Environmental Impact Study White Church Urban Boundary Expansion

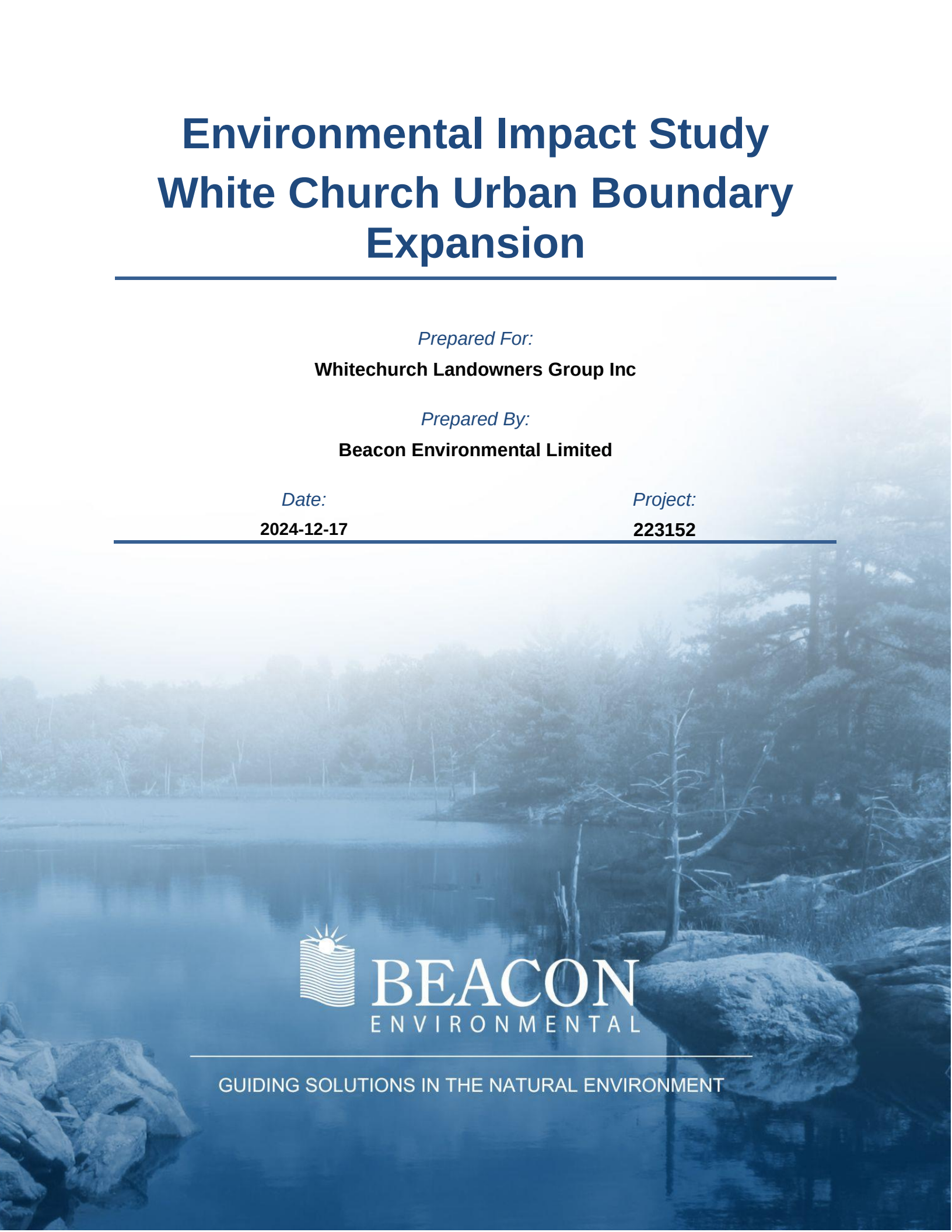
Prepared For:

Whitechurch Landowners Group Inc

Prepared By:

Beacon Environmental Limited

Date:	*Project:*
2024-12-17	**223152**



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Report Versions Issued

Version	Date	Revisions
1.	December 2023	
2.	December 2024	Section 4- Updated Existing Conditions

1. Introduction

Beacon Environmental Limited (Beacon) was retained by the Whitechurch Landowners Group Inc to complete an Environmental Impact Study (EIS) for participating landowners within the White Church Urban Boundary Expansion Area in the City of Hamilton. The majority of the 364 hectare (ha) properties (hereafter referred to as Study Area) are bounded by Airport Road East to the north, Miles Road to the east, White Church Road East to the south and Upper James Street to the west. The location of the Urban Boundary Expansion Area and the Study Area which include the participating landholdings are shown on **Figure 1**.

The northwest corner of the Study Area falls within the Airport Influence Area. The subject lands are currently designated as 'Agriculture', 'Rural' and 'Open Space' in the Rural Hamilton Official Plan. The natural heritage features mapped by the City of Hamilton on these properties are shown only on the Schedules of the Rural Hamilton Official Plan. Schedule B of the Rural Official Plan shows Core Areas of the Natural Heritage System on several of the properties within the Study Area. The Niagara Peninsula Conservation Authority (NPCA) mapping does not show any flood plain within the Study Area. However, several watercourses and associated regulated areas are identified on the NPCA mapping within the Study Area.

The purpose of the EIS is to characterize the natural heritage and hydrological features associated with the Study Area and to present the City's Natural Heritage System (NHS) that is consistent with current natural heritage planning policies, guidelines, and criteria. Detailed seasonal surveys were completed to confirm feature limits and to develop a natural heritage system, as required by the City of Hamilton.

The study area was historically within the City's Rural Area, outside the Urban Boundary. It was added to the City's Urban Boundary by the Province of Ontario in 2022 through Official Plan Amendment No. 167, and then returned back outside the City's Urban Boundary through the Province's implementation of the Planning Statute Amendment Act in 2023. Since then, the new Provincial Planning Statement was brought into force which permits privately initiated applications for Urban Boundary Expansions of any size. This EIS was prepared to support bringing the study area into the urban boundary for the City of Hamilton.

This report provides the findings of the seasonal surveys conducted on the participating properties.

2. Policy Review

This section provides a summary of environmental legislation, regulations and policies at the federal, provincial, and local level that would apply to the Study Area.

2.1 Species at Risk *Act* (2002)

The federal *Species at Risk Act* (SARA; 2002) is intended to prevent federally endangered or threatened wildlife (including plants) from becoming extinct in the wild, and to help in the recovery of these species. The Act is also intended to help prevent species listed as special concern from becoming endangered or threatened.

To ensure the protection of Species at Risk, SARA contains prohibitions that make it an offence to kill, harm, harass, capture, take, possess, collect, buy, sell, or trade an individual of a species listed in Schedule 1 of SARA as endangered, threatened, or extirpated.

SARA applies primarily to lands under federal jurisdiction and relies on provincial laws to protect federal SAR habitat. On private land, SARA prohibitions apply only to aquatic species (see **Section 2.2** below) and migratory birds that are also listed in the *Migratory Birds Convention Act* (1994). The intent of SARA is to protect residences and critical habitat as much as possible through voluntary actions and stewardship measures.

2.2 Fisheries *Act* (1985)

Fish and fish habitat are protected under the federal Fisheries *Act* which is administered by the Fish and Fish Habitat Protection Program (FFHPP) within Fisheries and Oceans Canada (DFO). The protection provisions of the Fisheries *Act* apply to all fish and fish habitat throughout Canada and the *Act* sets out authorities for the regulation of works, undertakings or activities that risk harming fish and fish habitat.

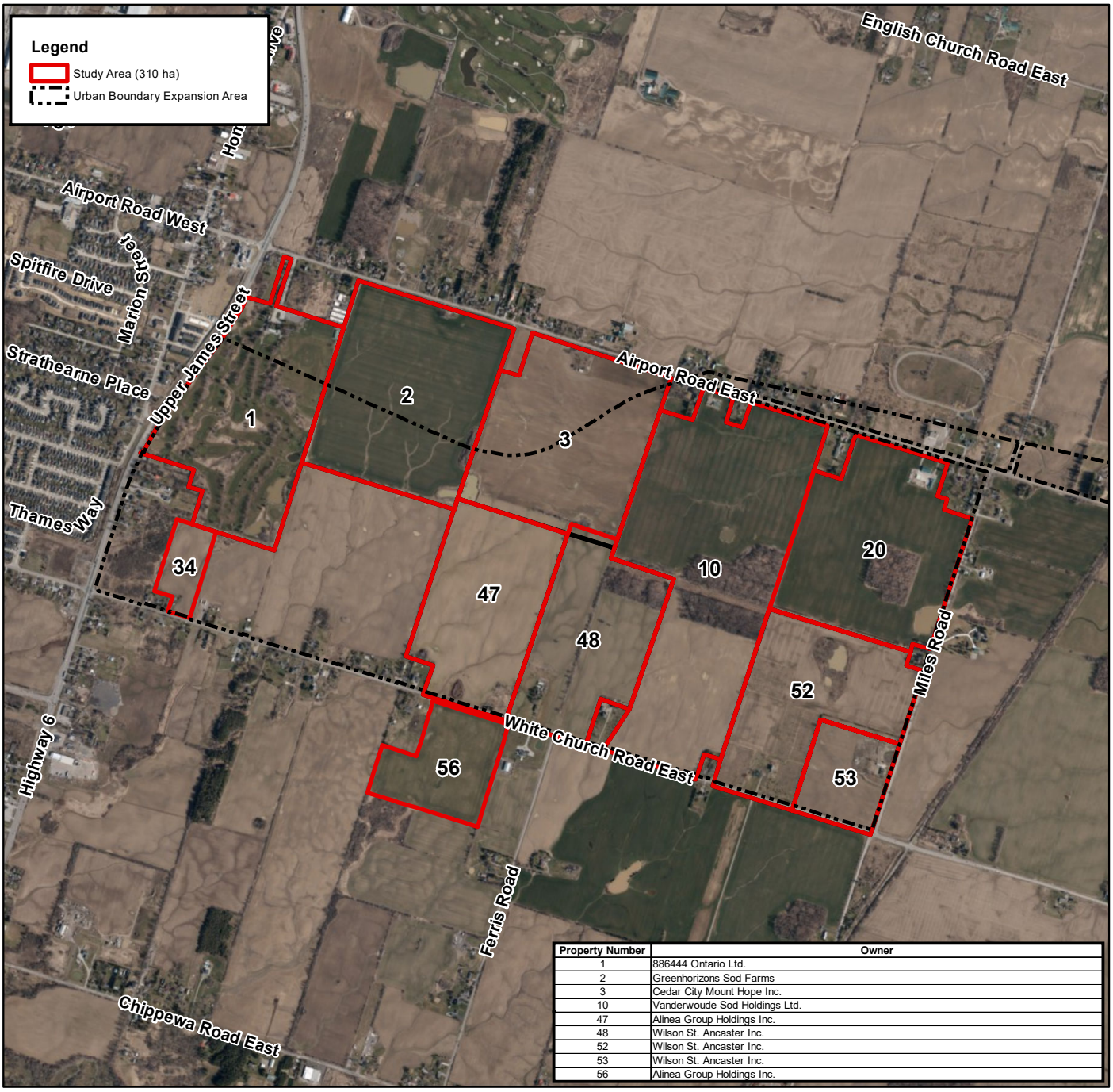
Fish habitat is defined in subsection 2(1) of the Fisheries *Act* to include all waters frequented by fish and any other areas upon which fish depend directly or indirectly to carry out their life processes. The types of areas that can directly or indirectly support life processes include, but are not limited to, spawning grounds and nursery, rearing, food supply and migration areas. Critical habitat is defined in subsection 2(1) of SARA as the habitat necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.

Section 35 of the Fisheries *Act*, which prohibits the carrying out of any work, undertaking, or activity that results in the harmful alteration, disruption, or destruction of fish habitat, applies to all fish habitat, including the critical habitat of endangered and threatened species listed under Schedule 1 of SARA. Under section 73 of SARA, the Minister may enter into an agreement with a person, or issue a permit to a person, authorizing the person to engage in an activity affecting a listed aquatic species, any part of its critical habitat, or the residences of its individuals, provided that the following requirements are met.

The FFHPP ensures compliance with relevant provisions under the Fisheries *Act* and SARA by reviewing proposed works, undertakings and activities that may impact fish and fish habitat. If a project is taking place in or near water, the proponent is responsible for understanding project related impacts on fish and fish habitat and applying measures to avoid and/or mitigate potential impacts (i.e., harmful, alteration, disruption, or destruction) to fish and fish habitat. Per Section 73(3)(c) of SARA an activity would be considered to jeopardize the survival or recovery of a species at risk if it would prevent the "attainment of the population and distribution objectives described within the recovery strategy". It is DFO's responsibility to complete an assessment to determine whether an activity would jeopardize the survival or recovery of the species on a case-by-case basis.

2.3 Endangered Species Act (2007)

The provincial *Endangered Species Act* (ESA, 2007) primarily protects species listed as Threatened or endangered by the Committee on the Status of Species at Risk in Ontario (COSSARO).



Property Number	Owner
1	886444 Ontario Ltd.
2	Greenhorizons Sod Farms
3	Cedar City Mount Hope Inc.
10	Vanderwoude Sod Holdings Ltd.
47	Alinea Group Holdings Inc.
48	Wilson St. Ancaster Inc.
52	Wilson St. Ancaster Inc.
53	Wilson St. Ancaster Inc.
56	Alinea Group Holdings Inc.

Site Location	Figure 1
Whitechurch Urban Boundary Expansion	
BEACON ENVIRONMENTAL	Project: 223152 Last Revised: December 2024
Client: Whitechurch Landowners Group Inc.	Prepared by: BD Checked by: AP
N	1:21,000 — Inset Map:1:150,000

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Threatened or endangered species are protected, as is their habitat. Depending on the time of a species' listing, habitat is protected either under a General Habitat protection provision or a Species-Specific Habitat protection provision.

The ESA generally prohibits the killing or harming of a threatened or endangered species (Section 9), as well as the destruction of its habitat (Section 10). Where activities are likely to adversely affect threatened or endangered species or their habitat, permitting may be required under Section 17(2)(c) of the ESA.

2.4 Provincial Planning Statement (2024)

The Provincial Planning Statement (PPS) was issued under section 3 of the *Planning Act* and came into effect October 20, 2024. It replaces the Provincial Policy Statement that came into effect May 1, 2020.

Chapter 4.1 of the PPS provides direction to regional and local municipalities regarding planning policies specifically for the protection and management of natural heritage features and their ecological functions.

The PPS provides planning policies for the following features:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Significant Areas of Natural and Scientific Interest (ANSIs);
- Fish habitat; and
- Habitat, and significant habitat, of endangered and threatened species.

Each of these features is afforded varying levels of protection subject to guidelines, and in some cases, regulations. Identification of the various natural heritage features noted above is a responsibility shared by Ministry of Natural Resources and Forestry (MNRF), Ministry of Environment Conservation and Parks (MECP), Fisheries and Oceans Canada (DFO) and the local planning authority.

MNRF is responsible for the Areas of Natural and Scientific Interest (ANSIs), while MECP is responsible for the confirmation of habitat of endangered species and threatened species, and for its regulation under the *Endangered Species Act*.

Local and regional planning authorities are responsible for the identification of significant wetlands, significant woodlands, significant valleylands, and significant wildlife habitat, with support from applicable guidance documents (i.e., Natural Heritage Reference Manual [MNR 2010]; Significant Wildlife Habitat Technical Guidelines [MNR 2000]; and Significant Wildlife Habitat Criteria for Ecoregion 6E, [MNRF 2015]). Identification and verification of fish habitat is now self-regulated although enforcement of the related policies and regulations is still managed by MNRF and regulated by the DFO.

In areas where significant natural heritage features are present, the boundaries of natural heritage features are further refined through site-specific studies undertaken as part of the planning process and in accordance with the requirements of municipal policies.

Policy 4.1.4 and 4.1.5 of the PPS state that development and site alteration shall not be permitted in natural features listed above unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Policy 4.1.8 states that development of lands adjacent to natural features is not permitted unless the ecological function has been evaluated and it has been demonstrated that there will be no negative impacts on features or functions. Further, policies 4.1.6 and 4.1.7 state that development shall not be permitted in fish habitat or habitat of threatened and endangered species, expect in accordance with provincial and federal requirements.

2.5 Green Belt Plan (2017)

A portion of the Study Area (Parcel 56) is currently located within the protected countryside of the Greenbelt Plan. This Natural Heritage Assessment was prepared on the basis that the Study Area lands are outside the Greenbelt Plan Area and therefore not subject to the policies of the Greenbelt Plan.

2.6 City of Hamilton Urban Official Plan (2022)

The northwest corner of the Study Area is currently located outside the Urban Boundary within the Airport Influence Area.The subject lands are currently designated as ‘Agriculture’, Rural’ and ‘Open Space’ in the Rural Hamilton Official Plan. The remainder of the lands north of White Church Road East fall within the Urban Expansion Area-Neighborhoods. This EIS report was prepared on the basis of the Study Area being brought into the urban area at some point in the future and subject to the policies of the City’s Urban Official Plan.

Section C.2.0 of the City’s Urban Official Plan contains policies pertaining to the protection of the Natural Heritage Systems (NHS) in the urban area of the City of Hamilton.

The Natural Heritage System consists of Core Areas, Linkages, and the matrix of lands between them which may be suitable for restoration. Core Areas include key natural heritage features, key hydrologic features, and associated vegetation protection zones.

Minor refinements to the boundaries of Core Areas may occur through Environmental Impact Statements, watershed studies or other appropriate studies accepted by the City of Hamilton without an amendment to the Plan.

The following are policy excerpts relevant to natural heritage features on the Study Area:

> *“C.2.3.3 Any development or site alteration within or adjacent to Core Areas shall not negatively impact their environmental features or ecological functions. “*
>
> *“C.2.5.2 New development and site alteration shall not be permitted within provincially significant wetlands, significant coastal wetlands or significant habitat of threatened and endangered species.”*

"C.2.5.3 New development and site alteration shall not be permitted within fish habitat, except in accordance with provincial and federal requirements."

"C.2.5.4 New development and site alteration shall not be permitted within significant woodlands, significant wildlife habitat, significant valleylands, and significant areas of natural and scientific interest it has been demonstrated that there shall be no negative impacts on the natural features or their ecological functions. "

"C.2.5.5 New development or site alteration shall not be permitted on adjacent land to the natural heritage features and aeras identified in Sections C.2.3.2 to C.2.5.4 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there shall be no negative impacts on the natural features or on their ecological functions."

"C.2.5.7 Streams are mapped in Schedule B - Natural Heritage System. Streams have been separated into two classes: Coldwater Watercourse/Critical Habitat and Warmwater Watercourse/Important/Marginal Habitat. If the stream has not been classified as part of an EIS, subwatershed study, or other study, a scoped EIS is required to determine the classification."

"C.2.5.8 New development or site alteration subject to Policies C.2.5.3 to C.2.5.7 requires, prior to approval, the submission and approval of an Environmental Impact Statement which demonstrates to the satisfaction of the City and the relevant Conservation Authority that:

a) There shall be no negative impacts on the Core Area's natural features or their ecological functions.

b) Connectivity between Core Areas shall be maintained, or where possible, enhanced for the movement of surface and ground water, plants and wildlife across the landscape.

c) The removal of other natural features shall be avoided or minimized by the planning and design of the proposed use or site alteration wherever possible."

"C. 2.5.9 An Environmental Impact Statement shall propose a vegetation protection zone which:

a) has sufficient width to protect the Core Area and its ecological functions from impacts of the proposed land use or site alteration occurring during and after construction, and where possible and deemed feasible to the satisfaction of the City, restores or enhances the Core Area and/or its ecological functions; and

b) is established to achieve, and be maintained as natural self-sustaining vegetation. "

"2.5.10 Where vegetation protection zone widths have not been specified by watershed and sub-watershed plans, secondary, Environmental assessments and other studies, the following vegetation protection zone widths shall be evaluated and addressed by Environmental Impact Statements. Other agencies, such as Conservation Authorities, may have different vegetation protection zone requirements.

a) Coldwater Watercourse and Critical Habitat – 30-metre vegetation protection zone on each side of the watercourse, measured from the bankfull channel.

b) Warmwater Watercourse and Important and Marginal Habitat – 15 metre vegetation protection zone on each side of the watercourse, measured from the bankfull channel.

c) Provincially Significant Wetlands – 30-metre vegetation protection zone, measured from the boundary of the wetland, as approved by the Conservation Authority or Ministry of Natural Resources.
d) Unevaluated wetlands – Unevaluated wetlands and locally significant wetlands require a 15 metre vegetation protection zone, measured from the boundary of the wetland, as approved by the Conservation Authority or Ministry of Natural Resources, unless an Environmental Impact Statement recommends a more appropriate vegetation protection zone.
e) Woodlands – 10-metre vegetation protection zone, measured from the edge (drip line) of the woodland.
f) Significant woodlands – 15-metre vegetation protection zone, measured from the edge (drip line) of the significant woodland.
g) Areas of Natural and Scientific Interest (ANSIs) – Life and Earth Science ANSIs require a 15-metre vegetation protection zone.
h) Significant Valleylands – As required by the relevant Conservation Authority.
i) Significant Habitat of Threatened or Endangered Species and Significant Wildlife Habitat: the minimum vegetation protection zone shall be determined through Environmental Impact Statements, dependent on the sensitivity of the feature. "

"C.2.5.11 Vegetation protection zone widths greater or less than those specified in a) to i) above 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."

"C.2.5.12 Permitted uses within a vegetation protection zone shall be dependent on the sensitivity of the feature, and determined through approved studies. Generally, permitted uses within a vegetation protection zone shall be limited to low impact uses, such as vegetation restoration, resource management, and open space. Permitted uses within the vegetation protection zone shall be the same uses as those within the Core Area in Policy C.2.5.1 and the vegetation protection zone should remain in or be returned to a natural state. "

"C.2.5.13 All plantings within vegetation protection zones shall use only non-invasive plant species native to Hamilton. The City may require that applicants for development or site alteration develop a restoration or management plan for the vegetation protection zone as a condition of approval. "

Section 2.7 of the Urban Official Plan contains policies applicable to Linkages. Linkages are natural areas within the landscape that ecologically connect Core Areas. Linkages are a component of the Natural Heritage System shown on Schedule B of the Official Plan.

"C.2.7.5 Where new development or site alteration is proposed within a Linkage in the Natural Heritage System as identified in Schedule B – Natural Heritage System, the applicant shall prepare a Linkage Assessment. On sites where an Environmental Impact Statement (EIS) is being prepared, the Linkage Assessment can be included as part of the EIS report. Any required Linkage Assessment shall be completed in accordance with Policy F.3.2.1.11 - Linkage Assessments. "

"C.2.7.6 Linkage Assessments shall include the following information:

a) identify and assess the Linkage including its vegetative, wildlife, and/or landscape features or functions;

b) assess the potential impacts on the viability and integrity of the Linkage as a result of the development proposal; and,

c) make recommendations on how to protect, enhance or mitigate impacts on the Linkage(s) and its functions through planning, design and construction practices."

"C.2.7.7 In addition to the Linkages identified on Schedule B – Natural Heritage System, there may be Hedgerows that are worthy of protection, especially where:

a) they are composed of mature, healthy trees and generally provide a wide, unbroken linkage between Core Areas;

b) there is evidence that wildlife regularly use them as movement corridors or habitat;

c) they contain tree species which are threatened, endangered, special concern, provincially or locally rare; or,

d) groupings of trees which are greater than 100 years old."

2.7 Niagara Peninsula Conservation Authority Regulations and Policy

2.7.1 Conservation Authorities Act (Ontario Regulation 41/24)

Part VI of the *Conservation Authorities Act* (*CA Act*; 2024) sets out the regulatory powers of conservation authorities. The *CA Act* prohibits, in the absence of a permit, development activities to straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or to change or interfere in any way with a wetland are prohibited. Development activities are also prohibited in hazardous lands in the absence of a permit issued by the NPCA.

Under Ontario Regulation 41/24 (2024) of the *CA Act*, the NPCA regulates hazard lands including floodplains, watercourses, valleylands, shorelines, and wetlands. NPCA also regulates other areas which include areas within 30 m of a wetland.

The NPCA may issue a permit for a prohibited activity if, in its opinion,

- the activity is not likely to affect the control of flooding, erosion, dynamic beaches, or unstable soil or bedrock.
- the activity is not likely to create conditions or circumstances that, in the event of a natural hazard, might jeopardize the health or safety of persons or result in the damage or destruction of property; and
- any other requirements that may be prescribed by the regulations are met.

The NPCA may issue a permit with or without conditions.

Portions of the Study Area are situated within the regulated area of the NPCA.

3. Methodology

The following sections describe the various field investigations and analyses undertaken to characterize the biophysical functions and significant ecological features associated with the Study Area.

3.1 Background Review

Background information was gathered and reviewed at the outset of the project. This involved consideration of the following documents or information sources relevant to the Study Area:

- Current and historic aerial imagery;
- Provincially Tracked Species data from Land Information Ontario (LIO);
- Ontario Breeding Bird Atlas;
- Ontario Reptile and Amphibian Atlas;
- Natural Heritage Information Centre (NHIC) Data via the Make-A-Map application;
- Species at risk range maps https://www.ontario.ca/environment-and-energy/species-risk-ontario-list;
- Natural and physical feature layers from LIO, including wetlands and watercourses with thermal regime; and
- Physiography of Southern Ontario (Chapman and Putnam 1984).

3.1.1 Desktop Species at Risk Habitat Screening

A desktop review of available information sources was undertaken to determine potential species at risk. As part of the desktop screening, the following information sources were reviewed:

- Natural Heritage Information Centre (NHIC) Data via the Make-A-Map application;
- Databases of the Ontario Breeding Bird Atlas (OBBA) project;
- Ontario Reptile and Amphibian Atlas (ORAA);
- SAR range maps https://www.ontario.ca/environment-and-energy/species-risk-ontario-list;
- Aquatic SAR maps http://www.dfo-mpo.gc.ca/species-especes/fpp-ppp/index-eng.htm;
- High Resolution aerial photography of the property; and
- Natural and physical feature layers from Land Information Ontario (LIO).

The information sources referenced above were reviewed in a Geographic Information System (GIS) mapping environment that Beacon uses to assess the likelihood that sensitive fish habitat or potential endangered or threatened species are present in an area of interest. This system allows Beacon to combine the most current information provided by MNRF through the LIO portal with GIS layers from provincial floral and faunal atlases. All relevant layers can then be overlaid on the most recent high resolution ortho-imagery. The screening process helps identify areas that can then be targeted (for example, potential habitat) during field assessment to maximize the efficiency and effectiveness of on-site investigations.

3.2 Field investigations

Field investigations of natural heritage features on the Study Area were conducted throughout 2023 and 2024 by Beacon's team of ecologists specializing in terrestrial and aquatic inventory and assessment protocols. The following sections describe the field surveys completed and associated methodologies. Survey types and dates are summarized in **Table 1.**

Table 1. Summary of Field Surveys and Dates

Survey Type	Dates of Surveys
Ecological Land Classification and Flora Inventory	August 9, 17 and 25, 2023, April 23 and 24, 2024, June 03, 2024, August 22, 2024, and October 02, 2024.
Breeding Bird Surveys	June 5, 6, 7, 23, 24 and 25, July 8, 2023, May 31, June 11 and July 8, 2024
Amphibian Surveys	May 23, June 19 and 26, 2023, April 1, May 27, and June 24, 2024
Headwater Drainage Feature & Aquatic Habitat Assessments	April 6 and June 6, 2023, April 16, May 31, and July 8,2024.
Turtle Basking Surveys	May 1, May 8, May 27, June 6, June 12, 2024
Snag Surveys	April 23 and 24, 2024
Bat Acoustic Monitoring	May 31 to June 30, 2024

3.2.1 Headwater Drainage Features Assessment

Two rounds of surveys were conducted in 2023 on April 6 and June 6. A third round was not required as flow conditions were dry in all identified reaches during the round 2 survey. Additional field investigations were completed in 2024 on April 16, May 31 and July 8.

An assessment of the drainage features within the Study Area was completed in accordance with TRCA's *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (2014). Drainage features were characterized based on flow regime, form, riparian vegetation, fish and fish habitat, and terrestrial habitat. Each drainage feature reach was evaluated individually based on each of these parameters and assigned a rating of important, valued, contributing, or limited based on functional significance. These ratings were then used to determine an overall management recommendation for each reach based on the following categories:

- *Protection* – Important Functions: i.e., swamps with amphibian breeding habitat; perennial headwater drainage features; seeps and springs; Species at Risk (SAR) habitat; permanent fish habitat with woody riparian cover;
- *Conservation* – Valued Functions: i.e., seasonal fish habitat; with woody riparian cover; marshes with amphibian breeding habitat; or general amphibian habitat with woody riparian cover;
- *Mitigation* – Contributing Functions: i.e., contributing fish habitat with meadow vegetation or limited cover;

- *Recharge Protection* – Recharge Functions: i.e., features with no flow with sandy or gravelly soils;
- *Maintain or Replicate Terrestrial Linkage* – Terrestrial Functions: i.e., features with no flow with woody riparian vegetation and connects two other natural features identified for protection; and
- *No Management Required* – Limited Functions: i.e., features with no or minimal flow; cropped land or no riparian vegetation; no fish or fish habitat; and no amphibian habitat.

Speculative management recommendations were provided for the unassessed watercourses based on background information and data collected from the ELC surveys.

3.2.2 Ecological Land Classification

Ecological communities in the Study Area were mapped and classified in accordance with the protocols of the Ecological Land Classification (ELC) System for Southern Ontario (Lee *et al.* 1998). Communities were surveyed in the summer of 2023 and 2024 (see **Table 1** for specific dates).

3.2.3 Flora Inventory

A flora inventory was completed for the Study Area on the above noted dates. A list was compiled of all observed vascular plant species. Follow-up visits were conducted in spring on April 22 and June 03, 2024; and in fall on October 02, 2024 to complete the 3-season flora inventory in accordance with the City's requirements.

3.2.4 Breeding Bird Surveys

Two rounds of breeding bird surveys were conducted on the Study Area lands on June 5, 6, 7, 2023 (Round 1) and June 23, 24 and 25, 2024 (Round 2), in the early mornings (start times between 6:40 and 7:25), when temperatures were within 5^{o} C of seasonal norms, and without precipitation or persistent winds given their potential interference with survey results. The breeding bird community was surveyed by walking all parts of the Study Area to within 50 m of all habitats to document individuals and breeding evidence. Species were noted as confirmed or probable breeders, or migrants. All observations were noted on an aerial photograph of the site.

An additional survey was completed on July 8, 2023, specifically surveying the open meadow and grassland areas for the grassland bird species at risk, Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*). Thus, the areas with suitable habitat for these species were surveyed three times, whereas the remainder of the habitat had two survey visits.

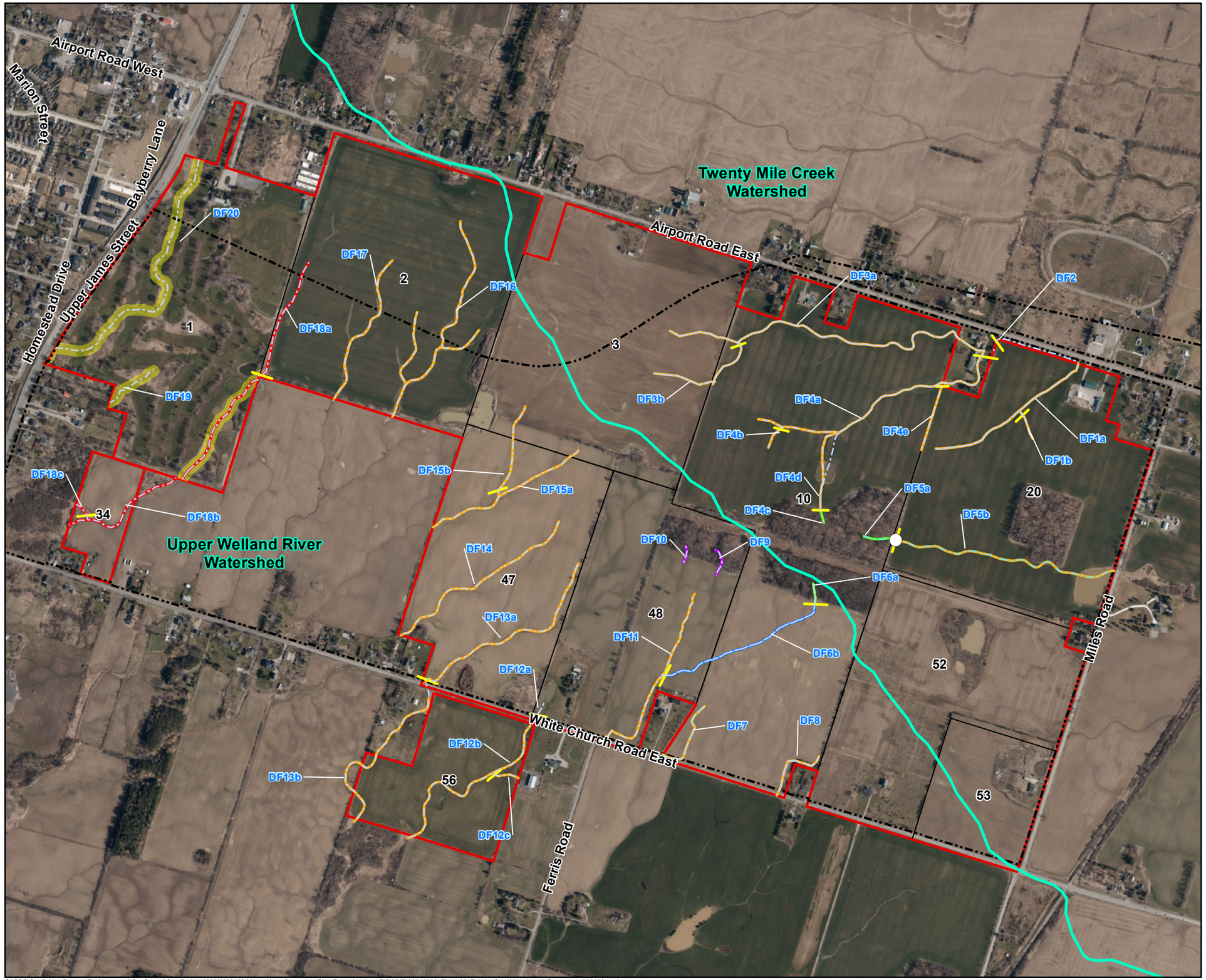
3.2.5 Amphibian Surveys

Six rounds of surveys were conducted within the subject area to survey for breeding amphibians across 2023 and 2024. These surveys took place on May 23, June 19, and June 26, 2023, and April1, May 27, and June 24, 2024. Seventeen survey locations within the subject area were placed in proximity to wetland habitat considered suitable to support breeding amphibians (**Figure 2**). The surveys were conducted as per the protocol outlined in the Great Lakes Marsh Monitoring Program (Bird Studies Canada, 2009).

