



Final

52 Hawkesville Road, 110 and 118 Northside Drive, St. Jacobs

Environmental Impact Study

Prepared for:

Schlegel Urban Developments
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Kitchener, ON
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NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

52 Hawkesville Road, 110 and 118 Northside Drive, St. Jacobs

Environmental Impact Study

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by Schlegel Urban Developments to complete an Environmental Impact Study (EIS) for a proposed residential subdivision located at 52 Hawkesville Road and 110 and 118 Northside Drive, St. Jacobs (herein, these properties, are referred to as the “subject property”). For the purposes of this EIS, the “study area” is considered the subject property plus adjacent lands within 120 m. Adjacent lands have been considered in cases where occurrence of adjacent significant habitat may require a buffer, development setback, or other development constraints that extend onto the subject property.

The 28.98 ha subject property (Map 1) contains a Regionally-mapped Core Environmental Feature (CEF) which is characterized by a Significant Woodland, as defined by the Regional Official Plan (OP) (Region of Waterloo 2015). A section of the evaluated, non-provincially significant Upper Conestogo Creek Wetland complex is located within the subject property, near the area of proposed development (>30 m from the development limits). A natural watercourse is located within the northern portion of the subject property within the woodland. Within the eastern portion of the study area, the watercourse has been channelized and crosses under King Street, flowing east through a 2 m diameter culvert. This drainage feature is known as Municipal Drain No. 11. It is understood that this is an anthropogenic drainage feature created by the municipality several years ago to alleviate flooding concerns. A second channelized drain was created to the rear of houses fronting the west side of Northside Drive, referred to as the Northside Drive Municipal Drain. This drain channels runoff into the woodland feature, where it intersects with the natural watercourse (Map 1).

The properties at 110 and 118 Northside Drive represent existing residential lots and are fully developed with the exception of small regenerating thicket (old orchard) features. The large property to the immediate west, and the adjoining 52 Hawkesville Road property, contain areas of actively cultivated agricultural field. The subject property is predominantly surrounded by agricultural lands with the exception of the east, where existing residential lots front onto Northside Drive and King Street North, and south where residential lots and a church front onto Hawkesville Road. A north-south oriented rail line borders the western edge of the subject property. The subject property is located west of the Grand River and north of the Conestogo River.

The proponent is proposing the construction of a subdivision comprising of a mix of low and medium density residential units, stormwater management infrastructure, a park, and associated roads/sidewalks. Due to the presence of regulated areas (wetlands and watercourse) and CEF, an EIS is required to ensure adverse impacts to these natural heritage features do not occur as a result of development.

This report summarizes background information on natural heritage features and species records, as well as results of field surveys completed within the study area. This information was used to identify and delineate natural environment development constraints based on the significance and sensitivity of the features and to inform the proposed development layout. An impact assessment has been completed based on the comparison of the existing natural features to the development plan and construction details. Recommendations have been provided to avoid, or otherwise mitigate impacts to the existing natural features. This report is in conformance with the Region's Greenlands Network Implementation Guideline (Region of Waterloo 2016), Township of Woolwich Official Plan (Woolwich Township 2025), and Grand River Conservation Authority (GRCA) EIS Guidelines (GRCA 2005). The Project Team is comprised of:

- GSP Group (planning),
- WalterFedy (engineering),
- GHD Limited (hydrogeology), and
- NRSI (natural heritage).

1.1 Project Scoping

1.1.1 Background Information Review

In order to determine a study approach for the EIS, existing natural heritage information was first gathered and reviewed to identify key natural heritage features and species that are known or have potential to occur within the study area.

Background information on the natural environment features within the study area vicinity was gathered and reviewed from the following sources:

- Region of Waterloo Official Plan (2015);
- Woolwich Township Official Plan (2025);
- MNR Natural Heritage Information Centre (NHIC) online database (MNR 2024a)
- Fisheries and Oceans Canada (DFO) Species at Risk Mapping (DFO 2024);

- Aquatic Resource Area (ARA) Data (MNR 2024b);
- Grand River Conservation Authority Interactive Mapping Tool (2024);
- Waterloo Region Greenlands Network Implementation Guideline (2016);
- Atlas of the Breeding Birds of Ontario (BSC et al. 2008);
- Ontario Reptile and Amphibian Atlas (ORAA 2024);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Butterfly Atlas (MacNaughton et al. 2024); and
- Ontario Odonata Atlas Database (OOAD 2022).

Initial wildlife species lists were compiled to provide information on species reported from the vicinity of the study area within a 10 x 10 km survey square (17NJ3522, 17NJ3521, 17NJ3621) containing the subject property.

A Terms of Reference (TOR) was prepared by NRSI and submitted to the Region of Waterloo, Woolwich Township, and GRCA on August 29, 2024. Peer review comments prepared by LGL Limited were received on October 1, 2024. The TOR was amended to reflect peer review comments and circulated as a final version on October 23, 2024 (Appendix I). The GRCA provided comments on February 3, 2025 and are addressed herein.

On May 3, 2024, the project team met with Headway Engineering on site to understand the details of the existing drains, evaluate potential opportunities and options for stormwater management outletting, and determine potential impacts of the proposed development on the existing drains.

1.1.2 Significant Species and Habitat Screening

Species at Risk (SAR) are those listed on the Species at Risk in Ontario (SARO) List (MECP 2024). These include species identified by the Committee on the Status of Species at Risk in Ontario (COSSARO) as provincially Endangered, Threatened, or Special Concern. Species listed as Endangered or Threatened species are protected under the *Endangered Species Act* (ESA), which includes protection of their habitat (Government of Ontario 2007). Migratory birds listed as Endangered or Threatened, and their habitat, are protected under the *Species at Risk Act* (SARA) (Government of Canada 2002) and are also considered SAR in this EIS.

SCC are those identified as:

- species designated provincially as Special Concern;

- species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the Natural Heritage Information Centre (MNR 2024c); and,
- terrestrial species that are designated federally as Threatened or Endangered on the federal *Species at Risk Act* (SARA) but not provincially by the ESA.

Habitat for SCC is considered Significant Wildlife Habitat (SWH) (MNR 2010), which is afforded protection under the Provincial Planning Statement (MMAH 2024) and municipal natural heritage protection policies. For the purposes of this report, the term “SAR” will refer to provincially Threatened and Endangered species regulated under the ESA while provincial species of Special Concern will be considered SCC.

Based on NRSI’s examination of background sources and federally or provincially significant species with occurrence records in the study area vicinity (within 10 km), an assessment of SAR and SCC suitable habitat presence within the study area was completed. Assessments of habitat suitability in the study area were made by cross-referencing each species’ known habitat preferences or requirements (e.g., MNR 2000) with habitat availability based on satellite imagery interpretation and available mapping.

Based on the results of the preliminary screening, the following SAR were identified as having potential for suitable habitat within the study area:

- Chimney Swift (*Chaetura pelagica*) – provincially and federally Threatened
- Little Brown Myotis (*Myotis lucifugus*) – provincially and federally Endangered
- Northern Myotis (*Myotis septentrionalis*) – provincially and federally Endangered
- Tri-colored Bat (*Perimyotis subflavus*) – provincially and federally Endangered
- Eastern Red Bat (*Lasiurus borealis*) – provincially and federally Endangered
- Hoary Bat (*Lasiurus cinereus*) – provincially and federally Endangered, and
- Silver Haired Bat (*Lasionycteris noctivagans*) – provincially and federally Endangered.

See Appendix II for the full habitat screening table for SAR and SCC with occurrence records in the study area vicinity.

A preliminary screening for the presence of Significant Wildlife Habitat (SWH) was also completed for the study area, as summarized in the TOR. The Significant Wildlife Habitat Technical Guide (SWHTG) outlines the types of habitats that the MNR considers significant in Ontario as well as criteria to identify these habitats for Ecoregion 6E, in which the study area is

located (MNR 2000, MNR 2015). The SWHTG groups SWH into four broad categories: i) seasonal concentration areas, ii) rare vegetation communities and specialized wildlife habitat, iii) habitats of SCC, and iv) animal movement corridors.

Based on the results of this preliminary screening exercise, the following SWH types were initially considered Candidate SWH for the study area to inform the need for further assessment:

- Bat Maternity Colonies
- Seeps and Springs
- Amphibian Breeding Habitat (Woodland)
- Potential habitat for the following SCC that is not addressed through other SWH categories:
 - Eastern Wood-Pewee (*Contopus virens*) – provincial and federal species of Special Concern
 - Wood Thrush (*Hylocichla mustelina*) – provincial species of Special Concern
 - Monarch (*Danaus plexippus*) – provincial and federal species of Special Concern

See Appendix III for the detailed SWH screening tables, including rationale as to whether the SWH types are considered candidate or not present within the study area.

2.0 Relevant Policies, Legislation and Regulations

Table 1 provides an overview of natural heritage-based policies, regulations and legislation that were considered and informed the EIS. To help inform suitable land-use concepts, guide the layout of development, and identify areas to be protected, inventoried natural features were evaluated against relevant policies, regulations and legislation outlined in the following sections.

Table 1. Relevant Policies, Legislation and Planning Studies.

Policy/Legislation	Description	Project Relevance
Provincial Planning Statement (MMAH 2024)	• Issued under the authority of Section 3 of the <i>Planning Act</i> and came into effect on October 20, 2024, replacing the 2020 PPS. • Section 4.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as ‘significant’. • Section 4.1.5 of the PPS identifies that development and site alteration shall not be permitted within the area outlined in sub-sections a) – f) <i>“unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.”</i> • The Natural Heritage Reference Manual (MNR 2010) and the Significant Wildlife Habitat Technical Guide (MNR 2000, MNR 2015) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.	• Natural features that occur or may occur within the study area, and which receive protection under the PPS, include: ○ Significant Woodland, ○ Fish habitat, ○ Potential Significant Wildlife Habitat, and ○ Potential habitat for Endangered and Threatened species. • Development and site alteration shall not be permitted in SWH unless it has been demonstrated that there will be no negative impacts on natural features or their ecological functions (Section 4.1.5). • Development and site alteration shall not be permitted in habitat of endangered and threatened species except in accordance with provincial and federal requirements (Section 4.1.7). • Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 4.1.4 and 4.1.5 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.
<i>Endangered Species Act</i> (Government of Ontario 2007)	• The original ESA, written in 1971, underwent a year-long review which resulted in a number of changes which came into force in 2007. • The ESA prohibits killing, harming, harassing or capturing SAR and protects their habitats from damage and destruction. • Ontario Regulation 242/08 under the ESA applies to all species on the Species at Risk in Ontario List, as of June 2, 2017. • Ontario Regulation 829/21 and 830/21 may apply depending on which SAR are confirmed to be present within the Subject	• Based on information available through background documents and field surveys, including the SAR/SCC screening, several SAR were identified as having the potential to occur within the overall study area based on the presence of suitable habitat: Chimney Swift, Little Brown Myotis, Northern Myotis, Tri-coloured Bat, Eastern Red Bat, Silver-haired Bat and Hoary Bat.

Policy/Legislation	Description	Project Relevance
	property where harm to those species and their habitat is proposed.	
<i>Migratory Birds Convention Act</i> (CWS 2012)	- The MBCA protects migratory game birds, insectivorous birds, and several other migratory non-game birds from persecution in the form of harassment. - Prohibits the disturbance, destruction, or taking of a nest or eggs of migratory birds. "Incidental take" is considered illegal, with the exception of a permit obtained by the Canadian Wildlife Service (CWS).	- The schedule of on-site work must consider MBCA windows, within timing of the breeding bird season typically occurring between April 1 and August 31; however, this is a guideline, since the MBCA applies to nesting bird species. - Any vegetation removal required for construction of the proposed redevelopment must have regard for this legislation in the form of timing window restrictions or other suitable mitigation measures.
<i>Species at Risk Act</i> (Government of Canada 2002)	- The SARA prohibits killing, harming, harassing, capturing or taking an individual listed as an extirpated, endangered, or threatened. - The SARA prohibits damage or destruction of the residence or critical habitat of individuals listed as an endangered or threatened species. - This applies to all listed species on federal lands, and migratory birds and aquatic species anywhere, regardless of land ownership.	Based on information available through background documents and field surveys, including the SAR/SCC screening, Chimney Swift were identified as having the potential to occur within the overall study area.
Region of Waterloo Official Plan (2015) Region of Waterloo Greenlands Network Implementation Guide (2016)	- The Regional Official Plan outlines and describes their approach to the identification of the environmental features that comprise the Greenlands Network. The Official Plan also provides direction on how the environmental features will be maintained, enhanced or, wherever feasible, restored. - Section 7.C.10 of the OP states that development or site alteration will only be permitted on lands contiguous to a Core Environmental feature where an Environmental Impact Statement, or similar study, demonstrates that the proposed	- Core Environmental Features within the study area include: - Significant Woodland, - and - Potential habitat for Endangered and Threatened species. - Fish habitat may also be present within the study area, which is part of the Region's Greenlands Network.

Policy/Legislation	Description	Project Relevance
	development would not result in adverse environmental impacts on the feature and ecological function of the Core Environmental Features.	
Township of Woolwich Official Plan (2025)	• The Township of Woolwich Official Plan outlines policies for the protection of the Township's natural heritage resources, including those resources identified in the Region of Waterloo Official Plan. • Section 13.7.5 of the OP states that development or site alteration will only be permitted on lands contiguous to a Core Environmental feature where an Environmental Impact Statement, or similar study, demonstrates that the proposed development would not result in adverse environmental impacts on the feature and ecological function of the Core Environmental Features. • Section 13.8.2 of the OP states that development or site alteration will not be permitted within fish habitat, except in accordance with Provincial and Federal requirements.	• The Township's natural heritage features associated with the subject property include: ○ Core Environmental Features ○ Fish Habitat
Ontario Regulation 41/24 (Prohibited Activities, Exemptions and Permits) (2024)	• Regulation issued under Conservation Authorities Act, R.S.O. 1990. Effective date April 1, 2024. • The regulation prohibits certain development activities directly in the legislation.	• A natural watercourse as well as a portion of the Upper Conestogo Creek Wetland Complex are located within the subject property. • All wetlands and the area within 30 m of the wetland boundary are regulated. • Development within regulated areas or adjacent lands (30 m) may require a permit.

Policy/Legislation	Description	Project Relevance
	The GRCA developed a policy and procedure document for administering this regulation in May 2024.	
<i>Canadian Fisheries Act</i> (Government of Canada 2019)	- Under the updated federal <i>Fisheries Act</i>, fish are protected through two core prohibitions: Section 34.4(1) the death of fish by means other than fishing, and Section 35(1) the harmful alteration, disruption, or destruction (HADD) of fish habitat. - Any proposed work, undertaking, or activity should aim to avoid causing the death of fish, or the harmful alteration, disruption or destruction of fish habitat through the course or as a result of any proposed undertaking. Fish habitat is defined as “spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes”. - If there is any proposed work below the high-water mark or channel itself, a proponent-led DFO assessment must be completed for the proposed works to determine if the works have the potential to contravene the <i>Fisheries Act</i> and require a request for review by the Fisheries Protection Program. - If impacts to fish or fish habitat cannot be mitigated effectively, a <i>Fisheries Act</i> Authorization may be required.	The study area includes the Municipal Drain No. 11 and the Northside Drive Municipal Drain. If these features are identified as fish habitat, they fall under the protections of the <i>Fisheries Act</i>.

Policy/Legislation	Description	Project Relevance
<i>Fish and Wildlife Conservation Act</i> (Government of Ontario 1997)	The <i>Fish and Wildlife Conservation Act</i> (FWCA) provides protection for certain bird species not protected under the MBCA (e.g., raptors), as well as furbearing mammals and their dens or habitual dwellings, aside from the Red Fox (<i>Vulpes vulpes</i>) and Striped Skunk (<i>Mephitis mephitis</i>).	The timing of construction activities, especially vegetation clearing and site grading must have consideration for bird nesting and den sites for furbearing mammals.

3.0 Field Methods

The EIS field survey methodology was described in the 2024 TOR as submitted to the Region, Township, and GRCA (Appendix I). Table 2 provides a summary of field surveys undertaken on the subject property. In total, 14 site visits were completed between November 1, 2021 and September 11, 2024.

Table 2. Field Survey Summary.

Survey Type	Survey Protocol	Dates	Observer(s)
Vegetation community mapping	Lee et al. 1998	November 1, 2021	Andrew Dean
		June 14, 2022	Andrew Dean
Vegetation inventories	Comprehensive search by ELC polygon	November 1, 2021	Andrew Dean
		June 14, 2022	Andrew Dean
		July 27, 2022	Andrew Dean
Woodland boundary delineation	N/A	July 27, 2022	Andrew Dean
Woodland boundary review with Regional staff	N/A	August 15, 2024	Robert Pivar Albert Hovingh ¹
Wetland boundary delineation and review with GRCA staff	OWES (MNR 2022)	August 23, 2024	Elaine Gosnell Claire Gosnell
		September 11, 2024	Jessica Linton Robert Messier ²
Breeding bird surveys	Birds Canada 2021	June 3, 2022	Ryan Archer
		June 14, 2022	Charlotte Teat
Bat cavity tree assessment	MECP 2022a, MECP 2022b	March 25, 2022	Tara Sieg Andrew Rutland
		November 16, 2024	Tara Brenton Robert Pivar
Amphibian call surveys	BSC 2009	April 12, 2022	Phil Anderson
		May 11, 2022	Ryan Archer Carla Kolar
		June 15, 2022	Pam Hammer Sydney Gilmour
Aquatic habitat assessment	N/A	June 10, 2022	Steve Burgin Jake Hunter

¹Region of Waterloo

²Grand River Conservation Authority

4.0 Existing Conditions

4.1 Soil, Terrain and Drainage

The site is located within the Till Plains (Drumlinized) physiographic region and the surficial soil primarily consists of a clay to silt textured soil derived from glaciolacustrine deposits or shale (GHD 2025a). There are also smaller portions of sandy glaciofluvial deposits derived from river deposits found in the north and east of the subject property (GHD 2025a).

Elevations on the subject property range from 344.5 metres above sea level (MASL) in the northwest to 344.5 MASL in the southeast (WalterFedy 2025). Topography slopes north and northeast towards the CEF in the northern portion of the site, and south and southwest towards Conestogo River to the south of the site (GHD 2025a). Drainage patterns follow the topography, with northern drainage flowing into the wetland and eventually into Municipal Drain No. 11, and the south towards Conestogo River (GHD 2025a).

Historically, several of the properties along Northside Drive experienced rear yard flooding and poor drainage around their residential homes. As a result, a new storm drainage system was constructed from the southerly lot line (74 Northside Drive North) running northward, paralleling the rear of the residential lots to 122 Northside Drive North. The tile drain then turns towards the west and outlets into the woodlot on the subject property. This drainage daylights into an open channel and is shown on Map 1 as the Northside Drive Municipal Drain.

4.2 Vegetation

4.2.1 Vegetation Communities

A large portion of the subject property is under active agricultural production, however the northern portion of the property is woodland, characterized by a mix of upland and wetland communities. High quality mature yard trees are located within the subject property, such as Red Oak (*Quercus rubra*), White Pine (*Pinus strobus*), cedar species (Pinaeaceae), and Bitternut Hickory (*Carya cordiformis*), all determined to be in good health. Agricultural fields are located within the southern and northwest sections of the subject property.

The southeast corner of the woodland has historically been cleared and has since regenerated into a shrub thicket (CUT1-1). The Dry – Fresh Sugar Maple Deciduous Forest (FOD5-1) community is used for maple syrup tapping and contains a storage shelter and sap storage bins within its east end. This woodland feature contains existing trails throughout; one large off-road trail runs approximately east-west through the woodland feature, with smaller, less defined

paths also present (Map 2). A number of invasive species were noted along the margin of the woodland features, including the areas that have been disturbed for pathways and along the south edge of the woodland.

The White Cedar-Hardwood Organic Mixed Swamp (SWM4-1) contains a small, previously unmapped pond, characterized as a Duckweed Floating-leaved Shallow Aquatic (SAF1-3) inclusion, which has resulted from a constructed dam (approximately 30 m x 10 m) at the northern outlet to the Municipal Drain No. 11. The pond terminates just south of the natural watercourse.

On June 14, 2022, NRSI noted an active construction area outside of, but adjacent to, the subject property, within the northwestern section of the study area. This area adjacent to the subject property had obvious tree clearing with approximately 10 m deep of excavation. The excavated area was observed being dewatered directly into the subject property. NRSI did not observe any signs of silt bag or other flow control measures implemented within the area. As a result, turbid water was discharging directly into the wetland feature, scouring at the point of discharge. A machine access route is located within the Fresh – Moist White Cedar Coniferous Forest (FOC4) in the northwest section of the subject property, causing soil compaction and disturbances.

Vegetation communities within the study area are shown on Map 2. Additional details of the ELC vegetation communities are provided in Table 3 below.

Table 3. Vegetation Communities within the Study area.

ELC Ecosite Type	ELC Description	Environmental Characteristics
Forest		
FOD5-1 (with CUT1 inclusion)	Dry – Fresh Sugar Maple Deciduous Forest (with Mineral Cultural Thicket complex)	This is a mature forest community with tableland topography and mineral soil. Within this community, NRSI noted maple syrup production throughout. The deciduous forest is thinned along the southern edge and the wetland canopy cover was approximately 35-60%. As a result, NRSI noted opportunity for restoration along the south edge and southeast corner. In 2021, NRSI noted evidence of tree cutting (likely in 2020 and 2021) and a high amount of disturbance (e.g., tree cutting, brush dumping) within the Cultural Thicket community. <u>Canopy:</u> Sugar Maple (<i>Acer saccharum</i>), American Beech (<i>Fagus grandifolia</i>), Bitternut Hickory.

ELC Ecosite Type	ELC Description	Environmental Characteristics
		<u>Sub-canopy:</u> Sugar Maple, Black Cherry (<i>Prunus serotina</i>), Alternate-leaved Dogwood (<i>Cornus alternifolia</i>). <u>Understorey:</u> Alternate-leaved Dogwood, Chokecherry (<i>Prunus virginiana</i>), European Buckthorn (<i>Rhamnus cathartica</i>). <u>Groundcover:</u> Zigzag Goldenrod (<i>Solidago flexicaulis</i>), Long-stalked Sedge (<i>Carex pedunculata</i>), Northern Blue Cohosh (<i>Caulophyllum thalictroides</i>).
Thicket		
CUT1 (with CUM1 inclusion)	Mineral Cultural Thicket (with Mineral Cultural Meadow inclusion)	This is a small, young to mid-age thicket community with tableland topography and mineral soil that is located within the rear of the residential properties at 118 and 122 Northside Drive. In 2021, NRSI noted recent tree cuttings and yard waste/debris dumping. This area had previously been an orchard, with European Buckthorn and young native tree species with a cultural meadow area adjacent. <u>Canopy:</u> N/A. <u>Sub-canopy:</u> European Buckthorn, Apple (<i>Malus pumila</i>), Black Walnut (<i>Juglans nigra</i>). <u>Understorey:</u> European Buckthorn, Tatarian Honeysuckle (<i>Lonicera tatarica</i>), Black Raspberry (<i>Rubus occidentalis</i>). <u>Groundcover:</u> Wood Avens (<i>Geum urbanum</i>), Garlic Mustard (<i>Alliaria petiolata</i>), Tall Goldenrod (<i>Solidago altissima</i>).
Wetland		
SWM4-1 (with SAF1-3, FOC4, and SWD6-3 inclusions)	White Cedar – Hardwood Organic Mixed Swamp (with Duckweed Floating-leaved Shallow Aquatic, Fresh – Moist White Cedar Conifer Forest, and Swamp Maple Organic Deciduous Swamp inclusions)	This is a mid-age swamp community with bottomland riverine topographic features and organic substrates. <u>Canopy:</u> Eastern White Cedar (<i>Thuja occidentalis</i>), Yellow Birch (<i>Betula alleghaniensis</i>), Eastern Hemlock (<i>Tsuga canadensis</i>). <u>Sub-canopy:</u> Yellow Birch, Eastern White Cedar, Green Ash (<i>Fraxinus pennsylvanica</i>). <u>Understorey:</u> Eastern White Cedar, Black Ash (<i>Fraxinus nigra</i>), Bell's Honeysuckle (<i>Lonicera x bella</i>). <u>Groundcover:</u> Common Jewelweed (<i>Impatiens capensis</i>), Bulblet Bladder Fern (<i>Cystopteris bulbifera</i>), Foam Flower (<i>Tiarella cordifolia</i>).

4.2.2 Vascular Flora

In total, 112 plant species were inventoried within and immediately adjacent to the subject property. A complete list of these species is appended to this report (Appendix IV).

One plant SAR, Black Ash, was recorded within the subject property. Black Ash was observed throughout the White Cedar – Hardwood Organic Mixed Swamp (SWM4-1) with Duckweed

Floating-leaved Shallow Aquatic (SAF1-3), Fresh – Moist White Cedar Conifer Forest (FOC4), and Swamp Maple Organic Deciduous Swamp (SWD6-3) during the vegetation inventory completed on June 14, 2022. Black Ash is listed as Endangered in Ontario as well as in Canada (MECP 2024, Government of Canada 2023).

Four plant species designated as rare in Waterloo Region (Richardson and Martin 1999) were inventoried within the subject property:

- Virginia Stickseed (*Hackelia virginiana*) – located in FOD5-1 (CUT1 inclusion)
- Canada Moonseed (*Menispermum canadense*) – located in FOD5-1 (CUT1 inclusion)
- Eastern Rough Sedge (*Carex scabrata*) – located in SWM4-1 (with SAF1-3, FOC4, and SWD6-3 inclusions), and
- Wood's Sedge (*Carex woodii*) – located in FOD5-1 (CUT1 inclusion).

The coefficient of conservatism (CC) is a value ranging from 0 (low) to 10 (high), which is based on a species' tolerance of disturbance and fidelity to a specific habitat integrity (Oldham et al. 1995). Higher values are assigned to species that have specific environmental growing requirements and are less tolerant of disturbance. Average CC values for vegetation communities on the subject property included 4.65 (SWM4-1 with SAF1-3, FOC4, and SWD6-3 inclusions), 3.24 (FOD5-1 with CUT1 complex), and 1.08 (CUT1 with CUM1 inclusion). Average CC values therefore range widely, between the relatively good quality SWM4-1 swamp and associated inclusions, which contain more species with narrow environmental tolerances, to the CUT1 and CUM1 communities where the species are largely generalists in their habitat preferences and have tolerance for ecologically disturbed conditions. Of the 112 species inventoried, 41 (36.61%) had CC values of 0-3. Nineteen percent (19%) of the inventoried species are non-native in Ontario, which is relatively low for an urban woodlot.

Twelve groundwater seepage indicators were observed within the wetlands (TRCA 2017), such as Eastern Rough Sedge, White Turtlehead (*Chelone glabra*), Clinton's Wood Fern (*Dryopteris clintoniana*), and Crested Wood Fern (*Dryopteris cristata*). These species suggest the SWM4-1 (with SAF1-3 and SWD6-3 inclusions) community is likely highly groundwater dependent and sensitive to changes in its water regime.

4.3 Wildlife

4.3.1 Birds

In total, 82 bird species are reported from within 10 km of the study area based on the OBBA (BSC et al. 2008). Thirty-one bird species were documented within the study area during site investigations. Of these, 30 were recorded with possible, probable, or confirmed breeding evidence. Refer to Appendix V for a list of bird species recorded within the subject property and vicinity.

One bird SCC, Eastern Wood-Pewee, was recorded within the study area. During the first breeding bird survey conducted on June 3, 2022, four individuals were recorded; two singing males were heard calling, both within the east side of the Dry – Fresh Sugar Maple Deciduous Forest (FOD5-1) community, and one individual was observed carrying food in the White Cedar – Hardwood Organic Mixed Swamp (SWM4-1) community. One individual was also heard calling within the canopy of a small group of mature trees at the rear of residential lots to the south of the subject property (Map 3). During the second breeding bird survey conducted on June 14, 2022, one individual was recorded within the FOD5-1 community, and another individual was recorded off-site. This species is considered to have displayed evidence of “probable” breeding in the FOD5-1 community due to evidence of territoriality, and “confirmed” breeding in the SWM4-1 (with SAF1-3, FOC4, and SWD6-3 inclusions), in accordance with OBBA criteria (Birds Canada 2021).

Three regionally significant species were recorded within the study area: Great Blue Heron (*Ardea herodias*), Red-Bellied Woodpecker (*Melanerpes carolinus*), and American Redstart (*Setophaga ruticilla*). One Great Blue Heron was observed in suitable habitat within the SWM4-1 (with SAF1-3, FOC4, and SWD6-3 inclusions) community and a Red-Bellied Woodpecker was also recorded within this community during the breeding season. Both species were therefore observed with evidence of “possible” breeding within the SWM4-1 swamp community and/or its inclusions. One pair of American Redstarts were observed in the FOD5-1 community, indicating evidence of “probable” breeding within that forest community.

A pair of Red-tailed Hawks (*Buteo jamaicensis*) were observed around the south edge of the woodland during the first breeding bird survey. A stick nest was observed within the SWM4-1 swamp community 25 m east of anuran survey station ANR-002 (Map 2). The observed Red-Tailed Hawk pair may therefore be nesting within the on-site wooded feature.

4.3.2 Herpetofauna

According to the Ontario Amphibian and Reptile Atlas (ORAA 2024), 14 species of herpetofauna are reported from within 10 km of the study area. Three species were recorded within the study area: American Toad (*Anaxyrus americanus*), Green Frog (*Lithobates clamitans*), and Wood Frog (*Lithobates sylvaticus*). No SAR or SCC herpetofauna were observed within the study area. A complete list of herpetofauna species reported from the subject property and vicinity is provided in Appendix VI.

Anuran Call Survey

Two species, Wood Frog and American Toad, were recorded within the study area natural features across the three anuran surveys. Two Wood Frog individuals were heard calling (Call Code 1) on the west side of the SWM4-1 community, as surveyed from ANR-002, during the April 12, 2022 anuran call survey. During this survey but outside of the 3-minute point count, the NRSI biologist incidentally recorded multiple Wood Frogs calling near ANR-002 when walking to other survey stations. Five American Toads were recorded approximately 100 m east of station ANR-003 during the May 11, 2022 survey; these individuals would have been located near the east boundary of the woodland. No anurans were recorded within the study area during the June 15, 2022 survey.

4.3.3 Mammals

According to the Mammal Atlas of Ontario (Dobbyn 1994), 46 mammal species are reported from within 100 km of the study area. Of these, evidence of four mammal species were observed within the study area: Eastern Gray Squirrel (*Sciurus carolinensis*) (direct observation), Eastern Chipmunk (*Tamias striatus*) (direct observation), White-Tailed Deer (*Odocoileus virginianus*) (tracks), and Northern Raccoon (*Procyon lotor*) (tracks).

None of the observed species are considered federally or provincially significant; all are relatively common with secure provincial populations (ranked S4-S5; MNR 2024c). A complete list of mammals reported from the study area and vicinity is included in Appendix VII.

Bat Habitat Assessment

A leaf-off bat habitat assessment was completed on March 25, 2022 to document the presence of any potential roosting trees (i.e., “cavity trees”). This assessment focused on trees that may be directly impacted by the proposed development (i.e., excluding the large woodland feature, which will be retained) at 110 and 118 Northside Drive. However, a cursory inspection of the

woodland edge trees for potential bat habitat was also completed. Only two suitable bat roosting habitat trees were observed on these properties (see Map 3). One of the identified trees, Horse Chestnut (*Aesculus hippocastanum*), contained a knothole 2.5 m high on the tree, along with loose bark, a crack/crevice, and an additional cavity 6 m high on the tree. The other identified tree was a Norway Maple (*Acer platanoides*) with a knothole 3 m high on the tree and a frost crack. Both of these trees are located within the developed residential lot at 118 Northside Drive. The Horse Chestnut is located at the property's frontage immediately adjacent to Northside Drive, while the Norway Maple is located within the manicured rear yard of the property.

An artificial bat roosting structure ("bat box") was observed on a maple tree behind the house located at 118 Northside Drive.

A leaf-off bat habitat assessment was completed on a large Bitternut Hickory located in the northeast corner 52 Hawkesville Road on November 16, 2024, but no suitable bat habitat was observed.

4.3.4 Insects

According to the Ontario Butterfly Atlas (MacNaughton et al. 2024), 23 butterfly species are reported from within 10 km of the study area. One butterfly species, Common Ringlet (*Coenonympha tullia*), was incidentally observed on June 14, 2022. Six individuals were observed within the residential area. A complete list of butterfly species reported from the subject property and vicinity is included in Appendix VIII.

According to the Ontario Odonate Atlas (OOAD 2024), two odonate species (dragonflies and damselflies) are reported from within 10 km of the study area, both common and secure in Ontario. No odonate species were incidentally observed during site visits. A complete list of odonate species reported from the subject property and vicinity is included in Appendix VX.

4.4 Aquatic Features

4.4.1 Northside Drive Municipal Drain and Tributary 1

Northside Drive Municipal Drain and Tributary 1 were assessed within the study area at AHA-001 (Map 2). The Northside Drive Municipal Drain flows generally north along the eastern subject property boundary adjacent to agricultural fields and residential lots before entering the woodland at its southeast corner through a plastic pipe of approximately 25-30 cm in diameter.

Near its entry point into the woodland, the drain flows through a channelized section but becomes less defined as it continues through the woodland (FOD5-1) and swamp (SWD6-3, and SWM4-1) (Map 2). The drain transitions to an unnamed tributary (labeled as 'Tributary 1') that continues through the subject property and eventually flows into Tributary 2 in the northeastern portion of the woodland and then on to Municipal Drain No. 11. The extents of the Northside Drive Municipal Drain were determined based on an existing drain report prepared by Dietrich Engineering Limited (DEI 2011). Overall, the flow through the drain and Tributary 1 during the assessment in June was relatively low and the feature is expected to become dry, or nearly dry in the summer season, likely depending on the amount of surface water reaching the swamp. The wetted width of the drain ranged from 1-2 m. Water depths were relatively low throughout most of the drain, although occasional deeper areas were noted measuring up to approximately 0.5 m.

The extent of frequent flood ranged from 0-10 m from the edge of the drain. Bank vegetation density was low in the upper 200 m, and medium to high in the lower sections towards Municipal Drain No. 11. Vegetation type consisted of forested areas, with Common Jewelweed, Marsh Marigold (*Caltha palustris*), and Bulblet Bladder Fern. The adjacent lands had a gentle slope (<5°) and were primarily made up of a mixed forest community with an extent of >30 m. The watercourse contains good quality canopy cover and receives shading of >75%.

Substrates were characterized by detritus and muck near the drain origin, but transitioned to sand, and then some gravel and cobble near Municipal Drain No. 11. Abundant woody debris was noted throughout the watercourse, as well as emergent aquatic vegetation in moderate to high abundance. Water temperature was relatively cold, ranging from 10-12°C. Based on the results of the groundwater surveys completed by GHD as part of the hydrogeological assessment, the wetland and Tributary 1 are supported by surface water. However, given the presence of Brook Trout within Tributary 2 and the relatively cold water temperatures observed, there is still the potential for groundwater interaction associated with Tributary 2 and Municipal Drain No. 11.

Targeted surveys to classify the fish community were not completed within the drain and watercourse; however, NRSI biologists did not observe any fish species. Fish habitat may be present near the confluence with Tributary 2/Municipal Drain No. 11, but it would be limited, especially throughout its middle and upper reaches where the channel is likely to become very shallow and disconnected.

4.4.2 Tributary 2 and Municipal Drain No. 11

Tributary 2 was assessed within the study area at AHA-002 (Map 2). Tributary 2 originates north of King Street North and northwest of the subject property and study area boundaries. The tributary flows generally east through the northeast corner of the subject property and then under Arthur Street South where it transitions from a natural watercourse to Municipal Drain No. 11, a straightened channel that occurs as an unclassified drain.

Within the subject property Tributary 2 is relatively deep, permanently flowing, and is characterized by pools and gravel/cobble riffles with water depths ranging from 0.1 m in riffles up to a maximum of approximately 0.7 m in some of the pools. It flows through a meandering form and experiences a moderate gradient change within the subject property. The wetted width of the drain ranged from 1.5-3 m and the bank width ranged from 2-4 m with a bank height of 0.5 m. The extent of frequent flood ranged from 0-10 m from the edge of the channel. NRSI observed areas of bank erosion and channel incising.

Bank vegetation was moderate in density and contained herbaceous plants, such as Common Jewelweed, fern species, and Marsh Marigold. The adjacent lands had a low gradient (<5°) with mature forest 20-30 m in extent. The drain contains good quality canopy cover and receives shading of >75%.

Substrates were characterized by gravel (45%), silt (20%), sand (20%), and cobble (15%). Emergent vegetation was observed in low abundance and as well as woody debris within the channel. The water temperature was relatively cold (approximately 12.0°C). No Watercress was observed, but some groundwater inflow was noted through minor channels.

NRSI biologists confirmed the presence of fish habitat; one small-bodied fish was observed within the subject property boundary (Appendix X). Several Brook Trout (*Salvelinus fontinalis*) were also captured (via dip net) on the west side of King Street North, within the upstream end of the culvert. This capture confirms the presence of a coldwater fish community.

4.4.3 Unnamed Pond (SAF1-3)

As mentioned in Section 4.2.1, the Duckweed Floating-leaved Shallow Aquatic (SAF1-3) inclusion contains a constructed dam at the northern outlet to the Municipal Drain No. 11. The formation of a dam has created a pond, which terminates just south of the natural watercourse. NRSI observed some flow from the pond to the natural watercourse before it flows into Municipal Drain No. 11, but there is an earth berm that appears to isolate the pond from the

watercourse. There is potential that they could connect if water levels within the pond and/or watercourse are elevated enough, but this appears to be unlikely. Water temperature within the pond was 14°C.

4.4.4 Minor Tributaries

Several minor tributaries were also observed within the subject property, as shown on Map 3, and either flowed to Tributary 1 or Tributary 2. These were generally observed as shallow, poorly-defined channels or depressions that would flow intermittently to the primary watercourses on site, but do not provide fish habitat.

5.0 Significance and Sensitivity of Natural Features

This section analyzes the significance and sensitivity of natural features to determine what areas need to be protected and what areas present opportunities for development. Natural features that are sensitive to disturbance are identified based on the rarity or significance of the feature or the functions/processes and/or policies inhibiting development within them. These areas are discussed in the context of natural heritage policies governing their protection.

This analysis is intended to guide the recommendation of buffers and location of the proposed development envelope to avoid or minimize impacts to significant and sensitive natural features and their ecological functions. Identified natural features to be avoided during development are shown on Map 3 and are described in detail below.

5.1 Significant Natural Features and Habitats

As detailed above, the study area contains terrestrial, wetland and aquatic features that are afforded significance under the Township and Regional OPs, and areas that are regulated by the GRCA. The following is a summary of the significance and sensitivity of the study area natural features and how the natural heritage policies and legislation described in Section 2 inform the identification of constraints for the proposed development.

5.1.1 Regional Core Environmental Feature: Significant Woodland

The large woodland/wetland complex located within the subject property has been mapped by the Region as a CEF because it is considered a Significant Woodland (Region of Waterloo 2015) and represents the predominant ecological development constraint on the lands. This feature is considered a Significant Woodland because it is larger than 4 ha in size, consists primarily of native tree species, and meets the criteria of a “woodland” in accordance with the provisions of the Regional Woodland Conservation By-law (Region of Waterloo 2015).

The Significant Woodland has been mapped as comprising a complex that is dominated by White Cedar-Hardwood Organic Mixed Swamp (SWM4-1), representing approximately the western two-thirds of the feature as well as its northern end. Most of the eastern third of the feature comprises Dry-Fresh Sugar Maple Deciduous Forest (FOD5-1). Smaller inclusions of Swamp Maple Organic Deciduous Swamp (SWD3-6) and Fresh-Moist White Cedar Coniferous Forest (FOC4) comprise the remainder of the Significant Woodland. To inform the EIS, the southern limits of the Significant Woodland were refined through completion of a woodland dripline boundary delineation (Map 2). In delineating the boundary with regional staff, the

Mineral Cultural Thicket (CUT1), which represents a previously cleared southeast corner of the woodland that is now in early successional regeneration, was excluded from the Significant Woodland.

In accordance with Regional OP Section 7.C.9, development and site alteration for the proposed residential subdivision is prohibited within the CEF. Development and site alteration on lands contiguous to a CEF will only be permitted where an EIS or similar study has demonstrated that the proposed development would not result in adverse environmental impacts on the natural features and its ecological functions.

5.1.2 Wetlands

Wetland features within the subject property are mapped as evaluated, non-provincially significant wetlands, known as the Upper Conestogo Creek Wetland Complex (MNR 2024a). The SWM4-1 and SWD6-3 communities comprise the majority of the CEF, as well as the small Duckweed Floating-leaved Shallow Aquatic (SAF1-3) community. As a non-provincially significant wetland, these features are considered Supporting Environmental Features in accordance with the Regional and Township OPs (Region of Waterloo 2015, Township of Woolwich 2022). However, since they comprise part of the larger CEF, the protection policies associated with CEFs apply.

The on-site wetlands and their surrounding areas of interference are also regulated by the GRCA. Development and site alteration within GRCA-regulated lands is prohibited unless permitted by the GRCA in accordance with Ontario Regulation 41/24 (2024).

5.1.3 Watercourses and Fish Habitat

Several watercourses occur within the subject property including Northside Drive Municipal Drain, Tributary 1, Tributary 2, and a variety of minor channels. One constructed pond also occurs near the northeast corner of the property, which flows to Tributary 2. Tributary 2 collects water from northwest of subject property and from the property via Tributary 1 and flows east to Municipal Drain No. 11 and eventually to the Grand River.

Northside Drive Municipal Drain, Tributary 1, and the various minor tributaries occur as intermittent features while Tributary 2/Municipal Drain No. 11 occurs as a permanent feature. Fish habitat may be present within Tributary 1 near the confluence with Tributary 2/Municipal Drain No. 11 or further up under high flow conditions, but overall it would be limited, especially throughout its middle and upper reaches where the channel is likely to become very shallow and

disconnected. No fish were observed throughout the tributary during the June habitat assessment. Tributary 2/Municipal Drain No. 11 provides direct, coldwater fish habitat and was confirmed to support Brook Trout.

Fish and fish habitat are protected under the federal *Fisheries Act* (Government of Canada 2019). Section 34.4 provides a prohibition against causing the death of fish, by means other than fishing and Section 35 provides a prohibition against causing the harmful alteration, disruption or destruction of fish habitat (HADD). These prohibitions apply to watercourses that contain fish at any time of the year or that connect directly to fish-bearing watercourses. Within the subject property, Tributary 1 and Tributary 2/Municipal Drain No. 11 are subject to the *Fisheries Act* prohibitions and any works, activities or undertakings associated with them may require a review by DFO.

In addition, the watercourses and their associated floodplains are regulated by the GRCA under O. Reg. 41/24 and development within these areas may require a permit from the GRCA.

The municipal drains are also subject to policies and standards associated with the provincial *Drainage Act*.

5.1.4 Habitat of Endangered and Threatened Species

One SAR, Black Ash, was confirmed within the subject property, while potential habitat for SAR bats was identified, as discussed below.

Black Ash

Black Ash (endangered) was observed to occur occasionally throughout the SWM4-1 community. Specific numbers and locations of these trees were not documented for the purposes of this EIS. The entire SWM4-1 community should therefore be considered habitat for Black Ash (Map 3). Black Ash is regulated under the *ESA* through Regulations 6/24 (Limitations on Section 9 Prohibitions) and 7/24 (amending Regulation 832/21). The Black Ash trees are found exclusively within the SWM4-1 community where no development is proposed that would remove trees or their habitat, thus specific health assessments were not conducted.

Species at Risk Bats

Six bat SAR (Little Brown Myotis, Northern Myotis, Tri-colored Bat, Eastern Red Bat, Silver-haired Bat and Hoary Bat) were screened as having potential to occur within the study area.

Based on the site review, two potential bat roosting trees were identified as shown on Map 3. Both of these trees are located within the manicured residential lawns at 118 Northside Drive. Following a conservative approach, these trees would be considered potential roosting habitat for SAR bats.

The impact of the proposed removal of only two potential bat habitat trees is proportionally small in the context of the local landscape, and would not represent a negative impact to SAR bat habitat under the ESA. The large woodland/wetland complex on the subject property was not assessed for the presence of bat habitat, but it can be assumed that the feature provides potential roosting habitat for SAR bats.

5.1.5 Significant Wildlife Habitat

The comprehensive background review was used to identify a number of candidate or confirmed SWH types within the Subject property (Appendix III) and the field program was scoped to include specific surveys to confirm if these habitats were present.

One category of SWH was confirmed within the study area: Habitat for Special Concern and Rare Wildlife Species, which was identified for the SCC Eastern Wood-Pewee. This SWH is restricted to the large woodland/wetland complex on the subject property. Three other categories of SWH that were initially screened as Candidate SWH (Bat Maternity Colonies, Seeps and Springs and Amphibian Breeding Habitat (Woodland)) are maintained as candidate SWH as described below.

In accordance with the Township OP (2022) and the Provincial Planning Statement (MMAH 2024), development and site alteration within SWH features are prohibited unless it can be demonstrated that no negative impacts to the natural features or their ecological functions will occur.

The following is a summary of the confirmed and candidate SWH types identified within the subject property.

Confirmed Significant Wildlife Habitat

Special Concern and Rare Wildlife Species: Eastern Wood-Pewee

Eastern Wood-Pewee is designated as a species of Special Concern in Ontario (MECP 2024) and is therefore considered a SCC (MNR 2010). Eastern Wood-Pewee predominantly occupy intermediate-age to mature deciduous and mixed forests having a relatively open understorey.

This species utilizes woodland edge habitats in proximity to its nest area for foraging purposes, and tends to select breeding territories with fewer pines (COSEWIC 2012).

Singing male Eastern Wood-Pewees were recorded in three distinct locations within the subject property, although only two of these are considered to represent SWH. This species was observed with evidence of probable breeding within the FOD5-1 forest community (evidence of territoriality) and was observed with evidence of confirmed breeding within the SWM4-1 swamp community (observed carrying food). Since it is likely that this species would also use the central SWD6-3 community, it is also considered part of the SWH (Map 3). A singing male was recorded within the canopy of a small group of mature trees at the rear of residential lots to the south of the subject property. However, since these trees are not located within a natural feature, they are not identified as SWH.

Candidate Significant Wildlife Habitat

Bat Maternity Colonies

As stated above, the large wooded feature on the subject property was not investigated for the presence of suitable bat habitat since it will be located outside of the limits of proposed development. It can be assumed that this feature provides suitable bat roosting habitat, such as within trees with suitable cavities or within decaying trees and snags. The treed vegetation communities that comprise this feature (i.e., SWM4-1, FOD5-1 and SWD6-3) are therefore considered as assumed candidate SWH for Bat Maternity Colonies. There is insufficient information to determine whether these wooded features meet the criteria to be considered Candidate SWH for Bat Maternity Colonies (MNR 2015) (i.e., that they meet the minimum density threshold of large-diameter (>25 cm diameter-at-breast-height) trees). Further studies are required to confirm or rule out the presence of Bat Maternity Colonies SWH based on MNR criteria.

Seeps and Springs

As noted above, a number of vascular plant seepage indicator species were observed on the subject property. Further surveys to identify seepage and spring areas were not carried out, and it is maintained as candidate SWH.

Amphibian Breeding Habitat (Woodland)

Anuran surveys did not identify woodland breeding habitat for frogs; however, salamander egg mass and breeding surveys were not carried out in the Duckweed Floating-leaved Shallow Aquatic ecosite (SAF1-3). It is possible this pond may support salamander breeding habitat, but since it is expected to be retained, further surveys were not carried out and its status remains as candidate SWH.

5.2 Buffers

Buffers are required for natural heritage features such as woodlands, wetlands, significant wildlife habitats, and watercourses to protect them from potential impacts during and after development. Properly functioning buffers protect natural features against sedimentation, erosion, provide attenuation of precipitation and run-off, protect against human disturbances, serve as habitat transition zones, and contribute to the protection of the natural feature through, for example, maintaining microclimate conditions and limiting the spread of invasive species to within the sensitive natural feature.

The woodland in the northern portion of the subject property is considered a Core Environmental Feature and is identified as SWH. Protecting the form and function of these features and the species which inhabit them is considered of utmost importance and opportunities to enhance adjacent areas which have been subjected to agricultural activities for decades should be carried out. Based on the site-specific character of these woodlands and guiding policies and planning studies, the following buffers are recommended to adequately protect these features from adverse impacts:

- 10 m from the dripline of the Core Environmental Feature; and
- 15 m from the wetlands.

Buffer areas, which are currently under agricultural production or directly adjacent to these areas, should be actively planted to create and expand the natural areas, reduce edge effects, and limit the establishment of non-native vegetation. The recommended dripline buffer is illustrated on Map 2 and includes the wetland buffer within it. Transitional grading and/or portions of compatible land uses (e.g. trails) may occur within the buffer.

6.0 Impact Assessment

NRSI worked closely with the study team to ensure the proposed development was designed to avoid significant natural features and reduce the potential for and level of impact to the natural features of the subject property and the overall ecological function of the study area to the greatest extent possible.

The following is a description of the types of impacts which will be discussed.

1. Direct impacts to the natural features on the subject property associated with disruption or displacement caused by the actual proposed 'footprint' of the undertaking;
2. Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality;
3. Induced impacts associated with impacts after the development is constructed such as subsequent demand on the resources created by increased habitation/use of the area and vicinity; and
4. Cumulative impacts as a result of incremental impacts of multiple or successive developments.

6.1 Proposed Undertaking

Schlegel Urban Developments is proposing to construct a subdivision comprising a mix of low and medium density residential units, and parkland on the properties. A new local road is proposed to provide access to the dwellings, with vehicular access and servicing connections from both Northside Drive and Hawkesville Road. Site drainage will be received by two stormwater management ponds located along the north side of the development. See Map 4 for the proposed development plan overlain over the subject property, and the natural areas with recommended buffers.

All of the planned development will take place within the actively farmed lands, subjected to a long-history of disturbance. All woodlands and wetland will be retained and buffered from the development.

6.2 Approach to Impact Assessment

Potential impacts arising from the proposed undertaking were determined by comparing the details of the proposed undertaking, including the site plan, grading details, storm water management (SWM) plans, geotechnical information, the hydrogeological assessment, and any

other components of the development, with the characteristics of the existing natural features and their functions. Where the development proposal overlaps with the natural features, impacts may arise.

This EIS has considered different types of predicted effects (i.e., direct, indirect, induced, and cumulative) and various mitigation measures that are available and proven to address predicted impacts.

The mitigation hierarchy typically includes the following common steps:

- Avoidance;
- Minimization;
- Restoration/enhancement; and
- Creation/offsetting.

Avoidance is often the first mitigation measure to consider. In some cases, where features are required to be removed to accommodate development, impacts can be minimized through actions such as design modifications. Restoration is used to improve conditions in retained features (e.g., removal of invasive species). In addition to restoration/enhancement measures, creation may also be required to address any residual impacts that are not fully addressed by avoidance, minimization, and restoration/enhancement.

The Natural Heritage Reference Manual provides guidance and clarification as to the identification of no negative impacts. The result of this process is the identification of potential residual negative impacts, including the analysis of whether these are significant. The overall result of the retention, enhancement, creation, and management of the on-site features in conjunction with implementation of effective mitigation measures are anticipated to offset significant residual negative impacts to the vegetation, wildlife, and aquatic resources in the study area.

For this development, the first step in the hierarchy (avoidance) was achieved, as the woodlands and wetlands have been protected and buffered. Impacts to the watercourse and overall hydrology of the wetlands have been minimized through strategic engineering and stormwater management and areas under active agriculture will be restored and naturalized. Compensation for individual tree removals will be addressed at detailed design through a Tree Preservation Plan.

6.3 Direct Impacts and Mitigations

6.3.1 Grading and Vegetation Removal

Preliminary site grading plans prepared by WalterFedy (2025) identify that site grading will be required within the development footprint up to the CEF. The grading design of the site was influenced by many factors including servicing constraints (both sanitary and storm), matching grades along the adjacent properties, protection of environmental features (e.g. maintaining water balance of wetlands, adhering to no-touch zone buffer limits) and minimizing fill requirements for the development. Minor temporary transitional grading is proposed within the woodland buffer adjacent to the larger stormwater management pond. No direct impact to the CEF Significant Woodland, its constituent wetland and watercourse features, or the CEF's ecological functions will therefore occur.

The proposed development will be entirely located on lands that are currently comprised of developed residential lots and agricultural lands. Natural feature removal will be limited to early successional and low-sensitivity cultural meadow (CUM1) and thickets (CUT1). Various planted trees on the residential lots will also require removal.

No significant vegetation species will be removed as a result of the proposed development. Tree removal will be limited to isolated trees and hedgerow trees. A Tree Inventory and Preservation Plan (TIPP) will be completed at the detailed design stage and will provide an opportunity to mitigate impacts to trees and vegetation to the greatest extent possible and identify opportunities for retaining trees based on detailed grading.

In general, the following mitigation measures are recommended and will reduce negative residual impacts as a result of area grading and vegetation removal:

- *The limit of development should be clearly delineated in the field prior to construction beginning;*
- *Prior to construction work starting examination of work area by a qualified biologist and relocation of any wildlife;*
- *Temporary Tree Protection Fencing (TPF) should be installed along the woodlands prior to area grading;*
- *For isolated boundary trees, TPF should be installed a minimum from 1 m from the dripline of the trees to ensure root zones are adequately protected.*

- *TPF must be installed and inspected by a Certified Arborist prior to construction and maintained during construction;*
- *Any limbs or roots of trees to be retained which are damaged during construction should be pruned using appropriate arboricultural techniques. Hazard trees should be identified by a Certified Arborist or tree professional and removed as warranted;*
- *TPF should be inspected on a regular basis by an Environmental Inspector or qualified biologist and should be inspected by a Certified Arborist or qualified other to ensure no roots or limbs are damaged during installation;*
- *The limit of construction should be inspected by a qualified biologist on a regular basis to document any potential negative impacts to the woodland (e.g., construction garbage, ineffective boundary markings, erosion, etc.);*
- *Vegetation removal is recommended to occur outside of the breeding and nesting season for migratory birds as established by the Canadian Wildlife Service. The peak breeding period for birds in southern Ontario extends from approximately April 1 through August 31 (CWS 2018);*
- *Should vegetation removal be required during the nesting season for migratory birds, surveys for nesting birds may be undertaken to permit vegetation removal should breeding bird absence be confirmed;*
- *It is recommended that planting of new trees be incorporated into the Detailed Design stage in order to compensate for any tree loss;*
- *Suitable regionally native species should be selected for planting, and these should be maintained appropriately; and*
- *Retained natural areas will be enhanced through the removal of non-native plant species and improvements to woodland resilience.*

6.4 Indirect Impacts

6.4.1 Sedimentation and Erosion

During construction, areas of bare soil will be exposed which have the potential to erode during rainfall events and impact adjacent natural features. In the event of a heavy rain, sediment-laden runoff can enter adjacent natural areas by way of overland flow. In order to protect on-site and off-site natural features from potential impacts due to sediment, an Erosion and Sediment Control (ESC) Plan must be developed and implemented prior to any construction activities on the site.

During the site grading work, suitable sedimentation controls will be required to help control and reduce the turbidity of run-off water which may flow towards the surface water features. As construction work progresses at the site, regular maintenance and additional sedimentation measures may be required to limit the effect of siltation of run-off water in localized areas. The following mitigation measures should be followed:

- *Develop and implement an Erosion and Sediment Control Plan prior to construction. Siltation control measures such as silt fencing, a mud mat at the construction entrance, and tree protection fencing are recommended;*
- *Disturbed areas should be kept to a minimum and re-vegetated in a reasonable timeframe in order to minimize dust;*
- *Inspection and maintenance of the installed erosion and sediment measures throughout the duration of construction, to ensure they are functioning as originally intended; and*
- *An environmental monitoring program is recommended and provided below to ensure that the sediment and erosion control measures are installed, maintained and functioning as intended.*

6.4.2 Water Quality, Groundwater Balance and Stormwater Management

Stormwater management is employed to mitigate the effects of the roads and other impervious surfaces associated with urban development. Water quantity control is required to prevent flooding and mitigate erosion in the receiving water body. Water quality control is required to mitigate the conveyance of pollutants into the receiving water body. The Stormwater Planning and Design Manual (MOE 2003) lists two levels of protection with the goal to “maintain or enhance existing habitat, based on suspended solids removal performance for the different end-of-pipe storm water management facilities developed in the continuous simulation modeling”.

The approach to stormwater management (SWM) for the proposed development is presented in the stormwater management report provided by WalterFedy (2025). The proposed development will include construction of a municipal storm sewer system to convey minor system flows to two SWM facilities: a northwestern facility and a northeastern facility (WalterFedy 2025). Major flows will be conveyed overland through an internal street network to the SWM facilities. Both SWM facilities will flow to the northern wetland, but the northwestern SWM facility will also outlet to the existing storm sewer system located along Northside Drive. A ‘super-pipe’ storage facility is proposed to mitigate any potential increase in post-development

peak flows on the wetlands to the north (WalterFedy 2025). A 'super-pipe' will temporarily retain stormwater and release it at a controlled rate so that flows do not exceed existing conditions, which will ensure that the wetlands continue to experience a suitable hydroperiod (WalterFedy 2025). Both SWM facilities will provide quality, erosion and quantity control as outlined by WalterFedy (2025).

The SWM report identifies that post-development peak flows will be reduced to those of the existing conditions for the 2 to 100-year return period, while providing a safe conveyance of the stormwater flows during the 48-hour Hurricane Hazel storm event (WalterFedy 2025).

GHD completed hydrogeological studies (GHD 2025b), including a water balance for the wetlands found in the CEF to the north. At the request of NRSI, GHD examined the options to direct enough water to ensure that the wetlands experience a similar post-development hydroperiod to the existing condition. The feature-based water balance of the wetland shows that under post-development (controlled) conditions, only minor changes to the surface water flow contributions to the wetland area and no changes to the hydrological function of Municipal Drain No. 11 or Northside Drive Municipal Drain (GHD 2025b). While there may be some limited lowering of shallow groundwater elevations beneath the site due to a reduction in infiltration post-development, this is not expected to have an impact on the wetlands because the hydroperiod will remain similar to pre-development conditions (GHD 2025b). GHD found that groundwater elevations in the southeast corner of the wetland remains constant under wet conditions during winter and spring, supporting that the wetland is sustained by surface water runoff rather than groundwater discharge from the shallow groundwater zone (GHD 2025b).

In order to further mitigate potential impacts to adjacent wetlands and aquatic habitat the following mitigation measures should be implemented:

- *During and post-construction, groundwater level monitoring is recommended to ensure that predevelopment drainage patterns are not altered that would result in a change in surface water and groundwater flows to wetlands;*
- *Runoff directed upstream of wetlands should be maintained to pre-development measures of quantity and quality to avoid impacts to downstream habitats;*
- *The limit of grading should be protected with heavy duty silt fencing in areas around wetland features;*

- *An Erosion and Sediment Control (ESC) Plan should be developed to ensure the fencing is properly installed and functioning during construction;*
- *A Salt Management Plan should be implemented as part of the proposed development; and*
- *Snow storage should be located well away from natural features or areas that will drain into natural features, particularly the adjacent wetlands.*

6.4.3 Indirect Impacts to Wildlife and Vegetation

Indirect disturbances can stress natural features and weaken their ecological integrity. In these states, natural features are more prone to the establishment and proliferation of invasive, non-native species. Proliferation of invasive, non-native species within natural communities decreases their ecological value by suppressing native species, decreasing biodiversity, and reducing habitat suitability. The proposed development will maintain and buffer the more important natural features within the subject property, thereby maintaining these important areas for wildlife. Potential indirect impacts to wildlife in the retained natural areas may arise from noise and dust associated with construction activities and unnatural lighting resulting from the development. Indirect impacts associated with construction are predicted to be minimized, localized, and temporary, and it is expected that displaced wildlife species will return to the vicinity of the subject property following construction. Therefore, no negative impacts to wildlife from noise and dust are expected. The following mitigation measures will lessen indirect impacts:

- *In order to suppress dust, areas of bare soil should be moistened with water during construction activities to ensure that the amount of dust within the subject property is reduced. Topsoil stockpile locations should be in areas of lesser wind exposure and away from natural features and their buffers;*
- *Disturbed areas with exposed soils should be kept to a minimum and re-vegetated with an approved seed mix in a reasonable timeframe in order to stabilize soils and minimize dust;*
- *All machinery, storage and refueling to be maintained outside of the natural features and their buffers;*
- *Work should be limited to daytime hours to avoid excessive noise and disturbance to wildlife; and*

- *Any lighting equipment associated with construction activities should be turned off following cessation of daily construction activities, or at least turned away from the adjacent natural features so as to prevent 'light wash' of these areas.*

The vast majority of the lands proposed for development are characterized by agricultural fields planted annually with row crops. These areas are not habitat for wildlife to carry out essential life processes, though certain areas may provide a corridor function for movement (see species at risk habitat below).

The proposed development may temporarily displace wildlife species that are currently using adjacent natural features as habitat while the site is under construction. Species that use the proposed development area within the study area are likely adapted to the existing within a relatively modified landscape. These species are expected to return to the adjacent natural areas and protected buffer areas post-development.

Species at Risk and Significant Wildlife Habitat

Black Ash is confirmed within the CEF and it also contains probable habitat for SAR bats. Confirmed SWH for Eastern Wood-Pewee was identified for the SWM4-1, FOD5-1, and SWD6-3 communities within the CEF and it is also considered assumed candidate SWH for Bat Maternity Colonies, Seeps and Springs, and Amphibian Breeding Habitat (Woodland). This feature will be retained in its entirety and buffered from subdivision development.

Other Wildlife

Wildlife habitat removal on the property will be limited since the development will primarily be located on developed residential lots and agricultural lands, with some localized removal of anthropogenically-influenced habitat associated with the Mineral Cultural Meadow (CUM1) and the Mineral Cultural Thicket (CUT1) communities located on the 118 Northside Drive property. The proposed development will therefore remove habitat for species that utilize these early successional habitat features as well as the open agricultural field, such as Savannah Sparrow (*Passerculus sandwichensis*), Cedar Waxwing (*Bombycilla cedrorum*), and Black-capped Chickadee (*Poecile atricapillus*). However, suitable habitat is abundant on the surrounding landscape and populations of these species are not considered to be sensitive to localized habitat loss in the vicinity of this property. Several of the species that were observed occupying the subject property are habitat generalists that utilize a wide array of human-altered landscapes. These species, which include Mourning Dove (*Zenaida macroura*), Song Sparrow

(*Melospiza melodia*) and Blue Jay (*Cyanocitta cristata*) will continue to occupy the subdivision lands post-development.

The following construction-related mitigations are proposed to avoid negative impacts to wildlife:

- *Prior to construction work starting examination of work area by qualified biologist and relocation of any wildlife;*
- *Prior to demolition, any existing buildings must be examined by a biologist for potential bat roosts;*
- *Retained wetlands adjacent to the subject property will be protected and buffered (30 m) from development and wetland water balance will be achieved both during and after construction;*
- *Habitat enhancement, including within the woodland edges and buffer areas;*
- *Trail signage and a new home owners brochure to direct the public to stay on authorized trails, not wonder into sensitive natural areas, and to educate new residents on important natural features in their neighbourhood; and*
- *Erosion and sediment control (ESC) fencing is to be erected along the limit of development prior to any on-site works to ensure that construction activities and equipment are maintained outside of the protected areas and their buffers.*

6.4.4 Introduction and/or Spread of Invasive Species

During construction there is potential to introduce invasive species via contaminated construction equipment which has brought foreign plant material to the site. Invasive species can quickly spread into natural areas, outcompeting native species for resources and degrading overall biodiversity. European Buckthorn (*Rhamnus cathartica*) is known from the adjacent woodlands, so there is greater potential for the introduction and spread of this species in the woodland when construction adjacent to the feature is occurring and during subsequent use of roads/sidewalks/trails in the vicinity of the area. In order to mitigate the impacts of potential invasive species introductions, the following mitigation strategies are recommended:

- *Inspection and cleaning of construction equipment, including the cleaning of equipment prior to arriving on site, should adhere to the Clean Equipment Protocol for Industry (Halloran et al. 2013). All soil and plant material should*

be thoroughly cleaned from all machinery including tracks, blades and radiators;

- *Strictly control vehicle/equipment access into retained natural areas and ensure soil stockpiles are >30 m from natural areas;*
- *Use only species native to the Waterloo Region that complement the surrounding natural features in restoration and enhancement plantings;*
- *Habitat restoration and enhancement measures will include the management of aggressive invasive species that have the potential to compromise intact habitats. A management program with a focus on control of non-native invasive shrubs, including European Buckthorn, should be implemented;*
- *Prior to the planting of natural feature buffers, a licensed herbicide applicator should be retained to treat all mature (fruit-producing) European Buckthorn with a basal bark application of herbicide to reduce the seed source and to afford the buffer plantings improved conditions for establishment; and*
- *Provide a homeowner package to encourage the planting of native tree species in yards and avoidance of non-native invasive species (e.g. Norway Maple).*

6.5 Induced Impacts

Induced impacts are described as those that are not directly related to the construction or operation of the facilities in question, but rather arise from the use of the natural areas as a result of the development. The simplest example is increased use of a natural area by residents or users of the property, feral domestic wildlife, and unauthorized trail/pathway construction. Since this is proposed as a residential development the potential impacts from residents and domestic wildlife are increased.

The existing trail system will remain mostly intact, except for a small branch that leads into a neighbouring resident's backyard that will be blocked and restored (Map 5), and will maximize resident opportunities to enjoy and appreciate the CEF. The Township and Regional Official Plans lack specific guidance with respects to trails but discussions with both agencies, as well as the GRCA, have indicated a desire to maintain the existing trails provided new ones are not created, especially within the wetlands.

Adherence to the following mitigation measure will avoid and minimize induced impacts:

- *Signage should be used to direct people not to trespass off-trail into sensitive natural areas or restoration areas and keep their pets on leash. This signage will be used to inform residents of the value and importance of using natural areas carefully and sustainably;*
- *Fencing should be erected to assist in preventing human induced impacts to more sensitive natural areas;*
- *The northwestern portion of the trail should be extended into a loop through the proposed restored pollinator habitat; and*
- *Wildlife proof waste receptacles should be made available throughout the development blocks and along the walking trails to reduce litter and its associated impacts in the natural areas.*

6.6 Cumulative Impacts

The study area is situated within lands designated as Township Urban Area and The Countryside (Woolwich Township 2025). The adjacent lands to the south have recently submitted a Draft Plan of Subdivision application, while the residential homes to the east have been present for decades. These lands have historically undergone modification resulting from agricultural uses, rural residential and commercial uses but are anticipated to change significantly due to the proposed residential developments. In order to evaluate the potential for cumulative impacts resulting from the development of the subject property, it is necessary to look beyond the boundaries of the subject property to the neighbouring lands, especially where Core Environmental Features are present. A cumulative impact assessment approach looks at the character and potential changes that are occurring, or may occur in the future, on surrounding lands. In this regard, it is important to recognize the ecological significance of the natural features within the study area within the larger landscape context and identify potential cumulative effects from the proposed development of these lands.

The development of these lands will result in impacts due to an increase in impervious areas, changes in surface water flows to wetlands and watercourses, increased human presence and increased opportunities for pollution to the natural environment (e.g. litter and refuse dumping, air and water pollution from vehicles, etc.) which must be considered in the cumulative impact assessment.

Landscape level changes include the cumulative effects of increasing impervious area, modifications to hydrological processes, habitat fragmentation, and increased barriers to wildlife

movement. There is also consideration for the compounding impacts of increases in noise, light, and/or human activity as the landscape is developed. The development of the subject property will undoubtedly change the landscape and increase pressures on the surrounding natural features.

7.0 Stewardship Management Plan

The recommendations provided below are aimed at protecting and enhancing the existing natural areas within the subject property, such as woodland edge habitats (Map 5). These natural communities will be preserved and disturbance to wildlife will be minimized.

Major features of the Stewardship Management Plan relevant to the proposed development include:

- Feature-specific buffers and habitat enhancement areas along the southern boundary of the Core Environmental Feature.
- Creation of 0.65 ha of naturalized habitat through restoration of the northwestern CUM1 and OAGM1 communities to pollinator habitat, including the addition of educational signage about the benefits to pollinators.
- Strategic restoration of existing foot trails which includes plantings and blocking the trail with natural materials.
- A conceptual planting plan for the development area which consists of native, non-invasive species indigenous to the Region of Waterloo.
- The development of a Homeowners Manual to educate community members about the natural heritage features within the community and stewardship of these features.
- The well-established main trail, looping trail and trail that leads to the SWM pond will be retained.

To ensure the Stewardship Management Plan is implemented, it is recommended that the following be included as conditions of Draft Plan approval:

- Planting plans for buffer and restoration areas,
- Development of Homeowners Manual,
- Development of an invasive species management plan,
- Completion of a Tree Protection Plan;
- Development and erection of educational signage along the trail.

8.0 Monitoring Plan

The implementation of a comprehensive and integrated monitoring plan is recommended to ensure that the proposed development is executed effectively. This approach aims to minimize erosion potential, maintain natural features, and protect natural areas from sedimentation impacts.

8.1 Pre-Construction Monitoring

This portion of the monitoring is intended to establish the detailed site background conditions and baseline data, prior to area grading, over a period of two years (minimum). This information will facilitate comparison with conditions during and post-construction, and allow for an evaluation of mitigative measures, if necessary.

This study provides baseline data to measure the effectiveness of the restoration/ enhancement recommendation and other environmental initiatives (i.e. stormwater and groundwater management measures, biodiversity conservation).

The pre-construction monitoring includes one year of the following surveys:

Vegetation

Vegetation monitoring plots will be established and monitored three times (late May, late June/early July, and early September) through a qualitative photo inventory. Photos will be taken on or near the same day each year at the same location using the same perspective. The areas monitored will be those most likely to be affected by potential development or those proposed for restoration. Proposed photo locations include:

- Four locations in the SWM4-1 wetlands,
- One location each at the SWD6-3 and SAF1-3 wetlands,
- Two locations within the FOD5-1 community, and
- Three locations along the edge of the Core Environmental Feature where habitat enhancement is proposed.

No quantitative measures will be provided for the photo locations unless negative changes occur that warrants further study.

Breeding Birds

Breeding bird monitoring stations in or at each of the vegetation communities (i.e. woodland, wetland, forest edge) will be monitored during this stage. Ten-minute point counts will be completed in late May to early July, with the second visit at least 10 days after the first. Surveys

will be completed during the early morning between sunrise and 1000 hrs, and conducted for a duration of 10 minutes. Breeding evidence and numbers of individuals will be recorded. Supplementary data will also be recorded at each station, including the survey time, air temperature, wind speed (as per Beaufort Wind Scale), cloud cover, and precipitation.

Amphibians

Consistent with the Marsh Monitoring Program (BSC 2009), evening amphibian call surveys will be completed on three occasions in mid to late April, May, and June. Surveys will be conducted at each wetland and will involve 3-minute point counts. Point count stations will be at least 100 m apart. A three-level calling code system will be utilized to record relative levels of calling intensity for each identified species:

- Calling code 1 is used when number of calling males can be estimated and calls do not overlap,
- Calling code 2 is used when some calls overlap but number of calling males can still be estimated, and
- Calling code 3 is used when males are calling at full chorus and it isn't possible to estimate the number of individuals.

Supplementary data will also be recorded at each station, including the survey time, air and water temperature, pH, wind speed (as per Beaufort Wind Scale), cloud cover, direction surveyors were facing, and background noise levels.

Human Impact

A transect route will be established within the woodland areas which will be walked once in mid-summer to determine the presence/absence of litter, footpaths, and any other forms of disturbance (i.e. dumping of yard waste, forts). This information will inform the baseline condition of human impacts in the woodland to be used as a comparative condition for future monitoring.

Edge Management

The current condition of the edge of the woodlands will be walked to determine the presence/absence of litter, footpaths, and any other forms of disturbance. Photo monitoring of vegetation plots in these edge habitats will be used to record the changes of the edge over time (vegetation establishment, disturbances, etc.). Additional photographs will be taken if there is evidence of disturbance.

8.2 During-Construction Monitoring

This stage is a continuation of pre-construction monitoring with the addition of monitoring mitigation measures implemented during the construction process, such as erosion and sediment control measures and SWM facility function. This stage would typically begin at the commencement of area grading and continue until 95% stabilization of the contributing catchment is achieved. The pre-construction biological monitoring program outlined above will continue annually through the construction stage.

Construction monitoring is the responsibility of the proponent and is tied to the specific undertaking. Generally, construction monitoring must occur to ensure compliance with the conditions of various permits. Often, an environmental inspector is required to carry out construction monitoring during grading, servicing and building construction.

In addition to an environmental inspector, the following are recommended during construction:

- Pruning of any limbs or roots disrupted during construction (of trees to be retained) by a Certified Arborist in accordance with the Tree Protection Plan,
- Maintenance of vegetated setbacks from wetlands and woodlands,
- Implementation of monitoring associated with the Sediment and Erosion Control Plan and Tree Protection Plan.
- Fueling of machinery to be done at designated locations away from the Core Environmental Features,
- Storage of machinery and material, fill, etc. to be done in designated areas away from the Core Environmental Features,
- Equipment movement through natural areas and associated buffers are controlled,
- Nest searches, if construction during the breeding bird season (April 1 to August 31).
- Wetland water balance monitoring.

Thresholds and Contingency Measures

Any observations of concern including changes in monitoring parameters that cause the Project Team members to have concern based on their professional opinion will be addressed. The abundance and diversity of breeding birds, calling amphibians, and the condition of vegetation and habitats throughout, during and post-construction phases of the project will be compared with those previously documented for the study area. At this time specific contingency measures are not recommended. Adaptive management measures will be recommended and

implemented in consultation with the Township, Region, and/or the GRCA should any adverse environmental impacts be documented. As development proceeds, an on-site environmental monitoring specialist will be available in case of construction-wildlife conflicts and to ensure protection of natural heritage features. Monitoring for ongoing use of habitats by species, and an assessment of whether proposed mitigation measures have been successful, especially for regionally significant breeding bird and herpetofauna species, will be conducted during and post-construction.

Restoration Areas

Restoration areas, as identified in the Stewardship Management Plan, will be monitored to ensure adequate establishment of native vegetation. Annual health inspections of plantings within the SWM facility and restoration areas will occur during and post-construction. All plants will be inspected by an appropriate inspector at the end of the guarantee period (typically 2 years). Plants which, at that time, are not in healthy vigorous growing condition, to the inspector's approval, will be recommended to be replaced at no extra charge. All tree staking will be removed just prior to final inspection. Monitoring will be focused on vegetation establishment, which will create habitat.

Annual reports are to be submitted, summarizing the data collected along with any conclusions, to the Township, the GRCA, and the Region. The interpretation of temperature data will be completed in the context of climate conditions during the monitoring period.

8.3 Post-Construction Monitoring

This stage monitors the effectiveness of mitigation measures implemented during construction. This period of the monitoring would typically begin following full build-out. The post-construction monitoring period will extend for a two-year period.

The biological monitoring components, as described in the pre-construction program above, are recommended to be surveyed annually following substantial build-out of the subdivisions, to satisfy the post-construction monitoring commitment. Water balance monitoring is recommended to ensure the wetlands existing hydroperiod is maintained.

9.0 Summary

NRSI was retained by Schlegel Urban Developments to complete an EIS in response to the proposed development of the 52 Hawkesville Road, 110 and 118 Northside Drive lands in St. Jacobs, Ontario. The intent of this report is to characterize important natural features, recommend appropriate buffers, and identify potential impacts associated with the proposed development.

The subject property is 28.98 ha and characterized by agricultural lands to the south, wetlands and woodlands to the north and existing residential lots to the east. The subject property is predominantly surrounded by agricultural lands with the exception of the east, where existing residential lots front onto Northside Drive and King Street North, and south where residential lots and a church front onto Hawkesville Road. A north-south oriented rail line borders the western edge of the subject property.

Direct impacts to the natural heritage features of the subject property associated with this undertaking are few, as nearly all of the development footprint is located in the agricultural lands. Tree removals will be minimal and limited to isolated trees in the agricultural field, around existing residences and hedgerows. A TIPP discussing tree removals will be prepared at the detailed design stage. The Core Environmental Feature is entirely outside the development limit and have been adequately protected through buffers and detailed mitigation strategies.

Indirect impacts to water quality and quantity are addressed in the Stormwater Management Report prepared by WalterFedy (2025) and the hydrogeological report by GHD (2025a). These reports also include preliminary recommendations for sediment and erosion controls to avoid indirect impacts to the natural features and will be finalized during the detailed design stage.

This EIS report provides recommendations to minimize impacts to the adjacent natural heritage features and ensure that mitigation measures are installed and functioning properly. These include recommendations to mitigate direct, indirect, induced and cumulative impacts that may arise during the proposed development. These mitigation strategies should be incorporated into the detailed design stage and resulting draft plan conditions for the project. NRSI should review the final detailed design components of the project to ensure the conclusions of the EIS are applicable and/or update the EIS as necessary.

References

- Bird Studies Canada (BSC). 2008. Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources. Ontario Breeding Bird Atlas Database. <https://www.birdsontario.org/jsp/datasummaries.jsp>
- Bird Studies Canada (BSC). 2009. Marsh Monitoring Program Participant's Handbook for Surveying Amphibians. 2009 Edition. Published by Bird Studies Canada in Cooperation with Environment Canada and the U.S. Environmental Protection Agency.
- Birds Canada. 2021. Ontario Breeding Bird Atlas. Instruction for General Atlassing. Updated April 2021. <https://www.birdsontario.org/atlassing/>.
- Canadian Wildlife Services (CWS). 2012. Migratory Birds Regulations in Canada. Available at: https://publications.gc.ca/collections/collection_2012/ec/CW69-16-36-2012-eng.pdf
- Canadian Wildlife Service (CWS). 2018. Core Breeding Periods in Ontario for Birds Protected Under the Migratory Birds Convention Act, but Bird Conservation Region (BCR) and Habitat Type. Ontario Region.
- COSEWIC. 2012. COSEWIC assessment and status report on the Eastern Wood-pewee \ *Contopus virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 39 pp.
- Dietrich Engineering Limited (DEI). 2011. Northside Drive Municipal Drain 2011. Township of Woolwich. Regional Municipality of Waterloo.
- Department of Fisheries and Oceans Canada (DFO). 2024. Aquatic Species at Risk Critical Habitat and Species at Risk Distribution Data. Updated: 2024-07-08. Available: <https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html>
- Dobbyn, J.S. 1994. Atlas of the Mammals of Ontario. Don Mills, Federation of Ontario Naturalists. 120p.
- GHD. 2025a. Hydrogeological Investigation: St. Jacobs Lands. 13 pp.
- GHD. 2025b. Preliminary Feature-Based Water Balance Assessment, Technical Memorandum, St. Jacobs Lands.
- Government of Canada. 2002. Species at Risk Act (S.C. 2002, c. 29).
- Government of Canada. 2019. Fisheries Act, 1985.
- Government of Canada. 2023. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2023-12-12. Available: <https://species-registry.canada.ca/index.en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>
- Government of Ontario. 1997. *Fish and Wildlife Conservation Act*, 1997, S.O. 1997, c. 41. <https://www.ontario.ca/laws/statute/97f41>
- Government of Ontario. 2007. *Endangered Species Act*, 2007, S.O. 2007, c. 6. <https://www.ontario.ca/laws/statute/07e06>

- Government of Ontario. 2024. O. Reg. 41/24: Prohibited Activities, Exemptions and Permits. Page O. Reg. 41/24.
- Grand River Conservation Authority (GRCA). 2005. Environmental Impact Study Guidelines and Submission Standards for Wetlands. 24 pp.
- Grand River Conservation Authority (GRCA). 2024. Grand River Conservation Network: Interactive Mapping Tool. Grand River Conservation Authority. 2019.
- Halloran, J., H. Anderson and D. Tassie. 2013. Clean Equipment Protocol for Industry. Peterborough Stewardship Council and Ontario Invasive Plant Council. Peterborough, ON. 17 pp. Available at: https://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf
- Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.
- Macnaughton A., Layberry R., Cavašin R., Edwards B., and C. Jones. 2024. Ontario Butterfly Atlas. Updated March 2024. Available: <https://www.ontarioinsects.org/atlas/index.html>
- Ministry of the Environment (MOE). 2003. Stormwater Management Planning and Design Manual.
- Ministry of the Environment, Conservation, and Parks (MECP). 2020. Reptile and Amphibian Exclusion Fencing. Available at: <https://www.ontario.ca/page/reptile-and-amphibian-exclusion-fencing>
- Ministry of Environment, Conservation and Parks (MECP). 2022a. Species at Risk Bats Survey Note - 2022. 3pp.
- Ministry of Environment, Conservation and Parks (MECP). 2022b. Maternity Roost Surveys \ (Forests/Woodlands). 3pp.
- Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>
- Ministry of Municipal Affairs and Housing (MMAH). 2024. Provincial Planning Statement. Approved by the Lieutenant Governor in Council, Order in Council No. 1099/2024.
- Ministry of Natural Resources (MNR). 2000. Significant Wildlife Habitat Technical Guide. Appendix G: Wildlife Habitat Matrices and Habitat Descriptions for Rare Vascular Plants. October 2000.
- Ministry of Natural Resources (MNR). 2010. Natural Heritage Reference Manual for Policies of the Provincial Policy Statement, Second Edition. March 18, 2010.
- Ministry of Natural Resources (MNR). 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E. January 2015.

- Ministry of Natural Resources (MNR). 2016. Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario.
https://files.ontario.ca/bmp_herp_2016_final_final_resized.pdf
- Ministry of Natural Resources (MNR). 2022. Ontario Wetland Evaluation System (OWES): Southern Manual. 4th Edition.
- Ministry of Natural Resources (MNR). 2024a. Natural Heritage Information Centre (NHIC): Make a Natural Heritage Area Map Application. Published: 2014-07-17. Updated 2024-07-31. Available: <https://www.ontario.ca/page/make-natural-heritage-area-map>
- Ministry of Natural Resources (MNR). 2024b. Land Information Ontario: Ontario GeoHub. Aquatic Resource Area Survey Point Data. Published: 2009-06-08. Updated: 2023-05 26. Available: <https://geohub.lio.gov.on.ca/datasets/>
- Ministry of Natural Resources (MNR). 2024c. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-05-27. Available: <https://www.ontario.ca/page/get-natural-heritage-information>
- Oldham, M.J., W.D. Bakowsky and D.A. Sutherland. 1995. Floristic quality assessment for southern Ontario. OMNR, Natural Heritage Information Centre, Peterborough. 68 pp.
- Ontario Odonata Atlas Database (OOAD). 2024. Natural Heritage Information Centre, Ontario Ministry of Natural Resources and Forestry. Species data by 10x10 km square accessed on July 15, 2024.
- Ontario Reptile and Amphibian Atlas (ORAA). 2024. Ontario Reptile and Amphibian Atlas, 2009-2019. Ontario Nature, Toronto. 443 pp.
- Region of Waterloo. 2015. Regional Official Plan – 2031. June 18, 2015.
- Region of Waterloo. 2016. Greenlands Network Implementation Guideline. May 16, 2016, final draft.
- Richardson, W. and V. Martin. 1999. Regional Municipality of Waterloo. Revisions to Waterloo Region's Significant Species List: Native Vascular Plant Component.
- WalterFedy. 2025. Functional Servicing and Stormwater Management Report: 52 Hawkesville Road, St. Jacobs. 27 pp.
- Woolwich Township. 2025. Woolwich Township Official Plan Planning Horizon 2016 to 2031. August 2022. Updated March 2025.

Appendix I
Terms of Reference



October 23, 2024

Project #3289

To: Chris Foster-Pengelly, Grand River Conservation Authority;
Will Towns, Region of Waterloo;
Stephen Dykstra, Township of Woolwich

**Re: 52 Hawkesville Road, 110 and 118 Northside Drive, St. Jacobs
Environmental Impact Study Terms of Reference**

On behalf of Natural Resource Solutions Inc. (NRSI), I am pleased to provide the Terms of Reference (TOR) for an Environmental Impact Study (EIS) associated with the proposed residential subdivision development to be located at the above-listed properties within the town of St. Jacobs, Ontario. NRSI has conducted work on the 110 and 118 Northside Drive lands from 2021-2023 for the previous landowner, and submitted an accepted TOR on for these lands on March 16, 2022. Schlegel has since acquired these lands, in addition to the 52 Hawkesville Road lands, and NRSI has been retained to continue the EIS. An EIS is required due to the presence of a Regional Core Environmental Feature, including Significant Woodland within the subject lands. A portion of the subject lands also fall within the regulation limit of the Grand River Conservation Authority (GRCA). An EIS will be completed to ensure that the Region of Waterloo, Township of Woolwich and the GRCA's natural heritage policies/regulation have been addressed. The EIS will be completed with reference to, and in conformance with, the guidelines of the Region's Greenlands Network Implementation Guideline.

The attached TOR outlines the steps proposed to complete the EIS for the proposed development in accordance with Region, Township and GRCA requirements.

Sincerely,
Natural Resource Solutions Inc.

Robert J. Pivar, Ph.D.
Terrestrial and Wetland Biologist

52 Hawkesville Road, 110 and 118 Northside Drive, St. Jacobs
Environmental Impact Study
Terms of Reference
October 23, 2024

Introduction

The subject lands are located at 52 Hawkesville Road and 110, 118 Northside Drive, St. Jacobs, Ontario, henceforth referred to as the 'subject property' (Map 1). The subject property is within the northern section of St. Jacobs and is located west of Northside Drive. A 'study area' has also been identified in order to characterize and assess lands adjacent to (within 120 m of) the subject lands as site access allows. For the purposes of the EIS, the study area will also include the large property to the north of 52 Hawkesville Road and 110, 118 Northside Drive that contains much of the large woodland feature, which is also owned by the proponent.

The subject property includes a Regionally-mapped Core Environmental Feature that is understood to represent a Significant Woodland. A section of the Upper Conestogo Creek Wetland complex is also located within the subject property near the proposed development area (>30 m from the development limits) (Map 1). A natural watercourse is located within the northern portion of the subject lands within the woodland. Within the eastern portion of the study area the watercourse has been channelized, and crosses under King Street and flows easterly through a 2 m diameter culvert. This drainage feature is known as Municipal Drain No. 11. It is understood that this drainage feature is anthropogenic as it was created by the Municipality several years ago to alleviate flooding concerns. Another channelized drain was created to the rear of houses fronting the west side of Northside Drive, referred to as the Northside Drive Municipal Drain. This drain channels runoff into the woodland feature to where it intersects with the natural watercourse (see Map 1).

The properties at 110 and 118 Northside Drive represent existing residential lots and are fully developed with the exception of small regenerating and meadow and thicket (old orchard) features. The large property to the immediate west, and adjoining 52 Hawkesville Road contains areas of actively cultivated agricultural field. The subject lands are predominantly surrounded by agricultural lands, with the exception of the east where existing residential lots front onto Northside Drive and King Street North, and south where residential lots and a church front onto Hawkesville Road. A north-south oriented rail line borders the western edge of the subject property. The subject lands are located west of the Grand River and north of the Conestogo River.

The proponent is proposing to construct a subdivision comprising of a mix of low and medium density residential units, stormwater management infrastructure, a park and associated roads/sidewalks. Residual lands within the subject lands will remain undeveloped. See Appendix I for the proposed development concept.

An EIS is required to ensure conformance with Township and Regional Official Plan policies, the Provincial Planning Statement (PPS) (OMMAH 2024) and the *Endangered Species Act*, as well as the GRCA's Policies for the Administration of Ontario Regulation 41/24 and related policies. In doing so, the EIS will include characterization of the woodland, wetland and aquatic natural features, confirmation of the feature boundary limits, and recommendations on ecologically-appropriate buffers and development setbacks. It will also screen for and assess the presence of potential Significant Wildlife Habitat (SWH) and Species at Risk (SAR) habitats associated

with the study area and recommend appropriate measures to avoid or mitigate impacts. The EIS will be completed in conformance with the guidelines of the Region's Greenlands Network Implementation Guideline (Region of Waterloo 2016) and in accordance with the GRCA's EIS guidelines (GRCA 2005).

Characterization of Natural Features

Collection and Review of Background Information

Background information pertaining to the biological resources on and in the vicinity of the subject lands will be collected. Significant species records will be obtained through review of the following resources:

- Natural Heritage Information Center (NHIC) database (MNRF 2024),
- OMNRF, Guelph District,
- Region of Waterloo Official Plan (2015),
- Woolwich Township Official Plan (2022),
- Grand River Conservation Authority Interactive Mapping Tool (2022),
- Ontario Breeding Bird Atlas (BSC et al. 2008),
- Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature 2020),
- Atlas of the Mammals of Ontario (Dobbyn 1994),
- Ontario Butterfly Atlas (Macnaughton et al. 2022), and
- Ontario Odonata Atlas Database (OOAD 2022).

Information and other correspondence received from the regulatory agencies, including the Ontario Ministry of the Environment, Conservation and Parks (MECP), will be appended to the EIS.

Species At Risk / Species of Conservation Concern Screening

A screening has been completed to determine the potential for SAR and Species of Conservation Concern (SCC) and their habitat to be present within the study area. The habitats within the study area, as derived from air photo interpretation, have been compared to the habitat requirements of SAR/SCC known from the vicinity of the study area (up to 10 km). See Appendix II for the complete SAR/SCC screening table. Based on the results of the screening, the following SAR that are regulated under the *Endangered Species Act* were identified as having potentially suitable habitat within the study area:

- Chimney Swift (*Chaetura pelagica*) – provincially and federally Threatened
- Little Brown Myotis (*Myotis lucifugus*) – provincially and federally Endangered
- Northern Myotis (*Myotis septentrionalis*) – provincially and federally Endangered
- Tri-colored Bat (*Perimyotis subflavus*) – provincially and federally Endangered

See below for SCC whose habitats were screened as potentially occurring on the subject lands. Habitats for SCC are considered a form of SWH (MNRF 2015).

Significant Wildlife Habitat Screening

Potential Significant Wildlife Habitat (SWH) types were also screened based on air photo interpretation of natural features within the study area and using discrete significance criteria

established by the MNRF (MNRF 2015). The results of the SWH screening have informed surveys required to confirm such habitat within the study area.

Based on the detailed field surveys conducted to date, the following were identified as Candidate or Confirmed SWH types within the study area:

- Bat Maternity Colonies (candidate)
- Seeps and Springs (candidate)
- Amphibian Breeding Habitat (Woodland) (candidate)
- Confirmed habitat for the following SCC that is not addressed through other SWH categories:
 - Eastern Wood-Pewee (*Contopus virens*) – provincial and federal species of Special Concern
 - Smooth-cone Sedge (*Carex laevivonica*) – ranked S2 (Imperiled) in Ontario

See Appendix III for the complete SWH screening tables.

Field Surveys

Field studies have been scoped to characterize and delineate the natural features within the study area. The following summarizes the field surveys that will be completed to inform the EIS.

Vegetation Community Mapping

NRSI biologists described and mapped the vegetation communities on and adjacent to the subject lands using the Ecological Land Classification (ELC) system for southern Ontario (Lee *et al.* 1998) on November 1, 2021 and June 14, 2022. The ELC mapping was informed through a comprehensive vegetation inventory (see below) and surficial soil characterization within each identified vegetation community. Where site access was restricted, adjacent vegetation communities were interpreted and mapped based on what can be viewed on the ground from the subject lands boundary and based on air photo interpretation.

Woodland Boundary Delineation

NRSI biologists flagged and surveyed the woodland dripline to sub-metre accuracy, which was later reviewed and confirmed by Regional staff on August 15, 2024.

Wetland Boundary Delineation

The wetland boundaries were delineated and flagged by an Ontario Wetland Evaluation System certified biologist on August 23, 2024. The eastern portion of this boundary was confirmed by the GRCA on July 27, 2022 as part of the previous studies on the subject property, however, arrangements have been made for NRSI biologists to meet on-site with GRCA staff to review and confirm the entirety of the wetland boundary adjacent to the proposed development. NRSI will GPS-georeference the confirmed wetland boundary to sub-metre accuracy for mapping purposes.

Vegetation Inventory

In conjunction with the ELC mapping described above, NRSI biologists completed a comprehensive three-season (November 1, 2021; June 14, 2022; July 27, 2022) vegetation inventory on and adjacent to the subject lands. An emphasis of this inventory was on the identification, description and mapping of any federally, provincially, or regionally significant species. Black Ash (*Fraxinus nigra*), listed as endangered in Ontario, was observed in the White Cedar – Hardwood Organic Mixed Swamp (SWM4-1). Smooth-cone Sedge (*Carex*

laeviconica), ranked S2 “Imperiled” in Ontario was also observed in the SWM4-1 ecosite. Four species listed as rare in Waterloo Region were observed in the subject property: Virginia Stickseed (*Hackelia virginiana*), Canada Moonseed (*Menispermum canadense*) and Wood’s Sedge (*Carex woodii*) were observed in the Dry – Fresh Sugar Maple Deciduous Forest (FOD5-1), while Eastern Rough Sedge (*Carex scabrata*) was observed in the SWM4-1 ecosite.

Breeding Bird Surveys

Two early morning breeding bird surveys were completed on June 3, 2022 and June 14, 2022 in accordance with the Ontario Breeding Bird Atlas (OBBA) protocol (Birds Canada et al. 2020). Surveys were completed through an area search of the subject lands. All observations of significant species were recorded in detail, including their specific observation location(s), observed behaviour and highest level of breeding evidence. Four Eastern Wood-Pewee (*Contopus virens*) were observed within the subject property, and displayed evidence of both “probable” breeding in the FOD5-1 community (males calling) and “confirmed” breeding in the SWM4-1 community (individual carrying food). Eastern Wood-Pewee is listed as special concern in Ontario.

Bat Habitat Assessment

A site visit was completed on March 25, 2022 to document the presence of any potential bat roosting trees (i.e., “cavity trees”) during the leaf-off condition. This assessment was completed in accordance with MNRF guidelines (MECP 2022a, 2022b) and included the identification of any live trees or snags with tree cavities or loose/sloughing bark that is suitable for roosting. Potential suitable cavity trees were recorded in detail on standardized forms and GPS-georeferenced. Only trees that may be directly impacted by the proposed development were investigated (i.e., excluding the large woodland feature, which will be retained) on 110 and 118 Northside Drive. However, a cursory inspection of woodland edge trees for potential bat habitat was also completed. A bat habitat assessment will be completed for any trees proposed to be impacted by development on 52 Hawkesville Road following the protocols mentioned above.

Amphibian Surveys

Three nighttime amphibian call surveys were conducted (April 12, 2022; May 11, 2022; and June 15, 2022) within the wetland/woodland features to assess the presence of significant amphibian breeding habitat. This assessment was completed in accordance with the Marsh Monitoring Program amphibian survey protocol (BSC 2009). The results of the survey indicate that significant amphibian breeding habitat is not present.

Aquatic Habitat Assessment

The surface water drainage features (Northside Drive Municipal Drain, the naturalized stream, and Municipal Drain No. 11) were assessed by an NRSI aquatic biologist, and the property parcel investigated for the presence of any other intermittent or ephemeral flow paths on June 10, 2022. The entire length of the drainage features within the study area were walked by an aquatic biologist as access permitted, documenting and mapping in-stream aquatic habitat features. Aquatic habitat surveys included documenting flow regime, adjacent land uses, basic channel morphology, substrates, in-water habitat and cover, riparian and shoreline habitat and cover, aquatic vegetation, important habitat features and in-situ water quality (temperature, pH and dissolved oxygen). The aquatic features were assessed in terms of their potential to provide fish habitat and the quality of available habitat, including their potential to support a coldwater fish community, such as Brook Trout (*Salvelinus fontinalis*). Due to the presence of the downstream coldwater Conestogo Creek, Municipal Drain No. 11 was assessed to confirm its thermal regime. The aquatic habitat assessment was timed to avoid periods immediately

following heavy rain events so as to provide accurate information on typical flows, water levels, water clarity measures, etc. It was determined through this assessment that the stream on site is a cool water feature that provides direct habitat for fish and important baseflows to downstream coldwater habitats.

The Project Team met with Headway Engineering on May 3, 2024 to understand details of the existing drains, evaluate potential opportunities and options for stormwater management outletting, and determine potential impacts of the proposed development on the existing drains.

Wildlife Habitat Assessment

Each site visit included an assessment of the presence of wildlife habitat within the study area. This included an assessment of potential SAR habitat and SWH presence based on the results of the screening exercise described above. Habitat for Special Concern and Rare Wildlife species is the only confirmed SWH within the study area due to the confirmed breeding evidence of Eastern Wood-Pewee within the SWM4-1 community and probable breeding evidence in the FOD5-1 community. Also, Smooth-cone Sedge was observed in the SWM4-1 community.

Since the woodland/wetland communities were not surveyed for the presence of suitable bat habitat because it is not proposed to be impacted, this area is considered as potential SWH for Bat Maternity Colonies. There is insufficient information to determine whether these wooded features meet the criteria to be considered Candidate SWH for Bat Maternity Colonies (MECP 2022a, 2022b) (i.e., that they meet the minimum density threshold of large-diameter (>25cm diameter-at-breast-height) trees), although there are likely trees with suitable cavities, snags and decay characteristics suitable for bat habitat.

Incidental Wildlife Observations

Observations of all wildlife were recorded during the site visit, including birds, herpetofauna, mammals, butterflies and odonates (dragonflies and damselflies). In addition to direct observations, any evidence such as dens, tracks, and scat were documented.

Natural Feature Constraints Assessment and Buffer Delineation

The results of the field survey will be combined with the background information to provide a detailed summary of the existing natural features that occur within the study area, and any significant habitat features or functions that exist within these lands. This will include detailed vegetation community descriptions and mapping, and summaries of wildlife species present within the study area based on background information review and any incidentally-observed species during the site investigation. Potential for significant wildlife species habitat presence will be determined based on updates to the SAR/SCC and SWH screening tables arising from site-level characterization of features and habitat suitability.

Results from this work will be used to identify appropriate buffers from the confirmed wetland and woodland dripline boundaries to inform an ultimate development setback limit. For aquatic features, buffers will be applied based on thermal regimes as well as direct and indirect fish habitat. Habitat functionality and sensitivity of the natural features will be assessed to inform impact avoidance and mitigation measures. Natural feature constraint mapping will be provided to the Project Team to aid in preparing site plans that aim to avoid impact to the natural features and their ecological functions.

Impact Analysis

An impact analysis will be completed based on details of the proposed development plan. The analysis will consider potential direct (e.g., habitat removal), indirect (e.g., construction-related, stormwater drainage), and induced (e.g., post-construction human use) impacts on the existing natural features and ecological functions. The analysis will also consider potential impacts on aquatic features, including mitigation measures, as appropriate, to ensure that thermal regimes are maintained or improved, in accordance with PPS Section 4.1.8. Given the high groundwater recharge area on the subject property, the EIS will include an assessment of potential impacts of the proposed subdivision on the Core Environmental Features and Fish Habitat, in accordance with Section 7.E.4 of the Region of Waterloo Official Plan. The impact analysis will be prepared based on the layout of the proposed subdivision, the stormwater management plan, the hydrogeological assessment, and a preliminary grading plan and any other development plan details as may be available. NRSI will incorporate and summarize the results of technical studies and plans to be completed in support of the property redevelopment (e.g., stormwater management plan) that are relevant to the impact analysis.

The Town of Woolwich has requested a salt management impact assessment. The EIS will consider any impacts of salt inputs to the ecological functions of the natural features within the subject property, to ensure compliance with Section 4.1 of the PPS and 7.C of the Region of Waterloo Official Plan.

Recommendations will be provided to avoid, or otherwise minimize or mitigate natural feature impacts associated with the proposed development. The Greenlands Network Implementation Guideline as well as applicable research will be used to guide future development design (i.e., buffer widths). Recommendations stemming from the impact analysis will be communicated to the Project Team for consideration to inform site plan development.

If suitable cavity trees are identified through further site investigations that are determined to require removal due to property development, NRSI will provide recommendations for compliance with the *Endangered Species Act*. Data collected to date, does not suggest there are any other SAR using the property.

Recommendations will also be provided to ecologically enhance or restore lands where opportunities exist (e.g., within the recommended buffer). Enhancement recommendations will include establishment of native vegetation species and other measures to buffer the effects of adjacent residential land use. Where appropriate, monitoring recommendations may be provided to ensure that mitigation measures are functioning appropriately during and/or following construction.

References

- Birds Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Forestry, Environment and Climate Change Canada, and Ontario Nature. 2020. Ontario Breeding Bird Atlas. Instructions for General Atlassing. December 2020. Birds Canada, Ontario Field Ornithologists, Environment and Climate Change Canada, Ontario Nature, and Ontario Ministry of Natural Resources and Forestry. 17pp.
- Bird Studies Canada (BSC). 2009. Marsh Monitoring Program. Participant's Handbook for Surveying Amphibians. Published by Bird Studies Canada in Cooperation with Environment Canada and the U.S. Environmental Protection Agency. February 2009.
- Bird Studies Canada (BSC). 2008. Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources. 2008. Ontario Breeding Bird Atlas Database, 31 January 2008.
<http://www.birdsontario.org/atlas/aboutdata.jsp?lang=en> (Accessed December 2018).
- Dobbyn, J.S. 1994. Atlas of the Mammals of Ontario. Don Mills, Federation of Ontario Naturalists.
- Grand River Conservation Authority (GRCA). 2005. Environmental Impact Study Guidelines and Submission Standards for Wetlands. August 26, 2005.
- Grand River Conservation Authority (GRCA). 2022. Grand River Conservation Network: Interactive Mapping Tool. Grand River Conservation Authority.
- Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.
- MacNaughton, A., Layberry, R., Cavaasin, R., Edwards, B. and Jones, C. 2022. Ontario Butterfly Atlas. Updated February 2022. <https://www.ontarioinsects.org/atlas/index.html>
- Ontario Ministry of the Environment, Conservation and Parks (MECP). 2022a. Maternity Roost Surveys (Forests/Woodlands). 3 pp.
- Ontario Ministry of the Environment, Conservation and Parks (MECP). 2022b. Species at Risk Bats Survey Note – 2022. 3 pp.
- Ontario Ministry of Municipal Affairs and Housing (OMMAH). 2024. Provincial Planning Statement.
- Ontario Ministry of Natural Resources and Forestry (MNRF). 2015. Significant Wildlife Habitat Ecoregion 6E Criterion Schedule: Addendum to Significant Wildlife Habitat Technical Guide. MNRF, January 2015.
- Ontario Ministry of Natural Resources and Forestry (MNRF). 2024. Natural Heritage Information Centre (NHIC): Make a Natural Heritage Area Map Application. Published: 2014-07-17. Updated 2023-03-23. Available: <https://www.ontario.ca/page/make-natural-heritage-area-map>

Ontario Nature. 2020. Ontario Reptile and Amphibian Atlas: A Citizen Science Project to Map the Distribution of Ontario's Reptiles and Amphibians.
<https://www.ontarioinsects.org/herp/>

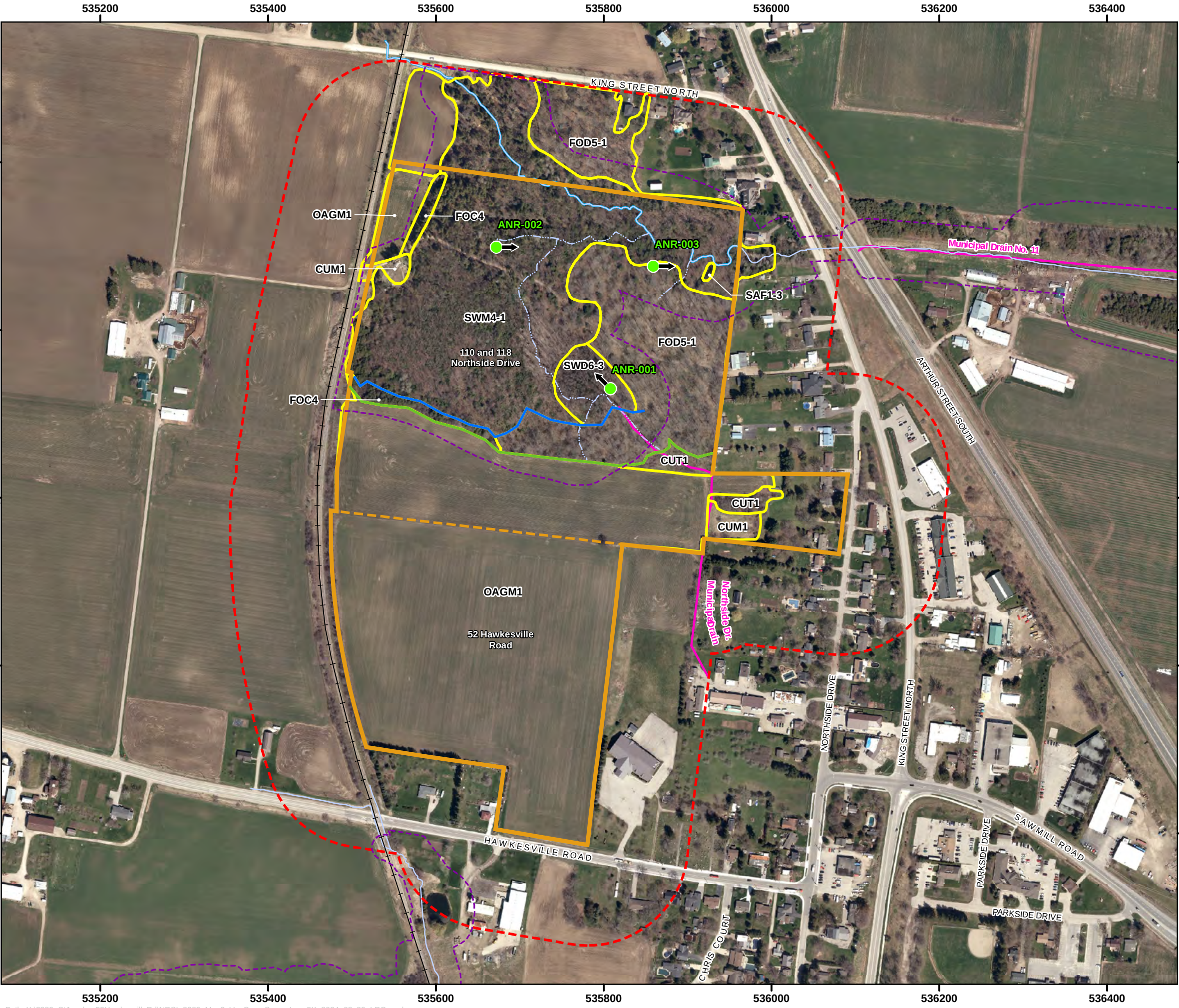
Ontario Odonata Atlas Database (OOAD). 2022. Natural Heritage Information Centre, Ontario Ministry of Natural Resources and Forestry. Species list from atlas square 17NJ32 queried on December 1, 2021.

Region of Waterloo. 2015. Regional Official Plan. <https://www.regionofwaterloo.ca/en/regional-government/land-use-planning.aspx#Regional-Official-Plan>

Region of Waterloo. 2016. Region of Waterloo Greenlands Network Implementation Guideline. May 18, 2016.

Woolwich Township. 2022. Official Plan. Consolidated Version.
<https://www.woolwich.ca/en/doing-business/Official-Plan.aspx#>

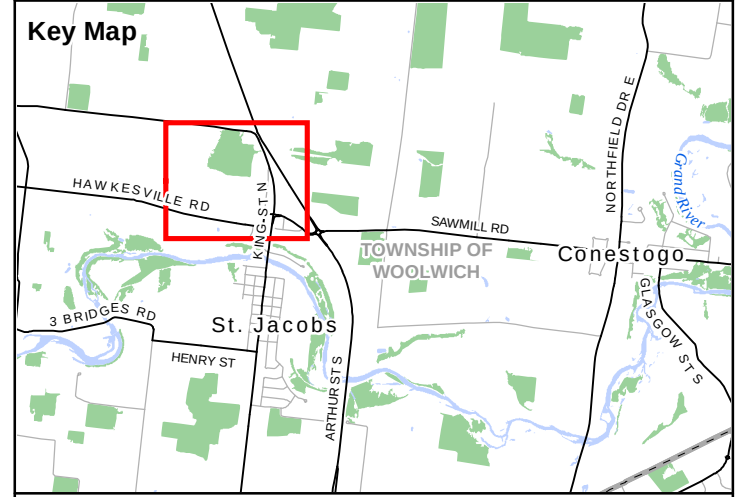
MAP



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52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs EIS

Vegetation Communities and Survey Locations



- Legend**
- | | | | |
|--|---|--|--|
| | Study Area | | Ecological Land Classification (ELC) |
| | Subject Lands | | (CUM1) Mineral Cultural Meadow Ecosite |
| | Parcel Boundary | | (CUT1) Mineral Cultural Thicket Ecosite |
| | GRCA Regulation Limit | | (FOC4) Fresh - Moist White Cedar Coniferous Forest Ecosite |
| | Railway | | (FOD5-1) Dry - Fresh Sugar Maple Deciduous Forest Type |
| | Permanent Watercourse | | (OAGM1) Agricultural |
| | Intermittent Watercourse | | (SAF1-3) Duckweed Floating-leaved Shallow Aquatic Type |
| | Municipal Drain | | (SWD6-3) Swamp Maple Organic Deciduous Swamp Type |
| | Natural Watercourse | | (SWM4-1) White Cedar-Hardwood Organic Mixed Swamp Type |
| | NRSI Surveyed Wetland (August 23, 2024) | | Anuran Survey Station (ANR) |
| | NRSI Surveyed Dripline (Region of Waterloo confirmed August 15, 2024) | | |

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

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Project: 3289 Date: August 29, 2024	NAD83 - UTM Zone 17 Size: 11x17" 1:4,500
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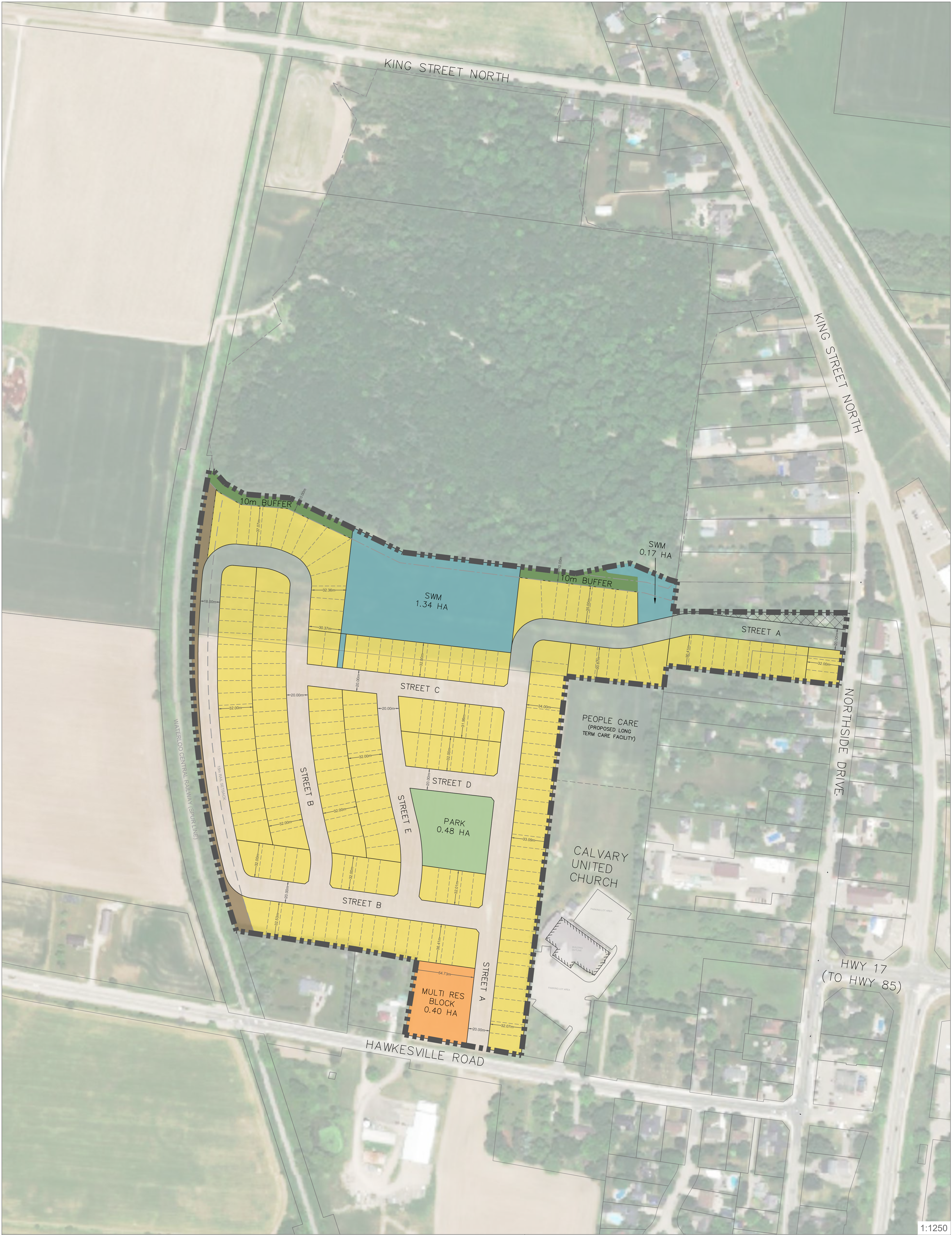
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Appendix I

Proposed Development Concept for 52 Hawkesville Road, 110 and 118 Northside Drive,
St. Jacobs



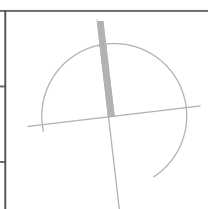
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	Subject Lands 15.57 ha / 38.47 ac		Stormwater Management 1.53 ha / 3.78 ac
	Low Density Residential 203 - 271 Units 8.40 ha / 20.75 ac		Buffer Zone 0.28 ha / 0.70 ac
	Medium Density Residential 24 - 40 Units 0.40 ha / 1.0 ac		Railway Setback 0.30 ha / 0.75 ac
	Parkland 0.48 ha / 1.18 ac		Future Development 0.12 ha / 0.30 ac

DRAFT / CONCEPT
FOR DISCUSSION
PURPOSES ONLY

St. Jacobs North Lands
52 Hawkesville Road, 110 & 118 Northside Drive

Drawn by: AR
Date: 5/23/2024
Plan: Conceptual Draft Plan



Appendix II

Species at Risk and Species of Conservation Concern Habitat Screening

Scientific Name	Common Name	S-RANK ¹	SARO ¹	COSEWIC ²	SARA ²	SARA Schedule ²	Background Source	Habitat Requirements	Suitable Habitat within Subject Property	Suitable Habitat within Study Area
Birds										
<i>Chaetura pelagica</i>	Chimney Swift	S3B	THR	T	T	Schedule 1	BSC et al. 2008	Commonly found in urban areas near buildings; nests in chimneys, hollow trees,and crevices of rock cliffs. Feeds over open water. ^{3,4}	Yes	Yes
<i>Contopus virens</i>	Eastern Wood-pewee	S4B	SC	SC	SC	Schedule 1	BSC et al. 2008	Mid-canopy layer of forest clearings and edges of deciduous and mixed forest. Abundant in intermediate-age mature forest stands with little understory vegetation. ^{3,4}	Yes	Yes
<i>Dolichonyx oryzivorus</i>	Bobolink	S4B	THR	T	T	Schedule 1	BSC et al. 2008	Large (>10 ha), open expansive grasslands, pastures, hayfields, meadows or fallow fields with dense ground cover. Occasionally nest in large (>50 ha) fields of winter wheat and rye in southwestern Ontario. ^{3,4}	No	No
<i>Hylocichla mustelina</i>	Wood Thrush	S4B	SC	T	T	Schedule 1	BSC et al. 2008	Carolinian and Great Lakes-St. Lawrence forest zones. Undisturbed moist mature deciduous or mixed forest with deciduous sapling growth. Near pond or swamp. Must have some trees higher than 12 m. ^{3,4}	Yes	Yes
<i>Riparia riparia</i>	Bank Swallow	S4B	THR	T	T	Schedule 1	BSC et al. 2008	Nests in burrows in natural and human-made settings with vertical faces in silt and sand deposits. Ususally on banks of river and lakes, but also found in sand and gravel pits. ^{3,4}	No	No
<i>Sturnella magna</i>	Eastern Meadowlark	S4B, S3N	THR	T	T	Schedule 1	BSC et al. 2008	Open pastures, hayfields, grasslands or grassy meadows with elevated singing perches (small trees, shrubs or fence posts). Also weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields or other open areas. Generally prefers larger tracts of habitat >10 ha, but will sometimes use smaller tracts. ^{3,4}	No	No
Herpetofauna										
<i>Chelydra serpentina</i>	Snapping Turtle	S4	SC	SC	SC	Schedule 1	NDMNRF 2021; Ontario Nature 2019	Slow-flowing rivers and streams, lakes, and permanent or semi-permanent wetlands with soft substrates and vegetation. Key habitat requirements: open areas with structures for basking, open sand or gravel areas for nesting, shallow areas with soft substrates to bury in, soft banks or substrates for hibernation. ³	No	No
Mammals										
<i>Microtus pinetorum</i>	Woodland Vole	S3?	SC	SC	SC	Schedule 1	Dobbyn 1994	Mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow. ^{3,4}	No	No
<i>Myotis leibii</i>	Eastern Small-footed Myotis	S2S3	END				Humphrey 2017	Roosts in caves, mine shafts, crevices or buildings that are in or near woodland. Hibernates in cold dry caves or mines. Maternity colonies in caves or buildings. Hunts in forests. ^{3,4}	No	No
<i>Myotis lucifungus</i>	Little Brown Myotis	S3	END	E	E	Schedule 1	ECCC 2018	Uses caves, quarries, tunnels, hollow trees or buildings for roosting. Winters in humid caves. Maternity sites in dark warm areas such as attics and barns. Feeds primarily in wetlands and forest edges. ^{3,4}	Yes	Yes
<i>Myotis septentrionalis</i>	Northern Myotis	S3	END	E	E	Schedule 1	ECCC 2018	Roosts in houses and man-made structures but prefers hollow trees or under loose bark. Hibernates in mines or caves. Hunts within forest, below the canopy. ^{3,4}	Yes	Yes
<i>Perimyotis subflavus</i>	Tri-colored Bat	S3?	END	E	E	Schedule 1	ECCC 2018	Roosts and maternity colonies in older forests and occassionally in barns or other sturctures. Forage over water and along streams in the forest. Hibernates in caves. ^{3,4}	Yes	Yes
Butterflies										
<i>Danaus plexippus</i>	Monarch	S2N, S4B	SC	END	SC	Schedule 1	MacNaughton et al. 2022	Adults found in a diversity of habitats with a variety of wildflowers. Caterpillars are confined to meadows and open areas where milkweeds grow (larval food plants). ³	Yes	Yes

Significant Wildlife Habitat Assessment Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)					
<u>Rationale:</u> Habitat important to migrating waterfowl.	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	Fields with sheet water during Spring (mid March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available ^{xxviii} . <u>Information Sources</u> • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs) • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Field Naturalist Clubs • Ducks Unlimited Canada • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{ccxi} • Any mixed species aggregations of 100 or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat ^{xxviii} . • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMIST ^{xxix} Index #7 provides development effects and mitigation measures.	Grassland habitat within and adjacent to the subject property are too small to support species aggregations of 100 or more waterfowl individuals. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)					
Rationale: Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked Duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). <u>Information Sources</u> • Environment Canada • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100¹ or more of listed species for 7 days¹, results in > 700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH^{cxdix} • The combined area of the ELC ecosites and a 100m radius area is the SWH^{cxdviii} • Wetland area and shorelines associated with sites identified within the SWHTG^{cxdviii} Appendix K^{cxdix} are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi} • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWHMIST^{cxdix} Index #7 provides development effects and mitigation measures.	Swamp maple deciduous habitat within the centre of the subject property is too small to support waterfowl species aggregations of 100 or more individuals for 7 days. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Shorebird Migratory Stopover Area					
Rationale: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin Whimbrel	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. <u>Information Sources</u> • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area ^{cdviii} • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{cccxi} • SWHMIST ^{cxix} Index #8 provides development effects and mitigation measures.	No shorelines of lakes or rivers are located within or adjacent to the subject property. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Raptor Wintering Area					
<u>Rational:</u> Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl <u>Special Concern:</u> Short-eared Owl Bald Eagle	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class: Forest: FOD, FOM, FOC Upland: CUM, CUT, CUS, CUW	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering sites need to be > 20 ha ^{Cxlviii, Cxlix} with a combination of forest and upland. ^{Xvi, xvii, xviii, xix, xx, xxi} Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands ^{Cxlix} Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water, large trees and snags available for roosting <u>Information Sources</u> • OMNRF Ecologist or Biologist • Field Natural Clubs • Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Reports and other information available from Conservation Authorities CAs.	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years) ^{Cxlix} for a minimum of 20 days by the above number of birds • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{Ccxi} • SWHMIST ^{Cxlix} Index #10 and #11 provides development effects and mitigation measures.	Field area within or adjacent to the subject property likely actively disturbed for agriculture. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bat Hibernacula					
<u>Rationale</u> Bat hibernacula are rare habitats in Ontario landscapes.	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	- Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. - Active mine sites should not be considered as SWH - The locations of bat hibernacula are relatively poorly known. <u>Information Sources</u> - OMNRF for possible locations and contact for local experts - Natural Heritage Information Center (NHIC) Bat Hibernaculum - Ministry of Northern Development and Mines for location of mine shafts. - Clubs that explore caves (eg. Sierra Club) - University Biology Departments with bat experts.	- All sites with confirmed hibernating bats are SWH. - The habitat area includes a 200m radius around the entrance of the hibernaculum^{cxviii, ccvii} for most. - Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"^{ccv} - SWHMiST^{cxix} Index #1 provides development effects and mitigation measures.	No caves, mine shafts, underground foundations and Karsts are known from this area. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bat Maternity Colonies					
<u>Rationale:</u> Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	Maternity colonies can be found in tree cavities, vegetation and often in buildings ^{xxii, xxv, xxvi, xxvii, xxxi} (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario ^{xxii} • Maternity colonies located in Mature deciduous or mixed forest stands ^{ccix, ccx} with >10/ha large diameter (>25cm dbh) wildlife trees ^{ccvii} • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 ^{ccxiv} or class 1 or 2 ^{ccxii} • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred ^{ccx} <u>Information Sources</u> • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts.	• Maternity Colonies with confirmed use by: • >10 Big Brown Bats • >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for wind Power Projects" ^{ccv} • SWHMS T ^{cdix} Index #12 provides development effects and mitigation measures.	Woodland area (SWM4-1, SWD6-3, FOD5-1 and FOC4) may provide suitable habitat within and adjacent to the subject property. Candidate SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Turtle Wintering Area					
<u>Rationale:</u> Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Midland Painted Turtle <u>Special Concern:</u> Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles - ELC Community Classes: SW, MA, OA and SA; ELC Community Series: FEO and BOO Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen ^{cxix, cx, cxi, cxviii} . • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. <u>Information Sources</u> • EIS studies carried out by Conservation Authorities. • Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • OMNRF ecologist or biologist • Natural Heritage Information Center (NHIC)	• Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May) ^{cvii} • Congregation of turtles is more common where wintering areas are limited and therefore significant ^{cxix, cx, cxi, cxviii} . • SWHMiST ^{cxix} Index #28 provides development effects and mitigation measures for turtle wintering habitat.	Deep water bodies are not present within the subject property. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Snake Hibernaculum					
<u>Rationale:</u> Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	<u>Snakes:</u> Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake <u>Special Concern:</u> Milksnake Eastern Ribbonsnake <u>Lizard:</u> <u>Special Concern</u> (Southern Shield population): Five-lined Skink	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. The existence of features that go below the frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line^{cxiv, i, ii, iii, cxii.} • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. • Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures cciii. Information Sources • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells). • Reports and other information from CAs. • Local Field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. clubs • Natural Heritage Information Center (NHIC) • OMNRF ecologist or biologist may be aware of locations of wintering skinks	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. <u>or</u>; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. <u>or</u>; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct). • <u>Note:</u> If there are Special Concern Species present, then site is SWH • <u>Note:</u> Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWHⁱ • SWHMiST^{cxix} Index #13 provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for skink is significant. • SWHMiST^{cxix} Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.	Rock piles or slops, old stone fences, and abandoned foundation are not present within or adjacent to the subject property. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)					
<u>Rationale:</u> Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow populations are declining in Ontario.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	- Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. - Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. - Does not include a licensed/permitted Mineral Aggregate Operation. <u>Information Sources</u> - Reports and other information available from CAs - Ontario Breeding Bird Atlas^{ccv} - Bird Studies Canada; <i>NatureCounts</i> http://www.birdscanada.org/birdmon/ - Field Naturalist clubs	Studies confirming: - Presence of 1 or more nesting sites with 8^{cdvix} or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. - A colony identified as SWH will include a 50m radius habitat area from the peripheral nests^{ccvii} - Field surveys to observe and count swallow nests are to be completed during the breeding season Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi} - SWHMIST^{cdix} Index #4 provides development effects and mitigation measures	Exposed soil banks are not present. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)					
<u>Rationale:</u> Large Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	- Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. - Most nests in trees are 11 to 15m from ground, near the top of the tree. <u>Information Sources</u> - Ontario Breeding Bird Atlas^{CCV}, colonial nest records. - Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNR). - NHIC Mixed Wader Nesting Colony - Aerial photographs can help identify large heronries - Reports and other information available from CAs - MNRF District Offices - Local naturalist clubs	Studies confirming: - Presence of 5¹ or more active nests of Great Blue Heron or other listed species. - The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH ^{CC, CCVII} - Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells - SWHMIST^{CCIX} Index #5 provides development effects and mitigation measures.	Lakes, islands, and peninsulas are not present within the subject property. On-site wetland habitat is not suitable to support colonies. Suitable habitat not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Ground)					
<u>Rationale:</u> Colonies are important to local bird populations, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6 MAS1 – 3 CUM CUT CUS	- Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. - Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. <u>Information Sources</u> - Ontario Breeding Bird Atlas^{ccv}, rare/colonial species records. - Canadian Wildlife Service - Reports and other information available from CAs - Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area - MNRF District Offices - Field naturalist clubs	Studies confirming: - Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern^l. - Presence of 5 or more pairs for Brewer's Blackbird. - Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. - The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH^{cc, ccviii} - Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi} - SWHMiST^{cxix} Index #6 provides development effects and mitigation measures.	Rocky islands or peninsula not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Migratory Butterfly Stopover Areas					
<u>Rationale:</u> Butterfly stopovers areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral <u>Special Concern:</u> Monarch	Combination of ELC Community Series: Need to have present one Community Series from each landclass: <u>Field:</u> CUM CUS CUT <u>Forest:</u> FOC FOM FOD CUP Anecdotal, a candidate sight for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario^{cxlix}. - The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south^{xxviii, xxviii, xxviii, xxv, xxvii}. - The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat cxlviii, cxlix. - Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes^{xxvii, xxviii, xxviii, xl, xli}. <u>Information Sources</u> - OMNRF (NHIC) - Agriculture Canada in Ottawa may have list of butterfly experts. - Field Naturalist Clubs - Toronto Entomologists Association - Conservation Authorities	Studies confirm: - The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)^{xlii}. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day^{xxvii}, significant variation can occur between years and multiple years of sampling should occur^{xl, xlii}. - Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD - MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. - SWHMIST^{cxlix} Index #16 provides development effects and mitigation measures.	Subject and adjacent property are not within 5 km of Lake Ontario. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Landbird Migratory Stopover Areas					
<u>Rationale:</u> Sites with a high diversity of species as well as high number are most significant	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	Woodlots need to be >10 ha ¹ in size and within 5km ^{iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv} of Lake Ontario. • If multiple woodlands are located along the shoreline, those woodlands <2km from Lake Ontario are more significant ^{cxlix} • Sites have a variety of habitats; forest, grassland and wetland complexes ^{cxlix} . • The largest sites are more significant ^{cxlix} • Woodlots and forest fragments are important habitats to migrating birds ^{ccxviii} , these features located along the shore and located within 5km of Lake Ontario are Candidate SWH ^{cxlviii} . <u>Information Sources</u> • Bird Studies Canada • Ontario Nature • Local birders and naturalist club • Ontario Important Bird Areas (IBA) Program	Studies confirm: • Use of the woodlot by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Apr/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{ccxli} • SWHMiST ^{cxlix} Index #9 provides development effects and mitigation measures.	On-site woodlands are not within 5 km of Lake Ontario. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Deer Yarding Areas					
<u>Rationale:</u> Winter habitat for deer is considered to be the main factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.	White-tailed Deer	Note: OMNRF to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include: FOM, FOC, SWM and SWC. Or these ELC Ecosites: CUP2 CUP3 FOD3 CUT	- Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. - The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%^{CXCIV}. - OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual"^{CXCV} - Woodlots with high densities of deer due to artificial feeding are not significant.	No Studies Required: - Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH^{vi, vii, viii, ix, bc, l}. - Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO). - Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations^{CXCV}. - If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. - SWHMiST^{CXIX} Index #2 provides development effects and mitigation measures.	Deer yarding habitat not identified within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Deer Winter Congregation Areas					
<u>Rationale:</u> Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions ^{eniviii}	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50ha may also be used.	• Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on MNRF studies or assessment. • Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands^{cxviii}. • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha^{ccxxiv}. • Woodlots with high densities of deer due to artificial feeding are not significant. <u>Information Sources</u> • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF^{cxviii}. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRⁱ. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques^{ccxxiv}, ground or road surveys, or a pellet count deer density survey^{ccxxv}. • If a SWH is determined for Deer Wintering Area of if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST^{cxix} Index #2 provides development effects and mitigation measures.	Woodlots >100ha are not present within or adjacent to the subject property. The area has not been mapped by the MNR. Not SWH.

Significant Wildlife Habitat Assessment Tables

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Cliff and Talus Slopes					
<u>Rationale:</u> Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	Most cliff and talus slopes occur along the Niagara Escarpment. <u>Information Sources</u> • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF District • Natural Heritage Information Center (NHIC) has location information on their website • Local naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes ^{xxviii} • SWHMiST ^{cdix} Index #21 provides development effects and mitigation measures.	Vegetation community not present within or adjacent to the subject property. Not SWH.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Sand Barrens					
<u>Rationale:</u> Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	Any sand barren area, >0.5ha in size. <u>Information Sources</u> • OMNRF Districts. • Natural Heritage Information Center (NHIC) has location information on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens^{xxxviii} • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)^l. • SWHMiST^{cdix} Index #20 provides development effects and mitigation measures.	Vegetation community not present within or adjacent to the subject property. Not SWH.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Alvar					
<u>Rationale:</u> Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregion 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 Five Alvar Indicator Species: 1) <i>Carex crawei</i> 2) <i>Panicum philadelphicum</i> 3) <i>Eleocharis compressa</i> 4) <i>Scutellaria parvula</i> 5) <i>Trichostema branchiatum</i> These indicator species are very specific to Alvars within Ecoregion 6E	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoo geographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover^{boxviii}.	An Alvar site > 0.5 ha in size^{boxv}. <u>Information Sources</u> • Alvars of Ontario (2000), Federation of Ontario Naturalists^{boxvi}. • Ontario Nature – Conserving Great Lakes Alvars^{boxviii}. • Natural Heritage Information Center (NHIC) has location information on their website • Field Naturalist clubs • Conservation Authorities	Field studies identify four of the five Alvar indicator species^{boxv}, ^{boxlix} at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses^{boxv}. • SWHMiST^{boxlix} Index #17 provides development effects and mitigation measures.	Vegetation community not present within or adjacent to the subject property. Not SWH.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Old Growth Forest					
<u>Rationale:</u> Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland Stands areas 30ha or greater in size or with at least 10 ha interior habitat assuming 100m buffer at edge of forest í. Information Sources • OMNRF Forest Resource Inventory mapping • OMNRF Forester, Ecologist or Biologist • Field Local naturalist clubs • Conservation Authorities • Sustainable Forestry License (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat ^{cxdviii} • The stand will have experienced no recognizable forestry activities ^{cxlviii} • The area of Forest Ecosites combined to make up the stand is the SWH. • Determine ELC Vegetation Type for forest stand ^{boxviii} • SWHDSS ^{cxibx} Index #23 provides development effects and mitigation measures.	Old Growth Forest not present within or adjacent to the subject property. Not SWH.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Savannah					
<u>Rationale:</u> Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.	• No minimum size to site • Site must be restored or a natural site. • Remnant sites such as railway right of ways are not considered to be SWH. <u>Information Sources</u> • Natural Heritage Information Center (NHIC) has location information on their website • OMNRF Ecologists • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in ^{boxv} Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used ^{cxlviii} . • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics sp.). • SWHMiST^{cxlix} Index #18 provides development effects and mitigation measures.	Vegetation community not present within or adjacent to the subject property. Not SWH.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Tallgrass Prairie					
<u>Rationale:</u> Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.	• No minimum size to site • Site must be restored or a natural site. • Remnant sites such as railway right of ways are not considered to be SWH. <u>Information Sources</u> • OMNR Districts • Natural Heritage Information Center (NHIC) has location information available on their website • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in ^{bov} Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used ^{cxlviii} . • Area of the ELC Ecosite is the SWH • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMiST^{cxlix} Index #19 provides development effects and mitigation measures.	vegetation community not present within or adjacent to the subject property. Not SWH.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Other Rare Vegetation Communities					
<u>Rationale:</u> Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG ^{cxlviii} . Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M ^{cxlviii} The OMNR/NHIC will have up to date listing for rare vegetation communities. <u>Information Sources</u> • Natural Heritage Information Center (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG ^{cxlviii} . • Area of the ELC Vegetation Type polygon is the SWH. • SWHMiST^{cxlix} Index #37 provides development effects and mitigation measures.	No other rare vegetation communities are present within or adjacent to the subject property. Not SWH.

Significant Wildlife Habitat Assessment Tables

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Nesting Area					
<u>Rationale:</u> Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends 120m ^{cxlix} from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur ^{cxlix} . • Upland areas should be at least 120m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. <u>Information Sources</u> • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{ccxi} • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m ^{cxlviii} from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMiST ^{cxlix} Index #25 provides development effects and mitigation measures.	Field surveys confirmed that waterfowl are not nesting in high enough numbers within or adjacent to the subject property. Not SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat					
<u>Rationale:</u> Nest sites are fairly uncommon in Eco-region 6E are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey <u>Special Concern:</u> Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). <u>Information Sources</u> • Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data. • OMNRF Districts • Sustainable Forestry License (SFL) companies will identify additional nesting locations through field operations. • Check the Ontario Breeding Bird Atlas^{ccv} or Rare Breeding Birds in Ontario for species documented • Reports and other information available from CAs. • Field naturalists clubs	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area^{cxviii}. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the SWH^{ccvii}, maintaining undisturbed shorelines with large trees within this area is important^{cxviii}. • For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH^{cvl}, ccvii. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat^{cvl}. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant^{ccvii} • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi} • SWHMIST^{cxlix} Index #26 provides development effects and mitigation measures	Lakes, ponds, rivers, and wetlands with productive fishing waters are not present. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Woodland Raptor Nesting Habitat					
Rationale: Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat ^{bxxxviii, bxxxix, xc, xci, xciii, xciv, xcv, xcvi, cxoodii} . Interior habitat determined with a 200m buffer ^{cxlviii} . • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Cooper's hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <u>Information Sources</u> • OMNRF • Check the Ontario Breeding Bird Atlas ^{ccv} or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from CAs	Studies confirm: • Presence of 1 or more active nests from species list is considered significant ^{cxlviii} . • Red-shouldered Hawk and Northern Goshawk – a 400m radius around the nest or 28ha area of habitat is the SWH ^{ccvii} . • Barred Owl – a 200m radius around the nest is the SWH ^{ccvii} . • Broad-winged Hawk and Coopers Hawk – a 100m radius around the nest is the SWH ^{ccvii} . • Sharp-shinned Hawk – a 50m radius around the nest is the SWH ^{ccvii} . • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMiST ^{cxlix} Index #27 provides development effects and mitigation measures.	Natural or conifer plantation woodland/forest stands >30ha in size is not present within or adjacent to the subject property. Not SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

Table 3: Characteristics of Specialized Wildlife Habitat for Ecoregion EL					
	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Turtle Nesting Area					
<u>Rationale:</u> These habitats are rare and when identified will often be the only breeding site for local populations of turtles	Midland Painted Turtle <u>Special Concern:</u> Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) ^{cxlviii} or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Center (NHIC) • Field Naturalist clubs and landowners	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH^l • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH^{cxlviii}. • Travel routes from wetland to nesting area are to be considered within the SWH^{cxlix}. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWHMiST^{cxlix} Index #28 provides development effects and mitigation measures for turtle nesting habitat.	Exposed mineral soil areas are not present. Suitable habitat not present within or adjacent to the subject property. Not SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Seeps and Springs					
<u>Rationale:</u> Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system ^{cxvii, cxlix} . • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species ^{cxix, cxx, cxoi, cxoii, cxiii, cxiv} <u>Information Sources</u> • Topographical Map • Thermography • Hydrological surveys conducted by CAs and MOE • Field naturalists clubs and landowners • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.	Field Studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat ^{cxlviii} • SWHMiST ^{cxlix} Index #30 provides development effects and mitigation measures	Forested area within the headwaters of a stream is present. Seeps and springs may be present within and adjacent to subject property, however these areas will be retained and protected within the woodland. Candidate SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

Table 5. Characteristics of Specialized Wildlife Habitat for Ecoregion 02.					
	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Woodland)					
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond or woodland pool (including vernal pools) >500m² (about 25m diameter) ^{ccvii} within or adjacent (within 120m) to a woodland (no minimum size) ^{chooxii, bxii, bxv, bxvi, bxvii, bxviii, bxix, box} Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat ^{cxviii} <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF District • OMNRF wetland evaluations • Field naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) ^{boxj} or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys ^{cviii} will be required during the spring March-June when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the woodland area plus a 230m radius of woodland area ^{bxiii, bxv, bxvi, bxvii, bxviii, bxix, box, boxj} if a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is the be included in the habitat. • SWHMiST ^{cxlix} Index #14 provides development effects and mitigation measures.	NRSI biologists did not observe any vernal pools on the subject property and frogs were not heard during anuran call surveys. It is possible that the SAF1-3 pond may support salamander breeding habitat, but the wetlands will be retained and protected within the woodland. Candidate SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Wetland)					
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Tree frog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	- Wetlands >500m² (about 25m diameter)^{ccvii} supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats^{cbxxxiv}. - Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. - Bullfrogs require permanent water bodies with abundant emergent vegetation. <u>Information Sources</u> - Ontario Herpetofaunal Summary Atlas (or other similar atlases) - Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. - OMNRF Districts and wetland evaluations - Reports and other information available from CAs.	Studies confirm: - Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species and with at least 20 individuals (adults or eggs masses)^{boxi, boxiii}, or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant. - The ELC ecosite wetland area and the shoreline are the SWH. - A combination of observational study and call count surveys^{cviii} will be required during spring (March to June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. - If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. - SWHMiST^{cxlix} Index #15 provides development effects and mitigation measures.	Wetlands isolated from woodlands are not present. Suitable habitat not present within or adjacent to the subject property. Not SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Woodland Area-Sensitive Bird Breeding Habitat					
<u>Rationale:</u> Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.	Yellow-Bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Special Concern: Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	- Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. ^{cv, cxood, cxoodi, cxoodii, cxoodiv, cxov, cxovi, cxooxvii, cxooxviii, cxoodix, cxi, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvii, clviii, clix} - Interior forest habitats are at least 200m from forest edge habitat. Information Sources - Local bird clubs - Canadian Wildlife Service (CWS) for the location of forest bird monitoring. - Bird studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to greatest value to interior species - Reports and other information available from CAs.	- Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. - Conduct field investigations in spring and early summer when birds are singing and defending their territories. - Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi} - SWHMIST^{cxlix} Index #34 provides development effects and mitigation measures.	Forest stands are too small (<30ha) to provide woodland area-sensitive bird breeding habitat. Suitable habitat is not present within or adjacent to the subject property. Not SWH

Significant Wildlife Habitat Assessment Tables

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Marsh Bird Breeding Habitat					
Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1	- Nesting occurs in wetlands - All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present^{cciv}. - For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.	Studies confirm: - Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species¹. - Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH¹. - Area of the ELC ecosite is the SWH - Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. - Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi}. - SWHMiST^{ccix} Index #35 provides development effects and mitigation measures	Field surveys did not observe marsh bird breeding occurring within or adjacent to the subject property.
	Special Concern: Black Tern Yellow Rail	For Green Heron: All SW, MA and CUM1 sites.	Information Sources - Contact OMNRF, wetland evaluations are a good source of information. - Field naturalist clubs - Natural Heritage Information Center (NHIC) Records - Reports and other information available from CAs. - Ontario Breeding Bird Atlas^{ccv}		Not SWH.

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species ¹		Candidate SWH	Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Open Country Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow Special Concern: Short-eared Owl	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) >30 ha ^{c1c, c1d, c1e, c1f, c1g, c1h, c1i, c1j, c1k, c1l, c1m, c1n, c1o, c1p, c1q, c1r, c1s, c1t, c1u, c1v, c1w, c1x, c1y, c1z, c2a, c2b, c2c, c2d, c2e, c2f, c2g, c2h, c2i, c2j, c2k, c2l, c2m, c2n, c2o, c2p, c2q, c2r, c2s, c2t, c2u, c2v, c2w, c2x, c2y, c2z, c3a, c3b, c3c, c3d, c3e, c3f, c3g, c3h, c3i, c3j, c3k, c3l, c3m, c3n, c3o, c3p, c3q, c3r, c3s, c3t, c3u, c3v, c3w, c3x, c3y, c3z, c4a, c4b, c4c, c4d, c4e, c4f, c4g, c4h, c4i, c4j, c4k, c4l, c4m, c4n, c4o, c4p, c4q, c4r, c4s, c4t, c4u, c4v, c4w, c4x, c4y, c4z, c5a, c5b, c5c, c5d, c5e, c5f, c5g, c5h, c5i, c5j, c5k, c5l, c5m, c5n, c5o, c5p, c5q, c5r, c5s, c5t, c5u, c5v, c5w, c5x, c5y, c5z, c6a, c6b, c6c, c6d, c6e, c6f, c6g, c6h, c6i, c6j, c6k, c6l, c6m, c6n, c6o, c6p, c6q, c6r, c6s, c6t, c6u, c6v, c6w, c6x, c6y, c6z, c7a, c7b, c7c, c7d, c7e, c7f, c7g, c7h, c7i, c7j, c7k, c7l, c7m, c7n, c7o, c7p, c7q, c7r, c7s, c7t, c7u, c7v, c7w, c7x, c7y, c7z, c8a, c8b, c8c, c8d, c8e, c8f, c8g, c8h, c8i, c8j, c8k, c8l, c8m, c8n, c8o, c8p, c8q, c8r, c8s, c8t, c8u, c8v, c8w, c8x, c8y, c8z, c9a, c9b, c9c, c9d, c9e, c9f, c9g, c9h, c9i, c9j, c9k, c9l, c9m, c9n, c9o, c9p, c9q, c9r, c9s, c9t, c9u, c9v, c9w, c9x, c9y, c9z, c0a, c0b, c0c, c0d, c0e, c0f, c0g, c0h, c0i, c0j, c0k, c0l, c0m, c0n, c0o, c0p, c0q, c0r, c0s, c0t, c0u, c0v, c0w, c0x, c0y, c0z} Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years) ¹ . Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. <u>Information Sources</u> • Agricultural land classification maps, Ministry of Agriculture. • Ask local birders • Ontario Breeding Bird Atlas ^{ccv} • Reports and other information available from CAs.	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owl is to be considered SWH. • The area of the SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{ccxi} . • SWHMiST ^{cdix} Index #32 provides development effects and mitigation measures.	Grassland areas are too small (<30 ha) to support open country bird breeding habitat. Indicator birds also not observed. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat					
<u>Rationale:</u> This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix.	<u>Indicator spp.:</u> Brown Thrasher Clay-coloured Sparrow <u>Common spp.:</u> Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher <u>Special Concern:</u> Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	Large field areas succeeding to shrub and thicket habitats>10ha ^{cxiiv} in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years) ¹ . Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species ^{cboxiii} . Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. <u>Information Sources</u> • Agricultural land classification maps Ministry of Agriculture Local bird clubs • Ontario Breeding Bird Atlas ^{ccv} • Reports and other information available from CAs	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species ¹ . • A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{ccxi} • SWHMiST ^{cxiix} Index #33 provides development effects and mitigation measures.	Field areas succeeding to shrub and thicket habitats are too small (<10ha). Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Terrestrial Crayfish					
Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. ccii	Chimney or Digger Crayfish: (<i>Fallicambarus fodiens</i>) Devil Crawfish or Meadow Crayfish: (<i>Cambarus Diogenes</i>)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM	Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites ^{ccii} • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH • Surveys should be done April to August during in temporary or permanent water Note the presence of burrows or chemistry are often the only indicator of presence, observance or collection of individuals is very difficult ^{ccii} • SWHMIST ^{cxlix} Index #36 provides development effects and mitigation measures.	Terrestrial crayfish and burrows were not observed along edges of on-site wetlands during field surveys. Suitable habitat is not present within or adjacent to the subject property. Not SWH

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Special Concern and Rare Wildlife Species					
<u>Rationale:</u> These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites^{boviii}. <u>Information Sources</u> • Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website: "Get Information": http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas^{ccv} • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWHMIST^{cdx} Index #37 provides development effects and mitigation measures.	Eastern Wood-Pewee and Smooth-cone Sedge were observed on the subject property in the FOD5-1 forest community and SWM4-1 swamp community, respectively. Confirmed SWH.

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Amphibian Movement Corridors					
Rationale: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	Movement corridors between breeding habitat and summer habitat ^{cxxiv, cxov, cxovi, cxovii, cxoviii, cxoix, cxox, cxoxi} . Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule ¹ . <u>Information Sources</u> • MNRF District Office • Natural Heritage Information Center NHIC • Reports and other information available from CAs • Field Naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant ^{cxlix} . • Corridors should have at least 15m of vegetation on both sides of waterway ^{cxlix} or be up to 200m wide ^{cxlix} of woodland habitat and with gaps <20m ^{cxlix} . • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat ^{cxlix} . • SWHMIST ^{cxlix} Index #40 provides development effects and mitigation measures.	Movement corridors meeting the criteria for provincial significance are not present within or adjacent to the subject property. Not SWH.

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Deer Movement Corridors					
<u>Rationale:</u> