development within the overall UWS, several collector roads are required to provide a road network. The extension of Garth Street is a key component of this network as it represents the arterial road. As such, the Municipal Class Environmental Assessment (EA) for the proposed road infrastructure is integrated with the Garth Street Industrial Subdivision Draft Plan and is therefore referred to as an Integrated EA. A TOR for the Integrated EA authored by R.J. Burnside & Associates Limited and dated July 2018 was circulated to the City of Hamilton and the Niagara Peninsula Conservation Authority (NPCA) for review and comment.

In 2020, applications for the expansion of the City of Hamilton's urban boundary were also submitted by the UWSLG for several areas within the UWS community, referred to in previous applications and reports as the Western, Central, and Eastern Urban Boundary Expansion areas, or 'white belt lands'; a provincial order brought these lands into the City's Urban

Boundary in November 2022. These areas are now referred to as the Twenty Road West Urban Expansion Area, and are shown on Map 1.

Natural Heritage Study Approach

Although the majority of the UWS community is located within the existing AEGD Secondary Plan area, Secondary Planning studies that cover the lands within the Twenty Road West Urban Expansion Area have not yet been completed. The UWSLG is proposing to establish a Secondary Plan and zoning requirements for a new urban neighbourhood within the overall UWS lands, including the Urban Expansion Area. The proposed UWS Secondary Plan consists of residential, commercial and mixed-use development areas, neighbourhood parks and natural open space, an elementary school, stormwater management areas, and a road network.

A Development Review Team (DRT) meeting for this proposal (File No. FC-23-049) was held on April 26, 2023; a Formal Consultation Document was subsequently provided outlining the required reports, studies and plans for this privately-initiated Secondary Plan application. Detailed comments from City of Hamilton Natural Heritage Planning staff were also received in April 2023, and have been considered during the preparation of this TOR.

The Formal Consultation Document and comments received from City Natural Heritage Planning staff have identified a requirement for a Subwatershed Study to inform the Secondary Planning process for the Twenty Road West Urban Expansion Area. City staff have indicated that the AEGD Subwatershed Study and Stormwater Master Plan (Dillon Consulting & Aquafor Beech Ltd. 2011) are now considered out of date. Additionally, these previous studies considered employment-related land uses only, whereas the UWS Secondary Plan proposes both employment and residential land uses.

A Subwatershed Study is typically completed in advance of, and separate from, a Secondary Planning Study, and usually establishes the Natural Heritage System (NHS), water resource management framework, land use impacts, mitigation measures, buffers, and restoration opportunities. In some instances, including for the AEGD, the two studies are fully integrated and completed as a simultaneous, iterative process.

This TOR for the natural heritage component of the UWS Secondary Plan application outlines an approach to the completion of a single Master EIS, LA, and TPP that will consider and integrate Subwatershed Study components in addition to a comprehensive evaluation of the proposed Secondary Plan land use concepts and water resource management strategies from the natural heritage perspective.

Study Area

The study area for the Master EIS, LA, and TPP is defined as the entire UWS community and all immediately adjacent natural features, and includes participating and non-participating lands (Map 1). The UWS community is generally characterized by row crop and specialty crop (sod) agricultural lands (including the former Glancaster Golf Course area where row crops have been planted since 2020), rural residences and farms, naturalizing orchard areas, hedgerows, headwater drainage features (HDFs), and natural features including woodlands, wetlands, thickets, meadows, and ponds.

The study area is within the boundaries of the Urban Hamilton Official Plan (UHOP, 2013) and contains several Core Areas that include Significant Woodlands, portions of the Upper Twenty Mile Creek Provincially Significant Wetland (PSW) complex, and key hydrologic features (streams and wetlands). Several Linkages are also mapped on Schedule B – Natural Heritage

System and on the AEGD Secondary Plan Natural Heritage System Map B.8-2. The study area includes HDFs that are part of the Twenty Mile Creek watershed. All HDFs within the UWS community are classified as Seasonal/Warmwater Type 2 Important or Type 3 Marginal Fish Habitat according to the AEGD Subwatershed Study and NPCA mapping (A. Parks, pers. comm.).

Collection and Review of Background Information

In the study area, information that can be gathered (without direct access to the lands outside of those owned by the UWSLG) will be collected and reviewed. Legacy data collected from agencies and wildlife atlases encompassed an area of approximately 1km around the UWS community (or in the case of the wildlife atlases, in the 10km x 10km atlas square that overlaps with the study area).

Background information will be collected and reviewed to identify key natural heritage features, habitats, and species that are reported from or have the potential to occur in the study area. The following sources will be consulted:

- Natural Heritage Information Centre (NHIC) database (MNRF 2023a);
- City of Hamilton Urban Official Plan (UHOP) (2013);
- Twenty Mile Creek Watershed Plan (NPCA 2006);
- City of Hamilton Natural Areas Inventory Project 3rd Edition (Hamilton Conservation Authority 2014);
- Natural Areas Inventory 2006-2009 Volume 1 (Niagara Peninsula Conservation Authority 2010);
- Airport Employment Growth District (AEGD) Subwatershed Study (Dillon Consulting Ltd. and Aquafor Beech Ltd. 2011);
- AEGD Subwatershed Study Implementation Document (Aquafor Beech Ltd. 2017);
- Species at risk public registry (Government of Canada 2023);
- Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR 2000, MNRF 2015a);
- Department of Fisheries and Oceans (DFO) Aquatic Species at Risk mapping (DFO 2022);
- Aquatic Resource Area (ARA) Data (MNRF 2023b);
- Ontario Breeding Bird Atlas (OBBA) (Bird Studies Canada et al. 2006);
- Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature 2019);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Butterfly Atlas (Macnaughton et al. 2023);
- Ontario Odonata Atlas (OOAD 2023); and
- Research-grade observations from community-based wildlife databases including eBird (2023) and iNaturalist (2023).

For the purposes of this study, Species at Risk (SAR) are defined as species listed as provincially Threatened or Endangered that are afforded protection under the *Endangered Species Act* (ESA).

Within Ontario, Species of Conservation Concern (SCC) refer to:

- Species designated provincially as Special Concern;
- Species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the NHIC;
- Species that are designated federally as Threatened or Endangered by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC) but not provincially by the COSSARO. These species may be protected by the federal Species at Risk Act (SARA) if they are listed as Threatened or Endangered on Schedule 1 of the SARA.

Habitat for SCC is considered Significant Wildlife Habitat (SWH), which is afforded protection under the Provincial Policy Statement (OMMAH 2020).

Requests for background information have been sent to the NPCA and the Ministry of the Environment, Conservation and Parks (MECP) to request information on SAR, SCC, and SWH, as well as other relevant data. A request was also made to the City of Hamilton for Linkage mapping files, since the mapping provided in the Official Plans is very coarse and more details were needed to properly assess the Linkages in the subject site. The Community Planning – GIS Section department provided these files to NRSI in 2018. The Hamilton Natural Areas Database, administered by the Hamilton Conservation Authority, was also queried (L. McDonell, *pers. comm*.) and the results will be included in the background review process.

Significant Species and Significant Wildlife Habitat Desktop Assessments

Preliminary desktop habitat assessments for SAR, SCC, and SWH were completed to scope the work plan outlined in this TOR. As indicated previously by City Natural Heritage Planning staff, the provision of these screening results is not required at the TOR stage, but will need to be included in the EIS. Numerous SAR and SCC are reported from the study area; several of these species are considered to have, or potentially have, suitable habitat in the study area based on background information. Several candidate SWH types have also been identified in the study area based on discrete criteria provided by the MNRF (MNRF 2015a). The field program outlined in this TOR was carefully designed to ensure the collection of relevant, comprehensive data that can be used to determine the presence of these significant species and habitats.

Field Program

As detailed in Table 1 (Terrestrial Field Program) and Table 2 (Aquatic Field Program), NRSI has been completing field studies since December 2017 as part of a large-scale field program that assessed all participating lands in the UWS community. Field work was completed in early 2021.

Surveys were generally undertaken within the central portion of the UWS community between 2018-2019, followed by surveys in the western and eastern portions in 2020. Table 1 presents the dates surveys were completed for 1) Garth Street Draft Plan Area & Adjacent Lands and 2) Glancaster Golf Course Area & 2060 Upper James Area. The specific properties that were surveyed within each area are as follows:

- Garth Street Draft Plan Area & Adjacent Lands: 9751, 9625, 9511, 9445, and 9285 Twenty Road West
- Glancaster Golf Course Area & 2060 Upper James Area: 555 Glancaster Road and 2060 Upper James Street

Table 1 and 2 provide a comprehensive summary of all terrestrial and aquatic surveys undertaken in the study area to date and the protocols for each survey type. In the absence of a specific agency-authored protocol for conducting certain types of surveys, professional experience and judgement were used by NRSI biologists. A description of the general methodology for these surveys is provided.

Table 1. Terrestrial Field Program

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area
Vegetation				
Ecological Land Classification (ELC)	1 initial survey, with verification of results during subsequent on-site surveys.	Ecological Land Classification for Southern Ontario: A First Approximation and its Application (Lee et. al. 1998)	○ June 10, 2019	○ June 2, 2020
3-season vascular flora inventories	3 surveys: • Spring (May to early June) • Summer (July to August) • Fall (September to October) A comprehensive area search of all ELC vegetation community units to record all vascular plant species observed. The ELC code for each community was verified during inventories to make any necessary updates.	n/a- professional experience and judgement were used by NRSI staff in carrying out the surveys described in the column to the left.	○ May 28, 2018 ○ August 2, 2018 ○ September 28, 2018	○ June 2, 2020 ○ August 19, 2020 ○ September 22, 2020
Natural Feature Boundary Delineation	Significant Woodland Boundary Delineation and Agency Review	As per City of Hamilton EIS Guidelines Appendix 1 (March 2015), the Significant Woodland Boundary was delineated based on the dripline, which is considered the area immediately below the outer circumference of each tree crown that is located along the edge of the wooded feature being assessed.	○ December 8, 2017 <u>Attendees:</u> *NRSI* – N. Hardie, J. Lance *CLS* – N. Wood *City of Hamilton* – M. Kiddie	○ September 15, 2020 <u>Attendees:</u> *NRSI* – D. Frey, K. Richter *CLS* – N. Wood *GEO Morphix* – A. Baril *R.J. Burnside* – J. Vandermeer *City of Hamilton* – M. Kiddie

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area
	Wetland Boundary Delineation Agency Review	Ontario Wetland Evaluation System (OWES) (MNRF 2014a) and City of Hamilton EIS Guidelines Appendix 1 (March 2015)	○ August 8, 2019 Attendees: *NRSI* – K. Richter, J. Pickering, M. Heyming *City of Hamilton* – M. Kiddie *NPCA* – L. Price	*NPCA* – A. Aldsworth
Tree Inventory	Assessment of all trees >10cm DBH by NRSI Certified Arborists. Information collected included: • Tag number (where applicable) • Species (common and scientific name) • DBH measurement (cm) • Crown radius (m) • General health (good, fair, poor, dead) • Potential for structural failure (improbable, possible, probable, imminent) • Tree location (e.g., subject site) • General comments (i.e., disease, aesthetic quality, development constraints)	City of Hamilton's Tree Protection Guidelines (Appendix "A" to Report PD02229 (f) (City of Hamilton 2010)	○ March 5-9, 13-15, 2018 ○ August 6, 9, 13, 16, 19, and 20, 2019 ○ September 11, 17, 19, 2019 ○ November 1, 2019 ○ December 3,4,11,17, 2019 ○ January 14, 2020 ○ February 6,7, 2020 ○ April 28, 2020 ○ May 7, 2020	○ August 20, 2020

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area
Butternut Health Assessments	1 survey between May 15 and August 31	Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the *Endangered Species Act, 2007* (MNRF 2014b)	○ August 13, 14, 22, and 28, 2019 ○ August 25, 2020	○ August 28, 31, 2020
Birds				
Breeding Bird Surveys	2 surveys Conducted at least 10 days apart between May 24 and July 10 • 1st survey between May 24 and June 15 • 2nd survey between June 16 and July 10	Ontario Breeding Bird Atlas Guide for Participants (OBBA 2001)	○ June 4, 28 2018	○ June 5, 26 2020
Marsh Breeding Bird Surveys	2 surveys Conducted at least 10 days apart between May 20 and July 5	Marsh Monitoring Program Participant's Handbook for Surveying Marsh Birds (Bird Studies Canada 2009a)	○ June 5, 26, 2020	○ June 5, 26 2020
Amphibians				
Anuran Call Surveys	3 surveys: • April between the 15th and 30th, when air temperature is >5°C • May between the 15th and 30th, when air temperature is >10°C • June between the 15th and 30th, when air temperature is >17°C	Marsh Monitoring Program Participant's Handbook for Surveying Amphibians (Bird Studies Canada 2009b)	○ April 24, 2018 (10.5°C) ○ May 28, 2018 (23°C) ○ June 20, 2018 (18°C)	○ April 27, 2020 (8°C) ○ May 26, 2020 (25°C) ○ June 17, 2020 (18.5°C)

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area
Snakes				
Artificial Cover Object (ACO) Surveys	4' x 4' wooden boards with the upper surface painted black have been placed throughout suitable snake habitat in the study area, including at potential hibernacula sites. Based on the MNRF 2016 protocol, a minimum of 5 checks should occur before July 1st, and a minimum of 10 checks should occur during the active season (April to October).	Survey Protocol for Ontario's Species at Risk Snakes (MNRF 2016a)	○ May 6, 12, 13, 25, 2020 ○ June 12, 2020 ○ September 11, 14, 17, 22, 24, 2020	○ April 27, 2020 ○ May 6, 12, 13, 22, 2020 ○ September 11, 14, 17, 22, 24, 2020
Turtles				
Emergence and Basking Surveys	5 surveys: Conducted on clear or partly cloudy days during sunny periods between 0800h and 1700h. Conducted in suitable aquatic habitat between early spring and June 15th in a minimum 3-week period. Suitable aquatic habitat was scanned with binoculars, with a particular focus on basking structures (e.g., fallen logs, rocks) and the perimeter of the feature. The species, number, and behaviour of any observed individuals were recorded.	Modified Visual Encounter Surveys based on the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2015b)	○ April 27, 2018 ○ May 2, 9, 17, 30, 2018	○ April 6, 25, 2020 ○ May 6, 13, 22, 2020

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area
Nest and Nesting Surveys	6 surveys: Conducted between 18:00 and 22:00 hrs in appropriate weather conditions and commenced following the first reports of turtle nesting in the Hamilton area. Appropriately spaced transects were walked by biologists throughout all areas of suitable habitat (i.e., in areas within close proximity to wetlands, with high sun exposure and loose soil, sand or gravel substrates). All observations of turtles and evidence of nesting were documented, including evidence of digging, predated nests and nesting turtles.	MNRF Blanding's Turtle Nest and Nesting Survey Guidelines (MNRF 2016b) MNRF Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2015b)	○ June 10, 2019 *Candidate turtle nesting areas were surveyed on this date, and as no suitable habitat was observed, additional surveys were not conducted.*	○ June 3, 11, 12, 15, 17, 22, 2020
Species at Risk Bats				
Surveys for Habitat of Little Brown Myotis and Northern Myotis	1 survey during leaf-off conditions: Assess all isolated trees and trees in hedgerows for the presence of cavities or other features (e.g., loose bark, hollows) that may provide suitable roosting habitat for SAR bats. Determination of the use of candidate roost trees (through acoustic monitoring and exit surveys) will occur at a future development stage and is not included in this proposed scope of work. Consultation with the MECP will determine the monitoring approach. The MECP may also	Survey Protocol for Species at Risk Bats in Treed Habitats: Little Brown Myotis, Northern Myotis & Tri-Colored Bat (MNRF 2017)	○ May 7, 9, 2018	○ December 7, 20, 2020 ○ April 8, 15, 2021

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area
	require acoustic monitoring and exit surveys prior to the demolition of residences and outbuildings on site that have the potential to house bat maternity colonies.			
Surveys for Habitat of Tri-Colored Bat	During Tree Inventory surveys, all oak and maple trees ≥10cm DBH will be identified for further assessment as candidate habitat for Tri-colored Bat. Determination of the use of candidate roost trees (through acoustic monitoring and exit surveys) will occur at a future development stage and is not included in this proposed scope of work. Acoustic monitoring is to be carried out in the same year as any tree removal is proposed, since the tendency of trees to form suitable leaf clusters varies yearly. Consultation with the MECP will determine the monitoring approach.	Survey Protocol for Species at Risk Bats in Treed Habitats: Little Brown Myotis, Northern Myotis & Tri-Colored Bat (MNRF 2017)	○ March 5-9, 13-15, 2018 ○ August 6, 9, 13, 16, 19, and 20, 2019 ○ September 11, 17, 19, 2019 ○ November 1, 2019 ○ December 3,4,11,17, 2019 ○ January 14, 2020 ○ February 6,7, 2020 ○ April 28, 2020 ○ May 7, 2020	○ August 20, 2020
Insects				
Surveys Targeting Butterflies, Dragonflies, and Damselflies	3 surveys: • June • July • August Systematic area searches were conducted by walking through all vegetation communities to capture the full range and diversity of habitat types. Each species was	n/a- professional experience and judgement were used by NRSI staff in carrying out the surveys described in the column to the left.	○ July 16, 2019 ○ August 16, 2019 ○ June 26, 2020	○ June 26, 2020 ○ July 8, 2020 ○ August 27, 2020

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area
	identified either on the wing or in hand following capture with a mesh net. Surveys were conducted on sunny or partly-cloudy days when temperatures are 19°C or greater. Surveys did not occur if it was raining.			
Ecological Linkage Assessment[1]				
Winter Wildlife Movement Surveys	2 surveys within 24-48h of a fresh snow fall. The subject site was surveyed for wildlife tracks, travel corridors, and other evidence of use by wildlife, and mammal species in particular. Upon encountering tracks, the direction of movement, number of individuals, species, and behaviour was recorded where possible. Observations were mapped to identify wildlife movement patterns at a site-level scale. Surveys focused on areas mapped as Linkages on UHOP Schedule B and on the AEGD Secondary Plan Natural Heritage System Map B.8-2, and will address policies in Volume 1 – C.2.7.6 and F.3.2.1.11 of the UHOP.	n/a- professional experience and judgement were used by NRSI staff in carrying out the surveys described in the column to the left.	○ March 3, 2018 ○ March 1, 2020	○ February 11, 2020 ○ March 1, 2020

Survey Type	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area
Significant Wildlife Habitat Assessment				
SWH Surveys	Conducted for the purpose of identifying candidate SWH based on the desktop assessment. Surveys have and will include ongoing observations collected during all field surveys, following an initial site visit to identify areas of the subject site where candidate SWH may be located. Species or feature-specific surveys targeting candidate SWH are included in the field program outlined in this table and include: • Breeding Bird and Marsh Breeding Bird Surveys • Amphibian Call Surveys • Snake ACO Surveys • Turtle Emergence, Basking, Nest and Nesting Surveys • Insect Surveys All completed wildlife surveys will determine the presence of various SCC species and their habitats (habitat for SCC is considered SWH).	Significant Wildlife Habitat Technical Guide (OMNR 2000) and the Ecoregion Criteria Schedule for Ecoregion 7E (MNRF 2015a).	Initial Survey: o April 11, 2018 Subsequent Surveys: o Completed during all site visits up to and including April 2021	Initial Survey: o April 27, 2020 Subsequent Surveys: o Completed during all site visits up to and including April 2021

[1]In addition to Winter Wildlife Surveys, NRSI biologists will continue to assess the ecological linkage function of the mapped and candidate Linkages during all field surveys by recording incidental observations of wildlife and wildlife sign. Areas where wildlife appear to congregate and travel will be mapped to gain an understanding of how wildlife occupy and move through the site year-round. Completed field surveys have included these observations.

Table 2. Aquatic Field Program

Survey Type and Status	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area[2]
Headwater Drainage Features				
HDF Assessments	3 surveys: • Early spring, in the period closely following the spring freshet and after frost has left the ground (typically, late March to early April) • Late spring, conducted after the melt/thaw-related interflow has ceased (typically, late May) and prior to full vegetation "leaf-out" (i.e., prior to reaching a height of approximately 5cm) so that vegetation growth does not impact findings • Summer, conducted during dry periods to observe areas of permanent flow (typically July or August) It is preferable that the late spring and summer surveys are conducted following at least 3 days without precipitation. Field work was completed by NRSI biologists in cooperation with staff of GEO Morphix Limited, the fluvial geomorphology consultant on the project team.	Evaluation, Classification and Management of Headwater Drainage Feature Guidelines (CVC and TRCA 2014) Ontario Stream Assessment Protocol (OSAP) Section 4: Module 11 Unconstrained Headwater Sampling (Gorenc and Stanfield 2017)[1]	○ April 2, 2020 ○ May 22, 2020 ○ August 14, 2020	○ April 2, 2020 ○ May 22, 2020 ○ August 14, 2020

Survey Type and Status	Timing and Survey Notes	Protocol	Dates Completed	
			Garth Street Draft Plan Area & Adjacent Lands	Glancaster Golf Course Area & 2060 Upper James Area[2]
Aquatic Surveys				
Aquatic Habitat Assessments	1 survey: • Summer (between June and early September), during low flow / baseflow conditions NRSI biologists surveyed all HDFs in the study area. Riparian zone conditions, surrounding land use, bank stability, aquatic vegetation cover, in-stream habitat features, and water temperature were recorded. Information on the condition and connectivity of all features as well as barriers to fish passage in and adjacent to the study area (where possible) were also recorded. Any candidate habitat for significant fish species was described and mapped.	Modified version of the Ontario Stream Assessment Protocol (OSAP) Version 9.0 (Stanfield 2013)	○ May 22, 2020	○ May 22, 2020
Fish Community Sampling	1 survey: Electrofishing methods were used to determine the fish community composition in the pond features within the UWS community. Notes on the quality and character of aquatic habitat were also recorded for each pond.	Modified version of the Ontario Stream Assessment Protocol (OSAP) Version 9.0 (Stanfield 2013)	○ October 14, 2020	○ October 13, 2020

[1] NRSI biologists and GEO Morphix Limited staff that conducted HDF Assessments are certified in the application of this OSAP module.

Master Environmental Impact Statement Reporting

A Master EIS report will be prepared in accordance with the City's Environmental Impact Statement (EIS) Guidelines (March 2015a). The following paragraphs describe key aspects hat will be included in the Master EIS report. For a full list of all proposed EIS content, a preliminary Table of Contents is provided in Appendix I.

Subwatershed Study Components

Section 3.1.6 of the UHOP provides direction on the type of information required for a Subwatershed Study. As described earlier in this TOR, the Master EIS will integrate Subwatershed Study components in addition to a comprehensive evaluation of the proposed Secondary Plan land use concepts and water resource management strategies from the natural heritage perspective. As per the UHOP, natural heritage information and related analyses that will be integrated throughout the Master EIS to fulfill Subwatershed Study requirements will include:

- Characterization of natural heritage features:
    - Aquatic Environment – assessment of fisheries and benthic communities, classification of streams according to fish habitat;
    - Terrestrial Environment – assessment of plants, vegetation communities and wildlife, rare species, disturbance history, habitat fragmentation, etc.;
- Development of a natural heritage system (NHS);
- Identification of areas of constraint, land and water management strategies (as they relate to natural heritage), land use impacts, mitigation measures, buffers, and restoration recommendations;
- Development of an implementation plan that will include:
    - Recommendations for future natural heritage studies
    - Anticipated construction phasing as it relates specifically to the NHS; and
    - A pre-, during-, and post-construction ecological monitoring framework.

Terrestrial & Aquatic Environments- Existing Conditions

The results of the field program detailed in Table 1 and 2 will be summarized in the Master EIS, together with the results of the background information review, to provide a detailed description of the existing conditions and ecological functions of the terrestrial and aquatic environments within and adjacent to the UWS community. The preliminary SAR, SCC, and SWH screenings will be updated with the results of field surveys, and appended to the final report along with detailed species lists. Maps will be prepared to show the location and boundaries of natural features and habitats (including all Core Areas and Linkages).

Relevant details of other reports prepared by the project team (e.g., Geotechnical and Hydrogeological Investigations, Fluvial Geomorphology Assessment) will also be incorporated into the description of the existing conditions. Report sections and associated appendices specific to each vegetation and wildlife group will include the national, provincial, and local rankings of each species observed on site or reported from the study area. The local status will be based on the information provided in the Hamilton Natural Areas Inventory Project 3rd Edition (2014). The discussion of field survey results will include information about the location,

abundance, and life history of any significant species observed (e.g., SAR, SCC, and locally significant species).

Headwater Drainage Feature Assessment

Several headwater tributaries of Twenty Mile Creek overlap with the study area, flowing east to join the main stem of Twenty Mile Creek. As important eco-hydrological features, a fulsome assessment of the flow, form, and function of the HDFs on site is required to determine an appropriate management approach. As detailed in Table 2, these HDFs were comprehensively surveyed in 2020. The HDF Assessment will be detailed under the Aquatic Habitat Section of the EIS and will be prepared in accordance with the Evaluation, Classification and Management of Headwater Drainage Feature Guidelines (January 2014) authored by Credit Valley Conservation (CVC) and Toronto and Region Conservation Authority (TRCA) (referred to as the "Headwater Guidelines"). The results of the HDF field surveys will be used to classify each HDF reach on site and to determine management recommendations. The field work and the HDF Assessment will be completed in cooperation with GEO Morphix Limited, the fluvial geomorphology consultant on the project team.

As per the Headwater Guidelines, classification will consider the influence of modifiers and professional judgement to determine the appropriate classification, where applicable. The results of this process will be clearly articulated in a table in the EIS that summarizes the final management recommendations for each HDF.

Linkage Assessment

As detailed in Table 1, winter wildlife surveys were completed between 2018 and 2020, to identify wildlife tracks and movement patterns through the UWS community and mapped Linkages. These Linkages continued to be assessed during all field surveys (Table 1). Site investigations examined evidence of wildlife usage, connectivity, linkage boundaries, condition, integrity, vegetation, landscape features, and overall function. The boundaries of the linkages will be identified using ELC mapping. The purpose of the LA is to address policies in the UHOP Volume 1 – C.2.7.6 and F.3.2.1.11 and will:

- Assess the ecological features and functions of each mapped Linkage in the subject site, including its vegetation, wildlife usage, and landscape level functions;
- Identify Linkage boundaries based on these features and functions;
- Describe the ecological function, condition, and integrity of Linkages; and
- Identify how ecological function will be maintained or enhanced under the post-development condition.

The LA will be integrated into the EIS report, with separate discussions specific to Linkages under appropriate headings (e.g., Policies, Impacts, Mitigation Measures, Recommendations, etc.). The LA will be prepared in accordance with the City's Linkage Assessment Guidelines (March 2015b) and will include the following information:

- A description of the development proposal,
- Relevant policies, legislation, and planning studies, and a discussion on how the proposed undertaking addresses these policies,

- Characterization and assessment of the ecological function of the Linkages and surrounding areas (including discussion of the condition, viability, and integrity of the Linkage)
- Mapping that illustrates the boundaries of the Linkages,
- Assessment of the significance of environmental features and habitats
- An impacts analysis (including direct, indirect, induced, and cumulative impacts, as well as short and long-term impacts), which will include the Linkages, and
- Recommendations for mitigation measures and monitoring for the Linkages.

Since the LA will be integrated into the EIS report, a discussion of the Linkage-specific policies will be provided in the Policy Context section. In addition, impacts and mitigation measures associated with the Linkage areas will be discussed in those respective sections of the report.

Constraints Analysis and Natural Heritage System Development

A discussion of natural heritage constraints to development within the UWS community will be included in the Master EIS. The significance and sensitivity of important natural features (e.g., Core Areas) and habitats (e.g., SWH, habitat for SAR) will be evaluated. Vegetation Protection Zone (VPZs) widths will be recommended and shown on maps that will also depict Core Area and Linkage boundaries (as per ELC community limits).

A Natural Heritage System (NHS) will be developed and described in the report, consisting of Core Areas, Linkages, hydrological features, and other supporting ecological elements as appropriate. The Master EIS will also present a conceptual restoration and enhancement plan for the NHS, and will outline how the proposed NHS will protect significant and sensitive natural features and habitats.

Impact Analysis

The proposed UWS Secondary Plan land use concept will be reviewed and compared to the existing conditions in the study area. NRSI will continue to work with the project team throughout the process to inform the layout of blocks, roads and services to avoid direct impacts to the natural features. Any areas of conflict between significant natural features, VPZs, and the proposed undertaking that cannot be avoided will be discussed with the project team and options for reducing or mitigating impacts will be recommended. Mitigation measures will be discussed in a separate section of the report. Potential impacts associated proposed land use changes will be fully explored and evaluated in the Master EIS using the results of field studies as well as reports prepared by other disciplines to the extent possible.

Impacts will be determined based on the direct, indirect, induced, and cumulative effects of the undertaking, described as follows:

<u>Direct Impacts:</u>

The approach to identifying and delineating constraint areas, discussed above, will be used to avoid direct impacts from the development to important natural features. The delineation of natural features and associated VPZs, and other applicable development setbacks will be provided to the study team to guide the proposed development layout. Any direct impacts that cannot be avoided will be discussed in this section of the EIS.

Indirect Impacts:

Indirect impacts are those associated with changes to natural feature water balance, surface and groundwater conditions, and water quality. Using the results of hydrological and water resources engineering studies completed by others, NRSI biologists will complete a high-level water balance assessment for the natural features within the UWS community. Indirect impacts associated with changes to drainage patterns, surface and groundwater conditions, and water quality will be discussed as they pertain to the proposed changes in land use within the UWS community.

Induced and Cumulative Impacts:

Induced impacts are those that are not directly related to the construction of the undertaking, but rather arise from the human use of natural areas due to the development. Cumulative impacts look at the character and potential changes that are occurring or may occur in the future on surrounding lands. Cumulative impacts include spatial and temporal crowding, and spatial and temporal lags.

Mitigation Measures

The implications of development in or adjacent to natural features based on applicable regulations and policies will be identified and discussed. An analysis of the appropriate VPZs from the natural features in the UWS Community will be included in the report. Where it has been determined that potential negative impacts to environmental features or Linkages are unavoidable, a discussion of appropriate mitigation measures (e.g., construction timing windows, development limit fencing, tree protection measures, stormwater management strategies) and/or recommended compensation will be provided. The significance of any residual impacts, following the application of mitigation measures, will be discussed in this section.

Implementation Plan

An implementation plan specific to natural heritage components will be presented in the Master EIS to outline how the various recommendations and mitigation measures for protecting and enhancing important natural features will be executed at the Draft Plan stage of development and beyond. The implementation plan will list recommended natural heritage studies to be completed during future stages, and summarize specific implementation actions. The implementation plan will present information on the anticipated construction phasing as it relates to the NHS specifically, and will outline a recommended pre-, during-, and post-construction ecological monitoring framework.

Tree Protection Plan

NRSI Certified Arborists and/or Registered Professional Foresters will prepare a TPP for the UWS community for the UWS Secondary Plan submission. The TPP will be developed in accordance with the City's Tree Protection Guidelines (2010), Urban Woodland Conservation By-law No. 14-212, and Public Tree By-law No. 06-151. The objective of this study is to identify opportunities for the preservation and protection of existing trees, identify and summarize tree health, and present preliminary compensation recommendations where tree removal cannot be avoided. A preliminary assessment for the preservation and removal analysis will be provided in the TPP based on the proposed land use framework for the UWS Secondary Plan. For the purposes of this assessment, it will be assumed that trees located outside of the proposed NHS will not be retained. NRSI will describe and summarize all trees inventoried within the UWS

community participating lands, identify trees to be removed, retained, or potentially relocated based on the extent of the NHS, and overall health and potential for structural failure.

During tree inventories completed between 2018 and 2020, the location was documented for all trees greater than 10cm diameter at breast height (DBH) (using a Trimble backpack GPS unit, or similar). An assessment of each tree was completed (by recording the information for each tree as detailed in Table 1) and an aluminum tree tag with an identification number was installed.

A map (or series of maps) will be provided that shows each inventoried tree, other general site conditions (e.g., topography), and an overlay of the community framework plan. The ownership of each tree (private or public) will be determined. Trees that will be retained and protected, and those requiring removal will be identified, based on high-level information available for the Secondary Plan application. Opportunities for tree retention will also be provided. To ensure existing tree cover is maintained, the City requires 1:1 compensation for all trees ≥10cm DBH that are proposed for removal. The Master TPP will be appended to the Master EIS and will include a tree inventory chart, maps, and analysis as identified in the City's Tree Protection Guidelines. The results of the tree inventory and TPP will also be summarized in the EIS.

This TOR provides a comprehensive description of the proposed Master EIS, LA, and TPP for the UWS Secondary Plan application. Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely,
Natural Resource Solutions Inc.

Desta Frey
Project Manager
Aquatic & Terrestrial Biologist

Encl.: Map 1 – Study Area

Appendix I – Draft EIS Table of Contents

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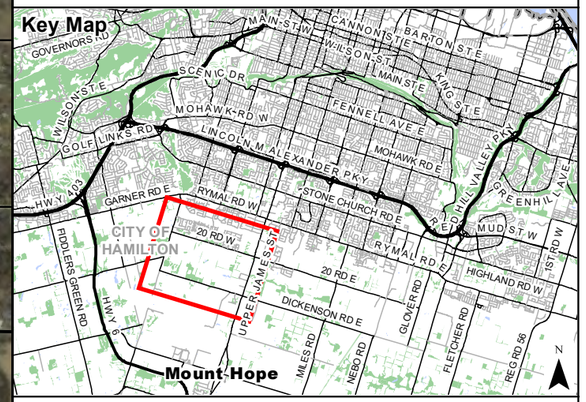
Map 1

Upper West Side Secondary Plan

Study Area



Legend

- Upper West Side Community
- Participating Lands
- Garth Street Draft Plan Area
- Twenty Road West Urban Expansion Area
- Glancaster Golf Course Area
- 2060 Upper James Area
- Primary Road
- Secondary Road

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Project: 1974E
Date: July 5, 2023

NAD83 - UTM Zone 17
Size: 11x17"
1:12,000

0 200 400 600 Metres

Path: X:\1405_TwentyRdLandownersGroupAssessments\NRSI_1974E_UWSSP_Map1_StudyArea_10K_2023_07_05_KEF.mxd

APPENDIX I

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Upper West Side: Secondary Plan

Master Environmental Impact Statement & Linkage Assessment

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Appendix V
Significant Species Screening

Species at Risk and Species of Conservation Concern Screening

Scientific Name	Common Name	S-RANK[1]	SARO[1]	COSEWIC[1,2]	SARA Status[2]	SARA Schedule[2]	Background Source	Habitat Preference[3,4,5,6,7]	Western Survey Block		Central Survey Block		Eastern Survey Block	
									Suitable Habitat Present?	Rationale	Suitable Habitat Present?	Rationale	Suitable Habitat Present?	Rationale
Vascular Plants														
Chimaphila maculata	Spotted Wintergreen	S2	THR	T	T	Schedule 1	MNRF 2023a	Deciduous forests of several kinds, often with some conifers, but especially under oaks on sandy soils, as on forested dunes. Flowering in spring to summer.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.
Coreopsis tripteris	Tall Tickseed	S1S2	-	-	-	-	iNaturalist 2023	Dry to wet priaries, meadows, marshes; oak forests, especially borders and clearings; fields, roadsides, and railroads.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.
Crataegus pennsylvanica	Pennsylvania Hawthorn	S1S2	-	-	-	-	iNaturalist 2023	Open woodlands and thickets.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.
Elodea nuttallii	Nuttall's Waterweed	S3	-	-	-	-	N/A	Waters, mostly calcareous, of lakes and rivers.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.
Frasera caroliniensis	American Columbo	S2	END	E	E	Schedule 1	iNaturalist 2023	Woodlands on sandy and clay soils; open deciduous forests.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.	n	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.
Gleditsia triacanthos	Honey-locust	S2?	-	-	-	-	N/A	River banks, shores, floodplains, and lowland woods.	Yes	NRSI confirmed the presence of Honey-locust during vegetation inventories.	Yes	NRSI confirmed the presence of Honey-locust during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.
Juglans cinerea	Butternut	S2?	END	E	E	Schedule 1	SAR in Hamilton Region (MNRF 2019c)	Stream banks, swamps, and upland beech-maple, oak-hickory, and mixed hardwood stands.	Yes	NRSI biologists confirmed the presence of Butternut during vegetation and tree inventories. Butternut Health Assessments were conducted to evaluate genetic makeup of all trees.	Yes	NRSI biologists confirmed the presence of Butternut during vegetation and tree inventories. Butternut Health Assessments to be conducted to evaluate genetic makeup of all trees.	Yes	NRSI biologists confirmed the presence of Butternut during vegetation and tree inventories. Butternut Health Assessments to be conducted to evaluate genetic makeup of all trees.
Monarda didyma	Scarlet Beebalm	S3	-	-	-	-	iNaturalist 2023	Moist woods, swampy thickets and roadsides.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.
Ranunculus hispidus	Bristly Buttercup	S3	-	-	-	-	N/A	Stream banks, bogs, moist clearings, depressions in woodlands.	Yes	NRSI biologists confirmed the presence of Bristly Buttercup during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.
Ratibida pinnata	Gray-headed Priarie Coneflower	S3	-	-	-	-	iNaturalist 2023	Prairies, open sandy woods.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.
Uvularia perfoliata	Perfoliate Bellwort	S1S2	-	-	-	-	MNRF 2023a	Deciduous woods and upland thickets, acid to neutral soils.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat not present. Species not observed by NRSI biologists during vegetation inventories.
Vernonia gigantea	Giant Ironweed	S1?	-	-	-	-	iNaturalist 2023	Mesic prairies, thickets, moist woods, roadsides and grassy meadows.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.	No	Preferred habitat is present. However, species not observed by NRSI biologists during vegetation inventories.
Birds														
Ammodramus savannarum	Grasshopper Sparrow	S4B	SC	SC	SC	Schedule 1	OBBA (BSC et al. 2006)	Well-drained grassland or prairie with low cover of grasses, taller weeds on sandy soil; hayfields or weedy fallow fields; uplands with ground vegetation of various densities; perches for singing; requires tracts of grassland > 10 ha	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.
Chaetura pelagica	Chimney Swift	S3B	THR	T	T	Schedule 1	OBBA (BSC et al. 2006)	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat (uncapped chimneys) potentially present in abandoned residences. Species observed foraging on site outside of the breeding season (August 2019) on lands adjacent to Central Block, but no breeding evidence was observed. Species not observed during breeding bird surveys.	No	Preferred habitat not present. Species not observed by NRSI biologists.

Scientific Name	Common Name	S-RANK[1]	SARO[1]	COSEWIC[1,2]	SARA Status[2]	SARA Schedule[2]	Background Source	Habitat Preference[3,4,5,6,7]	Western Survey Block		Central Survey Block		Eastern Survey Block	
									Suitable Habitat Present?	Rationale	Suitable Habitat Present?	Rationale	Suitable Habitat Present?	Rationale
Contopus virens	Eastern Wood-Pewee	S4B	SC	SC	SC	Schedule 1	OBBA (BSC et al. 2006)	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks	Yes	Preferred habitat of forest edges and farm woodlots is present. Species was observed by NRSI biologists during breeding bird surveys and possible breeding evidence was observed.	Yes	Preferred habitat of forest edges and farm woodlots is present. Species was observed by NRSI biologists during breeding bird surveys and possible breeding evidence was observed.	Yes	Preferred habitat of forest communities are present. Species was observed by NRSI biologists during breeding bird surveys and possible breeding evidence was observed.
Dolichonyx oryzivorus	Bobolink	S4B	THR	SC	T	Schedule 1	OBBA (BSC et al. 2006)	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.
Haliaeetus leucocephalus	Bald Eagle	S4	SC	NAR	NS	No Schedule	N/A	Require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200 m from shore; require tall, dead, partially dead trees within 400 m of nest for perching; sensitive to toxic chemicals	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. One juvenile was observed flying over the Central Survey Block on June 8, 2019. The observed individual was likely travelling through the area.	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.
Hirundo rustica	Barn Swallow	S4B	SC	SC	T	Schedule 1	OBBA (BSC et al. 2006)	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water	Yes	Foraging habitat present, nest cup observed by NRSI biologists in the abandoned golf course clubhouse in early spring, with adults nearby carrying nesting material. Barn Swallow osberved by NRSI biologists during field surveys (possible breeding evidence observed).	Yes	Foraging habitat present, species observed by NRSI biologists entering and exiting an abandoned residential building during breeding bird surveys. Barn Swallow breeding at this location considered probable.	Yes	Foraging habitat present, species observed incidentally by NRSI biologists during field surveys (no breeding evidence observed).
Riparia riparia	Bank Swallow	S4B	THR	T	T	Schedule 1	OBBA (BSC et al. 2006)	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence	Yes	Foraging habitat present, species observed by NRSI biologists during breeding burd surveys (no breeding evidence observed).	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.
Sturnella magna	Eastern Meadowlark	S4B,S3N	THR	T	T	Schedule 1	OBBA (BSC et al. 2006)	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size	No	Preferred habitat is not present. Naturalized golf course disturbed by tree removal and surface tilling in spring 2020; vegetation regrowth stunted and signing perches absent. Habitat not suitable for Eastern Meadowlark breeding habitat. Species not observed by NRSI biologists.	No	Preferred habitat is not present. Species was incidentally observed by NRSI biologists outside of the breeding period in the within the naturalized orchard community (no evidence of breeding)	No	Preferred habitat not present. Species not observed by NRSI biologists during breeding bird surveys.
Herpetofauna														
Ambystoma jeffersonianum	Jefferson Salamander	S2	END	E	E	Schedule 1	Ontario Nature 2019, iNaturalist 2023	Damp shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding; hides under leaf litter, stones or in decomposing logs	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Chelydra serpentina	Snapping Turtle	S4	SC	SC	SC	Schedule 1	Ontario Nature 2019, MNRF 2023a	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha	Yes	Preferred habtiat present in small ponds in West Survey Block. Species confirmed as present by NRSI biologists during spring turtle emergence and basking surveys.	Yes	Preferred habtiat present in the central pond in Central Survey Block. Species confirmed as present by NRSI biologists during spring turtle emergence and basking surveys.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Emydoidea blandingii	Blanding's Turtle (Great Lakes/St Lawrence population)	S3	THR	E	E	Schedule 1	iNaturalist 2023	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Graptemys geographica	Northern Map Turtle	S3	SC	SC	SC	Schedule 1	Ontario Nature 2019, iNaturalist 2023	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Sternotherus odoratus	Eastern Musk Turtle	S3	SC	SC	SC	Schedule 1	Ontario Nature 2019	Aquatic, except when laying eggs; shallow slow moving water of lakes, streams, marshes and ponds; hibernate in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps or fallen logs at waters edge; often share nest sites; sometimes congregate at hibernation sites; not readily observed	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Mammals														
Microtus pinetorum	Woodland Vole	S3?	SC	SC	SC	Schedule 1	Dobbyn 1994	Mature deciduous forest in the Carolinian forest zone, with loose sandy soil and deep humus; grasslands, meadows and orchards with groundcover of duff or grass	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.

Scientific Name	Common Name	S-RANK[1]	SARO[1]	COSEWIC[1,2]	SARA Status[2]	SARA Schedule[2]	Background Source	Habitat Preference[3,4,5,6,7]	Western Survey Block		Central Survey Block		Eastern Survey Block	
									Suitable Habitat Present?	Rationale	Suitable Habitat Present?	Rationale	Suitable Habitat Present?	Rationale
Myotis leibii	Eastern Small-footed Myotis	S2S3	END	-	-	-	Dobbyn 1994	Hibernates in cool caves and abandoned mines; roosts in rocky habitats including talus slopes and open rock barrens. May also roost in man-made structures, however, very rarely; foraging habitat poorly understood in Ontario. Within the United States of America, it feeds primarily in forests, but also over waterbodies, within riparian forests, and occasionally open fields.	No	Preferred habitat not present.	No	Preferred habitat not present.	No	Preferred habitat not present.
Myotis lucifungus	Little Brown Myotis	S3	END	E	E	Schedule 1	Dobbyn 1994	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges	Possible	Candidate roosting trees and buildings may be present. Surveys will be completed to determine extent of suitable habitat on site.	Yes	Several candidate roosting trees are present. Consultation with MNRF and additional surveys may be required.	Yes	Several candidate roosting trees are present. Consultation with MNRF and additional surveys may be required.
Myotis septentrionalis	Northern Myotis	S3	END	E	E	Schedule 1	Dobbyn 1994	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; roosts in houses, man-made structures but prefers hollow trees or under loose bark; hunts within forest, below canopy	Possible	Candidate roosting trees and buildings may be present. Surveys will be completed to determine extent of suitable habitat on site.	Yes	Several candidate roosting trees are present. Consultation with MNRF and additional surveys may be required.	Yes	Several candidate roosting trees are present. Consultation with MNRF and additional surveys may be required.
Perimyotis subflavus	Tri-colored Bat	S3?	END	E	E	Schedule 1	Dobbyn 1994	Variety of forested habitats. Older forests and occasionally in barns or other structures may be used for roosts. They forage over water and along streams in the forest. Roost in clusters of dead leaves in oak and maples species.	Possible	Candidate roosting trees may be present. Surveys will be completed to determine extent of suitable habitat on site.	Yes	Several candidate roosting trees are present. Consultation with MNRF and additional surveys may be required.	Yes	Several candidate roosting trees are present. Consultation with MNRF and additional surveys may be required.
Taxidea taxus jacksoni	American Badger (Southwestern Ontario population)	S1	END	E	E	Schedule 1	Dobbyn 1994	Open grasslands and oak savannahs; dens in new hole or enlarged existing hole; sometimes makes food caches	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Urocyon cinereoargenteus	Gray Fox	S1	THR	T	T	Schedule 1	Dobbyn 1994	Hardwood forests with a mix of fields and woods; swamps; wooded, brushy or rocky habitats; woodland farmland edge; old fields with thickets; dens in hollow log or tree; individual has numerous winter dens throughout its range which is > 40 ha	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Insects														
Asterocampa clyton	Tawny Emperor	S3	-	-	-	-	Macnaughton et al. 2023	Riparian woodlands, dry woods, open woods, and suburbs.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Arigomphus villosipes	Unicorn Clubtail	S3	-	-	-	-	OOAD 2023	Ponds, lakes, and slow streams with muddy bottoms and little submerged vegetation.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Preferred habitat not present. Species not observed by NRSI biologists.
Bombus citrinus	Lemon Cuckoo Bumblebee	S3S4	-	-	-	-	N/A	Grasslands, meadows, forests, and backyard gardens.	No	Candidate habitat present. However, species not observed by NRSI during targeted insect surveys.	Yes	Preferred habitat is present and species was observed by NRSI biologists during surveys.	No	Candidate habitat present. However, species not observed by NRSI during targeted insect surveys.
Danaus plexippus	Monarch	S2N, S4B	SC	E	SC	Schedule 1	Macnaughton et al. 2023	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces.	Yes	Candidate habitat and host plants present. Several foraging Monarch were observed by NRSI biologists.	Yes	Candidate habitat and host plants present. Several foraging Monarch were observed by NRSI biologists.	Yes	Candidate habitat and host plants present. Several foraging Monarch were observed by NRSI biologists.
Euphyes conspicua	Black Dash	S3	-	-	-	-	Macnaughton et al. 2023	Boggy marshes, wet meadows, and marshy stream banks.	No	Preferred habitat not present. Species not observed by NRSI biologists.	No	Candidate habitat present. However, species not observed by NRSI during targeted insect surveys.	No	Candidate habitat present. However, species not observed by NRSI during targeted insect surveys.
Phanogomphus graslinellus	Pronghorn Clubtail	S3	-	-	-	-	OOAD 2023	Slow-flowing streams with sandy or muddy substrates. These streams can be either rocky or not and occur in either forested or open areas. Ponds and lakes are also suitable habitats	No	Species not observed by NRSI biologists during targeted insect surveys.	No	Species not observed by NRSI biologists during targeted insect surveys.	No	Species not observed by NRSI biologists during targeted insect surveys.
Thorybes bathyllus	Southern Cloudywing	S3	-	-	-	-	Macnaughton et al. 2023	Dry, usually rocky or sandy scrub, barrens, open woodlands, and prairies. Generally somewhat disturbed areas but still containing native vegetation.	No	Candidate habitat present. However, species not observed by NRSI during targeted insect surveys.	No	Candidate habitat present. However, species not observed by NRSI biologists during targeted insect surveys.	No	Candidate habitat present. However, species not observed by NRSI biologists during targeted insect surveys.
Freshwater Fishes														
Esox americanus vermiculatus	Grass Pickerel	S3	SC	SC	SC	Schedule 1	MNRF 2023a; DFO 2022	Found in wetlands, ponds, slow-moving streams and shallow bays of larger lakes with warm, shallow, clear water and an abundance of aquatic plants.	No	Preferred habitat not present.	Possible	Candidate wetland breeding habitat present in the study area east of East B Block, but not within the site. Electrofishing to determine species presence or absence is requried.	Possible	Candidate wetland breeding habitat present in the study area east of East B Block, but not within the site. Electrofishing to determine species presence or absence is requried.

Scientific Name	Common Name	S-RANK[1]	SARO[1]	COSEWIC[1,2]	SARA Status[2]	SARA Schedule[2]	Background Source	Habitat Preference[3,4,5,6,7]	Western Survey Block		Central Survey Block		Eastern Survey Block	
									Suitable Habitat Present?	Rationale	Suitable Habitat Present?	Rationale	Suitable Habitat Present?	Rationale
Freshwater Molluscs														
Cyclonaias pustulosa	Pimpleback	S2	-	-	-	-	iNaturalist 2023	Small streams to large rivers in course substrates (gravel), sand, or mud.	No	Preferred habitat not present.	No	Preferred habitat not present.	No	Preferred habitat not present.
Fusconaia flava	Wabash Pigtoe	S2S3	-	-	-	-	iNaturalist 2023	Medium streams to large rivers with a mix of sand and gravel substrates.	No	Preferred habitat not present.	No	Preferred habitat not present.	No	Preferred habitat not present.
Pleurobema sintoxia	Round Pigtoe	S1	END	E	E	Schedule 1	iNaturalist 2023	Medium to large rivers, occasionally small rivers. Prefers coarse sand and gravel substrates.	No	Preferred habitat not present.	No	Preferred habitat not present.	No	Preferred habitat not present.
Toxolasma parvum	Lilliput	S1	THR	E	E	Schedule 1	iNaturalist 2023	Found in a variety of habitats including small to large rivers, wetlands, shallows of lakes, ponds and reservoirs. They are common in soft substrates with over 50% of the substrate type comprised of sand and a mud/muck/silt combination. Typically occur with or near Green Sunfish, Bluegill, White Crappie, and Johnny Darter	No	Preferred habitat not present.	No	Preferred habitat not present.	No	Preferred habitat not present.

[1]MNRF 2023a; [2]Government of Canada 2023; [3]MNRF 2000; [4]Michigan Flora Online 2011; [5]Oldham and Brinker 2009; [6]Riley 1989; [7]Paulson 2017

Provincial Ranks

SRANK

S1	Critically Imperiled	**S4**	Apparently Secure	**S#?**	Uncertain Rank	**SNR**	Unranked	**NP**	Not Provided
S2	Imperiled	**S5**	Secure	**SX**	Presumed Extirpated	**SU**	Unrankable		
S3	Vulnerable	**S#S#**	Status is Between Ranks	**SH**	Possibly Extirpated (Historical)	**SNA**	Not Applicable		

Breeding Status Qualifiers

B	Breeding	**N**	Non-breeding	**M**	Migrant

SARO

END	Endangered	**SC**	Special Concern	**DD**	Data Deficient
THR	Threatened	**NAR**	Not at Risk	**EXP**	Extirpated

Federal Ranks

COSEWIC and SARA

E	Endangered	**SC**	Special Concern	**NS**	No Status	**N-A**	Non-Active	**EX**	Extirpated
T	Threatened	**NAR**	Not at Risk	**DD**	Data Defficient	**X**	Extinct		

SARA Schedule

Schedule 1	Extirpated, Endangered, Threatened, Special Concern Species officially protected under SARA
Schedule 2	Endangered, Threatened species not yet re-assessed using revised criteria; may be considered for inclusion to Schedule 1
Schedule 3	Special Concern species not yet re-assessed using revised criteria; may be considered for inclusion to Schedule 1

Appendix VI
Significant Wildlife Habitat Screening

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)							
Rationale: Habitat important to migrating waterfowl	American Black Duck Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler Tundra Swan	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. - Fields with seasonal flooding and waste grain in the Long Point, Rondeau, Lake. St. Clair, Grand Bend and Pt. Pelee areas may be important to Tundra Swans.	Fields with sheet water during Spring (mid March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available[cxlviii] Information Sources • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs) • Sites documented through waterfowl planning processes (e.g. EHJV implementation plan) • Field Naturalist Clubs • Ducks Unlimited Canada • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • Any mixed species aggregations of 100[l] or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependant on local site conditions and adjacent land use is the significant wildlife habitat[cxlviii]. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMIST[cxlix] Index #7 provides development effects and mitigation measures.	**Not SWH.** No evidence of aggregations of waterfowl species. Fields with spring sheet water are not present within the study area.		
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)							
Rationale: Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district	Canada Goose Cackling Goose Snow Goose Green-winged Teal American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Blue-winged Teal Hooded Merganser Common Merganser Red-breasted Merganser Lesser Scaup Greater Scaup Common Goldeneye Bufflehead Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Canvasback Redhead Ruddy Duck Brant White-winged Scoter Black Scoter	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). Information Sources • Environment Canada • Naturalist clubs often are aware of staging/stopover areas • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (e.g. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100[l] or more of listed species for 7 days, results in >700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH[cxlix] • The combined area of the ELC ecosites and a 100m radius area is the SWH[cxlviii] • Wetland area and shorelines associated with sites identified within the SWHTG[cxlviii] Appendix K[cxlix] are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWHMIST[cxlix] Index #7 provides development effects and mitigation measures.	**Not SWH.** Waterbodies of sufficient size to support the required concentrations of waterfowl are not present within the study area.		

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Shorebird Migratory Stopover Area							
Rationale: High quality shorebird stopover habitat is extremely rare and typically has a long history of use	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. Information Sources • Western hemisphere shorebird reserve network • Canadian Wildlife Service (CWS) Ontario Shorebird Survey • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and > 1000[i] shorebird use days during spring or fall migration period (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period). • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100[i] Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area[cxlviii] • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #8 provides development effects and mitigation measures.	**Not SWH.** Shoreline habitats and suitable wetlands are not present within the study area. Generally, shorebird stopover areas are located in close proximity to the Great Lakes, large marshes or rivers.		
Wildlife Habitat: Raptor Wintering Area							
Rationale: Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl Special Concern: Short-eared Owl Bald Eagle	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class. Forest: FOD, FOM, FOC Upland: CUM, CUT, CUS, CUW Bald Eagle: Forest Community Series: FOD, FOM, FOC, SWD, SWM, or SWC, on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering (hawk/owl) sites need to be > 20ha[cxlviii, cxlix] with a combination of forest and upland[xvi, xvii, xviii, xix, xx, xxi]. Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands[cxlix] Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water and large trees and snags available for roosting[cxlix] Information Sources • OMNRF Districts • Natural clubs • Natural Heritage Information Centre (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Reports and other information available from CAs • Results of Christmas Bird Counts	Studies confirm the use of these habitats by: • One or more Short-eared Owls, or, One of more Bald Eagles or; at least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years)[cxlix] for a minimum of 20 days by the above number of birds. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #10 and #11 provides development effects and mitigation measures.	**Not SWH.** Suitably-sized combinations of field and woodland habitat are not present. At least 10 individuals of the listed indicator hawk/owl species were not observed over the course of field surveys (inclusive of winter wildlife surveys) completed by NRSI biologists between 2018 and 2020.		
Wildlife Habitat: Bat Hibernacula							
Rationale: Bat hibernacula, are rare habitats in all Ontario landscapes.	Big Brown Bat Eastern Pipistrelle/Tri-colored Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. Active mine sites should not be considered The locations of bat hibernacula are relatively poorly known. Information Sources • OMNRF for possible locations and contact for local experts • Natural Heritage Information Centre (NHIC) Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts • Clubs that explore caves (e.g. Sierra Club) • University Biology Departments with bat experts	• All sites with confirmed hibernating bats are SWH[i]. • The area includes 200m radius around the entrance of the hibernaculum[cxlviii, ccvii, i]. for the development types and 1000m for wind farms [ccv]. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the[ccv]."Bats and Bat Habitats: Guidelines for Wind Power Projects" [ccv] • SWHMIST[cxlix] Index #1 provides development effects and mitigation measures.	**Not SWH.** However, no known hibernacula are present within 200m of the subject lands, and suitable ecosites are not present within the study area.		

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Bat Maternity Colonies							
Rationale: Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	Maternity colonies can be found in tree cavities, vegetation and often in building [sxxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii]. • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii]. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3[ccxiv] or class 1 or 2[ccxii]. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx]. Information Sources • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts	Maternity Colonies with confirmed use by: • >10 Big Brown Bats[l] • >5 Adult Female Silver-haired Bats[l] • The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity colonies[l]. • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv]. • SWHMIST[cxlix] Index #12 provides development effects and mitigation measures.	**Candidate SWH.** Suitable deciduous or mixed forests are present within the study area and may support bat maternity colonies.		
Wildlife Habitat: Turtle Wintering Area							
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles: ELC Community Classes: SW, MA, OA and SA ELC Community Series: FEO and BOO Northern Map Turtle: Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxviii]. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH Information Sources • EIS studies carried out by Conservation Authorities • Field naturalists clubs • OMNRF Ecologist or Biologist • Natural Heritage Information Centre (NHIC)	• Presence of 5 over-wintering Midland Painted Turtles is significant[l]. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[l]. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – Apr)[cvii]. Congregation of turtles is more common where wintering areas are limited and therefore significant[cix, cx, cxi, cxii]. • SWHMIST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	**Confirmed SWH.** Turtle emergence and basking surveys conducted by NRSI biologists confirmed the presence of overwintering Snapping Turtles (*Chelydra serpentina*) and Midland Painted Turtles (*Chrysemys picta marginata*) in all three ponds located on the former Glandcaster Golf Course (Ponds 1, 2, and 3).	**Confirmed SWH.** Turtle emergence and basking surveys conducted by NRSI biologists confirmed the presence of overwintering Snapping Turtles (*Chelydra serpentina*) in Pond 4.	**Not SWH.** Suitable permanent waterbodies or large wetlands with adequate hydroperiods for overwintering are not present.
Wildlife Habitat: Reptile Hibernaculum							
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Special Concern: Milksnake Eastern Ribbonsnake	For all snakes, habitat may be found in any ecosite in southern Ontario other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. The existence of rock piles or slopes, stone fences, and crumbling foundations assist in identifying candidate SWH.	For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost linexliv, l, li, lii, cxii. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Information Sources • In spring, local residents or landowners may have observed the emergence of snakes on their site (e.g. old dug wells). • Reports and other information available from CAs • Local naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • Natural Heritage Information Centre (NHIC) • SWHMISTcxlix Index #13 provides development effects and mitigation measures for snake hibernacula.	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp., or, individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp., or, individuals of two or more snake spp. near potential hibernacula (e.g. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)[l]. • Note: If there are Special Concern Species present, then site is SWH • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWH[l].	**Confirmed SWH** Suitable hibernation sites for snakes may be present, and NRSI biologists confirmed seven juvenile Eastern Gartersnakes under board #2 during fall surveys (September 24, 2020) in the southwestern corner of the former Glancaster Golf Course. The hibernaculum is anticipated to be located within the Significant Woodland between the Western Survey Block and Glancaster Road.	**Confirmed and Candidate SWH** Suitable hibernation sites for snakes may be present throughout the Central Survey Block, and NRSI biologists confirmed one feature (an old silo south of the 9575 Twnty Road West property) as a hibernaculum for Northern Red-Bellied Snake based on the presence of 15 juveniles under snake board #44 on May 7, 2018. Other features within the Central Survey Block may support overwintering snakes, however cover board surveys could not confirm the location of these additional candidate sites.	**Confirmed and Candidate SWH** Suitable hibernation sites for snakes may be present throughout the Eastern Survey Block, and NRSI biologists confirmed a likely hibernaculum for Northern Red-Bellied Snake in the naturalized portion of the site, based on the presence of 5 juveniles under snake board #71 on June 3, 2020. Other areas within the Central Survey Block may support overwintering snakes, however cover board surveys could not confirm the specific location of any hibernacula.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)							
Rationale: Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. Information Sources • Reports and other information available from CAs • Ontario Breeding Bird Atlas[ccv]. • Bird Studies Canada: Nature Counts http://www.birdscanada.org/birdmon/ • Field Naturalist clubs	Studies confirming: • Presence of 1 or more nesting sites with 8[cxlvix] or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests[ccvii]. • Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]. • SWHMIST[cxlix] Index #4 provides development effects and mitigation measures.	**Not SWH.** Suitable bank and cliff habitat is not present in the study area.		
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)							
Rationale: Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. Information Sources • Ontario Breeding Bird Atlas[ccv], colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • Natural Heritage Information Centre (NHIC) Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries. • Reports and other information available from CAs • MNRF District Offices • Field naturalist clubs	Studies confirming: • Presence of 2 or more active nests of Great Blue Heron or other list species. • The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH[cc, ccvii]. • Confirmation of active colonies must be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWHMIST[cxlix] Index #5 provides development effects and mitigation measures.	**Not SWH.** Suitable deciduous or mixed swamp habitat is not present in the study area. No active or inactive nests of any of the listed indicator species were observed by NRSI biologists during field surveys.		
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Ground)							
Rationale: Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6 MAS1 – 3 CUM CUT CUS	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. Information Sources • Ontario Breeding Bird Atlas[ccv], rare/colonial species records. • Canadian Wildlife Service • Reports and other information available from CAs • Natural Heritage Information Centre (NHIC) Colonial Waterbird Nesting Area • MNRF District Offices • Field naturalist clubs	Studies confirming: • Presence of >25 active nests for Herring Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern[l]. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant[l]. • Presence of 5 or more pairs for Brewer's Blackbird[l]. • The edge of the colony and a minimum 150m radius area of the habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH[cc, ccvii]. • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]. • SWHMIST[cxlix] Index #6 provides development effects and mitigation measures.	**Not SWH.** Rocky islands and peninsulas within lakes or large rivers are not present in the study area.		

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Migratory Butterfly Stopover Areas							
Rationale: Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter	Painted Lady Red Admiral Special Concern: Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: Field: CUM CUT CUS Forest: FOC FOD FOM CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10ha in size with a combination of field and forest habitat present, and will be located within 5km of Lake Ontario and Erie[cxlix]. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south [xxxii, xxxiii, xxxiv, xxxv, xxxvi]. • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat [cxlviii, cxlix]. • 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 [xxxvii, xxxviii, xxxix, xl, xli]. Information Sources • MNRF District Offices • Natural Heritage Information Centre (NHIC) • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs • Toronto Entomologists Association	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur[xl, xlii]. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD • MUD of >5000 or >3000 with the presence of Painted Ladies or White Admiral's is to be considered significant[l]. • SWHMIST[cxlix] Index #16 provides development effects and mitigation measures.	**Not SWH.** The study area is not within 5km of Lake Ontario or Lake Erie.		
Wildlife Habitat: Landbird Migratory Stopover Areas							
Rationale: Sites with a high diversity of species as well as high numbers are most significant	All migratory songbirds Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html All migrant raptors species Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	Woodlots need to be >5 ha[l] in size and within 5km [iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Ontario and Erie. If woodlands are rare in an area of shoreline, woodland fragments 2-5ha can be considered for this habitat • If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Erie or Ontario are more significant[cxlix]. • Sites have a variety of habitats: forest, grassland and wetland complexes[cxlix]. • The largest sites are more significant[cxlix] • Woodlots and forest fragments are important habitats to migrating birds[ccxviii], these features located along the shore and located within 5km of Lake Ontario and Lake Erie are Candidate SWH[cxlviii]. Information Sources • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Ontario Important Bird Areas (IBA) Program	Studies confirm: • Use of the habitat by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates[l]. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (March/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]. • SWHMIST[cxlix] Index #9 provides development effects and mitigation measures.	**Not SWH.** The study area is not within 5km of Lake Ontario or Lake Erie.		
Wildlife Habitat: Deer Winter Congregation Areas							
Rationale: Deer movement during winter in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions [cxlviii]	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations (CUP) smaller than 50 ha may also be used.	• Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots>50ha[l]. • Deer movement during winter in Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands[cxlviii]. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha[ccxxiv]. • Woodlots with high densities of deer due to artificial feeding are not significant[l]. Information Sources • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF[cxlviii]. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF[l]. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv], ground or road surveys, or a pellet count deer density survey[ccxxv]. • SWHMIST[cxlix] Index #2 provides development effects and mitigation measures.	**Not SWH.** Suitably-sized woodlots are not present within the study area. There are no winter congregation sites mapped by MNRF.		

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
	ELC Ecosite Codes[1]	Habitat Description[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Cliff and Talus Slopes							
Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	Most cliff and talus slopes occur along the Niagara Escarpment. Information Sources • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii] • SWHMIST[cxlix] Index #21 provides development effects and mitigation measures.	**Not SWH.** Cliff and talus slopes are not present within the subject lands or surrounding study area.		
Sand Barrens							
Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always < 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	A sand barren area >0.5ha in size Information Sources • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens[lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp)[l]. • SWHMIST[cxlix] Index #20 provides development effects and mitigation measures.	**Not SWH.** Sand barrens are not present within the subject lands or surrounding study area.		
Alvar							
Rationale: Alvars are extremely rare habitats in Ecoregion 7E	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 **Five Alvar Indicator Species:** 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum These indicator species are very specific to Alvars within Ecoregion 7E[cxlix]	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover[lxxviii].	An Alvar site > 0.5ha in size[lxxv]. Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie[cxcix]. Information Sources • Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi]. • Ontario Nature – Conserving Great Lakes Alvars[ccviii]. • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Staff • Field Naturalist clubs • Conservation Authorities	Field studies identify four of the five **Alvar indicator species**[lxxv] at a candidate Alvar site is Significant • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv]. • SWHMIST[cxlix] Index #17 provides development effects and mitigation measures.	**Not SWH.** Alvar communities are not present within the subject lands or surrounding study area.		

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
	ELC Ecosite Codes[1]	Habitat Description[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Old Growth Forest							
Rationale: Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old growth forests are characterized by heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland area is >0.5ha Information Sources • OMNRF Forest Resource Inventory mapping • OMNRF Districts • Field naturalist clubs • Conservation Authorities • Sustainable Forestry Licence (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat[cxlviii]. • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities [cxlviii] (cut stumps will not be present) • Determine ELC Vegetation Type for forest area containing the old growth characteristics[lxxviii]. • SWHMIST[cxlix] Index #23 provides development effects and mitigation measures.	**Not SWH.** Old growth forests and woodlands are not present within the subject lands or surrounding study area.		
Savannah							
Rationale: Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)[cc].	No minimum size to site[l] Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location data available on their website • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in[lxxv] Appendix N should be present[l]. Note: Savannah plant spp. list from Ecoregion 7E should be used. • Area of the ELC Vegetation type is the SWH[lxxviii]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST[cxlix] Index #18 provides development effects and mitigation measures.	**Not SWH.** Savannah tallgrass prairie habitats are not present within the subject lands or surrounding study area.		
Tallgrass Prairie							
Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)[cc].	No minimum size to site[l]. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • Natural Heritage Information Centre (NHIC has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in[lxxv] Appendix N should be present[l]. Note: Prairie plant spp. list from Ecoregion 7E should be used. • Area of the ELC Vegetation Type is the SWH[lxxviii]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST[cxlix] Index #19 provides development effects and mitigation measures.	**Not SWH.** Tallgrass prairie habitats are not present within the subject lands or surrounding study area.		

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
	ELC Ecosite Codes[1]	Habitat Description[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Other Rare Vegetation Communities							
Rationale: Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii]. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M[cxlviii]. The OMNRF/NHIC will have up to date listing for rare vegetation communities. Information Sources • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii]. • Area of the ELC Vegetation Type polygon is the SWH. • SWHMIST[cxlix] Index #37 provides development effects and mitigation measures.	**Not SWH.** Rare vegetation communities are not present within the subject lands or surrounding study area.		

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Waterfowl Nesting Area							
Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 **Note: includes adjacency to Provincially Significant Wetlands**	A waterfowl nesting area extends: 120m[cxlix] from a wetland (>0.5ha) or a wetland (>0.5ha) with small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur[cxlix]. • Upland areas should be at least 120m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. Information Sources • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards[i], or, • Presence of 10 or more nesting pairs for listed species including Mallards[i]. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMIST[cxlix] Index #25 provides development effects and mitigation measures.	**Not SWH.** Upland waterfowl nesting habitats located within 120m of suitable wetlands are not present.		
Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat							
Rationale: Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey Special Concern: Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). Information Sources • Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario • MNRF values information (LIO/NRVIS) will list known nesting locations, Note: data from NRVIS is provided as a point format and does not include all the habitat. • Nature Counts, Ontario Nest Records Scheme data • OMNRF Districts • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented • Reports and other information available from CAs • Field naturalists clubs	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area[cxlviii]. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the SWH[ccvii], maintaining undisturbed shorelines with large trees within this area is important[cxlviii]. • For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH[cvi, ccvii]. Area of the habitat from 400-800m is dependant on site lines from the nest to the development and inclusion of perching and foraging habitat[cvi]. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for ≥3 years or suspected of not being used for >5 years before being considered not significant[ccvii]. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #26 provides development effects and mitigation measures.	**Not SWH.** Suitable woodland habitats adjacent to large water bodies or riparian zones are not present.		
Wildlife Habitat: Woodland Raptor Nesting Habitat							
Rationale: Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	All natural or conifer plantation woodland/forest stands combined >30ha or with >4ha of interior habitat[lxxxviii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii]. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. Information Sources • OMNRF Districts • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from CAs	Studies confirm: • Presence of 1 or more active nests from species list is considered significant[cxlviii]. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha of habitat is the SWH[ccvii].(the 28ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) • Barred Owl – A 200m radius around the nest is the SWH[ccvii]. • Broad-winged Hawk and Coopers Hawk – A 100m radius around the nest is the SWH[ccvii]. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH[ccvii]. • Conduct field investigations from early March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMIST[cxlix] Index #27 provides development effects and mitigation measures.	**Not SWH.** Suitably-sized (>30ha) woodlots are not present within the study area.		

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Turtle Nesting Area							
Rationale: These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m)[cxlviii] or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. Information Sources • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Center (NHIC) Field naturalist clubs	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles[l] • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[i] • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH[cxlviii]. • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100m area of habitat[cxlix]. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observation studies observing the turtles nesting is a recommended method. • SWHMIST[cxlix] Index #28 provides development effects and mitigation measures for turtle nesting habitat.	**Confirmed SWH.** Open areas with loose soils are present in the former Glancaster Golf Course; limited but suitable turtle nesting habitat is present in some areas of the Western Survey Block that are not tilled as part of recent agricultural operations on site. Snapping Turtle was confirmed as nesting, and Midland Painted Turtle is considered as possibly nesting, within this portion of the study area.	**Not SWH.** Suitable exposed mineral soils (sand or gravel) adjacent or within 100m of suitable ecosites are not present.	
Wildlife Habitat: Seeps and Springs							
Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system[cxvii, cxlix]. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species[cxix, cxx, cxxi, cxxii, cxiii, cxiv]. Information Sources • Topographical Map • Thermography • Hydrological surveys conducted by CAs and MOE • Field naturalists and landowners • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped	Field Studies confirm: • Presence of a site with 2 or more[l] seeps/springs should be considered SWH. • The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation of the habitat[cxlviii]. • SWHMIST[cxlix] Index #30 provides development effects and mitigation measures.	**Not SWH.** NRSI biologists have not encountered any seeps or springs within forested habitats during site visits completed to date.		
Wildlife Habitat: Amphibian Breeding Habitat (Woodland)							
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond or woodland pool (including vernal pools) >500m2 (about 25m diameter) ccvii within or adjacent (within 120m) to a woodland (no minimum size)clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx. Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitatcxlviii. Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their site. • OMNRF Districts and wetland evaluations • Field naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3. • A combination of observational study and call count surveys [cviii] will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230m radius of woodland area[lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi]. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWHMIST[cxlix] Index #14 provides development effects and mitigation measures.	**Not SWH.** Several criteria species were observed by NRSI biologists during field surveys, and suitable forested habitats are present. However, evening anuran call surveys and other site investigations did not detect the minimum number of individuals or species. SWH criteria are not met.		
Wildlife Habitat: Amphibian Breeding Habitat (Wetland)							
Rationale: Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario Landscapes	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	• Wetlands >500m^2 (about 25m diameter)[ccvii] supporting high species diversity are significant: some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats[clxxxiv]. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation. Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations • Reports and other information available from CAs	Studies confirm: • Presence of breeding population of 1or more of the listed newt/salamander species or 2 or more of the listed frog or toad species and with at least 20 breeding individuals (adults and eggs masses)[lxxi, lxxiii] or 2 or more of the listed frog/toad species with Call Level of 3. or; Wetland with confirmed breeding Bullfrogs are significant[l]. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys to determine breeding/larval stages will be required during the spring (May March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMIST[cxlix] Index #15 provides development effects and mitigation measures.	**Confirmed SWH.** The results of anuran call surveys conducted by NRSI biologists in 2018 and 2020 indicated that several wetland features within the Participating Lands met the criteria for designation as SWH due to the presence of 2 or more of the listed frog or toad species with at least 20 breeding individuals. In reference to Map 4, SWH criteria were met at monitoring stations ANR-02, -05, -7, -09, and -10.	**Not SWH.** Several criteria species are reported from the vicinity of the study site, and suitable wetland habtiat is present. However, the results of the anuran call surveys conducted by NRSI biologists in 2018 and 2020 showed that these candidate features did not meet the criteria for SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Woodland Area-Sensitive Bird Breeding Habitat							
Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Pileated Woodpecker Special Concern: Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs. old) forest stands or woodlots >30ha[cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix]. • Interior forest habitat is at least 200m from forest edge habitat[clxiv]. Information Sources • Local birder clubs • Canadian Wildlife Service (CWS) for the location of forest bird monitoring • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species. • Reports and other information available from CAs	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species[l]. • Note: any site with breeding Cerulean Warblers or Canada Warbler is to be considered SWH[l]. • Conduct field investigations in early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[cclxi] • SWHMIST[cxlix] Index #34 provides development effects and mitigation measures.	**Not SWH.** Several criteria species are reported from the vicinity of the study area. However, large mature woodlots >30ha in size are not present within the study area.		

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Marsh Bird Breeding Habitat							
Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan Special Concern: Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites	• Nesting occurs in wetlands • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present[cxxiv]. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources • OMNRF Districts and wetland evaluations • Field naturalist clubs • Natural Heritage Information Centre (NHIC) • Reports and other information available from CAs • Ontario Breeding Bird Atlas[ccv]	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species[l]. • Note: any wetland with breeding of 1 or more Trumpeter Swans, Black Terns, Green Heron or Yellow Rail is SWH[l]. • Area of the ELC ecosite is the SWH • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #35 provides development effects and mitigation measures	**Not SWH.** Wetland habitat occurs within the subject sites and several listed species are reported from the vicinity of the study area. However, marsh breeding bird surveys conducted by NRSI biologists in 2020 to determine the presence of SWH did not detect the presence of any nesting pairs of the indicator species.		
Wildlife Habitat: Open Country Bird Breeding Habitat							
Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow Special Concern: Short-eared Owl	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) >30ha[clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix]. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years)[j]. Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. Information Sources • Agricultural land classification maps Ministry of Agriculture • Local birder clubs • Ontario Breeding Bird Atlas[ccv] • EIS Reports and other information available from CAs	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species[l]. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #32 provides development effects and mitigation measures	**Not SWH.** Large grassland areas >30ha in size are not present within the study area. Of the listed indicator species, only Savannah Sparrow was confirmed as nesting within the Participaing Lands.		
Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat							
Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.	Indicator Spp: Brown Thrasher Clay-coloured Sparrow Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher Special Concern: Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat such as woodland area for some bird species.	Large natural field areas succeeding to shrub and thicket habitats >10ha[clxiv] in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years)[j]. Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species[clxxiii]. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs • Ontario Breeding Bird Atlas[ccv] • Reports and other information available from CAs	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species[j]. • A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat[l]. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #33 provides development effects and mitigation measures.	**Not SWH.** Large natural field areas succeeding to shrub and thicket habitats >10ha in area are not present.		

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Terrestrial Crayfish							
Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. [Ccii]	Chimney or Digger Crayfish (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish (*Cambarus Diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish	Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998.	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites[cci]. • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the large ecosite area is the SWH • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult [cci] • SWHMIST[cxlix] Index #36 provides development effects and mitigation measures.	**Not SWH.** Wet meadows and the edges of shallow marshes are present within Western Survey Block, however no terrestrial crayfish or their chimneys were observed by NRSI biologists during field surveys.	**Confirmed SWH.** Chimneys were observed in areas corresponding to the Upper Twenty Mile Creek PSW complex, which represents suitable wet meadow habitat or terrestrial crayfish species. In reference to Map 6, chimneys were observed within the following HDF reaches: TTMC3-3, TTMC3-3-2, TTMC3-3-3, TTMC3-5, TMC 2-10, and TTMC2-10-2.	
Wildlife Habitat: Special Concern and Rare Wildlife Species							
Rationale: These species are quite rare or have experienced significant population declines in Ontario	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites[lxxviii]. Information Sources • Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists and element occurrences for these species. • NHIC Website: "Get Information" http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas[ccv] • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWHMIST[cxlix] Index #37 provides development effects and mitigation measures.	**Confirmed and Candidate SWH.** Several Species of Conservation Concern (SCC) and rare wildlife are reported from the study area. The following species were documented within the Participating Lands by NRSI Biologists and were either confirmed to be carrying out important life processes, or may have suitable habitat within the study area (with more information being needed prior to designation as confirmed habitat): • Nuttall's Waterweed • Grasshopper Sparrow • Eastern Wood-Pewee • Barn Swallow • Snapping Turtle • Monarch • Unicorn Clubtail	• Nuttall's Alkaligrass • Eastern Wood-Pewee • Barn Swallow • Snapping Turtle • Monarch • Unicorn Clubtail • Lemon Cuckoo Bumble Bee	• Eastern Wood-Pewee • Barn Swallow • Monarch

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 7E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Western Survey Block	Central Survey Block	Eastern Survey Block
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details		
Wildlife Habitat: Amphibian Movement Corridors							
Rationale: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt American Toad Blue-spotted Salamander Spotted Salamander Four-toed Salamander Gray Treefrog Northern Leopard Frog Pickerel Frog Western Chorus Frog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	Movement corridors between breeding habitat and summer habitat[clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi] Movement corridors must be considered when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule[i]. Information Sources • MNRF District Office • Natural Heritage Information Centre NHIC • Reports and other information available from CAs • Field naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant[cxlix]. • Corridors should have at least 15m of vegetation on both sides of waterwaycxlix or be up to 200m widecxlix of woodland habitat and with gaps <20m[cxlix] • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat[cxlix]. • SWHMIST[cxlix] Index #40 provides development effects and mitigation measures.	**Candidate SWH.** Significant Amphibian Breeding Habitat (Wetland) was confirmed in the Western and Central Survey Blocks, and Amphibian Movement Corridors therefore require consideration. Although additional information is needed to confirm the location and function of movement corridors, it is anticipated that the HDFs throughout the study area provide movement corridor habitat, and that amphibians may also use hedgerows and other features to move between breeding habitats and Significant Woodlands.		**Not SWH.** Significant Amphibian Breeding Habitat (Wetland) is not present, therefore amphibian movement corridors do not require consideration.

Appendix VII
Vascular Flora Reported from the Study Area

Plant Species Reported from the Study Area - Upper West Side- Secondary Plan (Project #1974E)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Hamilton	iNaturalist Research-Grade Observations	NHIC Data*	NRSI Observed	NRSI Tree Inventory Data	Orchard	Hedgerows	CUW / CUW1	CUM / CUM1	CUT1-4	FOD4	FOD5-2	FOD5-6	FOD6-5	FOD7-4	FOD8-1	FOD9	MAM2-2	MAS2-1	SWD3-3	SWD4-1	SWT2-8	SAF1
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	Oldham 2017	iNaturalist 2023	MNRF 2023b	NRSI Results From 2018-2020																			
Pteridophytes	**Ferns & Allies**																												
Dryopteridaceae	**Wood Fern Family**																												
Athyrium filix-femina	Common Lady Fern	S5								X								X		X		X	X			X			
Athyrium filix-femina var. angustum	Northeastern Lady Fern	S5								X													X						
Dryopteris carthusiana	Spinulose Wood Fern	S5					C			X		X	X			X	X	X	X	X	X	X	X						
Matteuccia struthiopteris	Ostrich Fern	S5					C	X		X									X								X		
Onoclea sensibilis	Sensitive Fern	S5					C	X		X		X	X				X			X		X	X	X		X			
Equisetaceae	**Horsetail Family**																												
Equisetum arvense	Field Horsetail	S5					C			X			X		X	X		X						X		X		X	
Equisetum fluviatile	Water Horsetail	S5					C			X																			X
Equisetum pratense	Meadow Horsetail	S5					U			X			X																
Pteridaceae	**Maidenhair Fern Family**																												
Adiantum pedatum	Northern Maidenhair Fern	S5					C	X																					
Gymnosperms	**Conifers**																												
Cupressaceae	**Cypress Family**																												
Juniperus virginiana	Eastern Red Cedar	S5					C			X	X																		
Thuja occidentalis	Eastern White Cedar	S5					C			X	X																		
Pinaceae	**Pine Family**																												
Picea abies	Norway Spruce	SE3					IR			X	X		X																
Picea glauca	White Spruce	S5					C	X		X	X																		
Picea mariana	Black Spruce	S5					R	X		X	X																		
Picea pungens	Blue Spruce	SE1					IR			X	X																		
Pinus banksiana	Jack Pine	S5					IR			X	X																		
Pinus nigra	Black Pine	SE3					IR			X	X																		
Pinus resinosa	Red Pine	S5					R	X		X	X																		
Pinus strobus	Eastern White Pine	S5					C	X		X	X															X			
Pinus sylvestris	Scots Pine	SE5					IX	X		X	X			X															
Dicotyledons	**Dicots**																												
Aceraceae	**Maple Family**																												
Acer ginnala	Amur Maple	SE1						X																					
Acer negundo	Manitoba Maple	S5					C	X		X	X	X	X		X														
Acer platanoides	Norway Maple	SE5					IX	X		X	X															X			
Acer rubrum	Red Maple	S5					C	X		X	X			X			X												
Acer saccharinum	Silver Maple	S5					C	X		X	X																		
Acer saccharum	Sugar Maple	S5					C	X		X	X	X	X				X	X	X				X						
Acer x freemanii	Freeman's Maple	SNA					hyb	X		X	X		X	X						X									
Anacardiaceae	**Sumac or Cashew Family**																												
Rhus typhina	Staghorn Sumac	S5					C	X		X	X	X	X	X	X		X			X									
Toxicodendron radicans	Poison Ivy	S5								X		X	X						X										
Toxicodendron radicans var. radicans	Eastern Poison Ivy	S5					C	X		X														X			X		
Apiaceae	**Carrot or Parsley Family**																												
Anthriscus sylvestris	Wild Chervil	SE4?					IR			X								X											
Cicuta maculata	Spotted Water-hemlock	S5								X																	X		
Cryptotaenia canadensis	Canada Honewort	S5					C	X																					
Daucus carota	Wild Carrot	SE5					IC	X		X		X	X	X	X														
Apocynaceae	**Dogbane Family**																												
Apocynum androsaemifolium	Spreading Dogbane	S5					C	X		X													X						X
Apocynum cannabinum	Hemp Dogbane	S5						X		X				X						X							X		
Vinca minor	Periwinkle	SE5					IX	X																					
Araliaceae	**Ginseng Family**																												
Aralia nudicaulis	Wild Sarsaparilla	S5					C			X							X												
Asclepiadaceae	**Milkweed Family**																												
Asclepias exaltata	Poke Milkweed	S4					C			X										X									
Asclepias incarnata	Swamp Milkweed	S5					C			X																		X	
Asclepias syriaca	Common Milkweed	S5					C	X		X		X	X		X	X						X					X		X
Vincetoxicum rossicum	European Swallow-wort	SE5						X																					
Asteraceae	**Composite or Aster Family**																												
Achillea millefolium	Common Yarrow	SE5?					IX			X						X													
Ambrosia artemisiifolia	Common Ragweed	S5					C	X		X			X	X	X														
Ambrosia trifida	Great Ragweed	S5					U	X		X		X	X				X				X			X					
Arctium lappa	Great Burdock	SE5					IX	X																					
Arctium minus	Common Burdock	SE5					IC	X		X		X	X	X					X								X		
Bidens sp.	Beggarticks sp.									X					X												X		
Bidens cernua	Nodding Beggarticks	S5					C			X															X				X
Bidens frondosa	Devil's Beggarticks	S5					C			X															X				X
Bidens vulgata	Tall Beggarticks	S5					C	X																					
Carduus acanthoides	Spiny Plumeless Thistle	SE5					IX	X																					
Centaurea montana	Mountain Cornflower	SE1						X																					
Centaurea nigrescens	Short-fringed Knapweed	SE5					IX	X																					
Centaurea stoebe	Spotted Knapweed	SE5					IX			X		X																	
Cichorium intybus	Chicory	SE5					IC	X		X		X												X					
Cirsium arvense	Creeping Thistle	SE5					IC	X		X		X	X	X	X			X						X					
Cirsium vulgare	Bull Thistle	SE5					IX	X		X				X	X						X			X					
Coreopsis tripteris	Tall Tickseed	S1S2						X																					
Echinacea purpurea	Eastern Purple Coneflower	SE1						X																					
Erechtites hieraciifolius	Eastern Burnweed	S5					U			X																			X
Erigeron annuus	Annual Fleabane	S5					C	X		X		X				X	X												
Erigeron canadensis	Canada Horseweed	S5					C			X				X	X														
Erigeron hyssopifolius	Daisy Fleabane	S5								X			X	X	X		X				X	X							
Erigeron philadelphicus	Philadelphia Fleabane	S5					C	X		X				X	X		X		X										
Erigeron philadelphicus var. philadelphicus	Philadelphia Fleabane	S5								X			X																
Erigeron strigosus	Rough Fleabane	S5					C	X																					
Eupatorium perfoliatum	Common Boneset	S5					C	X		X				X	X										X				X
Eurybia macrophylla	Large-leaved Aster	S5					C			X							X												
Euthamia graminifolia	Grass-leaved Goldenrod	S5					C			X		X	X	X	X							X			X				
Eutrochium maculatum	Spotted Joe Pye Weed	S5						X		X														X			X		
Helianthus giganteus	Tall Sunflower	S5					R			X				X															
Heliopsis helianthoides	False Sunflower	S4S5					R	X																					
Helminthotheca echioides	Bristly Oxtongue	SEH					IR	X																					
Inula helenium	Elecampane	SE5					IX			X					X														
Lactuca serriola	Prickly Lettuce	SE5					IX	X																					
Leucanthemum vulgare	Oxeye Daisy	SE5					IX	X		X			X		X														
Nabalus albus	White Rattlesnakeroot	S5					C			X										X			X						
Nabalus altissimus	Tall Rattlesnakeroot	S5					C	X																					
Picris hieracioides	Hawkweed Oxtongue	SE5					IR	X																					
Pilosella caespitosa	Meadow Hawkweed	SE5					IX			X					X	X													
Ratibida pinnata	Gray-headed Prairie Coneflower	S3						X																					
Rudbeckia hirta	Black-eyed Susan	S5					C	X		X					X														
Rudbeckia triloba	Brown-eyed Susan	SE4					IX	X		X		X																	
Senecio vulgaris	Common Ragwort	SE5					IC	X																					
Solidago sp.	Goldenrod sp.									X									X										
Solidago altissima	Tall Goldenrod	S5						X		X			X	X	X		X					X				X			
Solidago caesia	Blue-stemmed Goldenrod	S5					C			X										X			X						
Solidago canadensis	Canada Goldenrod	S5						X		X		X	X		X	X	X	X			X	X			X				
Solidago flexicaulis	Zigzag Goldenrod	S5					C			X								X		X			X						
Solidago gigantea	Giant Goldenrod	S5					C	X																					
Solidago nemoralis	Gray-stemmed Goldenrod	S5						X		X					X	X													
Sonchus arvensis	Field Sow-thistle	SE5					IX	X		X			X		X														
Sonchus arvensis ssp. uliginosus	Smooth Sow-thistle	SE5								X			X	X															
Sonchus asper	Prickly Sow-thistle	SE5					IX			X					X														
Symphyotrichum cordifolium	Heart-leaved Aster	S5					C			X										X									
Symphyotrichum ericoides	White Heath Aster	S5								X			X	X								X	X			X			
Symphyotrichum firmum	Glossy-leaved Aster	S4?								X			X												X				
Symphyotrichum lanceolatum	Panicled Aster	S5					C	X		X		X	X	X			X	X				X		X	X			X	

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		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	Oldham 2017	iNaturalist 2023	MNRF 2023b	NRSI Results From 2018-2020																			
Symphyotrichum lateriflorum	Calico Aster	S5					C			X			X	X	X		X			X		X	X			X			
Symphyotrichum novae-angliae	New England Aster	S5					C	X		X		X			X	X				X		X			X				
Symphyotrichum ontarionis	Ontario Aster	S5					R			X				X															
Symphyotrichum pilosum	Old Field Aster	S5						X		X					X					X									
Symphyotrichum puniceum	Swamp Aster	S5					C			X			X		X							X		X	X		X		
Symphyotrichum urophyllum	Arrow-leaved Aster	S4					C			X		X				X				X		X	X						
Taraxacum officinale	Common Dandelion	SE5					IC	X		X		X	X								X								
Tussilago farfara	Colt's-foot	SE5					IX	X		X								X							X		X		
Vernonia gigantea	Giant Ironweed	S1?						X																					
Xanthium spinosum	Spiny Cocklebur	SE2?								X																			X
Xanthium strumarium	Rough Cocklebur	S5					C	X		X				X															X
Balsaminaceae	**Touch-me-not Family**																												
Impatiens capensis	Spotted Jewelweed	S5					C	X		X		X	X	X				X	X	X		X	X	X	X	X	X	X	X
Impatiens pallida	Pale Jewelweed	S4					C			X								X				X				X			
Berberidaceae	**Barberry Family**																												
Berberis thunbergii	Japanese Barberry	SE5					IX			X										X									
Berberis vulgaris	European Barberry	SE5					IX			X															X				
Caulophyllum giganteum	Giant Blue Cohosh	S5					C	X																					
Caulophyllum thalictroides	Blue Cohosh	S5					C			X									X										
Podophyllum peltatum	May-apple	S5					C	X		X			X					X	X	X	X		X						
Betulaceae	**Birch Family**																												
Alnus glutinosa	European Black Alder	SE4					IX	X																					
Betula alleghaniensis	Yellow Birch	S5					C			X										X						X			
Betula papyrifera	Paper Birch	S5					C			X	X																		
Carpinus caroliniana	Blue-beech	S5					C			X			X							X			X						
Ostrya virginiana	Eastern Hop-hornbeam	S5					C	X		X	X		X					X	X	X			X						
Bignoniaceae	**Bignonia Family**																												
Catalpa speciosa	Northern Catalpa	SE1					IR			X	X																		
Boraginaceae	**Borage Family**																												
Hackelia virginiana	Virginia Stickseed	S5					C	X		X		X					X												
Myosotis laxa	Small Forget-me-not	S5					C			X				X											X				
Brassicaceae	**Mustard Family**																												
Alliaria petiolata	Garlic Mustard	SE5					IC	X		X		X	X	X				X	X	X		X	X						
Barbarea vulgaris	Bitter Wintercress	SE5					IX	X		X			X											X			X		
Capsella bursa-pastoris	Common Shepherd's Purse	SE5					IX	X																					
Cardamine concatenata	Cut-leaved Toothwort	S5					C			X								X		X									
Cardamine diphylla	Two-leaved Toothwort	S5					C			X								X								X			
Erysimum cheiranthoides	Wormseed Wallflower	S5?					IX			X					X														
Hesperis matronalis	Dame's Rocket	SE5					IC	X		X		X	X	X			X		X										
Lepidium campestre	Field Peppergrass	SE5					IX	X		X			X																
Odontarrhena muralis	Wall Alyssum	SE1								X						X													
Thlaspi arvense	Field Penny-cress	SE5					IC	X																					
Campanulaceae	**Bellflower Family**																												
Lobelia cardinalis	Cardinal Flower	S5					C	X																					
Lobelia inflata	Indian-tobacco	S5					C	X		X				X															
Lobelia siphilitica	Great Blue Lobelia	S5					C	X																					
Caprifoliaceae	**Honeysuckle Family**																												
Lonicera maackii	Amur Honeysuckle	SE2					IC	X																					
Lonicera tatarica	Tatarian Honeysuckle	SE5					IX	X		X		X	X	X		X	X			X	X	X	X			X			
Sambucus canadensis	Common Elderberry	S5					C			X										X									
Triosteum aurantiacum	Orange-fruited Horse-gentian	S4S5					C	X																					
Viburnum acerifolium	Maple-leaved Viburnum	S5					C			X							X												
Viburnum opulus	Cranberry Viburnum	S5								X													X						
Caryophyllaceae	**Pink Family**																												
Cerastium arvense	Field Chickweed	S4								X					X	X													
Cerastium fontanum	Common Mouse-ear Chickweed	SE5					IC	X		X		X																	
Dianthus armeria	Deptford Pink	SE5					IC	X		X						X				X									
Dianthus barbatus	Sweet William	SE1						X																					
Sagina procumbens	Procumbent Pearlwort	SE4					IR	X																					
Stellaria media	Common Chickweed	SE5					IC	X																					
Celastraceae	**Staff-tree Family**																												
Euonymus obovatus	Running Strawberry Bush	S4					C	X		X								X	X	X			X						
Chenopodiaceae	**Goosefoot Family**																												
Atriplex patula	Spear Saltbush	SE5					IU	X																					
Clusiaceae	**St. John's-wort Family**																												
Hypericum majus	Larger Canadian St. John's-wort	S5					R	X		X																			X
Hypericum perforatum	Common St. John's-wort	SE5					IC			X			X	X							X								
Hypericum punctatum	Spotted St. John's-wort	S5					C			X								X											
Convolvulaceae	**Morning-glory Family**																												
Convolvulus arvensis	Field Bindweed	SE5					IC	X																					
Cornaceae	**Dogwood Family**																												
Cornus alternifolia	Alternate-leaved Dogwood	S5					C	X		X	X	X	X				X		X	X						X			
Cornus obliqua	Pale Dogwood	S5					C			X					X									X				X	
Cornus racemosa	Gray Dogwood	S5					C	X		X		X	X		X	X	X	X		X		X	X		X	X	X		
Cornus sericea	Red-osier Dogwood	S5					C	X		X		X		X	X		X			X				X	X	X			
Cucurbitaceae	**Gourd Family**																												
Echinocystis lobata	Wild Mock-cucumber	S5					C			X		X	X				X	X		X									
Dipsacaceae	**Teasel Family**																												
Dipsacus fullonum	Common Teasel	SE5					IX	X		X		X	X																
Fabaceae	**Pea Family**																												
Amphicarpaea bracteata	American Hog-peanut	S5					C	X																					
Gleditsia triacanthos	Honey-locust	S2?					IX			X	X		X																
Lotus corniculatus	Garden Bird's-foot Trefoil	SE5					IC	X		X		X			X										X				
Medicago lupulina	Black Medic	SE5					IC	X		X			X		X														X
Melilotus albus	White Sweet-clover	SE5					IC			X		X																	
Robinia pseudoacacia	Black Locust	SE5					IC	X		X	X																		
Securigera varia	Common Crown-vetch	SE5					IC	X		X		X																	
Trifolium hybridum	Alsike Clover	SE5					IC	X																					
Trifolium pratense	Red Clover	SE5					IC	X		X			X		X			X											X
Trifolium repens	White Clover	SE5					IC	X		X					X														
Vicia cracca	Tufted Vetch	SE5					IC	X		X		X		X	X														
Vicia sativa	Common Vetch	SE5					IX			X		X			X	X													
Vicia tetrasperma	Four-seeded Vetch	SE5					IX			X					X														
Fagaceae	**Beech Family**																												
Fagus grandifolia	American Beech	S4					C	X		X	X		X				X	X	X	X			X						
Quercus alba	White Oak	S5					C			X	X																		
Quercus bicolor	Swamp White Oak	S4					C	X																					
Quercus macrocarpa	Bur Oak	S5					C			X	X																		
Quercus robur	English Oak	SE1						X																					
Quercus rubra	Northern Red Oak	S5					C	X		X	X	X	X	X			X	X		X			X						
Gentianaceae	**Gentian Family**																												
Frasera caroliniensis	American Columbo	S2	END	E	E	Schedule 1	R	X																					
Geraniaceae	**Geranium Family**																												
Geranium maculatum	Spotted Geranium	S5					C	X		X			X					X											
Geranium robertianum	Herb-Robert	S5					C	X		X			X					X		X			X	X		X		X	
Grossulariaceae	**Currant Family**																												
Ribes americanum	Wild Black Currant	S5					C			X								X		X			X			X			
Ribes cynosbati	Prickly Gooseberry	S5					C	X		X								X					X						
Ribes hirtellum	Smooth Gooseberry	S5					U			X							X												
Ribes rubrum	Northern Red Currant	SE5					IX			X			X																
Ribes triste	Swamp Red Currant	S5					C			X													X						
Hippocastanaceae	**Buckeye Family**																												
Aesculus hippocastanum	Horse Chestnut	SE2					IR			X	X																		
Hydrophyllaceae	**Water-leaf Family**																												
Hydrophyllum virginianum	Virginia Waterleaf	S5					C	X		X			X				X	X	X	X			X						

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Juglandaceae	**Walnut Family**																												
Carya cordiformis	Bitternut Hickory	S5					C			X	X				X			X		X			X					X	
Carya ovata	Shagbark Hickory	S5					C	X		X			X							X			X			X			
Carya ovata var. ovata	Shagbark Hickory	S5								X	X																		
Juglans cinerea	Butternut	S2?	END	E	E	Schedule 1	C	X		X	X	X	X	X				X	X					X					
Juglans nigra	Black Walnut	S4?					C	X		X	X	X		X			X	X	X		X	X	X	X			X			
Lamiaceae	**Mint Family**																												
Collinsonia canadensis	Canada Horsebalm	S4					C	X																					
Glechoma hederacea	Ground Ivy	SE5					IC	X																					
Lamium purpureum	Purple Dead-nettle	SE3					IX	X																					
Lycopus europaeus	European Water-horehound	SE5					IX	X																					
Lycopus uniflorus	Northern Water-horehound	S5					C	X		X																X			X
Mentha canadensis	Canada Mint	S5					C	X		X																			X
Monarda didyma	Scarlet Beebalm	S3					R	X																					
Monarda fistulosa	Wild Bergamot	S5					C	X																					
Nepeta cataria	Catnip	SE5					IX	X																					
Prunella vulgaris	Self-heal	S5								X					X					X			X						
Pycnanthemum virginianum	Virginia Mountain-mint	S4					U	X		X		X		X		X													
Scutellaria lateriflora	Mad Dog Skullcap	S5					C			X																			X
Lythraceae	**Loosestrife Family**																												
Lythrum salicaria	Purple Loosestrife	SE5					IC	X		X		X												X	X		X	X	X
Malvaceae	**Mallow Family**																												
Abutilon theophrasti	Velvetleaf	SE5					IX	X		X			X																
Malva neglecta	Dwarf Cheeseweed	SE5					IC	X																					
Moraceae	**Mulberry Family**																												
Maclura pomifera	Osage-orange	SE2					IR	X																					
Morus alba	White Mulberry	SE5					IC			X	X		X																X
Nymphaeaceae	**Water-lily Family**																												
Nymphaea odorata	Fragrant Water-lily	S5					R	X																					
Oleaceae	**Olive Family**																												
Fraxinus americana	White Ash	S4					C			X	X		X				X	X	X				X						
Fraxinus pennsylvanica	Green Ash	S4					C			X	X									X			X			X		X	
Ligustrum vulgare	European Privet	SE5					IX			X										X			X						
Syringa vulgaris	Common Lilac	SE5					IR	X																					
Onagraceae	**Evening-primrose Family**																												
Circaea canadensis	Broad-leaved Enchanter's Nightshade	S5					C	X																					
Circaea canadensis ssp. canadensis	Canada Enchanter's Nightshade	S5								X							X	X	X	X	X	X	X			X			
Epilobium coloratum	Purple-veined Willowherb	S5					C	X		X					X										X				
Epilobium parviflorum	Small-flowered Willowherb	SE4					IX			X															X				X
Ludwigia palustris	Marsh Seedbox	S5					C			X																			X
Oenothera sp.	Evening-primrose sp.							X																					
Oenothera biennis	Common Evening-primrose	S5					C			X			X								X								X
Oenothera parviflora	Small-flowered Evening-primrose	S5					C	X																					
Oenothera perennis	Perennial Evening-primrose	S5					C			X					X	X													
Orobanchaceae	**Broom-rape Family**																												
Epifagus virginiana	Beechdrops	S5					C			X										X			X						
Oxalidaceae	**Wood Sorrel Family**																												
Oxalis dillenii	Slender Yellow Wood-sorrel	SE5?					C			X			X		X														
Oxalis montana	Common Wood-sorrel	S5					R			X			X				X				X								
Oxalis stricta	Upright Yellow Wood-sorrel	SE5					C			X				X						X									
Papaveraceae	**Poppy Family**																												
Sanguinaria canadensis	Bloodroot	S5					C	X		X				X				X					X						
Phytolaccaceae	**Pokeweed Family**																												
Phytolacca americana	Common Pokeweed	S4					U			X								X											
Plantaginaceae	**Plantain Family**																												
Plantago lanceolata	English Plantain	SE5					IC	X		X			X	X	X														
Plantago major	Common Plantain	SE5					IC	X		X					X											X			X
Platanaceae	**Plane-tree Family**																												
Platanus occidentalis	Sycamore	S4					R	X																					
Platanus × hispanica	London Plane-tree	SE1						X																					
Polygonaceae	**Smartweed Family**																												
Persicaria hydropiper	Marshpepper Smartweed	SE5					IX			X																			X
Persicaria lapathifolia	Pale Smartweed	S5					C			X															X				X
Persicaria maculosa	Spotted Lady's-thumb	SE5					IC			X															X				
Persicaria virginiana	Virginia Smartweed	S4					C	X		X				X				X											
Reynoutria japonica	Japanese Knotweed	SE5					IX	X																					
Rumex acetosella	Sheep Sorrel	SE5					IX			X						X													
Rumex crispus	Curly Dock	SE5					IX	X		X			X	X	X														X
Pyrolaceae	**Wintergreen Family**																												
Chimaphila maculata	Spotted Wintergreen	S2	THR	T	T	Schedule 1	H		X																				
Ranunculaceae	**Buttercup Family**																												
Actaea pachypoda	White Baneberry	S5					C	X		X										X			X						
Actaea rubra	Red Baneberry	S5					C	X		X													X			X			
Anemonastrum canadense	Canada Anemone	S5								X					X														
Anemone quinquefolia	Wood Anemone	S5					C			X								X											
Clematis virginiana	Virginia Virgin's-bower	S5					C	X																					
Ranunculus abortivus	Kidney-leaved Buttercup	S5					C			X								X	X	X			X						
Ranunculus acris	Tall Buttercup	SE5					IC	X		X		X		X				X										X	
Ranunculus hispidus	Bristly Buttercup	S3								X														X					
Ranunculus pensylvanicus	Pennsylvania Buttercup	S5					C			X														X					
Ranunculus recurvatus	Hooked Buttercup	S5					C			X				X			X												
Ranunculus sceleratus	Cursed Buttercup	S5					C	X		X			X		X														
Thalictrum dioicum	Early Meadow-rue	S5					C	X																					
Rhamnaceae	**Buckthorn Family**																												
Rhamnus cathartica	Common Buckthorn	SE5					IC	X		X		X	X	X						X	X	X	X			X	X		
Rosaceae	**Rose Family**																												
Agrimonia gryposepala	Hooked Agrimony	S5					C			X		X								X									
Agrimonia striata	Woodland Agrimony	S4								X				X				X		X			X						
Crataegus sp.	Hawthorn sp.									X	X	X	X		X	X	X	X	X	X			X						
Crataegus coccinea	Scarlet Hawthorn	S5						X																					
Crataegus coccinea var. pringlei	Pringle's Hawthorn	S5					U	X																					
Crataegus pennsylvanica	Pennsylvania Hawthorn	S1S2						X																					
Crataegus punctata	Dotted Hawthorn	S5					C	X		X													X						
Crataegus succulenta	Fleshy Hawthorn	S5						X																					
Fragaria vesca	Woodland Strawberry	S5					C			X										X			X			X			
Fragaria virginiana	Wild Strawberry	S5					C			X			X	X	X	X	X	X	X				X						
Geum sp.	Avens sp.									X								X	X										
Geum aleppicum	Yellow Avens	S5					C			X		X		X			X				X								
Geum canadense	White Avens	S5					C	X		X											X	X	X						
Geum urbanum	Wood Avens	SE3					IX	X																					
Malus baccata	Siberian Crabapple	SE1					IR			X	X																		
Malus coronaria	Sweet Crabapple	S4					C	X																					
Malus pumila	Common Apple	SE4					IX			X	X	X	X																
Physocarpus opulifolius	Eastern Ninebark	S5					C	X																					
Potentilla indica	Mock-strawberry	SE2					IR	X																					
Potentilla recta	Sulphur Cinquefoil	SE5					IX	X		X			X	X	X						X								
Potentilla simplex	Old-field Cinquefoil	S5					C	X																					
Prunus avium	Sweet Cherry	SE4					IX			X	X		X					X	X		X		X			X			
Prunus domestica	European Plum	SE2					IR			X	X																		
Prunus nigra	Canada Plum	S4					C	X																					
Prunus pensylvanica	Pin Cherry	S5					C			X			X																	
Prunus serotina	Black Cherry	S5					C	X		X	X	X	X	X			X	X	X	X			X						
Prunus virginiana	Choke Cherry	S5					C			X								X	X	X			X						
Pyrus communis	Common Pear	SE4					IX			X	X	X				X													
Rosa blanda	Smooth Rose	S5					C	X																					
Rosa canina	Dog Rose	SE2					IX	X																					
Rosa multiflora	Multiflora Rose	SE5					IC			X		X			X					X	X		X			X			
Rubus allegheniensis	Allegheny Blackberry	S5					C	X		X			X					X		X			X					X	

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Hamilton	iNaturalist Research-Grade Observations	NHIC Data*	NRSI Observed	NRSI Tree Inventory Data	Orchard	Hedgerows	CUW / CUW1	CUM / CUM1	CUT1-4	FOD4	FOD5-2	FOD5-6	FOD6-5	FOD7-4	FOD8-1	FOD9	MAM2-2	MAS2-1	SWD3-3	SWD4-1	SWT2-8	SAF1
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	Oldham 2017	iNaturalist 2023	MNRF 2023b	NRSI Results From 2018-2020																			
Rubus idaeus	Common Red Raspberry	S5						X		X							X												
Rubus idaeus ssp. strigosus	Wild Red Raspberry	S5					C			X		X	X	X												X			
Rubus occidentalis	Black Raspberry	S5					C	X		X		X				X	X	X		X			X						
Rubus odoratus	Purple-flowering Raspberry	S5					C			X								X		X			X						
Sorbus aucuparia	European Mountain-ash	SE4					IX			X												X							
Spiraea japonica	Japanese Spiraea	SE1					IR	X																					
Rubiaceae	**Madder Family**																												
Galium aparine	Cleavers	S5					C	X		X		X						X					X	X				X	
Galium mollugo	Smooth Bedstraw	SE5					IX			X							X												
Galium tinctorium	Stiff Marsh Bedstraw	S5					C			X																			X
Galium triflorum	Three-flowered Bedstraw	S5					C			X																X			
Mitchella repens	Partridge-berry	S5					C			X							X												
Salicaceae	**Willow Family**																												
Populus balsamifera	Balsam Poplar	S5					C	X		X	X								X										
Populus deltoides	Eastern Cottonwood	S5					C			X	X														X				X
Populus grandidentata	Large-toothed Aspen	S5					C			X			X																
Populus tremuloides	Trembling Aspen	S5					C	X		X	X	X	X	X	X			X				X	X				X	X	X
Salix sp.	Willow sp.									X	X																		
Salix alba	White Willow	SE4					IX	X		X	X																		
Salix amygdaloides	Peach-leaved Willow	S5					C			X	X														X				X
Salix bebbiana	Bebb's Willow	S5					C			X	X																		X
Salix caprea	Goat Willow	SE1						X																					
Salix discolor	Pussy Willow	S5					C	X																					
Salix eriocephala	Heart-leaved Willow	S5					C	x		X															X				
Salix euxina	Crack Willow	SE					IX			X	X															X	X		
Salix interior	Sandbar Willow	S5					C			X														X					
Salix nigra	Black Willow	S4					C	X		X	X														X				
Salix x sepulcralis	*(Salix alba X Salix babylonica)*	SNA					hyb	X																					
Saxifragaceae	**Saxifrage Family**																												
Micranthes virginiensis	Early Saxifrage	S5					C	X																					
Tiarella stolonifera	Heart-leaved Foam-flower	S5					C			X																X			
Scrophulariaceae	**Figwort Family**																												
Gratiola neglecta	Clammy Hedge-hyssop	S4					U			X														X					
Linaria vulgaris	Butter-and-eggs	SE5					IC	X		X		X																	
Lindernia dubia	Yellow-seeded False Pimpernel	S4					C	X																					
Penstemon digitalis	Foxglove Beardtongue	S4S5					C	X																					
Verbascum thapsus	Common Mullein	SE5					IC			X		X			X														
Veronica catenata	Water Speedwell	SU					R			X															X				
Veronica officinalis	Common Speedwell	SE5					IC			X										X									
Veronica peregrina ssp. peregrina	Purslane Speedwell	S5					U			X					X														
Veronica serpyllifolia	Thyme-leaved Speedwell	SU					IX			X							X						X						
Simaroubaceae	**Ailanthus Family**																												
Ailanthus altissima	Tree-of-heaven	SE5					IC			X	X																		
Solanaceae	**Nightshade Family**																												
Solanum dulcamara	Bittersweet Nightshade	SE5					IC	X		X			X				X			X									
Tiliaceae	**Linden Family**																												
Tilia americana	American Basswood	S5					C	X		X	X						X	X	X	X	X		X						
Tilia cordata	Little-leaf Linden	SE1					IR			X	X															X			
Ulmaceae	**Elm Family**																												
Celtis occidentalis	Common Hackberry	S4					U	x																					
Ulmus americana	American Elm	S5					C			X	X		X	X						X				X					
Ulmus pumila	Siberian Elm	SE3					IX	X																					
Ulmus rubra	Slippery Elm	S5					C			X	X																		
Urticaceae	**Nettle Family**																												
Laportea canadensis	Wood Nettle	S5					C			X																X			
Pilea pumila	Dwarf Clearweed	S5					C	X		X					X					X									
Urtica dioica	Stinging Nettle	SE2								X				X															
Urtica gracilis	Slender Stinging Nettle	S5					C			X			X											X					
Verbenaceae	**Vervain Family**																												
Verbena hastata	Blue Vervain	S5					C			X		X	X	X	X									X			X		X
Verbena urticifolia	White Vervain	S5					C	X		X		X			X									X					
Violaceae	**Violet Family**																												
Viola sp.	Violet sp.									X								X											
Viola odorata	English Violet	SE2					IX	X																					
Viola pubescens	Yellow Violet	S5					C			X								X					X			X			
Viola sororia	Woolly Blue Violet	S5					C			X								X		X					X				
Vitaceae	**Grape Family**																												
Parthenocissus quinquefolia	Virginia Creeper	S4?					C	X		X		X					X	X	X		X			X				X	
Parthenocissus vitacea	Thicket Creeper	S5					C			X										X			X						
Vitis riparia	Riverbank Grape	S5					C	X		X		X	X	X	X	X	X			X	X		X	X		X	X		
Monocotyledons	**Monocots**																												
Alismataceae	**Water-plantain Family**																												
Alisma sp.	Water-plantain sp.									X																			X
Alisma subcordatum	Southern Water-plantain	S4?					X			X															X				
Araceae	**Arum Family**																												
Arisaema triphyllum	Jack-in-the-pulpit	S5					C	X		X							X	X		X			X			X		X	
Cyperaceae	**Sedge Family**																												
Carex sp.	Sedge sp.									X									X		X								
Carex albursina	White Bear Sedge	S5					C			X										X									
Carex arctata	Drooping Woodland Sedge	S5					C			X								X		X									
Carex blanda	Woodland Sedge	S5					C			X		X	X	X	X	X		X	X	X			X				X		
Carex cephalophora	Oval-leaved Sedge	S5					C	X		X										X									
Carex communis	Fibrous-root Sedge	S5					C			X										X									
Carex deweyana	Dewey's Sedge	S5					C			X								X		X									
Carex gracillima	Graceful Sedge	S5					C			X										X			X						
Carex granularis	Limestone Meadow Sedge	S5					C			X										X									
Carex intumescens	Bladder Sedge	S5					C			X										X									
Carex laxiculmis	Spreading Sedge	S4						X																					
Carex leptonervia	Finely-nerved Sedge	S5					C	X		X										X									
Carex normalis	Larger Straw Sedge	S4					C			X					X														
Carex pedunculata	Long-stalked Sedge	S5					C			X								X		X									
Carex pensylvanica	Pennsylvania Sedge	S5					C			X										X									
Carex plantaginea	Plantain-leaved Sedge	S5					C			X													X						
Carex radiata	Eastern Star Sedge	S5					C			X				X									X						
Carex rosea	Rosy Sedge	S5					C			X								X		X		X	X						
Carex scabrata	Eastern Rough Sedge	S5					U	X																					
Carex sparganioides	Burreed Sedge	S4S5					C			X								X		X									
Carex spicata	Spiked Sedge	SE5					IC	X																					
Carex stipata	Awl-fruited Sedge	S5					C			X					X													X	
Carex tenera	Tender Sedge	S5					C			X				X															
Carex vulpinoidea	Fox Sedge	S5					C			X			X		X									X	X			X	X
Cyperus diandrus	Umbrella Flatsedge	S4					R	X		X															X				X
Cyperus erythrorhizos	Red-rooted Flatsedge	S4					R	X		X															X				
Cyperus esculentus	Perennial Yellow Flatsedge	S5					C	X		X															X				
Cyperus strigosus	Straw-colored Flatsedge	S5					U	X		X															X				X
Dulichium arundinaceum	Three-way Sedge	S5					C			X																			X
Eleocharis acicularis	Needle Spikerush	S5					U	X																					
Eleocharis erythropoda	Red-stemmed Spikerush	S5					C			X														X	X				
Eleocharis palustris	Creeping Spikerush	S5					C			X															X				X
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush	S5					C			X															X		X		
Scirpus atrovirens	Dark-green Bulrush	S5					C	X		X			X												X		X		X
Scirpus cyperinus	Cottongrass Bulrush	S5					C			X																	X		
Scirpus microcarpus	Red-tinged Bulrush	S5					R	X																					
Hydrocharitaceae	**Frog's-bit Family**																												
Elodea canadensis	Canada Waterweed	S5					C			X																			X
Elodea nuttalii	Nuttall's Waterweed	S3								X																			X
Iridaceae	**Iris Family**																												
Iris pseudacorus	Yellow Iris	SE4					IX	X																					

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		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	Oldham 2017	iNaturalist 2023	MNRF 2023b	NRSI Results From 2018-2020																			
Juncaceae	**Rush Family**																												
Juncus tenuis	Path Rush	S5					C			X		X			X					X				X				
Juncus torreyi	Torrey's Rush	S5					C	X																					
Lemnaceae	**Duckweed Family**																												
Lemna minor	Lesser Duckweed	S5					C			X																	X		X
Wolffia borealis	Northern Watermeal	S5					R			X																			X
Wolffia columbiana	Columbia Watermeal	S5					R			X																			X
Liliaceae	**Lily Family**																												
Allium schoenoprasum var. schoenoprasum	European Chives	SE2								X														X					
Allium tricoccum	Wild Leek	S4								X													X						
Asparagus officinalis	Garden Asparagus	SE5					IX	X		X					X														
Erythronium americanum	Yellow Trout-lily	S5					C	X		X										X			X						
Galanthus nivalis	Snowdrop	SE1						X																					
Hemerocallis lilioasphodelus	Yellow Daylily	SE4					IR	X																					
Maianthemum canadense	Wild Lily-of-the-valley	S5					C	X		X			X						X	X			X			X			
Maianthemum racemosum	Large False Solomon's Seal	S5					C			X			X					X		X			X			X			
Maianthemum stellatum	Star-flowered False Solomon's Seal	S5					C	X		X										X			X			X			
Polygonatum pubescens	Hairy Solomon's Seal	S5					C			X								X		X			X						
Trillium erectum	Red Trillium	S5					C	X		X								X			X		X						
Trillium grandiflorum	White Trillium	S5					C	X		X								X	X	X			X						
Uvularia perfoliata	Perfoliate Bellwort	S1S2					R		X																				
Uvularia sessilifolia	Sessile-leaved Bellwort	S4					R			X										X									
Najadaceae	**Naiad Family**																												
Najas flexilis	Slender Naiad	S4S5					R			X																			X
Orchidaceae	**Orchid Family**																												
Epipactis helleborine	Eastern Helleborine	SE5					IX	X																					
Poaceae	**Grass Family**																												
Agrostis gigantea	Redtop	SE5					IX			X				X		X				X					X				
Agrostis perennans	Upland Bentgrass	S4?					C	x		X										X									
Agrostis stolonifera	Creeping Bentgrass	SE5					IX	X		X															X				
Bromus ciliatus	Fringed Brome	S5					U	X																					
Bromus inermis	Smooth Brome	SE5					IC			X		X	X		X														
Bromus tectorum	Downy Brome	SE5					IX	X																					
Dactylis glomerata	Orchard Grass	SE5					IC			X		X	X	X	X	X	X												
Danthonia spicata	Poverty Oatgrass	S5					C			X										X									
Digitaria ischaemum	Smooth Crabgrass	SE5					IX			X					X														
Digitaria sanguinalis	Hairy Crabgrass	SE5					IX	X		X					X														
Echinochloa crus-galli	Large Barnyard Grass	SE5					IC	X																					
Echinochloa muricata	Rough Barnyard Grass	S5						X																					
Echinochloa muricata var. microstachya	Western Barnyard Grass	S5					U			X															X				
Echinochloa muricata var. muricata	Rough Barnyard Grass	S4?					R			X															X				
Festuca trachyphylla	Hard Fescue	SE4					IX			X										X									
Glyceria striata	Fowl Mannagrass	S5					C			X								X		X			X	X		X		X	
Leersia oryzoides	Rice Cutgrass	S5					C			X															X				X
Panicum capillare	Common Panicgrass	S5					C	X		X															X				
Panicum virgatum	Old Switch Panicgrass	S4					R	X																					
Phalaris arundinacea	Reed Canary Grass	S5					C	X		X		X	X	X	X		X	X			X			X	X		X	X	
Phleum pratense	Common Timothy	SE5					IC			X					X						X								
Phragmites australis	Common Reed	SU						X		X															X				X
Poa annua	Annual Bluegrass	SE5					IX	X																					
Poa compressa	Canada Bluegrass	SE5					IX			X				X															
Poa palustris	Fowl Bluegrass	S5					C			X								X						X		X		X	
Poa pratensis	Kentucky Bluegrass	S5								X		X	X		X	X	X		X		X						X		
Poa trivialis	Rough Bluegrass	SE3					IX			X										X									
Puccinellia nuttalliana	Nuttall's Alkaligrass	S1?								X														X					
Setaria pumila	Yellow Foxtail	SE5					IX	X		X					X														
Setaria viridis	Green Foxtail	SE5					IX			X					X														
Potamogetonaceae	**Pondweed Family**																												
Potamogeton crispus	Curly-leaved Pondweed	SE5					IX			X															X				X
Smilacaceae	**Catbrier Family**																												
Smilax herbacea	Herbaceous Carrionflower	S4?					C	X		X										X			X						
Smilax lasioneura	Hairy-nerved Carrionflower	S4S5					R	X																					
Typhaceae	**Cattail Family**																												
Typha angustifolia	Narrow-leaved Cattail	SE5					IX	X																					
Typha latifolia	Broad-leaved Cattail	S5					C	X		X			X											X	X		X		X
Typha x glauca	*(Typha angustifolia X Typha latifolia)*	SNA					hyb	X																					
Total								235	2	345	57	67	90	63	74	28	49	71	36	96	23	30	80	34	48	42	27	21	48

*NHIC Atlas Squares: 17NH8683, 17NH8783, 17NH8682, 17NH8782, 17NH8882, 17NH8982, 17NH8781, 17NH8881, 17NH8981

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Appendix VIII
Bird Species Reported from the Vicinity of the Study Area

Bird Species Reported from the Study Area - Upper West Side- Secondary Plan (Project #1974E)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	NPCA Status	Hamilton Status 2014	eBird Hotspot: Hamilton—John C. Munro International Airport	iNaturalist Research Grade Observations	OBBA*	NHIC Data**	NRSI Observed: Highest Level of Breeding Evidence	BMB-01	BMB-02	BMB-03	BMB-04	BMB-05	BMB-06	BMB-07	BMB-08	BMB-09	BMB-10	BMB-11	BMB-12	BMB-13	BMB-14	BMB-15	MSB-01	MSB-02	MSB-03	MSB-04	MSB-05	Other Observations
		MNRF 2023e	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	NPCA 2010	HCA 2014	eBird 2023	iNaturalist 2023	BSC et al. 2006	MNRF 2023h	NRSI Results from 2018-2020																					
Anatidae	**Ducks, Geese & Swans**																																
Aix sponsa	Wood Duck	SSB,S3N					U	U			PR		**OB**																				OB
Anas platyrhynchos	Mallard	S5					C	C			CO		**CO**																				CO
Aythya collaris	Ring-necked Duck	SSB,S4N								X																							
Aythya valisineria	Canvasback	S1B,S3N,S4M					O			X																							
Branta canadensis	Canada Goose	S5					VC	C	X	X	CO		**OB**				OB							OB	OB								OB
Bucephala albeola	Bufflehead	S5					O						**OB**																				OB
Cygnus olor	Mute Swan	SNA					R	R (I)			CO																						
Lophodytes cucullatus	Hooded Merganseer	S5					R	R		X																							
Odontophoridae	**New World Quails**																																
Colinus virginianus	Northern Bobwhite	S1?	END	E	E	Schedule 1	EX	EX				X																					
Phasianidae	**Partridges, Grouse & Turkeys**																																
Bonasa umbellus	Ruffed Grouse	S5					R	U			CO																						
Meleagris gallopavo	Wild Turkey	S5					U	C	X	X			**PO**											PO		PO							OB
Phasianus colchicus	Ring-necked Pheasant	SNA					I, R	R (I)			PR																						
Podicipediformes	**Grebes**																																
Podilymbus podiceps	Pied-billed Grebe	S4B,S2N					R	R		X																							
Columbidae	**Pigeons & Doves**																																
Columba livia	Rock Pigeon	SNA					VC	A	X		CO		**OB**						OB														OB
Zenaida macroura	Mourning Dove	S5					VC	A	X	X	CO		**PR**		PR				PO		PR								PR	PO			OB
Cuculiformes	**Cuckoos & Anis**																																
Coccyzus americanus	Yellow-billed Cuckoo	S4B					U	R			PR		**PO**																		PO		OB
Coccyzus erythropthalmus	Black-billed Cuckoo	S4S5B					U	U			PR		**PO**																		PO		
Coccyzus sp.	Black/Yellow-billed Cuckoo	NP									PO																						
Caprimulgidae	**Goatsuckers**																																
Chordeiles minor	Common Nighthawk	S4B	SC	SC	SC	Schedule 1	R	R		X																							
Apodidae	**Swifts**																																
Chaetura pelagica	Chimney Swift	S3B	THR	T	T	Schedule 1	U	U			PR		**OB**																				OB
Trochilidae	**Hummingbirds**																																
Archilochus colubris	Ruby-throated Hummingbird	S5B					U	U		X	CO																						
Rallidae	**Rails, Gallinules & Coots**																																
Porzana carolina	Sora	SSB					U	U			PO		**OB**																				OB
Rallus limicola	Virginia Rail	S4S5B					R	U			PR																						
Gruidae	**Cranes**																																
Antigone canadensis	Sandhill Crane	SSB,S3N		NAR	NS	No schedule	R	R					**OB**																				OB
Charadriidae	**Plovers & Lapwings**																																
Charadrius vociferus	Killdeer	S4B					C	A	X	X	PR		**CO**						PO				PO	PR	PR	PR		PR			PO	PR	CO
Scolopacidae	**Sandpipers & Allies**																																
Actitis macularia	Spotted Sandpiper	SSB					C	C			PR		**CO**		PO																		CO
Bartramia longicauda	Upland Sandpiper	S2B					R	R			PR																						
Scolopax minor	American Woodcock	S4B					U	C					**OB**																				OB
Tringa solitaria	Solitary Sandpiper	S4B,S5M					U						**OB**																				OB
Laridae	**Gulls, Terns & Skimmers**																																
Larus argentatus	Herring Gull	S4B,S5N					U	C					**OB**																				OB
Larus delawarensis	Ring-billed Gull	S5					VC	A	X	X			**OB**				OB		OB					OB	OB	OB		OB			OB		OB
Phalacrocoracidae	**Cormorants**																																
Nannopterum auritum	Double-crested Cormorant	SSB,S4N	NAR	NAR	NS	No schedule	VC	A		X			**OB**																				OB
Ardeidae	**Herons & Bitterns**																																
Ardea herodias	Great Blue Heron	S4					U	U		X			**OB**																				OB
Butorides virescens	Green Heron	S4B					U	U			PR																						
Cathartidae	**Vultures**																																
Cathartes aura	Turkey Vulture	SSB,S3N					U	U		X	CO		**PR**			OB								OB									PR
Accipitridae	**Hawks, Kites, Eagles & Allies**																																
Accipiter cooperii	Cooper's Hawk	S4	NAR	NAR	NS	No schedule	U	U		X	CO		**PO**											PO								PO	OB
Accipiter striatus	Sharp-shinned Hawk	S5	NAR	NAR	NS	No schedule	U	R			CO																						
Buteo jamaicensis	Red-tailed Hawk	S5	NAR	NAR	NS	No schedule	U	C	X	X	CO		**CO**				PO											OB			PR		CO
Buteo platypterus	Broad-winged Hawk	SSB					O	R			CO																						
Circus hudsonius	Northern Harrier	SSB,S4N	NAR	NAR	NS	No schedule	R	R			PR		**OB**																				OB
Haliaeetus leucocephalus	Bald Eagle	S4	SC	NAR	NS	No schedule	R	R					**OB**																				OB
Tytonidae	**Barn Owls**																																
Tyto alba	Barn Owl	S1	END	E	E	Schedule 1		EX			PR																						
Strigidae	**Typical Owls**																																
Asio flammeus	Short-eared Owl	S4?B,S2S3N	THR	T	SC	Schedule 1	R	R	X																								
Bubo scandiacus	Snowy Owl	S4N	NAR						X																								
Bubo virginianus	Great Horned Owl	S4					U	C		X	PO		**PR**																				PR
Megascops asio	Eastern Screech-Owl	S4	NAR	NAR	NS	No schedule	U	U		X	PO																						
Alcedinidae	**Kingfishers**																																
Megaceryle alcyon	Belted Kingfisher	SSB,S4N					U	U		X	CO		**OB**																				OB
Picidae	**Woodpeckers**																																
Colaptes auratus	Northern Flicker	S5					C	C		X	CO		**CO**				PO	PO					PO	PO								CO
Dryobates pubescens	Downy Woodpecker	S5					C	C			CO		**PO**			PO	PO					PO										OB
Dryobates villosus	Hairy Woodpecker	S5						U			CO		**PO**			PO																OB
Dryocopus pileatus	Pileated Woodpecker	S5					R	U			PR		**OB**																				OB
Melanerpes carolinus	Red-bellied Woodpecker	S5					U	U	X	X	PR		**PO**	PO		PO	PO	PO		OB									PO				OB
Falconidae	**Caracaras & Falcons**																																
Falco columbarius	Merlin	S5	NAR	NAR	NS	No schedule		R		X			**OB**																				OB
Falco peregrinus	Peregrine Falcon	S4	SC	NAR	NS	No schedule	R	R		X																							
Falco sparverius	American Kestrel	S4					U	U	X	X																							
Tyrannidae	**Tyrant Flycatchers**																																
Contopus virens	Eastern Wood-Pewee	S4B	SC	SC	SC	Schedule 1	C	C			PR	X	**PR**				PO		PO			PR		PO		PO					PO		OB
Empidonax alnorum	Alder Flycatcher	S5B					U	U			PR																						
Empidonax minimus	Least Flycatcher	S5B					U	U			PR		**OB**																				OB
Empidonax traillii	Willow Flycatcher	S4B					U	C	X	X	CO		**PR**						PR	PR	PR		PR	PO						PO	PO	PR	OB
Myiarchus crinitus	Great Crested Flycatcher	S5B					C	C			PR		**PR**				PO					PO	PR								PO		OB
Sayornis phoebe	Eastern Phoebe	S5B					C	U		X	CO		**OB**																				OB
Tyrannus tyrannus	Eastern Kingbird	S4B					C	A		X	CO		**PO**						PO														OB
Vireonidae	**Vireos**																																
Vireo flavifrons	Yellow-throated Vireo	S4B					R	U			PO																						
Vireo gilvus	Warbling Vireo	S5B					C	C		X	PR		**PO**										PO										
Vireo olivaceus	Red-eyed Vireo	S5B					C	C		X	CO		**PR**				PO					PR	PO			PO					PR		OB
Vireo philadelphicus	Philadelphia Vireo	S5B								X																							
Corvidae	**Crows & Jays**																																
Corvus brachyrhynchos	American Crow	S5					C	C	X	X	CO		**PR**	PO		PO		PO	PO	OB	PO	PR		PO	PO	PO		OB	PR	PO	PO		OB
Corvus corax	Common Raven	S5						R	X				**OB**																				OB
Cyanocitta cristata	Blue Jay	S5					VC	A	X	X	CO		**PR**	PO	PR	PR	PO	PO	PR	PO	PO	PO		PR	PR		PR	PO	PO		PO	PO	OB
Alaudidae	**Larks**																																
Eremophila alpestris	Horned Lark	S4					C	C	X		PR		**PR**											PR		PO				OB	PO		OB
Hirundinidae	**Swallows**																																
Hirundo rustica	Barn Swallow	S4B	SC	SC	T	Schedule 1	VC	C	X		CO		**CO**		OB						OB			OB	OB	PR		OB	OB	OB	OB	OB	CO
Riparia riparia	Bank Swallow	S4B	THR	T	T	Schedule 1	VC	U			CO		**OB**		OB																		
Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B					U	C			CO		**OB**																				OB
Tachycineta bicolor	Tree Swallow	S4S5B					VC	A			CO		**OB**																				OB
Paridae	**Chickadees & Titmice**																																
Baeolophus bicolor	Tufted Titmouse	S3					R	R			CO																						
Poecile atricapillus	Black-capped Chickadee	S5					C	A			CO		**PO**	PO					PO			PO	PO			PO	PO						OB
Sittidae	**Nuthatches**																																
Sitta canadensis	Red-breasted Nuthatch	S5					R	U			CO																						
Sitta carolinensis	White-breasted Nuthatch	S5					U	C		X	CO		**PO**									PO					PO						OB
Certhiidae	**Creepers**																																
Certhia americana	Brown Creeper	S5					U	U			CO		**OB**																				OB
Troglodytidae	**Wrens**																																
Cistothorus palustris	Marsh Wren	S4B,S3N					U	U			PR																						
Cistothorus stellaris	Sedge Wren	S4B	NAR	NAR	NS	No schedule	R	R			PR																						
Thryothorus ludovicianus	Carolina Wren	S4					U	R			CO																						
Troglodytes aedon	House Wren	S5B					C	C			CO		**PR**	PO			PO		PR	PO	PO				PO	PO	PR	PO	PO	PR		PO	OB
Troglodytes hiemalis	Winter Wren	SSB,S4N					R	U			PR																						
Polioptilidae	**Gnatcatchers**																																
Polioptila caerulea	Blue-gray Gnatcatcher	S4B					U	U		X	CO																						
Regulidae	**Kinglets**																																
Corthylio calendula	Ruby-crowned Kinglet	SSB,S3N					R			X			**OB**																				OB
Regulus satrapa	Golden-crowned Kinglet	S5					R	R					**OB**																				OB
Turdidae	**Thrushes**																																
Catharus fuscescens	Veery	S5B					U	C			CO																						
Catharus guttatus	Hermit Thrush	SSB,S4N								X			**OB**																				OB
Catharus ustulatus	Swainson's Thrush	SSB								X																							
Hylocichla mustelina	Wood Thrush	S4B	SC	T	T	Schedule 1	U	C			CO	X																					
Sialia sialis	Eastern Bluebird	SSB,S4N	NAR	NAR	NS	No schedule	U	U			CO																						
Turdus migratorius	American Robin	S5					VC	A	X	X	CO		**CO**	CO	PR	PR	PO	CO	PR	PO	PO				PR	CO	PR		PO	PO	PR		OB
Mimidae	**Mockingbirds, Thrashers & Allies**																																
Dumetella carolinensis	Gray Catbird	SSB,S3N					C	A		X	CO		**CO**			PO	PO		PO		PR	PR	PR		CO		PO	PR		PR	PR	PO	PR	OB
Mimus polyglottos	Northern Mockingbird	S4					U	U			CO																						
Toxostoma rufum	Brown Thrasher	S4B					U	U			CO		**PO**											PO									OB

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	NPCA Status	Hamilton Status 2014	eBird Hotspot: Hamilton--John C. Munro International Airport	iNaturalist Research Grade Observations	OBBA*	NHIC Data**	NRSI Observed: Highest Level of Breeding Evidence	BMB-01	BMB-02	BMB-03	BMB-04	BMB-05	BMB-06	BMB-07	BMB-08	BMB-09	BMB-10	BMB-11	BMB-12	BMB-13	BMB-14	BMB-15	MBB-01	MBB-02	MBB-03	MBB-04	MBB-05	Other Observations
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	NPCA 2010	HCA 2014	eBird 2023	iNaturalist 2023	BSC et al. 2006	MNRF 2023b	NRSI Results from 2018-2020																					
Sturnidae	**Starlings**																																
Sturnus vulgaris	European Starling	SNA					VC	A (I)	X	X	CO		**CO**	PO	CO					OB				OB	PO	PO				PO				OB
Bombycillidae	**Waxwings**																																
Bombycilla cedrorum	Cedar Waxwing	S5					C	C		X	CO		**CO**		PO					PO			PO		PO	CO				PR			OB
Passeridae	**Old World Sparrows**																																
Passer domesticus	House Sparrow	SNA					VC	A (I)	X	X	CO		**OB**												OB									OB
Passer montanus	Eurasian Tree Sparrow	SNA							X																									
Fringillidae	**Finches & Allies**																																
Coccothraustes vespertinus	Evening Grosbeak	S4	SC	SC	SC	Schedule 1				X																							
Haemorhous mexicanus	House Finch	SNA					C	A (I)	X	X	CO		**OB**																					OB
Spinus tristis	American Goldfinch	S5					C	A	X	X	CO		**PR**	PR		PO		PO	PR	PR	PR		PR	PO	PO	PR	PR	PR	PR	PR	PR		PR	OB
Emberizidae	**New World Sparrows & Allies**																																
Ammodramus savannarum	Grasshopper Sparrow	S4B	SC	SC	SC	Schedule 1	C	U			PR		**PO**																					PO
Junco hyemalis	Dark-eyed Junco	S5							X	X			**OB**																					OB
Melospiza georgiana	Swamp Sparrow	SSB,S4N					U	C			CO		**PO**																	PO				OB
Melospiza melodia	Song Sparrow	S5					VC	A	X	X	CO		**PR**	PR	PR	PR	PR	PR	PR	PR	PR	PR	PR	PO	PR	PR	PR	PR	PR	PR	PR	PR	PR	OB
Passerculus sandwichensis	Savannah Sparrow	SSB,S3N					VC	A	X		CO		**CO**		CO	PO								PO					PR				OB
Pipilo erythrophthalmus	Eastern Towhee	S4B,S3N					U	U			PR																							
Pooecetes gramineus	Vesper Sparrow	S4B					U	U			PR		**PO**																			PO		OB
Spizella pallida	Clay-colored Sparrow	S4B						R			PR																							
Spizella passerina	Chipping Sparrow	SSB,S3N					C	A			CO		**PO**	PO												PO	PO		PO	PO				OB
Spizella pusilla	Field Sparrow	S4B,S3N					U	C			PR		**PR**								PO			PO	PO			PO	PR			PO		OB
Spizelloides arborea	American Tree Sparrow	S5								X																								
Zonotrichia albicollis	White-throated Sparrow	S5					O	U		X	PO		**OB**																					OB
Icteridae	**Chats**																																
Icteria virens	Yellow-breasted Chat	S1B	END	E	E	Schedule 1	R	R			PO																							
Icteridae	**Troupials & Allies**																																
Agelaius phoeniceus	Red-winged Blackbird	S5					VC	A	X	X	CO		**CO**	PR	PR				PR	PO	PO	PO		PO	PO	PO	PO	PR	PO		CO	PR	PO		PO	OB
Dolichonyx oryzivorus	Bobolink	S4B	THR	SC	T	Schedule 1	U	U			PR	X	**OB**																					OB
Euphagus carolinus	Rusty Blackbird	S4B,S3N	SC	SC	SC	Schedule 1			X																									
Icterus galbula	Baltimore Oriole	S4B					C	C		X	CO		**PR**								PO						PO	PR						OB
Icterus spurius	Orchard Oriole	S4B					U	U			CO																							
Molothrus ater	Brown-headed Cowbird	S5					VC	A		X	CO		**PR**	PO	PO	PO	PO			PO		PR		PO		PO	PO		PO	PR				OB
Quiscalus quiscula	Common Grackle	S5					VC	A	X	X	CO		**PR**	PR		PO						PO				PR			OB		PO	PO	PO	OB
Sturnella magna	Eastern Meadowlark	S4B,S3N	THR	T	T	Schedule 1	U	U			PR	X	**OB**																					OB
Parulidae	**Wood Warblers**																																
Geothlypis philadelphia	Mourning Warbler	SSB					U	U			PR																							
Geothlypis trichas	Common Yellowthroat	SSB,S3N					C	C			CO		**PR**	PR	PO				PR	PR	PR			PO	PO			PO	PR		PR	PR	PR	PR	OB
Leiothlypis celata	Orange-crowned Warbler	SSB								X																								
Leiothlypis peregrina	Tennessee Warbler	SSB								X																								
Leiothlypis ruficapilla	Nashville Warbler	SSB					R	U		X																								
Mniotilta varia	Black-and-white Warbler	SSB					R	U		X	PO		**OB**																					OB
Parkesia motacilla	Louisiana Waterthrush	S2B	THR	T	T	Schedule 1	R	R			PR																							
Seiurus aurocapilla	Ovenbird	SSB						C			PR																							
Setophaga americana	Northern Parula	SSB					R						**OB**																					OB
Setophaga caerulescens	Black-throated Blue Warbler	SSB					R	R			PO		**OB**																					OB
Setophaga citrina	Hooded Warbler	S4B	NAR	NAR	NS	No schedule	R	R			PR																							
Setophaga coronata	Yellow-rumped Warbler	SSB,S4N						R		X																								
Setophaga dominica	Yellow-throated Warbler	S1M								X																								
Setophaga magnolia	Magnolia Warbler	SSB						R		X	PO																							
Setophaga palmarum hypochrysea	Yellow Palm Warbler	S1B								X																								
Setophaga palmarum palmarum	Western Palm Warbler	SSB								X																								
Setophaga pensylvanica	Chestnut-sided Warbler	SSB					U	U		X	CO		**OB**																					OB
Setophaga petechia	Yellow Warbler	SSB					C	A		X	CO		**PR**	PR					PR	PR	PO		PO			PO	PO	PO		PR	PR		PR	OB
Setophaga pinus	Pine Warbler	SSB,S3N						U		X	PR																							
Setophaga ruticilla	American Redstart	SSB					U	U			CO		**PO**							PO								PO						
Setophaga striata	Blackpoll Warbler	SSB											**OB**																					OB
Setophaga virens	Black-throated Green Warbler	SSB					R	R			CO																							
Vermivora chrysoptera	Golden-winged Warbler	S3B	SC	T	T	Schedule 1	R	R		X	PR																							
Vermivora cyanoptera	Blue-winged Warbler	S4B					U	U		X	CO																							
Cardinalidae	**Cardinals, Grosbeaks & Allies**																																
Cardinalis cardinalis	Northern Cardinal	S5					C	A	X	X	CO		**PR**	PR	PR		PR		PR	PO	PR	PR	PR	PO	PR	PO	PO	PR	PR	PR	PR	PO	PR	OB
Passerina cyanea	Indigo Bunting	SSB					C	C		X	CO		**PR**	PO	PO	PO	PO					PR	PR			PO	PO	PR			PR	PO	OB
Pheucticus ludovicianus	Rose-breasted Grosbeak	SSB					C	C		X	CO		**PO**																		PO			
Piranga olivacea	Scarlet Tanager	SSB					U	U			PR																							
Total									30	71	112	5	90	17	15	14	17	12	19	15	16	12	16	21	15	18	18	16	17	19	20	19	16	85

*OBBA Atlas Square: 17NH88

**NHIC Atlas Squares: 17NH8683, 17NH8783, 17NH8682, 17NH8782, 17NH8882, 17NH8982, 17NH8781, 17NH8881, 17NH8981

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Appendix IX

Herpetofauna Species Reported from the Vicinity of the Study Area

Reptile and Amphibian Species Reported from the Study Area - Upper West Side Secondary Plan (Project #1974E)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Hamilton Status	iNaturalist Research Grade Observations	ORAA*	NHIC Data**	NRSI Observed	Anuran Call Survey	Turtle Basking Survey	Snake Cover Board Survey
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	HCA 2013	iNaturalist 2023	Ontario Nature 2019	MNRF 2023b	NRSI Results from 2018-2020			
Turtles														
Chelydra serpentina	Snapping Turtle	S4	SC	SC	SC	Schedule 1	C		X	X	X		X	
Chrysemys picta marginata	Midland Painted Turtle	S4		SC	SC	Schedule 1	C		X	X	X		X	
Emydoidea blandingii	Blanding's Turtle (Great Lakes / St. Lawrence population)	S3	THR	E	E	Schedule 1	R	X						
Graptemys geographica	Northern Map Turtle	S3	SC	SC	SC	Schedule 1	R	X	X					
Sternotherus odoratus	Eastern Musk Turtle	S3	SC	SC	SC	Schedule 1	R		X					
Trachemys scripta	Pond Slider	SNA							X					
Snakes														
Crotalus horridus	Timber Rattlesnake	SX	EXP	XT	XT	Schedule 1	EX			X				
Diadophis punctatus	Northern Ring-necked Snake	S4					R		X					
Lampropeltis triangulum	Milksnake	S4	NAR	SC	SC	Schedule 1	U		X	X				
Opheodrys vernalis	Smooth Greensnake	S4					R		X					
Storeria dekayi	Dekay's Brownsnake	S5	NAR	NAR	NS	No schedule	U		X		X			X
Storeria occipitomaculata	Red-bellied Snake	S5					R	X	X		X			X
Thamnophis sirtalis sirtalis	Eastern Gartersnake	S5					C	X	X		X			X
Salamanders														
Ambystoma jeffersonianum	Jefferson Salamander	S2	END	E	E	Schedule 1	R	X	X					
Ambystoma laterale	Blue-spotted Salamander	S4					R		X					
Ambystoma maculatum	Spotted Salamander	S4					R	X	X					
Hemidactylium scutatum	Four-toed Salamander	S4	NAR	NAR	NS	No schedule	R		X					
Notophthalmus viridescens viridescens	Red-spotted Newt	S5					R		X					
Plethodon cinereus	Eastern Red-backed Salamander	S5					C		X					
Frogs and Toads														
Anaxyrus americanus	American Toad	S5					C	X	X		X	X		
Dryophytes versicolor	Gray Treefrog	S5					C		X		X	X		
Pseudacris triseriata pop. 1	Western Chorus Frog (Carolinian population)	S4	NAR	NAR	NS	No schedule	C		X					
Pseudacris crucifer	Spring Peeper	S5					C	X	X		X	X		
Lithobates catesbeianus	American Bullfrog	S4					U		X		X			
Lithobates clamitans	Green Frog	S5					C	X	X		X	X		
Lithobates palustris	Pickerel Frog	S4	NAR	NAR	NS	No schedule	R		X					
Lithobates pipiens	Northern Leopard Frog	S5	NAR	NAR	NS	No schedule	C	X	X		X	X		
Lithobates sylvaticus	Wood Frog	S5					C	X	X					
Total								**11**	**26**	**4**	**11**	**5**	**2**	**3**

*ORAA Atlas Square: 17NH88
**NHIC Atlas Squares: 17NH8982, 17NH8981, 17NH8683, 17NH8682, 17NH8783, 17NH8782, 17NH8781, 17NH8882

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Appendix X

Mammal Species Reported from the Vicinity of the Study Area

Mammal Species Reported from the Study Area - Upper West Side Secondary Plan (Project #1974E)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Hamilton Status	iNaturalist Research Grade Observations	Ontario Mammal Atlas	NHIC Data**	NRSI Observed
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	HCA 2013	iNaturalist 2023	Dobbyn 1994	MNRF 2023b	NRSI Results from 2018-2020
Didelphimorphia	**Opossums**										
Didelphis virginiana	Virginia Opossum	S4					C	X	X		
Eulipotyphla	**Shrews, Moles, Hedgehogs, and Allies**										
Blarina brevicauda	Northern Short-tailed Shrew	S5					C	X	X		X
Condylura cristata	Star-nosed Mole	S5					C		X		X
Parascalops breweri	Hairy-tailed Mole	S4					U		X		
Sorex cinereus	Masked Shrew	S5					C		X		
Sorex fumeus	Smoky Shrew	S5					C		X		
Chiroptera	**Bats**										
Eptesicus fuscus	Big Brown Bat	S4					UNK		X		
Lasionycteris noctivagans	Silver-haired Bat	S4		E	NS	No schedule	UNK		X		
Lasiurus borealis	Eastern Red Bat	S4		E	NS	No schedule	UNK		X		
Lasiurus cinereus	Hoary Bat	S4		E	NS	No schedule	UNK		X		
Myotis leibii	Eastern Small-footed Myotis	S2S3	END						X		
Myotis lucifugus	Little Brown Myotis	S3	END	E	E	Schedule 1	UNK		X		
Myotis septentrionalis	Northern Myotis	S3	END	E	E	Schedule 1	UNK		X		
Perimyotis subflavus	Tri-colored Bat	S3?	END	E	E	Schedule 1			X		
Lagomorpha	**Rabbits and Hares**										
Lepus europaeus	European Hare	SNA					CI		X		
Sylvilagus floridanus	Eastern Cottontail	S5					C	X	X		X
Rodentia	**Rodents**										
Castor canadensis	Beaver	S5					C		X		X
Erethizon dorsatum	Porcupine	S5					C		X		
Glaucomys volans	Southern Flying Squirrel (Great Lakes Plains population)	S4	NAR	NAR	NS	No schedule	C		X		
Marmota monax	Woodchuck	S5					C		X		
Microtus pennsylvanicus	Meadow Vole	S5					C		X		X
Microtus pinetorum	Woodland Vole	S3?	SC	SC	SC	Schedule 1	R		X		
Mus musculus	House Mouse	SNA					CI		X		
Napaeozapus insignis	Woodland Jumping Mouse	S5					U		X		
Ondatra zibethicus	Muskrat	S5					C		X		X
Peromyscus leucopus	White-footed Mouse	S5					C		X		
Peromyscus maniculatus	Deer Mouse	S5					C	X	X		X
Rattus norvegicus	Norway Rat	SNA					CI	X	X		
Sciurus carolinensis	Eastern Gray Squirrel	S5					C	X	X		X
Tamias striatus	Eastern Chipmunk	S5					C	X	X		X
Tamiasciurus hudsonicus	Red Squirrel	S5					C		X		X
Zapus hudsonius	Meadow Jumping Mouse	S5					C		X		X
Canidae	**Canines**										
Canis latrans	Coyote	S5					C	X	X		X
Urocyon cinereoargenteus	Gray Fox	S1	THR	T	T	Schedule 1			X		
Vulpes vulpes	Red Fox	S5					C		X		
Mephitidae	**Skunks and Stink Badgers**										
Mephitis mephitis	Striped Skunk	S5					C	X	X		
Mustelidae	**Weasels and Allies**										
Mustela richardsonii	American Ermine	S5					U		X		X
Neogale frenata	Long-tailed Weasel	S4					C		X		X
Neogale vison	American Mink	S4					C		X		
Taxidea taxus jacksoni	American Badger (Southwestern Ontario population)	S1	END	E	E	Schedule 1	R		X		
Procyonidae	**Raccoons and Allies**										
Procyon lotor	Northern Raccoon	S5					C		X		

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Hamilton Status	iNaturalist Research Grade Observations	Ontario Mammal Atlas	NHIC Data**	NRSI Observed
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	HCA 2013	iNaturalist 2023	Dobbyn 1994	MNRF 2023b	NRSI Results from 2018-2020
Artiodactyla	**Deer and Bison**										
Odocoileus virginianus	White-tailed Deer	S5					C	X	X		X
Total								**10**	**42**	**0**	**15**

*Mammal Atlas Square Number: NT88
**NHIC Atlas Squares: 17NH8982, 17NH8981, 17NH8683, 17NH8682, 17NH8783, 17NH8782, 17NH8781, 17NH8882

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Appendix XI

Butterfly Species Reported from the Vicinity of the Study Area

Butterfly Species Reported from the Study Area - Upper West Side Secondary Plan (Project #1974E)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Hamilton Status	iNaturalist Research Grade Observations	Ontario Butterfly Atlas*	NHIC Data**	NRSI Observed
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	HCA 2013	iNaturalist 2023	Macnaughton et al. 2023	MNRF 2023b	NRSI Results from 2018-2020
Hesperiidae	**Skippers**										
Anatrytone logan	Delaware Skipper	S4					C		X		X
Ancyloxypha numitor	Least Skipper	S5					C	X	X		X
Epargyreus clarus	Silver-spotted Skipper	S4					C		X		X
Erynnis baptisiae	Wild Indigo Duskywing	S4					U	X	X		X
Erynnis juvenalis	Juvenal's Duskywing	S5					C		X		
Euphyes conspicua	Black Dash	S3					C		X		
Euphyes dion	Dion Skipper	S4					U		X		
Euphyes vestris	Dun Skipper	S5					C		X		
Hesperia leonardus	Leonard's Skipper	S4					U		X		
Pholisora catullus	Common Sootywing	S4					U		X		
Poanes hobomok	Hobomok Skipper	S5					C		X		X
Poanes viator	Broad-winged Skipper	S4					C		X		
Polites mystic	Long Dash Skipper	S5					C		X		
Polites origenes	Crossline Skipper	S4					C		X		
Polites peckius	Peck's Skipper	S5					C		X		X
Polites themistocles	Tawny-edged Skipper	S5					C	X	X		
Pompeius verna	Little Glassywing	S4					C		X		
Thorybes bathyllus	Southern Cloudywing	S3					EX		X		
Thorybes pylades	Northern Cloudywing	S5					R		X		
Thymelicus lineola	European Skipper	SNA					C		X		X
Wallengrenia egeremet	Northern Broken Dash	S5					C		X		X
Papilionidae	**Swallowtails**										
Battus philenor	Pipevine Swallowtail	SNA					R		X		
Heraclides cresphontes	Giant Swallowtail	S4					C	X	X		X
Papilio canadensis	Canadian Tiger Swallowtail	S5						X			
Papilio glaucus	Eastern Tiger Swallowtail	S5					C	X	X		X
Papilio polyxenes	Black Swallowtail	S5					C		X		X
Papilio troilus	Spicebush Swallowtail	S4					R		X		
Pieridae	**Whites and Sulphurs**										
Colias eurytheme	Orange Sulphur	S5					C	X	X		X
Colias philodice	Clouded Sulphur	S5							X		X
Pieris rapae	Cabbage White	SNA					C		X		X
Lycaenidae	**Harvesters, Coppers, Hairstreaks, Blues**										
Callophrys niphon	Eastern Pine Elfin	S5					R		X		
Celastrina lucia	Northern Spring Azure	S5							X		
Celastrina neglecta	Summer Azure	S5					C		X		X
Celastrina sp.	Azure species	SNA							X		
Cupido comyntas	Eastern Tailed Blue	S5					C		X		X
Feniseca tarquinius	Harvester	S4					R		X		
Glaucopsyche lygdamus	Silvery Blue	S5					U		X		
Lycaena hyllus	Bronze Copper	S5					U		X		
Lycaena phlaeas	American Copper	S5					U		X		
Satyrium acadica	Acadian Hairstreak	S4					C		X		
Satyrium calanus	Banded Hairstreak	S4					C	X	X		X
Satyrium caryaevorus	Hickory Hairstreak	S4					U		X		
Satyrium liparops	Striped Hairstreak	S5					C		X		
Satyrium titus	Coral Hairstreak	S5					U		X		
Nymphalidae	**Brush-footed Butterflies**										
Aglais milberti	Milbert's Tortoiseshell	S5					R		X		
Asterocampa clyton	Tawny Emperor	S3							X		
Boloria bellona	Meadow Fritillary	S5					C		X		
Boloria selene	Silver-bordered Fritillary	S5					U		X		

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Hamilton Status	iNaturalist Research Grade Observations	Ontario Butterfly Atlas*	NHIC Data**	NRSI Observed
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	HCA 2013	iNaturalist 2023	Macnaughton et al. 2023	MNRF 2023b	NRSI Results from 2018-2020
Cercyonis pegala	Common Wood-Nymph	S5					C	X	X		X
Chlosyne harrisii	Harris's Checkerspot	S4							X		
Chlosyne nycteis	Silvery Checkerspot	S5					EX		X		
Coenonympha california	Common Ringlet	S5					C		X		X
Danaus plexippus	Monarch	S2N,S4B	SC	E	SC	Schedule 1	C	X	X		X
Euphydryas phaeton	Baltimore Checkerspot	S4					U		X		
Euptoieta claudia	Variegated Fritillary	SNA					STRAY		X		
Junonia coenia	Common Buckeye	SNA					U		X		
Lethe anthedon	Northern Pearly-Eye	S5					C	X	X		X
Lethe appalachia	Appalachian Brown	S4					C		X		
Lethe eurydice	Eyed Brown	S5					C		X		
Libytheana carinenta	American Snout	SNA					R	X	X		X
Limenitis archippus	Viceroy	S5					C	X	X		X
Limenitis arthemis arthemis	White Admiral	S5					U		X		
Limenitis arthemis astyanax	Red-spotted Purple	S5					C	X	X		X
Megisto cymela	Little Wood-Satyr	S5					C		X		X
Nymphalis antiopa	Mourning Cloak	S5					C	X	X		X
Nymphalis l-album	Compton Tortoiseshell	S5					U		X		
Phyciodes batesii	Tawny Crescent	S4					EX		X		
Phyciodes cocyta	Northern Crescent	S5							X		X
Phyciodes tharos	Pearl Crescent	S4					C	X	X		X
Polygonia comma	Eastern Comma	S5					C		X		
Polygonia interrogationis	Question Mark	S5					C	X	X		X
Polygonia progne	Gray Comma	S5					U		X		
Speyeria cybele	Great Spangled Fritillary	S5					C		X		X
Vanessa atalanta	Red Admiral	S5B					C	X	X		X
Vanessa cardui	Painted Lady	S5B					C	X	X		
Vanessa virginiensis	American Lady	S5					C		X		X
Total								**19**	**75**	**0**	**32**

*TEA Atlas Square: Square # 17NH88
**NHIC Atlas Square: Square # 17NH8982, 17NH8981, 17NH8683, 17NH8682, 17NH8783, 17NH8782, 17NH8781, 17NH8882

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Appendix XII
Odonata Species Reported from the Vicinity of the Study Area

Odonate Species Reported from the Study Area - Upper West Side Secondary Plan (Project #1974E)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Hamilton Status	iNaturalist Research Grade Observations	Odonate Atlas*	NHIC Data**	NRSI Observed
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	HCA 2013	iNaturalist 2023	OOAD 2023	MNRF 2023b	NRSI Results from 2018-2020
Calopterygidae	**Broadwinged Damselflies**										
Calopteryx maculata	Ebony Jewelwing	S5					C		X		
Lestidae	**Spreadwings**										
Lestes congener	Spotted Spreadwing	S5					U		X		
Lestes rectangularis	Slender Spreadwing	S5					C		X		
Lestes vigilax	Swamp Spreadwing	S4					C		X		
Coenagrionidae	**Narrow-winged Damselflies**										
Amphiagrion saucium	Eastern Red Damsel	S4					U		X		
Enallagma civile	Familiar Bluet	S5					C	X			
Ischnura posita	Fragile Forktail	S4					C	X			X
Ischnura verticalis	Eastern Forktail	S5					C	X	X		X
Aeshnidae	**Darners**										
Aeshna constricta	Lance-tipped Darner	S5					C				X
Aeshna umbrosa	Shadow Darner	S5					C		X		
Anax junius	Common Green Darner	S5					C		X		X
Gomphidae	**Clubtails**										
Arigomphus villosipes	Unicorn Clubtail	S3					C				X
Phanogomphus exilis	Lancet Clubtail	S5					U		X		
Phanogomphus graslinellus	Pronghorn Clubtail	S3					R		X		
Cordulegasteridae	**Spiketails**										
Cordulegaster diastatops	Delta-spotted Spiketail	S4					U		X		
Libellulidae	**Skimmers**										
Celithemis eponina	Halloween Pennant	S4					U				X
Erythemis simplicicollis	Eastern Pondhawk	S5					C				X
Leucorrhinia intacta	Dot-tailed Whiteface	S5					C				X
Libellula luctuosa	Widow Skimmer	S5					C		X		X
Libellula pulchella	Twelve-spotted Skimmer	S5					C		X		X
Pachydiplax longipennis	Blue Dasher	S5					C	X		X	X
Pantala hymenaea	Spot-winged Glider	S4					U		X		
Perithemis tenera	Eastern Amberwing	S4					C				X
Plathemis lydia	Common Whitetail	S5					C		X		X
Sympetrum internum	Cherry-faced Meadowhawk	S5					C				X
Sympetrum rubicundulum	Ruby Meadowhawk	S5					C		X		
Sympetrum semicinctum	Band-winged Meadowhawk	S4					C		X		
Sympetrum vicinum	Autumn Meadowhawk	S5					C				X
Tramea lacerata	Black Saddlebags	S4					C	X	X		X
Total								**5**	**18**	**1**	**16**

*Odonate Atlas Square Numbers: 17NH88
**NHIC Atlas Square: Square # 17NH8982, 17NH8981, 17NH8683, 17NH8682, 17NH8783, 17NH8782, 17NH8781, 17NH8882

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Appendix XIII
Fish Species Reported from the Vicinity of the Study Area

Fish Species Reported from the Study Area - Upper West Side Secondary Plan (Project #1974E)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Research Grade iNaturalist Observations	Fisheries and Oceans SAR Data	Aquatic Resource Area Data	NHIC Data*	NRSI Observed	Pond 1	Pond 2	Pond 3	Pond 4	Other Observations
		MNRF 2023a	MECP 2022	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	iNaturalist 2023	DFO 2022	MNRF 2023b	MNRF 2023c	NRSI Results from 2018-2020					
Cyprinidae	**Carps**															
Cyprinus carpio	Common Carp	SNA									X	X				
Leuciscidae	**Minnows**															
Hybognathus hankinsoni	Brassy Minnow	S5									X				X	
Notemigonus crysoleucas	Golden Shiner	S5							X		X	X	X			
Notropis atherinoides	Emerald Shiner	S5									X		X			
Pimephales notatus	Bluntnose Minnow	S5	NAR	NAR	NS	No schedule			X							
Pimephales promelas	Fathead Minnow	S5					X		X							
Ictaluridae	**North American Catfishes**															
Ameiurus nebulosus	Brown Bullhead	S5							X							
Noturus gyrinus	Tadpole Madtom	S4							X							
Esocidae	**Pikes**															
Esox americanus vermiculatus	Grass Pickerel	S3	SC	SC	SC	Schedule 1		X	X	X						
Esox lucius	Northern Pike	S5							X							
Umbridae	**Mudminnows**															
Umbra limi	Central Mudminnow	S5							X		X		X	X		
Gasterosteidae	**Sticklebacks**															
Culaea inconstans	Brook Stickleback	S5									X					X
Centrarchidae	**Sunfishes and Basses**															
Lepomis cyanellus	Green Sunfish	S4	NAR	NAR	NS	No schedule			X		X	X	X	X	X	
Lepomis gibbosus	Pumpkinseed	S5							X		X	X	X			
Lepomis macrochirus	Bluegill	S5									X		X	X		X
Micropterus salmoides	Largemouth Bass	S5							X		X	X	X			
Pomoxis annularis	White Crappie	S4							X							
Total							**1**	**1**	**12**	**1**	**10**	**5**	**7**	**3**	**2**	**2**

*NHIC Atlas Square(s): 17NH8982, 17NH8981, 17NH8683, 17NH8682, 17NH8783, 17NH8782, 17NH8781, 17NH8882

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Appendix XIV
Mussel Species Reported from the Vicinity of the Study Area

Mussel Species Reported from the Study Area - Upper West Side Secondary Plan (Project #1974E)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA STATUS	SARA SCHEDULE	iNaturalist Research Grade Observations	Fisheries and Oceans SAR Data	NHIC Data	NRSI Observed
		MNRF 2023a	MECP 2023	Government of Canada 2023	Government of Canada 2023	Government of Canada 2023	iNaturalist 2023	DFO 2022	MNRF 2023b	NRSI Results from 2018-2020
Unionida	**Native Freshwater Mussels**									
Ambleminae										
Cyclonaias pustulosa	Pimpleback	S2					X			
Fusconaia flava	Wabash Pigtoe	S2S3					X			
Pleurobema sintoxia	Round Pigtoe	S1	END	E	E	Schedule 1	X			
Lampsilinae										
Actinonaias ligamentina	Mucket	S4					X			
Lampsilis cardium	Plain Pocketbook	S4					X			
Potamilus fragilis	Fragile Papershell	S4					X			
Toxolasma parvum	Lilliput	S1	THR	E	E	Schedule 1	X			
Total							**7**	**0**	**0**	**0**

*NHIC Atlas Squares: 17NH8982, 17NH8981, 17NH8683, 17NH8682, 17NH8783, 17NH8782, 17NH8781, 17NH8882

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