Existing Conditions - Aquatic Resources

Figure 2

Whitechurch Urban Boundary Expansion



Legend

- Study Area (310 ha)*
- Parcel Boundaries*
- Secondary Plan Area
- Sub Watershed Boundaries
- Tiled Drainage Feature
- Headwater Drainage Features
- Headwater Drainage Features
- Drain
- Reach Break
- Further Study (3.38 ha)

HDFA Management Recommendations

- Protection
- Conservation
- Mitigation
- Maintain Recharge
- No Management

*Boundaries are approximate

BEACON ENVIRONMENTAL

Project: 223152

Last Revised: December 2024

Client: Whitechurch Landowners Group Inc.

Prepared by: BD
Checked by: AP

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Surveys consisted of auditory surveys undertaken during the prime breeding period to record calling males that are present, spread throughout the breeding season to include the short temporal peak for each species of interest. The surveys involved visiting the site after dusk when minimum night-time air temperatures of at least 5°C during the first visit, 10°C during the second visit and 17°C during the third visit. These windows were met for each point across the six surveys completed. Calling amphibians, if present, were identified to species and chorus activity was assigned a code from the following options:

0 No calls;
1 Individuals of one species can be counted, calls not simultaneous;
2 Some calls of one species simultaneous, numbers can be reliably estimated and shown in brackets; and
3 Full chorus, calls continuous and overlapping.

3.2.6 Turtle Surveys

Turtle surveys were completed on May 1, May 8, May 27, June 6, June 12, 2024 in accordance with the Ontario Blanding's Turtle survey protocol (OMNRF 2015). Surveys were conducted in appropriate weather conditions, that is, sunny weather with temperatures between 5 and 15 degrees Celsius, or sunny to partly cloudy days with temperatures up to 25 degrees Celsius. All ponds within the subject property were visited and thoroughly scanned with binoculars to detect basking turtles. One pond has dense emergent vegetation around the permitter and at that pond observers also walked through the vegetation to spot hidden turtles.

3.2.7 Bat Habitat Assessment

A bat habitat assessment was undertaken in accordance with the Ministry of the Environment Conservation and Parks (MECP) updated '*Bat Survey Standards*' guideline (undated). As per Step 1 of the protocol (*Treed Habitats, Maternity and Day Roosts*), any coniferous, deciduous or mixed wooded ecosite that include trees at least 10 cm diameter at breast height (DBH) are considered candidate maternity roost habitat.

All treed communities within the study area were surveyed.

Detailed bat snag surveys were undertaken on April 23 and 24, 2024 to determine the occurrence of snag trees in accordance with Step 1 of the protocol (*Treed Habitats, Maternity and Day Roosts*). The survey was completed during leaf off, and under suitable conditions (i.e., no precipitation, not immediately following heavy snowfall). Snag trees with characteristics favourable to Myotis species were considered as well as any maple or oak species with a DBH greater than 10 cm was noted to consider habitat for Tri-coloured Bat.

3.2.8 Bat Acoustic Monitoring

Based on the results of the bat habitat assessment, acoustic monitoring for bats was conducted from May 31 to June 30, 2024. Following the MECP protocol "Treed Habitats, Maternity Roost Surveys" (undated), this deployment period provided at least ten nights of data recorded under suitable weather conditions (air temp ≥10°C, low winds, and minimal precipitation).

Sixteen detectors were deployed over two rounds of acoustic monitoring in four woodland communities on the subject property, for a total of 32 acoustic monitoring locations (**Figure3**). The monitoring locations were selected based on potential impacts of the project, the range of the acoustic monitor and the location of potential roost trees.

At each of the acoustic monitoring locations an SM4BAT passive monitor equipped with a SMM-U1 or SMM-U2 ultrasonic microphone was installed. Microphones were oriented to optimize the echolocation detections. Each monitor was programmed to record during triggered events each night for a period of six hours beginning at sunset. A 12dB gain setting, was selected based on the SMM-U1 or SMM-U2 microphone and the surrounding habitat and proximity to potential roost trees. The unit was programmed to record in full spectrum with a 256 kHz sample rate. The high pass filter was set to 16 kHz to eliminate low frequency noise but to still capture the lowest frequency bat calls. The trigger level was set to +18SNR with a 0.5 second minimum call duration trigger. All files were recorded as full spectrum in .WAV format.

Recordings from both rounds for each of the 16 monitors were analyzed using Kaleidoscope Pro software. A combination of auto-identification and manual analysis was applied to call files to make species determinations. All unclassified files (No ID Files) were manually reviewed for call frequency to determine if unclassified calls fell within the 40 kHz Myotis species and Tri-Colored Bat range. If the call did not fall within the approximate 40 kHz range, it was not analyzed further as it is likely not an endangered species of bat. Furthermore, a random selection of noise files was reviewed to ensure that the batch filters functioned as intended.

3.2.9 Species at Risk Habitat Assessment

An assessment of the property was conducted for potential habitat for endangered or threatened species known to occur in the general vicinity of the Study Area based on NHIC records, wildlife atlases, recovery strategies, and other background resources.

4. Existing Conditions

4.1 Aquatic Resources

There is a watershed divide within the Study Area and the drainage features are associated with the Twenty Mile Creek or Upper Welland River watersheds (**Figure 2**).

The Twenty Mile Creek watershed is the second largest watershed within the jurisdiction of the Niagara Peninsula Conservation Authority (NPCA), and it is located in the City of Hamilton, and the Regional Municipality of Niagara including the Town of Lincoln, Township of West Lincoln, and Town of Grimsby (NPCA 2006). The total drainage of the watershed is 291 square kilometres. Drainage Features (DF) 1 through 5 located in the northeast portion of Parcel 10 are associated with the main branch of the Twenty Mile Creek subwatershed.

The Upper Welland River watershed has a total drainage of 480 square kilometres. DFs 6 through 18 are associated with the Welland River West subwatershed (Local Management Area 2.1). Area 2.1 includes the entire headwaters region of the Welland River, Lake Niapenco, and downstream to the confluence of Elsie Creek and the Welland River (NPCA 2011).

4.1.1 Fish and Fish Habitat

All of the drainage features that were assessed were ephemeral or intermittent and did not contain fish or direct fish habitat. The watercourse that is located on the Southern Pines Golf Course appears to be a permanent feature and likely provides fish habitat.

NPCA conducted sampling in 2007 at five stations in the Welland River headwaters, ranging 21 km upstream from the Binbrook reservoir. Species caught were Black Bullhead (*Ameiurus melas*), Black Crappie (*Pomoxis nigromaculatus*), Bluntnose Minnow (*Pimephales notatus*), Brown Bullhead (*Ameiurus nebulosus*), Central Mudminnow (*Umbra limi*), Common Carp (*Cyprinus carpio*), Grass Pickerel (*Esox americanus vermiculatus*), Green Sunfish (*Lepomis cyanellus*), Golden Shiner (*Notemigonus crysoleucas*) Johnny Darter (*Etheostoma nigrum*), Largemouth Bass (*Micropterus nigricans*), Northern Pike (*Esox lucius*), Pumpkinseed (*Lepomis gibbosus*), Tadpole Madtom (*Noturus gyrinus*), White Crappie (*Pomoxis annularis*), White Sucker (*Catostomus commersonii*), Yellow Bullhead (*Ameiurus natalis*), and Yellow Perch (*Perca flavescens*) (NPCA 2011).

4.1.2 Threatened and Endangered Species

Fisheries and Oceans Canada (DFO) Mapping identified Grass Pickerel (*Esox americanus vermiculatus*) within the Welland River watershed. The Grass Pickerel is listed provincially as Special Concern and is found in wetlands, ponds, slow-moving streams and shallow bays of larger lakes with warm, shallow, clear water and an abundance of aquatic plants (Government of Ontario 2014). DFO Species at Risk mapping does not have the Grass Pickerel present upstream of Lake Niapenco, approximately 10km from the study area.

4.1.3 Headwater Drainage Feature Assessment

In total, 18 headwater drainage features (HDFs) were identified and assessed in 2023 and 2024 (**Figure 2**). HDFs were assessed following the Ontario Stream Assessment Protocol Headwater Drainage Feature Module (Stanfield *et al.* 2014). Drainage features (DFs) 1 through 8 were assessed in 2023, while DFs 9 through 18 were assessed in 2024. All features were flowing in during the Round 1 assessments, however no permanent features were found on the subject property. Photos referenced in the below descriptions can be found in **Appendix A**.

DF1a and 1b were small swales with no defined banks that originated in the Parcel 20 agricultural field and drained into the roadside ditch along Airport Road East (DF2) (**Photographs 1-5**). Both features had flow in Round 1, and no flow in Round 2.

DF3 had two branches which originated in the Parcel 3 agricultural field and flowed eastward into Parcel 10, having a confluence near the west boundary of the parcel. It then meandered eastward through the neighbouring property and into DF2. DF3a was a large swale with poorly defined banks, with a wetted width measuring 1m at the widest (**Photographs 6-7**). DF3b was a small swale with no defined banks (**Photograph 8**). Both features associated with DF3 were flowing during the Round 1 assessment and dry during the Round 2 assessment.

DF4 had three branches originating within the Parcel 10 agricultural field that connected with DF4a. All features associated with DF4 had flow in Round 1, and no flow in Round 2. DF4a had a maximum wetted width and depth of 1.50 m and 0.08 m, respectively (**Photographs 9-10**).

DFs 4b and 4e gathered overland flow from the agricultural field before forming small, poorly defined swales and merging with DF4a (**Photographs 11 and 17**). DFs 4c and 4d were part of one continuous feature, gathering overflow from vernal pools within the woodlot and flowing into the online irrigational pond in the center of Parcel 10 (**Photographs 12-16**).

DF5a was a small, poorly defined channel that gathered overflow from vernal pools within the forested area located in the central area of Parcel 10 (**Photographs 18-19**). It exited the forested area into a tile drain which flowed eastward into the pond along the east perimeter of the study area (**Photograph 20**). All features associated with DF5 had flow in Round 1, and no flow in Round 2.

DF6a and 6b are part of one continuous feature, which originated within the wooded area where a series of vernal pools overflowed into a small channel within the agricultural field (**Photographs 21-23**). Flow continued southwest into Parcel 48 to merge with DF11. DF6b had a maximum wetted width and depth of 0.75 m and 0.10 m, respectively. All features associated with DF6 had flow in Round 1, and no flow in Round 2.

DF7 was a tiled feature that had no surface flow (**Photograph 24**). DF7 had flow in Round 1, and no flow in Round 2.

DF8 gathered overland flow from the surrounding agricultural field into a small, poorly defined swale before it flowed into the roadside ditch along White Church Road East (**Photographs 25-26**). DF8 had flow in Round 1, and no flow in Round 2.

The gradient of the field on Parcel 48 did not allow DFs 9 and 10 to connect with DF11. Instead, overland flow gathered in pools adjacent to the woodlot before forming poorly defined channels flowing into the woodlot (**Photographs 27-28**). Both features had flow entering the woodlot in Round 1, and no flow in Round 2. Pooling water remained within each feature in the woodlot forming a Mineral Meadow Marsh (MAM2).

DF11 gathered overland flow into a poorly defined channel that flowed south to White Church Road (**Photographs 29-30**). DF11 had flow in Round 1, and no flow in Round 2.

DF12a drained an online pond under White Church Road into Parcel 56 where a poorly defined swale meandered southward through the field (**Photographs 31-33**). DF12c was a poorly defined swale that drained a small, vegetated area into DF12b (**Photographs 34-35**). All features associated with DF12 had flow in Round 1, and no flow in Round 2. Standing water was present in DFs 12b and 12c during the Round 2 assessment.

All reaches associated with DFs 13, 14 and 15 were poorly defined swales that originated in the northern portion of Parcel 47 and flowed southwest through the field (**Photographs 36-42**). Both reaches of DF15 originated in the southern portion of Parcel 3. There was no connection to the pond located in the southwest corner of Parcel 3. DF13b meandered into the western portion of Parcel 56 briefly before it continued off the subject property to the south. All reaches associated with DFs 13, 14, 15 were flowing during Round 1, and had no flow during Round 2.

The field on Parcel 2 which contained DFs 16, 17 and 18 had already been tilled before the Round 1 assessment was completed. The flow paths associated with each feature on **Figure 2** are the original MNRF (MNRF, 2011) mapping lines. The hydrology of each feature was able to be assessed as flow crossing south into the neighbouring parcels was still observable in Round 1. DFs 16 and 17 were found dry during the Round 2 assessment (**Photographs 43-46**).

DF18a gathered overland flow from the northwestern portion of Parcel 2 before forming a poorly defined swale flowing southward into a heavily vegetated area in the southwestern portion of the parcel (**Photograph 47**). Flow from DF18a entered a small, corrugated plastic pipe (HDPE) culvert at the property boundary with the adjacent golf course (**Photographs 48-49**). Water flowed through a series of retention ponds on the golf course lands before it continued into Parcel 34 as DF18b.

DF18b flowed into Parcel 34 as a poorly defined, grassy channel with a wetted width and depth of 0.7 m and 0.05 m, respectively (**Photographs 50-52**). DF18b branched with DF18c in the western portion of the parcel before flowing off property (**Photographs 53-55**). The entirety of DF18 was found to have intermittent hydrology, having flow present in both the Rounds 1 and 2 assessments, but no flow observed in Round 3. It should be noted that irrigational activities on the golf course could have altered the hydrology downstream of the golf course. Dense vegetation occupied the western portions of DF18b and DF18c. No fish were observed during any of the assessments.

4.1.4 Drainage Feature Recommendations

Features were classified following the Evaluation, Classification and Management of Headwater Drainage Features Guidelines (TRCA, 2014). Most features on the property can be mitigated through low-impact developments (LIDs) due to their ephemeral hydrology, lack of riparian vegetation, and lack of terrestrial or fish habitat. Five reaches are classified as conservation or protection due to their connection to the surrounding forest features and riparian vegetation. A HDF management recommendations summary can be found in **Table 2.**

No Management Required

DFs 9 and 10 do not connect with any downstream feature and do not require any management.

Mitigation

All features listed as mitigation exhibited ephemeral hydrology and contributing fish habitat with limited riparian vegetation and terrestrial habitat. Flow associated with spring freshet and heavy rain events can be mitigated through LIDs.

The pond associated with DF4a remained wet year-round and supported breeding amphibians. Further hydrogeology studies are required to determine the hydrology of the pond, however it is assumed that the pond is used as a retention pond for crop irrigation. The guidelines recommend conservation, however due to the likely anthropogenic alteration of the pond and the presence of breeding amphibian habitat nearby, Beacon recommends that it be decommissioned, and its hydrology mitigated through LIDs.

Conservation

DF18b and 18c exhibited valued hydrology and are situated within a Cattail Mineral Shallow Marsh (MAM-2). The guidelines and Beacon recommend that the feature be conserved, and the riparian zone corridor be maintained, relocated, or enhanced.

Protection

DFs 4c, 5a, and 6a are within woodland and wetland communities and have permanent, standing water. These portions of the headwaters act as a breeding ground for amphibian species found within the Fresh-Moist Sugar Maple – Hardwood Deciduous Forest (FOD6-5) communities surrounding the features. The importance of the surrounding riparian vegetation and terrestrial habitat result in the guidelines and Beacon recommending that these features be protected

Table 2. Summary of Drainage Feature Mitigation Recommendations

Drainage Feature Segment	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat	HDFA Management Recommendations	Beacon Management Recommendations
DF1a	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF1b	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF2	Contributing	Drainage Ditch	Limited	Contributing	Limited	Mitigation	Mitigation
DF3a	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF3b	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF4a	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF4b	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF4c	Contributing	None	Important	Contributing	Important	Protection	Protection
DF4d	Contributing	Online Pond	Limited	Contributing	Important	Conservation	Mitigation
DF4e	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF5a	Contributing	None	Important	Contributing	Important	Protection	Protection
DF5b	Contributing	Tiled Feature	None	None	None	Mitigation	Mitigation
DF6a	Valued	None	Important	Contributing	Important	Protection	Protection
DF6b	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF7	Contributing	Tiled Feature	None	None	None	Mitigation	Mitigation
DF8	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF9	Contributing	Unconnected	Important	None	Important	No Management Required	No Management Required
DF10	Contributing	Unconnected	Important	None	Important	No Management Required	No Management Required
DF11	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation

Drainage Feature Segment	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat	HDFA Management Recommendations	Beacon Management Recommendations
DF12a	Contributing	Online Pond	Limited	Contributing	Limited	Mitigation	Mitigation
DF12b	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF12c	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF13a	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF13b	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF14	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF15a	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF15b	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF16	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF17	Contributing	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF18a	Valued	None	Limited	Contributing	Limited	Mitigation	Mitigation
DF18b	Valued	None	Important	Contributing	Limited	Conservation	Conservation
DF18c	Valued	None	Important	Contributing	Limited	Conservation	Conservation

4.2 Ecological Communities

Vegetation communities were mapped and described following the protocols of the Ecological Land Classification (ELC) System for Southern Ontario (Lee *et al.* 1998). This involves delineating vegetation communities on aerial photographs and recording species composition and abundance for each vegetation community. Information on dominant species cover, community structure, level of disturbance, presence of indicator species, vascular plant species and other notable features are also recorded. Both native and non-native species that were encountered were noted and are listed in **Appendix B**.

The ELC groups vegetation communities into two broad categories, naturally occurring communities, and cultural communities. Cultural communities represent vegetated areas that support a plant community that has been strongly influenced by human activities, both past and present, for example the naturalization of a fallowed agricultural field. Vegetation communities on the Study Area are illustrated in **Figure 3.** Photos of the vegetation communities can be found in Appendix B.

Natural Communities

Fresh – Moist Sugar Maple Hardwood Forest (FOD6-5)

This community is found in two locations on Parcel 10 and Parcel 20 of the Study Area. Typical of fresh to moist communities a mixture of upland and wetland species are common due to the presence of ephemeral ponds within the forest. Hence, some wetland species such as Jewelweed (*Impatiens capensis*), Fox Sedge (*Carex vulpinoidea*), and Bladder Sedge (*Carex intumescens*) were also observed. The canopy is primarily comprised of mature Sugar Maple (*Acer saccharum*) in association with Basswood (*Tilia americana*), Shagbark Hickory (*Carya ovata*) and Black Walnut (*Juglans nigra*). Sugar Maple is also dominant in the sub-canopy in association with other trees of mixed ages, including American Beech (*Fagus grandifolia*), Basswood, White Ash (*Fraxinus americana*), and a rare occasion of Ironwood (*Ostrya virginiana*), The understory is sparse and comprised of a mix of White Ash, Choke Cherry (*Prunus virginiana*), and American Beech. The abundance of the last two species varies between polygons. Other species contributing to the diversity of the understory include Ironwood (*Ostrya virginiana*), and Musclewood (*Carpinus caroliniana*), but these species are found in low numbers. The ground layer is equally dominated by Broadleaf Enchanter's Night Shade (*Circea canadensis*), and Rough Avens (*Geum laciniatum*), with occasional patches of Poison Ivy (*Toxicodendron radicans*)

Dry - Fresh Sugar Maple – Beech Deciduous Forest (FOD5 - 2)

This community is found on Parcel 48. This community is dominated by mature Sugar Maple and American Beech. The canopy is predominantly Sugar Maple in association with American Beech, Shagbark Hickory, and Eastern Cottonwood, as well as rare occurrences of Red Oak and Black Cherry. Sugar Maple and American Beech are also equally dominant in the sub-canopy, with Ironwood and Basswood contributing to its diversity. The understory is dominated by Gray Dogwood and Choke Cherry in association with young Ironwood trees. The ground layer is sparse and dominated by patches of Poison Ivy (*Toxicodendron radicans*), and Thicket Creeper (*Parthenocissus vitacea*), but occasionally Frost Aster (*Symphyotrichum pilosum*) stems are found in areas with canopy breaks.

Ephemeral Ponds

Several small ponds (<0.5 ha) are situated within the Fresh Moist Sugar Maple Harwood Forest and a few in Dry – Fresh Sugar Maple – Beech Forest and have been mapped as inclusions due to their small size. Most of these ponds are vegetated, but a few are unvegetated (open water). The plant forms vary from floating to emergent broadleaf and narrowleaf. Three types of vegetation communities are common in these forests. Jewelweed Mineral Shallow Marsh (*MAM2-9*) dominated by Jewelweed in association with Bladder Sedge and Hope Sedge (*Carex lupulina*). *False Nettle Mineral Shallow Marsh* (*MAM2*) is dominated by False Nettle (*Boehmeria cylindrica*) but Jewelweed, Hope Sedge (*Carex lupulina*), and Sensitive Fern (*Onoclea sensibilis*) are notable. Reed Canary Grass Mineral Shallow Marsh (*MAS2*) dominated by Reed Canary Grass (*Phalaris arundinacea*) with occasional Hope Sedge and Sallow Sedge (*Carex lurida*). Common Duckweed (*Lemna minor*) is the most common floating species in the open water areas of these ponds. Non-carex emergent species Rice-cut Grass (*Leersia oryzoides*) and Broadleaf Cattail (*Typha latifolia*) are also common in both communities.

Mineral Swamp Communities (SWD)

Silver Deciduous Swamp (SWD3-2)

This is a swamp wetland situated in the southeastern limit of Parcel 3. The swamp supports a mixed age of Silver Maple (*Acer saccharinum*), notably in the canopy and sub-canopy. There is a little understory layer and is comprised of a few scattered Red Osier Dogwood (*Cornus sericea*), and young Silver Maple. The ground layer is dominated by Reed Canary Grass, but Jewelweed (*Impatiens capensis*), Beggar Ticks (*Bidens frondosa*), and Lanceleaf Aster (*Symphyotrichum lancaeolatum*) also occur in the peripheries of the wetland.

Trembling Aspen Mineral Deciduous Swamp Type (SWD 4)

This community is situated in the southeastern portion of the Sugar Maple–Beech Forest on Parcel 48 and comprised of a mix of wet and dry knolls. This swamp is dominated by a mixed age stand of Trembling Aspen (*Populus tremuloides*) in association with American Elm (*Umus americana*) in its canopy and sub-canopy. The trembling Aspen is found on dry knolls within the swamp. Its understory is comprised of a mix of Silky Dogwood (C*ornus obliqua*), Meadow Sweet (*Spirea alba*), and Trembling Aspen as well as rare occurrences of American Elm. Wetland obligate species, Common Hope Sedge is dominant in the ground layer, but other species such as Fox Sedge, Lanceleaf Aster (*Symphyotrichum lancaeolatum*) and Reed Canary Grass also contribute to the ground layer diversity).

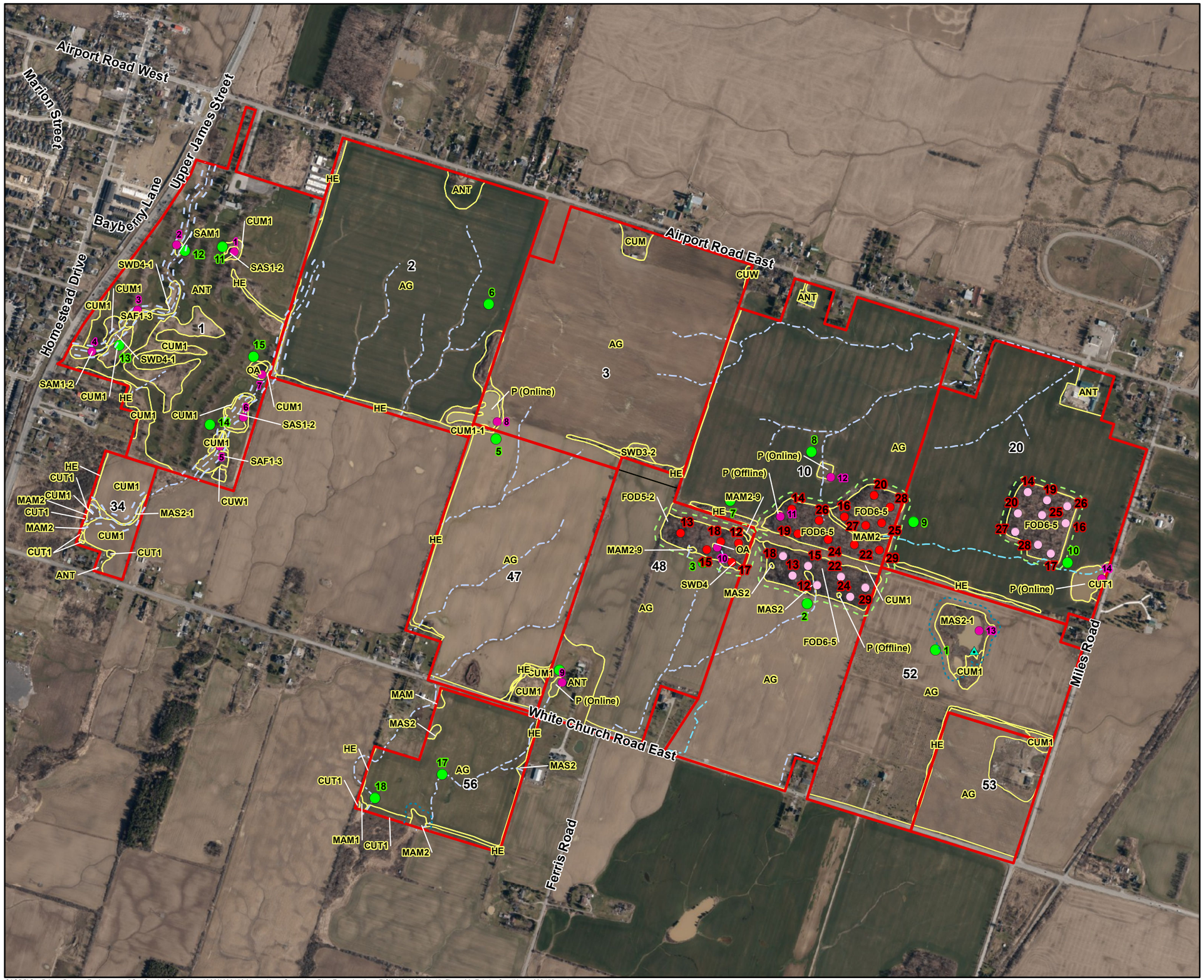
Willow Mineral Deciduous Swamp Type (SWD 4-1)

Two polygons of this community are situated along the drain west of Parcel 1 (**Figure 3**). The canopy of this swamp is dominated by Crack Willow (*Salix X fragilis*) with rare occasions of Silver Maple (*Acer saccharinum*). The sub-canopy is sparse and dominated by Crack Willow. Silky Dogwood is the most common understory species but mixed with Common Buckthorn (*Rhamnus catharica*) and Tatarian Honey Suckle (*Lonicera tatarica*), especially on the edges of the swamp.

Existing Conditions - Terrestrial Resources

Figure 3

Whitechurch Urban Boundary Expansion



Legend

- Study Area (310 ha)*
- Parcel Boundaries*
- Ecological Communities
- Tiled Drainage Feature
- Headwater Drainage Features
- Drainage Features + 15 m (City of Hamilton OP)
- Wetlands + 15 m (City of Hamilton OP)
- Woodlands + 15 m (City of Hamiton OP)
- Amphibian Sample Locations
- Turtle Survey Locations
- Threatened and Endangered
- Acoustic Bat Detectors (Round 1)
- Acoustic Detector Locations (Round 2)

Code	Wetland Communities
MAM2	Mineral Meadow Marsh
MAM	Meadow Marsh
MAM1	Bedrock Meadow Marsh
MAM2-9	Jewelweed Mineral Meadow Marsh
MAS2	Mineral Shallow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
SWD4	Mineral Deciduous Swamp
SWD4-1	Willow Mineral Deciduous Swamp
	Aquatic Communities
OA	Open Water
P (Offline)	Pond
P (Online)	Pond
SA	Shallow Water
SAF1-3	Duckweed Floating-leaved Shallow Aquatic
SAM1	Mixed Shallow Aquatic
SAM1-2	Duckweed Mixed Shallow Aquatic
SAS1-2	Waterweed Submerged Shallow Aquatic
	Forest Communities
FOD6-5	Fresh-Moist Sugar Maple - Hardwood Deciduous Forest
FOD5-2	Dry - Fresh Sugar Maple - Beech Deciduous Forest
	Cultural Communities
CUM1	Mineral Cultural Meadow
CUM1-1	Dry - Moist Old Field Meadow
CUW1	Mineral Cultural Woodland
CUT	Cultural Thicket
CUT1	Mineral Cultural Thicket
CUM	Cultural Meadow
CUW	Cultural Woodland
	Other Communities
AG	Agricultural
ANT	Anthropogenic
HE	Hedgerow

*Boundaries are approximate

BEACON ENVIRONMENTAL

Project: 223152

Last Revised: December 2024

Client: Whitechurch Landowners Group Inc.

Prepared by: BD
Checked by: AP

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0 220 440 m

C:\ODB\OneDrive - Beacon Environmental\GeoSpatial\Geo Projects\2023\223152 Mount Hope Secondary Plan Extension Area EIS\MXD\2023-09-15_Figure03_ExistingConditions_223152.mxd

The ground layer is comprised of a mixture of Jewelweed, Narrowleaf Cattail (*Typha latifolia*), and American Bugleweed (*Lycopus americanus*) on the banks of the drain. Tatarian Honeysuckle saplings are also notable in the peripheries of the swamp.

Mineral Marsh Communities (MAM)

These communities are associated with a network of drainage features that traverses all subject properties, but a few are associated with shallow ponds (**Figure 3**). Two types of marsh communities were identified during the ELC surveys include:

Meadow Marsh/Mineral Meadow Marsh (MAM/MAM2)

These communities are small areas throughout the study area which are dominated by Reed Canary Grass, with rare occasions of cattail species.

MAS2 Mineral Shallow Marsh/MAS2-1 Cattail Mineral Shallow Marsh (MAS2/MAS2-1)

This community is dominated almost entirely by Narrowleaf Cattail and Broadleaf Cattail mixed with Reed Canary Grass. There are open water communities within the marsh area. It is our understanding from the Landowner Group that this wetland community was historically an irrigation pond used for agricultural purposes.

Aquatic Communities

These communities are found in shallow water ponds associated with the drain network that traverses the Study Area. Most of these ponds are vegetated, but a few are unvegetated (i.e., open water). The dominant plant forms are floating and submergent, but emergent broadleaf and narrowleaf also occur. The aquatic communities identified during ELC surveys are as follows:

Open Water/Open Aquatic (OA/OAO)

These are shallow water unvegetated ponds that have been historically dug and used for anthropogenic purposes, specifically irrigation.

SAF1-3 Duckweed Floating-leaved Shallow Aquatic

This community is dominated by floating emergent Common Duckweed, but non-carex broadleaf emergent species such as Rice-cut Grass, Reed Canary Grass, and Broadleaf Cattail are also found in very shallow ends of the pond. Other species include Purple Loosestrife (*Lythrum salicaria*), American Bugleweed, and Riverbank Grape which form a vegetation cover on the banks. A few shrub species such as Sandbar Willow (*Salix interior*) and Red Osier Dogwood (*Cornus sericea*) form the understory but are rare within this community).

Mixed Shallow Aquatic/Duckweed Mixed Shallow Aquatic (SAM1/SAM1-2)

This community is dominated by Common Duckweed in association with submergent Canadian Waterweed (*Elodea canadensis*). Broadleaf Cattail, Narrowleaf Cattail, and Rice-cut Grass are occasional in the edges of water. The Mixed Shallow Aquatic community composition is similar to the Duckweed Mixed Shallow Aquatic but has a notable abundancy of algae species.

SAS1-2 Waterweed Submerged Shallow Aquatic

This community is dominated by Canadian Waterweed, but its banks are covered with broadleaf wetland species such as Fox Sedge, Common Beggar-ticks (*Bidens frondosa*), and American Bugleweed.

Cultural Communities (CU)

These communities are found throughout the subject properties and include meadows, thickets, and woodlands. The description of these communities is presented below.

Cultural Meadow/Dry - Moist Old Field Meadow (CUM1/CUM1-1)

These communities are found in all subject properties. Some occur as inclusions in the peripheries of ponds. Cultural meadow communities are often dominated by herbaceous species typically found in plant communities that were previously or recently influenced by human activity. Species such as Queen Ann's Lace (*Daucus carrota*), Redtop (*Agrostis gigantea*), and Reed Canary Grass (*Phalaris arundinacea*) are the most notable in the ground layer, but Common Milkweed (*Asclepias syriaca*) and Tall Goldenrod (*Solidago altissima*) occasionally present throughout the area. Saplings of Gray Dogwood, Hawthorn (Crataegus sp.), Staghorn Sumac (*Rhus typhina*), Silky Dogwood, as well as tree species including American Elm, Eastern Cottonwood (*Populus deltoides*) and White Ash (*Fraxinus americana*), are also present but on rare occasions.

Cultural Woodland/Mineral Cultural Woodland (CUW/CUW1)

Two polygons of this community type are found in Parcels 1 & 3 (**Figure 3**). This successional community dominated by a mix of mid-age and young poplar trees. Trembling Aspen is dominant species in the sub-canopy and the understory; but Staghorn Sumac and non-native the European Buckthorn and Black Locust also comprise the understory. In contrast, the canopy is sparse and comprised of mature Silver Maples. The ground layer is typical of the pioneer communities, dominated by species often found in cultural meadows these include Redtop, Tall Goldenrod and Lanceleaf Aster. Other ground layer species include Rough Avens, Field Strawberry (*Fragaria virginana*), Heal-all (*Prunella vulgaris*), and Riverbank Grape (*Vitis riparia*) scattered among Tall Goldenrod and Lanceleaf Aster patches.

Mineral Cultural Thicket (CUT)

Two polygons of this community type are situated in the southern portions of Parcel 56. This community is comprised mostly of Grey Dogwood with Hawthorn species. Dogwood is the most notable of two shrubs in the understory. Wild Raspberry and Tall Goldenrod are the most common herbaceous species in the ground layer.

Hedgerow (*HE*)

Hedgerows occur on all properties within the subject lands, but the species composition varies between properties. These communities often support a mix of shrub species, including Common Buckthorn, Downy Hawthorn (*Crataegus mollis*), Gray Dogwood (*Corns racemosa*), Silky Dogwood, Tatarian Honey Suckle, and Staghorn Sumac. They also support an array of tree species, including Freeman's Maple (*Acer X fremanii*), Sugar Maple, Shagbark Hickory, White Spruce (*Picea glauca*), and Trembling Aspen. The ground cover is represented by a mix of native and non-native species such as Fox Sedge, Tall Goldenrod, Garlic Mustard (*Alliaria petiolata*), Redtop, Lanceleaf Aster, Grass-leaf Goldenrod (*Euthamia graminifolia*), and Queen Ann's Lace.

4.3 Flora

A total of 221 vascular plant species were recorded in the study area during ELC surveys conducted by Beacon between August 2023 and October 2024. Of these, 149 (67%) of the species are considered native to Ontario, and 72 (33%) are non-native to Ontario, which is reflective of the agricultural land use history of the study area. 147 of the native species are considered provincially common and secure (ranked S5 or S4 provincially by NHIC), one species is considered rare to uncommon Pignut Hickory (*Carya glabra*), and one doesn't have an S-Ranking (SNA). The remaining 72 species are considered provincially exotic (SE). Additionally, the Carolinian Zone species list ranked 123 of the native species as common (C), and 2 native species as rare (R); these are Pignut Hickory and Switch Grass (*Panicum virgatum*). Similar to the NHIC raking, 69 of the species are considered introduced (I), and 27 do not have any rank. A plant list is included in **Appendix B.**

4.4 Breeding Birds

A total of 50 species of breeding birds were observed to be breeding in the Study Area (**Appendix C**). This species diversity is reflective of the habitat present dominated by agricultural areas in addition to areas of woodland, wetland and meadow as discussed in the preceding sections. Observations were made throughout the study area however were largely concentrated within the woodlands and hedgerows.

The avian community was comprised mostly of generalist and open habitat species, with some edge and forest specialists. The most numerous species included Red-winged Blackbird (*Agelaius phoeniceus*), American Robin (*Turdus migratorius*), Song Sparrow (*Melospiza melodia*), and Savannah Sparrow (*Passerculus sandwichensis*).

These species had total territories ranging between 96 and 28. Other species with multiple observations, however in less abundance, included Brown-headed Cowbird (*Molothrus ater*), European Starling (*Sturnus vulgaris*), Yellow Warbler (*Setophaga petechia*), and American Goldfinch (*Spinus tristis*).

In addition to the woodland species, the wetland communities on the subject property supported several species that typically rely on or are closely associated with wetland habitats to fulfill their life cycle. Such species included: Yellow Warbler (*Setophaga petechia*), Common Yellowthroat, Red-winged Blackbird, Spotted Sandpiper (*Actitis macularia*), Swamp Sparrow (*Melospiza georgiana*), Mallard (*Anas platyrhynchos*), Green Heron (*Butorides virescens*), and Willow Flycatcher (*Empidonax traillii*).

The open landscape which dominated the Study Area supported both agricultural and grassland elements, and supported birds such as Savannah Sparrow, Vesper Sparrow (*Pooecetes gramineus*), Killdeer (*Charadrius vociferus*), and Song Sparrow.

As discussed in the preceding sections, a number of hardwood forests were delineated on the property and subsequently supported woodland specialist birds. These included Rose-breasted Grosbeak (*Pheucticus ludovicianus*), Red-bellied Woodpecker (*Melanerpes carolinus*), Northern Flicker (*Colaptes auratus*), Eastern Wood-Pewee (*Contopus virens*), and Carolina Wren (*Thryothorus ludovicianus*).

Area-sensitive birds are those that require larger tracts of suitable habitat in which to breed or are those that have a higher breeding success in larger areas of suitable habitat. Three such species were recorded. Two of these were considered to be forest-sensitive species: White-breasted Nuthatch (*Sitta carolinensis*) and American Redstart (*Setophaga ruticilla*). The remaining species, Savannah Sparrow, was considered a grassland area-sensitive species. Three territories of White-breasted Nuthatch were recorded, two of American Redstart, and 28 of Savannah Sparrow.

Least Bittern, a provincially and federally threatened bird was recorded on Parcel 52 in the MAS 2-1 community. No other provincially ranked as S1 through S3 (Critically Imperiled through Vulnerable) were recorded nesting, nor were any nesting species regulated under the ESA. Bank Swallow was documented foraging during a breeding bird survey, however, it is unlikely to be nesting anywhere on the properties as no open bank nesting habitat for burrowing was observed. Eastern Wood-Pewee (*Contopus virens*) is listed as Special Concern, and Barn Swallow (*Hirundo rustica*) is listed as Special Concern and both were recorded within the Study Area.

Three territories of Eastern Wood-Pewee were recorded in three wooded valleyland areas on property 10a, 10b and 10c. Though this species is special concern provincially and federally based on a declining trend over their range, these birds remain relatively common in both urban and urbanizing woodlands. They are somewhat tolerant of forest fragmentation and will live in both edge habitats and forest interiors. Barn Swallows could be nesting on the outside or inside of any buildings on the property, and one building was noted as a likely nesting site on Parcel 52. Bank Swallows were recorded solely foraging through the site and are not breeding as no open bank nesting habitat for burrowing was observed.

4.5 Reptiles and Amphibians

4.5.1 Breeding Amphibians

Breeding amphibian surveys were conducted in 2023 and 2024. In total, six species of amphibians have been detected on the subject property: Grey Treefrog, Spring Peeper, Western Chorus Frog, Northern Leopard Frog, Green Frog, and American Toad. All survey stations were surveyed at least once in each of the three survey windows across both years.

See **Table 3** below for a summary of results by survey location, and **Figure 3** for a map of survey locations.

Table 3. Breeding Amphibian Survey Results

Station	Results
1	This wetland supports large numbers of amphibians, with Spring Peepers and Gray Treefrogs found in large numbers, and Green Frog and American Toad also detected.
2	Spring Peeper was found in large numbers in these forested wetlands
3	Spring Peeper and Gray Treefrog are found in large numbers in these forested wetlands, with American Toad also detected.
4	Small numbers of Gray Treefrog were found in this pond.
5	Large numbers of American Toad, and small numbers of Green Frog and Gray Treefrog were found in this artificial pond.
6	No amphibian species were detected at this location.
7	Large numbers of Spring Peeper and Gray Treefrog were found at these forested wetlands.
8	The only amphibian detected in this artificial pond were small numbers of Green Frog
9	No amphibian species were detected at this location.
10	The only amphibians detected at this location were one Green Frog and two American Toads.
11	Small numbers of Green Frogs were detected at this pond.
12	Small numbers of Green Frogs were detected at this pond.
13	Small numbers of Green Frogs and Gray Treefrogs were detected at this pond.
14	Small numbers of Green Frogs were detected at this pond.
15	Single Green Frog and Northern Leopard Frog were detected at this pond.
17	No amphibians were detected at this location, and the previously identified habitat is no longer present.
18	Small numbers of Western Chorus Frog and Gray Treefrog were heard calling at this location from a pond outside the subject property.

4.5.2 Reptiles

Surveys completed for turtles revealed that several species of turtles occur within the subject property **see Figure 3** for a map of survey locations.

Midland Painted Turtle (*Chrysemys picta*) is widespread, with sightings in nearly every permanent waterbody, with the exception of the ponds adjacent to amphibian survey points 8 and 10 (**Figure 3**). Snapping Turtle (*Chelydra serpentina*) was found at one location; however basking surveys do not reliably detect this species, and it is likely also widespread. One individual of the non-native Red-eared Slider (*Trachemys scripta*) was observed. No turtles were observed within the forested wetlands towards the eastern end of the subject property.

One species of snake, Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) was also observed during field investigations.

4.6 Bat Acoustic Analysis

Thirty-two acoustic monitoring locations were installed within suitable habitat (i.e. woodlands) within the study area. Eight bat species were documented within the subject property: Big Brown Bat (*Eptesicus fuscus*), Eastern Red Bat (*Lasiurus borealis*), Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Long-Eared Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*). Additionally, unidentified Myotis species were recorded. As the call spectrograms of all three Myotis species have overlapping characteristics, it can sometimes be difficult to differentiate between them. The results of the acoustic analysis are summarized in **Appendix D,** listing the total number of detections of each species over the monitoring period.

Of the species recorded, four are listed as endangered under the ESA: Little Brown Myotis, Eastern Small-footed Myotis, Northern Long-Eared Myotis, and Tri-colored Bat.

An analysis of the data was conducted and the acoustic monitoring results indicate the following:

- A total of 612 Eastern Small-footed Myotis calls were recorded in FOD6-5, which suggests that the FOD6-5 on the subject property provides general habitat for Eastern Small-footed Myotis.
- A total of 15 Little Brown Myotis calls were recorded in FOD5-2, this suggests that the FOD5-2 on the subject property provides general habitat for Little Brown Myotis.
- Northern Myotis calls were recorded twice within FOD6-5, this suggests that the FOD6-5 on the subject property does not serve as general habitat for Northern Myotis.
- One Tri-Colored Bat call was recorded in FOD6-5, this suggests that the FOD6-5 on the subject property does not serve as general habitat for Tri-colored bats.

4.7 Endangered or Threatened Species

As described in the preceding sections, Beacon staff conducted both desktop and on-site investigations to assess whether any endangered or threatened species were likely to occur on or within a 5-kilometer (km) radius of the subject property. **Table 4** provides Beacon's assessment based on the results of field and desktop investigations combined with knowledge of the habitat preferences and natural history of the species being considered.

Table 4. Endangered or Threatened Species

Species	Status on SARO List	Were Species and or/Habitat Documented during on-site Assessment?
Birds		
Acadian Flycatcher, *Empidonax virescens*	END	**No**, these birds nest in large mixed woodlands and were not detected during breeding bird surveys.
Bank Swallow, *Riparia riparia*	THR	**Yes**, a Bank Swallow was documented foraging during a breeding bird survey, however, it is unlikely to be nesting anywhere on the properties as no open bank nesting habitat for burrowing was observed.
Barn Owl, *Tyto alba*	END	**No,** this species generally nests in structures or mature tree hollows and were not detected during surveys. This species is understood to be exceptionally rare in Ontario.
Bobolink, *Dolichonyx oryzivorus*	THR	**No,** this species was not recorded during breeding bird surveys, as it requires extensive meadow habitat which is absent on the property.
Chimney Swift, *Chaetura pelagica*	THR	**No,** this species was not recorded during breeding bird surveys, and it is unlikely to be on property as suitable habitat, vertical columns, are absent.
Eastern Meadowlark, *Sturnella magna*	THR	**No,** this species was not recorded during breeding bird surveys, as it requires extensive meadow habitat which is absent on the property.
Least Bittern, *Ixobrychus exilis*	THR	**Yes,** this species was recorded during the breeding bird surveys using the MAS2-1 on Parcel 52 to carry out its life processes.
Louisiana Waterthrush, *Parkesia motacilla*	THR	**No,** this species was not documented during breeding bird surveys, and it is unlikely to be on property, as it is usually found in steep, forested ravines with fast-flowing streams, which are absent on the property.
Red-headed Woodpecker, *Melanerpes erythrocephalus*	END	**No,** none were documented during breeding bird surveys, suitable habitat includes open woodland, which is present on the property.
Short-eared Owl, *Asio flammeus*	THR	**No,** none were documented during field investigations, suitable habitat includes grasslands, which are present in the property, however the bulk of the property was agricultural.
Yellow-breasted Chat, *Icteria virens*	END	**No,** none were documented during field investigations, and suitable habitat is thickets and scrub, which is absent on the property.
Mammals		
Eastern Small-footed Myotis, *Myotis leibii*	END	**Yes**, suitable habitat for endangered bats is present in the FOD 5-2 and FOD 6-5 on the subject property as discussed in section 4.6.
Little Brown Myotis, *Myotis lucifugus*	END	
Northern Myotis, *Myotis septentrionalis*	END	
Tri-coloured Bat, *Perimyotis subflavus*	END	

Species	Status on SARO List	Were Species and or/Habitat Documented during on-site Assessment?
Aquatic Species		
Black Redhorse, *Moxostoma duquesnei*	THR	**No,** perennial watercourses and suitable habitat are absent in subject area. Suitable habitat may be present in extended 5-km radius.
Vascular Plants (Dicots)		
Butternut, *Juglans cinerea*	END	**No**, species was not recorded during field surveys, however, suitable habitat for Butternut is present in the edges of the treed communities and the hedgerows within the Study Area.
Spotted Wintergreen, *Chimaphila maculata*	THR	**No**, species was not recorded during field surveys, there are no dry-fresh oak dominated or Oak Pine Mixed forests within the Study Area.
Amphibians		
Jefferson's Salamander, *Ambystoma jeffersonianum*	END	**No**, suitable habitat for Jefferson's Salamander is not present due to absence of vernal pools.

Key: SARO Species at Risk in Ontario List EN: Endangered; THR Threatened; ORAA Ontario Reptile and Amphibian Atlas; NHIC Natural Heritage Information Centre

4.8 Significant Wildlife Habitat (SWH)

SWH designation is the responsibility of the planning authority and determination of it on a site-by-site basis is generally not an appropriate method to determine this constraint given that it is necessary to understand the context of the habitat within the local environment. In this case, the City of Hamilton has not identified SWH within their jurisdiction. There is guidance provided in two provincial documents: the Significant Wildlife Technical Guide (OMNR 2000), the Natural Heritage Reference Manual (MNRF 2010), and the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF 2015).

According to the Significant Wildlife Technical Guidelines (OMNR 2000), there are four main categories of Significant Wildlife Habitat (SWH):

- Seasonal Concentration Areas of Animals;
- Rare Vegetation Communities or Specialized Habitat for Wildlife;
- Habitat for Species of Conservation Concern; and
- Animal Movement Corridors.

Within each of these categories, there are multiple types of SWH, each intended to capture a specialized type of habitat that may or may not be captured by other existing feature-based categories (e.g., significant wetlands, significant woodlands).

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF 2015) was used to screen for potential SWH. The analysis and results of this screening are presented in **Table 5**.

Table 5. Assessment of Significant Wildlife Habitat Within Study Area

Wildlife Habitat Category	Presence or Absence on Subject Lands Based on MNRF Criteria for Ecoregion 7E	
	Absent	Confirmed Present
Seasonal Concentration Areas for Wildlife Species		
Waterfowl Stopover and Staging Areas (Terrestrial)	X	
Waterfowl Stopover and Staging Areas (Aquatic)	X	
Shorebird Migratory Stopover Area	X	
Raptor Wintering Area	X	
Bat Hibernacula	X	
Bat Maternity Colonies		X
Bat Migratory Stopover Area	X	
Turtle Wintering Areas	X	
Reptile Hibernaculum	X	
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)	X	
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)	X	
Colonially-Nesting Bird Breeding Habitat (Ground)	X	
Migratory Butterfly Stopover Areas	X	
Land bird Migratory Stopover Areas	X	
Deer Yarding Areas	X	
Deer Winter Congregation Areas	X	
Rare Vegetation Communities		
Cliffs and Talus Slopes	X	
Sand Barren	X	
Alvar	X	
Old Growth Forest	X	
Tallgrass Prairie	X	
Savannah	X	
Provincially Rare S1, S2 and S3 vegetation communities	X	

Wildlife Habitat Category	Presence or Absence on Subject Lands Based on MNRF Criteria for Ecoregion 7E	
	Absent	Confirmed Present
Regionally or Locally Rare vegetation communities	X	
Specialized Habitats of Wildlife		
Waterfowl Nesting Area	X	
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	X	
Woodland Raptor Nesting Habitat	X	
Turtle Nesting Areas	X	
Seeps and Springs	X	
Amphibian Breeding Habitat (Woodland)		X
Amphibian Breeding Habitat (Wetlands)	X	
Woodland Area-Sensitive Bird Breeding Habitat	X	
Habitats of Species of Conservation Concern		
Marsh Bird Breeding Habitat	X	
Open Country Bird Breeding Habitat	X	
Shrub/Early Successional Bird Breeding Habitat	X	
Terrestrial Crayfish	X	
Special Concern and Rare Wildlife Species		X
Animal Movement Corridors		
Amphibian Movement Corridors	X	
Deer Movement Corridors	X	

In summary, this analysis has determined that there are three types of significant wildlife habitat. The categories where SWH occur are the Seasonal Concentration Areas for Wildlife Species category, bat maternity colonies, Specialized Habitat of Wildlife Amphibian Breeding Habitat (woodlands) and Habitats of Species of Conservation Concern. A bat habitat assessment was conducted in April 2024 which identified the areas of suitable habitat for endangered bats. Based on the results of the breeding amphibian surveys, a full chorus of Spring Peepers and Grey Treefrog were recorded calling during the survey period. Due to the number of amphibians recorded and available wetland habitat within the woodland has determined that Station 3 is considered SWH. Three territories of Eastern Wood Peewee were also recorded on the subject property within the woodland community.

4.9 Summary of Key Natural Features

Table 6 provides a summary of the natural heritage features that have been identified and which need to be addressed with respect to potential development impacts based on field investigations completed in 2023 and 2024.

Table 6. Summary of Natural Heritage Features

Feature	Key Functions and Attributes
Provincially Significant Wetlands	• Based on LIO data, no Provincially Significant Wetlands (PSW) have been identified by MNRF within the Study Area.
Other Wetlands	• Additional wetland units that were present through field surveys as well and are indicated as additional wetland units on **Figure 3**. • Botanical composition and characterization of the identified wetlands is provided under Section 4.2. • Wetland communities include all SWD and MAM communities.
Watercourses & Fish Habitat	• Two watercourses are present on the golf course lands on the western proportion of the property and is considered fish habitat. • Additional DFs are present which are ephemeral in nature as shown on **Figure 2.** • Man-made irrigation ponds are present on the property. • Fish Habitat is not present within the DFs, but is likely present in the golf course watercourse.

Significant Wildlife Habitat	• SWH was identified for the following categories:
	  ○ Bat maternity colonies;
	  ○ Amphibian Breeding Habitat (woodlands)

Threatened and Endangered Species Habitat	• Seasonal surveys have confirmed that there is suitable habitat for endangered bats within the FOD 5-2 and FOD 6-5. Should any removals be proposed, consultation with MECP will be required to ensure compliance with the ESA. • Least Bittern, a provincially and federally threatened bird, was recorded in the MAS2-1 on property 52. This species is protected under the ESA and SARA, and consultation with MECP will be required to develop or remove the feature.
Significant Woodlands	• Based on the criteria set out by the City of Hamilton, significant woodlands are present within the Study Area including FOD communities.

5. City of Hamilton Natural Heritage System

The City of Hamilton Official Plan presents a Natural Heritage System (NHS) which consists of the Niagara Escarpment Plan area, and Core Areas and Linkages identified by the City, based on requirements of the Provincial Planning Statement. The NHS approach of the City of Hamilton involves delineating a NHS which includes Core Areas, as well as supportive features (Linkages) that maintain the ecological functionality and connectivity of the natural system. The NHS for the Study Area is shown on Schedule B of the Rural Hamilton Official Plan.

Figure 4 illustrates the natural features present within the Study Area in accordance with the City's mapping and NHS criteria based on seasonal surveys conducted to date. The presence of these features does not impede the lands from being brought into a Settlement Area; rather this information can be used to develop a fulsome NHS as the project moves forward.

5.1.1 Environmentally Significant Areas

No Environmentally Significant Areas have been identified within the study area on the City of Hamilton Official Plan Mapping.

5.1.2 Aquatic Habitat and Drainage Features

Drainage features and associated aquatic habitat within the Study Area based on seasonal surveys have been illustrated on **Figure 4**.

5.1.3 Wetlands

No wetlands are shown on Schedule B4 of the Official Plan. Wetlands were identified during field investigations within the study area and are illustrated on **Figure 4**. No PSW were identified on the subject property.

A single wetland on Parcel 52 was identified as habitat for a threatened species.

5.1.4 Significant Woodlands

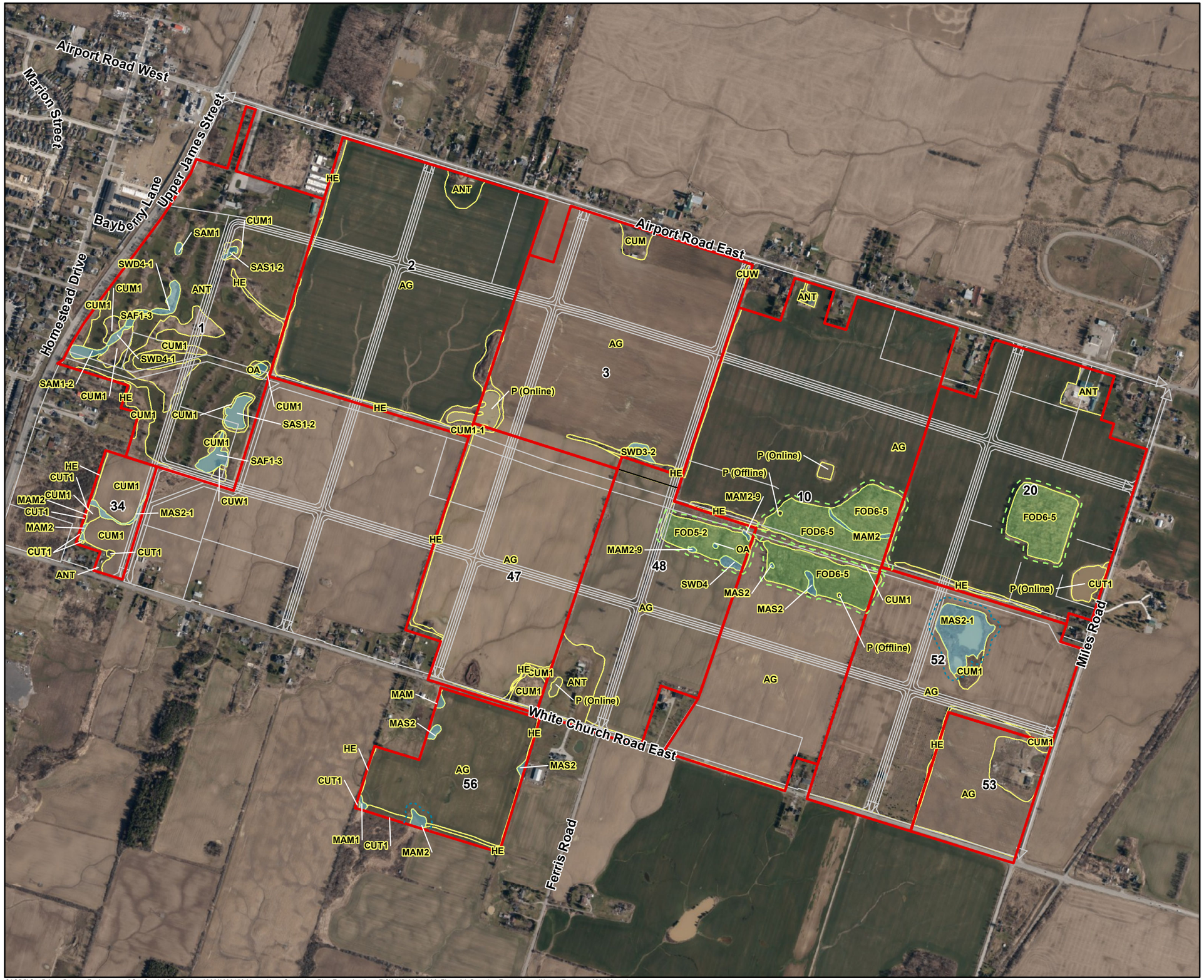
Significant Woodlands are generally depicted in Schedule B2 of the City's Official Plan. In the City of Hamilton, a woodland must meet at least two of the following criteria to qualify as significant:

- Size – Minimum patch size for significance is based on forest cover by planning unit:
  - < 5 % forest cover - 1 ha;
  - 5-10 % forest cover - 2 ha;
  - 11-15 % forest cover - 4 ha;
  - 16-20 % forest cover - 10 ha;
  - 21-30 % forest cover - 15 ha;

Boundary Expansion and Natural Features

Figure 4

Whitechurch Urban Boundary Expansion



Legend

- Study Area (310 ha)*
- Parcel Boundaries*
- Proposed Development
- Ecological Communities
- Wetlands (Beacon)
- Wetlands + 15 m (City of Hamilton OP)
- Woodlands (Beacon)
- Woodlands + 10 m (City of Hamilton OP)

*Boundaries are approximate

BEACON ENVIRONMENTAL

Project: 223152

Last Revised: December 2024

Client: Whitechurch Landowners Group Inc.

Prepared by: BD
Checked by: AP

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- Interior Forest - Woodlands that contain interior forest habitat. Interior forest habitat is defined as 100 metres from edge;
- Proximity/Connectivity - Woodlands that are located within 50 metres of a significant natural area (defined as wetlands 0.5 hectares or greater in size, ESAs, PSWs, and Life Science ANSIs);
- Proximity to Water - Woodlands where any portion is within 30 metres of any hydrological feature, including all streams, headwater areas, wetlands, and lakes;
- Age - Woodlands with trees of 100 years or more in age; and
- Rare Species - any woodland containing threatened, endangered, special concern, provincially or locally rare plant or wildlife species.

In determining significance, the Official Plan states that "woodlands shall meet a minimum average width of 40 metres."

Schedule B-2 of The City's Rural Official Plan identifies a number of "Significant Woodlands" within the Study Area. These woodlands identified by the OP and through seasonal surveys have been illustrated on **Figure 4**.

5.1.5 Threatened and Endangered Species Habitat

Habitat for threatened or endangered was identified though desktop review and field investigations for endangered bats and Least Bittern.

5.2 Buffers/Vegetation Protection Zones

The physical separation of development or land use changes from a natural feature (e.g., woodlands, wetlands, watercourses) using buffers or vegetated protection zones (VPZs) is often used for softening or reducing the impacts of land use changes on adjacent natural features (OMNR 2010). Buffers or VPZs can provide a number of benefits to natural features including reducing encroachments, reducing noise and light impact (particularly if the buffers contain dense vegetation), protecting root zones, enhancing woodland interior, and attenuating runoff (OMNR 2010).

While buffers or VPZs may sometimes be prescribed based on policy, determining whether a buffer is required and/or establishing an appropriate buffer width requires consideration of the sensitivity of the feature and its ecological functions and the nature of the proposed change in adjacent land uses or activities. Buffers/VPZs are recommended based on their ability to protect existing natural features and their associated ecological functions from changes to adjacent land uses and activities. Buffers represent one of many tools available for mitigating impacts to natural heritage features.

Policy 2.5.10 of the City of Hamilton Urban Official Plan provides the following guidance for minimum vegetation protection zones. The Official Plan allows for the determination of vegetation protection zone widths through the completion of a subwatershed study as per Section 2.1.10.

Based on the sensitivity, ecological and hydrological functions of the core NHS components within the Study Area, the minimum MVPZs outlined below are considered appropriate for the Study Area; therefore, the following VPZ were applied:

Woodlands

A 10 m VPZ from all woodlands is sufficient as it will protect the health and condition of the trees. By applying a 10 m VPZ it will also protect critical root zones for individual trees within the woodland community from potential impacts during construction (Carolinian Canada 2003).

Wetlands

There are no PSWs within the Study area however PSWs will require a 30 m VPZ should they be identified. Unevaluated or locally significant wetlands will require 15 m VPZ. A 15 m VPZ is sufficient within the study area given that the wetlands are commonly disturbed from ongoing uses (e.g., golf course or agricultural). These communities are relatively monocultural, have lower biodiversity and habitat functions.

Watercourses and Fish Habitat

A watercourse on the Southern Pines Golf course has been identified as a fish habitat. The following buffers are prescribed based on thermal regime and type of fish habitat.

Warmwater Watercourses and Important or Marginal Fish Habitat will require a 15 m VPZ to protect the feature and its functions.

Cool or Coldwater Watercourses or Critical Fish Habitat will require a 30 m VPZ due to the sensitivity of the feature and habitat.

Habitat of Threatened and Endangered Species

In accordance with the Endangered Species Act requirements consultation with MECP will be required to confirm the recommended buffers on the habitat features is sufficient for the species identified in the Study Area.

It is recommended that VPZs be planted with native species to restore and enhance the ecological condition and function of the VPZs, particularly where they extend over previously disturbed areas such agricultural fields. VPZ should be preserved in a naturalized condition to maintain their protective ecological functions.

These VPZs have been applied to the features identified on **Figure 4**.

5.3 Linkages

The importance of maintaining, and where possible improving, connections between and among protected natural features and areas, particularly in urbanizing settings, is well-recognized in the scientific literature (e.g., see papers cited in Environment Canada 2013).

The City of Hamilton Official Plan defines Linkages as natural areas within the landscape that ecologically connect Core Areas. Connections between natural areas provide opportunities for plant and animal movement, hydrological and nutrient cycling, and maintain ecological health and integrity of the overall NHS. It is intended that Linkages be protected, restored, and enhanced to sustain the Natural Heritage System wherever possible.

No linkage features have been identified within the Study Area in the Official Plan mapping.

5.4 Restoration and Enhancement Areas

The City's Official Plan recognizes Core Areas, Linkages, "and the matrix of lands between them which may be suitable for restoration" as components of the NHS. This approach implements PPS natural heritage s. 2.1.2 which states that the: "The diversity and connectivity of natural features in an area … should be maintained, restored or, where possible, improved…" and the definition of Natural Heritage System which includes "...lands which have been restored or have the potential to be restored to a natural state…". These policies recognize that the ecological integrity of natural areas is often impaired due to land use transformations (e.g., clearing for agriculture or urbanization) and that in such areas, opportunities may exist to restore or enhance core areas of the NHS through a variety of management and stewardship measures either within or adjacent to core areas.

Any non-significant natural heritage features that are proposed for removal must be compensated within and connected to the NHS to prevent fragmented portions of natural features across the landscape. Removal of natural features should be considered a last-case resort where no other alternatives are viable or feasible to maintain the features in place.

Restoration areas are not explicitly identified or mapped in the City's Official Plan and have not been addressed in this report and will be identified as part of the Phase 2 SWS Report within the Proposed NHS.

5.5 Natural Hazard Constraints

Natural hazards, including areas prone to flooding and erosion, are not identified by the City of Hamilton as Core Areas of the NHS; however, such areas are regulated by the Niagara Peninsula Conservation Authority and Section 4.1 of the PPS has policies governing development within and adjacent to natural hazards.

The NPCA mapping does not show any floodplain within the Study Area. This will be confirmed by the project engineer in consultation with the NPCA and City. If present, the natural hazards incorporated into the NHS mapping should it be required.

6. Impact Assessment

The lands within the study area have undergone detailed seasonal surveys to identify natural features in accordance with the City's OP. The findings of these surveys did not reveal any features or functions that would be negatively impacted as a result of the lands being brought into the City of Hamilton Urban Boundary. As discussed in Section 5, the Official Plan provides guidance for the identification of features and associated minimum vegetation protection zones on key natural heritage and hydrologic features.

Should there be any future development on these lands an impact assessment related to the development will be undertaken to ensure that any impacts to features are avoided, minimized and mitigated. Should impacts be proposed, opportunities for compensation and restoration would be envisioned.

7. Conclusion & Next Steps

Beacon was retained to undertake the necessary ecological investigations, analyses, and evaluations required to identify an NHS for the Whitechurch Landowners Group.

The assignment included the characterization of natural heritage and hydrological features and linkages within the study area, based on a review of the Rural Hamilton Official Plan mapping and seasonal field investigations. An evaluation of their significance using provincial and municipal criteria and guidelines, and identification of a NHS in accordance with the goals, objectives and polices of the Provincial Planning Statement (PPS) and the City of Hamilton Official Plan was undertaken.

Based on information collected through the background review and field investigations, the ecological functions and significance of natural heritage and hydrologic features within the study area were described.

Key natural heritage and hydrological features mapped in the Rural Hamilton Official Plan were identified as Core Areas of the Natural Heritage System in accordance with the policies of the City of Hamilton Urban Official Plan. Supporting features including vegetation protection zones identified for the study area. Restoration and enhancement opportunities will be addressed in the Phase 2 SWS.

The Study Area supports woodlands, wetlands and watercourse features that provide a level of ecological or hydrological functions and/or meet the provincial or municipal significance criteria of Core Areas.

The City of Hamilton Official Plan applies a systems approach to natural heritage system planning, which involves delineating a Natural Heritage System to include Core Areas and supportive features, such as linkages and restoration areas that maintain the ecological functionality and connectivity of the natural system. The NHS for the Study Area was delineated based on the Schedules of the Rural Hamilton Official Plan and seasonal field surveys. The presence of these features does not impede the lands from being brought into a Settlement Area; rather this information can be used to develop a fulsome NHS as the project moves forward.

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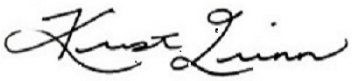

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Principal, Senior Environmental Planner

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Appendix A

Headwater Drainage Feature Photo log

Photograph 1. Upstream View of DF1A from Round 1	View: S
Date Taken: April 6, 2023	
Site: Parcel 20	

Photograph 2. Upstream View of DF1A Taken During Round 2.	View: S
Date Taken: June 6, 2023	
Site: Parcel 20	

Photograph 3. Downstream View of DF1B from Round 1.	View: N
Date Taken: April 6, 2023	
Site: Parcel 20	

Photograph 4. Downstream View of DF2 Taken During Round 1	View: E
Date Taken: April 6, 2023	
Site: Parcel 20	

Photograph 5. Downstream View of DF2 Taken During Round 2.	View: E
Date Taken: June 6, 2023	
Site: Parcel 20	

Photograph 6. Upstream view of DF3a Taken During Round 1.	View: W
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 7. Upstream view of DF3a Taken During Round 2.	View: W
Date Taken: June 6, 2023	
Site: Parcel 10	

Photograph 8. Downstream view of DF3b Taken During Round 1.	View: N
Date Taken: April 6, 2023	
Site: Parcel 3 (left) & Parcel 10 (right)	

Photograph 9. Upstream View of DF4a Near the Confluence with DF4f.	View: W
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 10. Upstream View of DF4a Near the Confluence with DF4f.	View: W
Date Taken: June 6, 2023	
Site: Parcel 10	

Photograph 11. Upstream View of DF4b taken during Round 1.	View: S
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 12. Upstream View of DF4c Taken During Round 1.	View: S
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 13. Upstream View of the Pond Associated with DF4d Taken During Round 1.	View: S
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 14. Upstream View of the Pond Associated with DF4d Taken During Round 2.	View: S
Date Taken: June 6, 2023	
Site: Parcel 10	

Photograph 15. Upstream View of DF4d Taken During Round 1.	View: S
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 16. Upstream View of DF4d Taken During Round 2.	View: S
Date Taken: June 6, 2023	
Site: Parcel 10	

Photograph 17. Upstream View of DF4e Taken During Round 1.	View: S
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 18. Upstream View of DF5a Taken During Round 1.	View: W
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 19. Upstream View of DF5a Taken During Round 2.	View: W
Date Taken: June 6, 2023	
Site: Parcel 10	

Photograph 20. Downstream View of DF5b Taken During Round 1.	View: E
Date Taken: April 6, 2023	
Site: Parcel 20	

Photograph 21. Upstream View of DF6a Taken During Round 1.	View: N
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 22. Upstream View of DF46b Taken During Round 1.	View: E
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 23. Upstream View of DF46b Taken During Round 2.	View: E
Date Taken: June 6, 2023	
Site: Parcel 10	

Photograph 24. Upstream View of Tile Drain Outlet (arrow) Associated with DF7 Taken During Round 1.	View: N
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 25. Downstream View of DF8 Taken During Round 1.	View: N
Date Taken: April 6, 2023	
Site: Parcel 10	

Photograph 26. Downstream View of the White Church Road Drainage Ditch. No Flow Was Observed During the Round 2 Assessment.	View: W
Date Taken: June 6, 2023	
Site: Parcel 10	

Photograph 27. Downstream View of DF9 as the Feature Enters the Woodlot. Taken In Round 1.	View: N
Date Taken: April 16, 2024	
Site: Parcel 48	

Photograph 28. Downstream View of DF10 as the Feature Enters the Woodlot. Taken In Round 1.	View: N
Date Taken: April 16, 2024	
Site: Parcel 48	

Photograph 29. Downstream View of DF11 Taken During Round 1.	View: S
Date Taken: April 16, 2024	
Site: Parcel 48	

Photograph 30. Downstream View of DF11 Taken During Round 2.	View: S
Date Taken: May 31, 2024	
Site: Parcel 48	

Photograph 31. Upstream View of DF12a Taken During Round 1.	View: N
Date Taken: April 16, 2024	
Site: Parcel 48	

Photograph 32. Downstream View of DF12b Taken Downstream of the DF12c Confluence. Taken During Round 1.	View: S
Date Taken: April 16, 2024	
Site: Parcel 56	

Photograph 33. Downstream View of DF12b Taken Downstream of the DF12c Confluence. Taken During Round 2.	View: S
Date Taken: May 31, 2024	
Site: Parcel 56	

Photograph 34. Upstream View of DF12c Taken In Round 1.	View: E
Date Taken: April 16, 2024	
Site: Parcel 56	

Photograph 35. Upstream View of DF12c Taken During Round 2. Water in Photo was Standing.	View: E
Date Taken: May 31, 2024	
Site: Parcel 56	

Photograph 36. Upstream View of DF13a Taken During Round 1.	View: N
Date Taken: April 16, 2024	
Site: Parcel 47	

Photograph 37. Upstream View of DF13a Taken During Round 2.	View: N
Date Taken: May 31, 2024	
Site: Parcel 47	

Photograph 38. Downstream View of DF13b Taken During Round 1.	View: S
Date Taken: April 16, 2024	
Site: Parcel 56	

Photograph 39. Upstream View of DF14 Taken During Round 1.	View: N
Date Taken: April 16, 2024	
Site: Parcel 47	

Photograph 40. Upstream View of DF14 Taken During Round 2.	View: N
Date Taken: May 31, 2024	
Site: Parcel 47	

Photograph 41. Upstream View of DF15a (right) and DF15b (left) Taken at Their Confluence in Round 1.	View: N
Date Taken: April 16, 2024	
Site: Parcel 47	

Photograph 42. Upstream View of DF15a Taken in Round 2.	View: N
Date Taken: May 31, 2024	
Site: Parcel 47	

Photograph 43. Upstream View of DF16 Taken During Round 1.	View: N
Date Taken: March 27, 2024	
Site: Parcel 2	

Photograph 44. Upstream View of DF16 Taken During Round 2.	View: N
Date Taken: May 31, 2024	
Site: Parcel 2	

Photograph 45. Upstream View of DF17 Taken During Round 1.	View: N
Date Taken: March 27, 2024	
Site: Parcel 2	

Photograph 46. Upstream View of DF17 Taken During Round 2.	View: N
Date Taken: May 31, 2024	
Site: Parcel 2	

Photograph 47. Upstream View of DF18a Taken Round 1.	View: N
Date Taken: April 16, 2024	
Site: Parcel 2	

Photograph 48. Upstream View of Flow Entering Culvert Associated with DF18a Taken in Round 2.	View: N
Date Taken: May 31, 2024	
Site: Parcel 2	

Photograph 49. Upstream View of No Flow Entering Culvert Associated with DF18a Taken in Round 3.	View: N
Date Taken: July 8, 2024	
Site: Parcel 2	

Photograph 50. Upstream View of DF18b Taken During Round 1.	View: N
Date Taken: April 16, 2024	
Site: Parcel 34	

Photograph 51. Upstream View of DF18b Taken During Round 2.	View: N
Date Taken: May 31, 2024	
Site: Parcel 34	

Photograph 52. Upstream View of DF18b Taken During Round 3. Channel was Dry and Overgrown.	View: N
Date Taken: July 8, 2024	
Site: Parcel 34	

Photograph 53. Downstream View of DF18c Taken During Round 2.	View: W
Date Taken: April 16, 2024	
Site: Parcel 34	

Photograph 54. Downstream View of DF18c Taken During Round 2.	View: W
Date Taken: May 31, 2024	
Site: Parcel 34	

Photograph 55. Downstream View of DF18c Taken During Round 3.	View: W
Date Taken: July 8, 2024	
Site: Parcel 34	

Appendix B

Ecological Land Classification photolog and botanical list

Appendix B

Ecological Land Classification photolog

Photograph 1: Sugar Maple Hardwood Forest Community (August 09, 2023)

Photograph 2: Sugar Maple-Beech Community (August 09, 2023)

Photograph 3: Ephemeral Pond within a Forest Community (August 09, 2023)

Photograph 4: A Silver Maple Swamp (August 25, 2023)

Photograph 5: Poplar Swamp Community (August 25, 2023)

Photograph 6: Reed Canary Grass Marsh Community (August 09, 2023)

Photograph 7: Cultural Meadow Community (August 22, 2024)

Photograph 8: Open Water Aquatic Community (August 25, 2023)

Photograph 9: Duckweed Floating-leaved Shallow Aquatic Community (August 25, 2023)

Photograph 10: Mixed Shallow Aquatic Community (August 17, 2023)

Photograph 11: Waterweed Submerged Shallow Aquatic Community (August 25, 2023)

Photograph 12: Hedgerow (August 09, 2023)

Appendix B

Botanical List

Scientific Name	Common Name	Family	COSEWIC	SARO	SRank	Hamilton	Nat Status
Acer negundo	Manitoba Maple	Aceraceae			S5	C	N
Acer platanoides	Norway Maple	Aceraceae			SE5	IX	I
Acer saccharinum	Silver Maple	Aceraceae			S5	C	N
Acer saccharum	Sugar Maple	Aceraceae			S5	C	N
Acer x freemanii	(Acer rubrum X Acer saccharinum)	Aceraceae			SNA	hyb	N
Achillea millefolium	Common Yarrow	Asteraceae			SE5?	IX	I
Actaea pachypoda	White Baneberry	Ranunculaceae			S5	C	N
Agrostis gigantea	Redtop	Poaceae			SE5	IX	I
Alisma triviale	Northern Water-plantain	Alismataceae			S5	X	N
Alliaria petiolata	Garlic Mustard	Brassicaceae			SE5	IC	I
Ambrosia artemisiifolia	Common Ragweed	Asteraceae			S5	C	N
Ambrosia trifida	Great Ragweed	Asteraceae			S5	U	N
Amphicarpaea bracteata	American Hog-peanut	Fabaceae			S5	C	N
Anemonastrum canadense	Canada Anemone	Ranunculaceae			S5	C	N
Anemone virginiana	Tall Anemone	Ranunculaceae			S5	C	N
Apocynum androsaemifolium	Spreading Dogbane	Apocynaceae			S5	C	N
Arctium lappa	Great Burdock	Asteraceae			SE5	IX	I
Arctium minus	Common Burdock	Asteraceae			SE5	IC	I
Arisaema triphyllum	Jack-in-the-pulpit	Araceae			S5	C	N
Asclepias syriaca	Common Milkweed	Apocynaceae			S5	C	N
Atriplex patula	Spear Saltbush	Chenopodiaceae			SE5	IU	I
Bidens cernua	Nodding Beggarticks	Asteraceae			S5	C	N
Bidens frondosa	Devil's Beggarticks	Asteraceae			S5	C	N
Boehmeria cylindrica	Small-spike False Nettle	Urticaceae			S5	C	N
Brassica nigra	Black Mustard	Brassicaceae			SE5	IR	I

Scientific Name	Common Name	Family	COSEWIC	SARO	SRank	Hamilton	Nat Status
Bromus inermis	Smooth Brome	Poaceae			SE5	IC	I
Carex bebbii	Bebb's Sedge	Cyperaceae			S5	C	N
Carex cristatella	Crested Sedge	Cyperaceae			S5	C	N
Carex interior	Inland Sedge	Cyperaceae			S5	U	N
Carex intumescens	Bladder Sedge	Cyperaceae			S5	C	N
Carex lupulina	Hop Sedge	Cyperaceae			S5	C	N
Carex pedunculata	Long-stalked Sedge	Cyperaceae			S5	C	N
Carex pensylvanica	Pennsylvania Sedge	Cyperaceae			S5	C	N
Carex plantaginea	Plantain-leaved Sedge	Cyperaceae			S5	C	N
Carex rosea	Rosy Sedge	Cyperaceae			S5	C	N
Carex scoparia	Pointed Broom Sedge	Cyperaceae			S5	C	N
Carex tribuloides	Blunt Broom Sedge	Cyperaceae			S4	C	N
Carex vulpinoidea	Fox Sedge	Cyperaceae			S5	C	N
Carpinus caroliniana	Blue-beech	Betulaceae			S5	C	N
Carya glabra	Pignut Hickory	Juglandaceae			S3	R	N
Carya ovata	Shagbark Hickory	Juglandaceae			S5	C	N
Caulophyllum thalictroides	Blue Cohosh	Berberidaceae			S5	C	N
Cephalanthus occidentalis	Eastern Buttonbush	Rubiaceae			S5	C	N
Cerastium fontanum	Common Mouse-ear Chickweed	Caryophyllaceae			SE5	IC	I
Cichorium intybus	Wild Chicory	Asteraceae			SE5	IC	I
Cicuta maculata	Spotted Water-hemlock	Apiaceae			S5		N
Circaea canadensis	Broad-leaved Enchanter's Nightshade	Onagraceae			S5	C	N
Cirsium arvense	Canada Thistle	Asteraceae			SE5	IC	I
Cirsium vulgare	Bull Thistle	Asteraceae			SE5	IX	I
Claytonia virginica	Eastern Spring Beauty	Portulacaceae			S5	C	N
Collinsonia canadensis	Canada Horsebalm	Lamiaceae			S4	C	N
Cornus obliqua	Silky Dogwood	Cornaceae			S5	C	N
Cornus racemosa	Grey Dogwood	Cornaceae			S5	C	N
Cornus sericea	Red-osier Dogwood	Cornaceae			S5	C	N
Crataegus douglasii	Douglas' Hawthorn	Rosaceae			S4?		N

Scientific Name	Common Name	Family	COSEWIC	SARO	SRank	Hamilton	Nat Status
Crataegus mollis	Downy Hawthorn	Rosaceae			S4S5		N
Crataegus monogyna	English Hawthorn	Rosaceae			SE4	IX	I
Cyperus strigosus	Straw-coloured Flatsedge	Cyperaceae			S5	U	N
Dactylis glomerata	Orchard Grass	Poaceae			SE5	IC	I
Daucus carota	Wild Carrot	Apiaceae			SE5	IC	I
Desmodium canadense	Canada Tick-trefoil	Fabaceae			S4	C	N
Dianthus armeria	Deptford Pink	Caryophyllaceae			SE5	IC	I
Dipsacus fullonum	Common Teasel	Dipsacaceae			SE5	IX	I
Echinochloa crus-galli	Large Barnyard Grass	Poaceae			SE5	IC	I
Elaeagnus umbellata	Autumn Olive	Elaeagnaceae			SE3	IX	I
Eleocharis erythropoda	Red-stemmed Spikerush	Cyperaceae			S5	C	N
Eleocharis obtusa	Blunt Spikerush	Cyperaceae			S5	C	N
Elodea canadensis	Canada Waterweed	Hydrocharitaceae			S5	C	N
Elymus hystrix	Bottlebrush Grass	Poaceae			S5	C	N
Epilobium ciliatum	Northern Willowherb	Onagraceae			S5		N
Epilobium coloratum	Purple-veined Willowherb	Onagraceae			S5	C	N
Erechtites hieraciifolius	Eastern Burnweed	Asteraceae			S5	U	N
Erigeron annuus	Annual Fleabane	Asteraceae			S5	C	N
Erigeron canadensis	Canada Horseweed	Asteraceae			S5	C	N
Erythronium americanum	Yellow Trout-lily	Liliaceae			S5	C	N
Euonymus obovatus	Running Strawberry-bush	Celastraceae			S4	C	N
Eupatorium perfoliatum	Common Boneset	Asteraceae			S5	C	N
Eurybia macrophylla	Large-leaved Aster	Asteraceae			S5	C	N
Euthamia graminifolia	Grass-leaved Goldenrod	Asteraceae			S5	C	N
Fagus grandifolia	American Beech	Fagaceae			S4	C	N
Fragaria virginiana	Wild Strawberry	Rosaceae			S5		N
Fraxinus americana	White Ash	Oleaceae			S4	C	N
Fraxinus pennsylvanica	Red Ash	Oleaceae			S4	C	N
Galium tricornutum	Rough-fruit Corn Bedstraw	Rubiaceae			SEH		I
Geranium maculatum	Spotted Geranium	Geraniaceae			S5	C	N
Geranium robertianum	Herb-Robert	Geraniaceae			S5	C	N
Geum canadense	Canada Avens	Rosaceae			S5	C	N
Geum laciniatum	Rough Avens	Rosaceae			S4	C	N
Glechoma hederacea	Ground-ivy	Lamiaceae			SE5	IC	I

Scientific Name	Common Name	Family	COSEWIC	SARO	SRank	Hamilton	Nat Status
Glyceria septentrionalis	Eastern Mannagrass	Poaceae			S4	C	N
Hackelia virginiana	Virginia Stickseed	Boraginaceae			S5	C	N
Helianthus tuberosus	Jerusalem Artichoke	Asteraceae			SU	IX	N
Hesperis matronalis	Dame's Rocket	Brassicaceae			SE5	IC	I
Hordeum jubatum	Foxtail Barley	Poaceae			S5?		N
Hydrophyllum virginianum	Virginia Waterleaf	Hydrophyllaceae			S5	C	N
Hypericum perforatum	Common St. John's-wort	Clusiaceae			SE5	IC	I
Impatiens capensis	Spotted Jewelweed	Balsaminaceae			S5	C	N
Inula helenium	Elecampane	Asteraceae			SE5	IX	I
Iris versicolor	Harlequin Blue Flag	Iridaceae			S5	C	N
Juglans nigra	Black Walnut	Juglandaceae			S4?	C	N
Juncus dudleyi	Dudley's Rush	Juncaceae			S5	C	N
Juncus effusus	Soft Rush	Juncaceae			S5		N
Juncus tenuis	Path Rush	Juncaceae			S5	C	N
Juniperus virginiana	Eastern Red Cedar	Cupressaceae			S5	C	N
Lactuca serriola	Prickly Lettuce	Asteraceae			SE5	IX	I
Leersia oryzoides	Rice Cutgrass	Poaceae			S5	C	N
Lemna minor	Small Duckweed	Lemnaceae			S5?	C	N
Lepidium campestre	Field Peppergrass	Brassicaceae			SE5	IX	I
Ligustrum vulgare	European Privet	Oleaceae			SE5	IX	I
Lobelia cardinalis	Cardinal Flower	Campanulaceae			S5	C	N
Lolium arundinaceum	Tall Ryegrass	Poaceae			SE5	IX	I
Lolium perenne	Perennial Ryegrass	Poaceae			SE4	IC	I
Lonicera tatarica	Tatarian Honeysuckle	Caprifoliaceae			SE5	IX	I
Lotus corniculatus	Garden Bird's-foot Trefoil	Fabaceae			SE5	IC	I
Lycopus americanus	American Water-horehound	Lamiaceae			S5	C	N
Lycopus uniflorus	Northern Water-horehound	Lamiaceae			S5	C	N
Lythrum salicaria	Purple Loosestrife	Lythraceae			SE5	IC	I
Maianthemum racemosum	Large False Solomon's Seal	Liliaceae			S5	C	N
Malus pumila	Common Apple	Rosaceae			SE4	IX	I

Scientific Name	Common Name	Family	COSEWIC	SARO	SRank	Hamilton	Nat Status
Matteuccia struthiopteris	Ostrich Fern	Dryopteridaceae			S5	C	N
Medicago lupulina	Black Medick	Fabaceae			SE5	IC	I
Melilotus albus	White Sweet-clover	Fabaceae			SE5	IC	I
Melilotus officinalis	Yellow Sweet-clover	Fabaceae			SE5	IC	I
Menispermum canadense	Canada Moonseed	Menispermaceae			S4	C	N
Mentha canadensis	Canada Mint	Lamiaceae			S5	C	N
Nepeta cataria	Catnip	Lamiaceae			SE5	IX	I
Oenothera biennis	Common Evening-primrose	Onagraceae			S5	C	N
Onoclea sensibilis	Sensitive Fern	Dryopteridaceae			S5	C	N
Ostrya virginiana	Eastern Hop-hornbeam	Betulaceae			S5	C	N
Oxalis stricta	Upright Yellow Wood-sorrel	Oxalidaceae			S5	C	N
Panicum capillare	Common Panicgrass	Poaceae			S5	C	N
Panicum dichotomiflorum	Fall Panicgrass	Poaceae			SE5	IX	I
Panicum virgatum	Old Switch Panicgrass	Poaceae			S4	R	N
Parthenocissus vitacea	Thicket Creeper	Vitaceae			S5	C	N
Penthorum sedoides	Ditch Stonecrop	Crassulaceae			S5	C	N
Persicaria lapathifolia	Pale Smartweed	Polygonaceae			S5	C	N
Persicaria maculosa	Spotted Lady's-thumb	Polygonaceae			SE5	IC	I
Phalaris arundinacea	Reed Canarygrass	Poaceae			S5	C	N
Phleum pratense	Common Timothy	Poaceae			SE5	IC	I
Phragmites australis	Common Reed	Poaceae			S4?		N
Picea abies	Norway Spruce	Pinaceae			SE3	IR	I
Picea glauca	White Spruce	Pinaceae			S5	C	N
Picea pungens	Blue Spruce	Pinaceae			SE1	IR	I
Pilea pumila	Dwarf Clearweed	Urticaceae			S5	C	N
Pilosella caespitosa	Meadow Hawkweed	Asteraceae			SE5	IX	I
Pinus strobus	Eastern White Pine	Pinaceae			S5	C	N
Pinus sylvestris	Scots Pine	Pinaceae			SE5	IX	I
Poa palustris	Fowl Bluegrass	Poaceae			S5	C	N
Poa pratensis	Kentucky Bluegrass	Poaceae			S5		N
Podophyllum peltatum	May-apple	Berberidaceae			S5	C	N

Scientific Name	Common Name	Family	COSEWIC	SARO	SRank	Hamilton	Nat Status
Populus deltoides	Eastern Cottonwood	Salicaceae			S5		N
Populus tremuloides	Trembling Aspen	Salicaceae			S5	C	N
Potentilla recta	Sulphur Cinquefoil	Rosaceae			SE5	IX	I
Prunella vulgaris	Common Self-heal	Lamiaceae			S5		N
Prunella vulgaris ssp. lanceolata	Lance-leaved Self-heal	Lamiaceae			S5	C	N
Prunus avium	Sweet Cherry	Rosaceae			SE4	IX	I
Prunus serotina	Black Cherry	Rosaceae			S5	C	N
Prunus virginiana	Chokecherry	Rosaceae			S5	C	N
Pyrus communis	Common Pear	Rosaceae			SE4	IX	I
Quercus rubra	Northern Red Oak	Fagaceae			S5	C	N
Ranunculus caricetorum	Northern Swamp Buttercup	Ranunculaceae			S5	C	N
Reynoutria japonica	Japanese Knotweed	Polygonaceae			SE5	IX	I
Rhamnus cathartica	European Buckthorn	Rhamnaceae			SE5	IC	I
Rhus typhina	Staghorn Sumac	Anacardiaceae			S5	C	N
Ribes americanum	American Black Currant	Grossulariaceae			S5	C	N
Robinia pseudoacacia	Black Locust	Fabaceae			SE5	IC	I
Rosa multiflora	Multiflora Rose	Rosaceae			SE5	IC	I
Rosa rubiginosa	Sweetbriar Rose	Rosaceae			SE4		I
Rubus allegheniensis	Allegheny Blackberry	Rosaceae			S5	C	N
Rubus occidentalis	Black Raspberry	Rosaceae			S5	C	N
Rumex crispus	Curled Dock	Polygonaceae			SE5	IX	I
Salix amygdaloides	Peach-leaved Willow	Salicaceae			S5	C	N
Salix bebbiana	Bebb's Willow	Salicaceae			S5	C	N
Salix discolor	Pussy Willow	Salicaceae			S5	C	N
Salix eriocephala	Cottony Willow	Salicaceae			S5	C	N
Salix interior	Sandbar Willow	Salicaceae			S5	C	N
Salix x fragilis	(Salix alba X Salix euxina)	Salicaceae			SNA	hyb	I
Sambucus canadensis	Common Elderberry	Caprifoliaceae			S5	C	N
Sanguinaria canadensis	Bloodroot	Papaveraceae			S5	C	N
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush	Cyperaceae			S5	C	N
Scirpus atrocinctus	Black-girdled Bulrush	Cyperaceae			S5		N

Scientific Name	Common Name	Family	COSEWIC	SARO	SRank	Hamilton	Nat Status
Scirpus cyperinus	Common Woolly Bulrush	Cyperaceae			S5	C	N
Setaria pumila	Yellow Foxtail	Poaceae			SE5	IX	I
Setaria viridis	Green Foxtail	Poaceae			SE5	IX	I
Sium suave	Common Water-parsnip	Apiaceae			S5	C	N
Solanum dulcamara	Bittersweet Nightshade	Solanaceae			SE5	IC	I
Solanum nigrum	Black Nightshade	Solanaceae			SE1	IR	I
Solidago altissima	Tall Goldenrod	Asteraceae			S5		N
Solidago flexicaulis	Zigzag Goldenrod	Asteraceae			S5	C	N
Solidago juncea	Early Goldenrod	Asteraceae			S5	C	N
Sonchus arvensis	Field Sow-thistle	Asteraceae			SE5	IX	I
Sorbus aucuparia	European Mountain-ash	Rosaceae			SE4	IX	I
Spiraea alba	White Meadowsweet	Rosaceae			S5	C	N
Symphyotrichum ericoides	White Heath Aster	Asteraceae			S5		N
Symphyotrichum lanceolatum	Panicled Aster	Asteraceae			S5	C	N
Symphyotrichum novae-angliae	New England Aster	Asteraceae			S5	C	N
Symphyotrichum pilosum	Old Field Aster	Asteraceae			S5		N
Syringa vulgaris	Common Lilac	Oleaceae			SE5	IR	I
Taraxacum officinale	Common Dandelion	Asteraceae			SE5	IC	I
Thelypteris palustris	Marsh Fern	Thelypteridaceae			S5	C	N
Thlaspi arvense	Field Pennycress	Brassicaceae			SE5	IC	I
Thuja occidentalis	Eastern White Cedar	Cupressaceae			S5	C	N
Tilia americana	Basswood	Tiliaceae			S5	C	N
Toxicodendron radicans	Poison Ivy	Anacardiaceae			S5		N
Trifolium hybridum	Alsike Clover	Fabaceae			SE5	IC	I
Trifolium pratense	Red Clover	Fabaceae			SE5	IC	I
Triticum aestivum	Common Wheat	Poaceae			SE1	IR	I
Tussilago farfara	Coltsfoot	Asteraceae			SE5	IX	I
Typha angustifolia	Narrow-leaved Cattail	Typhaceae			SE5	IX	I
Typha latifolia	Broad-leaved Cattail	Typhaceae			S5	C	N
Ulmus americana	White Elm	Ulmaceae			S5	C	N
Urtica dioica	Stinging Nettle	Urticaceae			S5		N

Scientific Name	Common Name	Family	COSEWIC	SARO	SRank	Hamilton	Nat Status
Verbascum thapsus	Common Mullein	Scrophulariaceae			SE5	IC	I
Verbena hastata	Blue Vervain	Verbenaceae			S5	C	N
Veronica officinalis	Common Speedwell	Scrophulariaceae			SE5	IC	I
Viburnum acerifolium	Maple-leaved Viburnum	Caprifoliaceae			S5	C	N
Viburnum opulus ssp. trilobum	Highbush Cranberry	Caprifoliaceae			S5	C	N
Vicia cracca	Tufted Vetch	Fabaceae			SE5	IC	I
Viola pubescens	Yellow Violet	Violaceae			S5	C	N
Viola sororia	Woolly Blue Violet	Violaceae			S5	C	N
Vitis riparia	Riverbank Grape	Vitaceae			S5	C	N
							N

KEY
S-Rank (from Natural Heritage Information Centre) for breeding status: S1 (Extremely Rare), S2 (Very Rare), S3 (Rare to Uncommon) (S4 (Common), S5 (Very Common) SNA (Not applicable…'because the species is not a suitable target for conservation activities'; includes non-native species), E (Exotic)

I introduced; thought to have been present in the Carolinian Zone or individual CZ area prior to European settlement; believed to be deliberately or inadvertently introduced to the CZ by humans (followed by a status, below)

C common
N Native
U uncommon
R rare
H historic records only (generally >30 years)
X present; status unknown or not specified in source lists
? unconfirmed report
hyb hybrid

Appendix C

Breeding Bird Species List

Appendix C

Breeding Bird Species List

Common Name	Scientific Name	Status				# Breeding Pairs/ Territories[4]
		COSEWIC[1]	COSSARO[2]	SRANK[3]	AREA SENSITIVE?	
Mallard	*Anas platyrhynchos*			S5		3
Mourning Dove	*Zenaida macroura*			S5		14
Killdeer	*Charadrius vociferus*			S5		15
Spotted Sandpiper	*Actitis macularius*			S5		3
Green Heron	*Butorides virescens*			S4		1
Great Blue Heron	*Ardea herodias*			S5		F
Turkey Vulture	*Cathartes aura*			S4		F
Red-tailed Hawk	*Buteo jamaicensis*			S5		F
Downy Woodpecker	*Dryobates pubescens*			S5		3
Red-bellied Woodpecker	*Melanerpes carolinus*			S4		3
Northern Flicker	*Colaptes auratus*			S4		4
Eastern Wood-Pewee	*Contopus virens*	Special Concern	Special Concern	S4		3
Willow Flycatcher	*Empidonax traillii*			S5		4
Great Crested Flycatcher	*Myiarchus crinitus*			S5		6
Eastern Kingbird	*Tyrannus tyrannus*			S5		7
Warbling Vireo	*Vireo gilvus*			S5		4
Red-eyed Vireo	*Vireo olivaceus*			S5		5
Common Raven	*Corvus corax*			S5		1
American Crow	*Corvus brachyrhynchos*			S5		2
Blue Jay	*Cyanocitta cristata*			S5		5
Black-capped Chickadee	*Poecile atricapillus*			S5		7
Horned Lark	*Eremophila alpestris*			S5		11
Tree Swallow	*Tachycineta bicolor*			S5		2
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*			S5		2
Bank Swallow	*Riparia riparia*	Threatened	Threatened	S5		F
Barn Swallow	*Hirundo rustica*	Threatened	Special Concern	S5		12
Cliff Swallow	*Petrochelidon pyrrhonota*			S5		1
White-breasted Nuthatch	*Sitta carolinensis*			S5	x	3

Common Name	Scientific Name	Status				# Breeding Pairs/ Territories[4]
		COSEWIC[1]	COSSARO[2]	SRANK[3]	AREA SENSITIVE?	
House Wren	*Troglodytes aedon*			S5		5
Carolina Wren	*Thryothorus ludovicianus*			S4		2
European Starling	*Sturnus vulgaris*			SNA		17
Gray Catbird	*Dumetella carolinensis*			S5		12
Chipping Sparrow	*Spizella passerina*			S5		10
Field Sparrow	*Spizella pusilla*			S5		4
Vesper Sparrow	*Pooecetes gramineus*			S4		3
Savannah Sparrow	*Passerculus sandwichensis*			S5	x	30
Song Sparrow	*Melospiza melodia*			S5		102
Swamp Sparrow	*Melospiza georgiana*			S5		1
Orchard Oriole	*Icterus spurius*			SZB		2
Baltimore Oriole	*Icterus galbula*			S4		9
Red-winged Blackbird	*Agelaius phoeniceus*			S5		110
Brown-headed Cowbird	*Molothrus ater*			S5		30
Common Grackle	*Quiscalus quiscula*			S5		18
American Robin	*Turdus migratorius*			S5		88
Cedar Waxwing	*Bombycilla cedrorum*			S5		10
Common Yellowthroat	*Geothlypis trichas*			S5		3
Yellow Warbler	*Setophaga petechia*			S5		20
American Redstart	*Setophaga ruticilla*			S5		2
House Finch	*Haemorhous mexicanus*			SE		7
American Goldfinch	*Spinus tristis*			S5		19
Northern Cardinal	*Cardinalis cardinalis*			S5		8
Indigo Bunting	*Passerina cyanea*			S5		4
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			S5		1
House Sparrow	*Passer domesticus*			SNA		8

[1]Committee on the Status of Endangered Wildlife in Canada
[2]Committee on the Status of Species at Risk in Ontario
[3]Provincial Conservation Status: S4=Apparently Secure, S5=Secure, SNA=Status Not Applicable
[4]F=Flyover (not breeding on property)

Appendix D

Bat Analysis Data

Appendix D

Bat Analysis Data

Detector #	ELC Community	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Eastern Small-footed Myotis	Little Brown Myotis	Northern Myotis	Myotis Species	Tri-Colored Bat	Total
12A	FOD5-2	0	0	9	7	0	0	0	0	0	16
12B	FOD6-5(a)	1519	1	201	633	0	0	0	3	0	2357
13A	FOD5-2	105	0	32	50	0	0	0	2	0	189
13B	FOD6-5(a)	66	0	88	125	0	0	0	0	0	279
14A	FOD6-5(b)	97	0	57	69	0	0	0	0	0	223
14B	FOD6-5(c)	104	0	147	60	43	0	0	83	0	437
15A	FOD5-2	191	0	45	69	0	4	0	13	0	322
15B	FOD6-5(a)	1716	57	467	358	47	1	0	20	0	2666
16A	FOD6-5(b)	107	0	53	7	18	0	0	10	0	195
16B	FOD6-5(c)	39	0	6	7	5	1	1	23	0	82
17A	SWD4	7	0	15	19	0	1	0	0	0	42
17B	FOD6-5(c)	671	28	335	246	29	0	0	168	0	1477
18	FOD6-5	121	3	60	82	9	0	0	39	0	314
19A	FOD6-5(b)	745	1	306	221	17	0	0	83	0	1373
19B	FOD6-5(c)	349	2	225	69	61	0	0	63	0	769
20A	FOD6-5(b)	163	11	175	72	2	7	0	113	0	543
20B	FOD6-5(c)	87	0	57	60	0	0	0	2	0	206
22A	FOD6-5(b)	66	0	57	21	127	0	0	38	0	309
22B	FOD6-5(a)	202	5	444	408	108	0	0	124	0	1291
24A	FOD6-5(b)	181	0	53	42	12	0	0	23	0	311
24B	FOD6-5(a)	461	37	290	397	11	1	0	267	0	1464
25A	FOD6-5(b)	10	0	63	17	0	0	0	3	0	93

Detector #	ELC Community	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Eastern Small-footed Myotis	Little Brown Myotis	Northern Myotis	Myotis Species	Tri-Colored Bat	Total
25B	FOD6-5(c)	124	11	42	17	17	0	0	25	0	236
26A	FOD6-5(b)	57	0	21	21	19	0	0	40	0	158
26B	FOD6-5(c)	419	0	46	46	2	0	0	0	0	513
27A	FOD6-5(b)	37	0	61	9	2	0	0	0	0	109
27B	FOD6-5(c)	170	0	41	70	0	0	0	0	0	281
28A	FOD6-5(b)	295	0	327	167	49	0	0	72	0	910
28B	FOD6-5(c)	541	0	166	173	28	0	1	44	1	954
29A	FOD6-5(b)	6	0	9	2	0	0	0	1	0	18
29B	FOD6-5(a)	82	0	110	40	6	0	0	3	0	241
	Total	**8738**	**156**	**4008**	**3584**	**612**	**15**	**2**	**1262**	**1**	**18378**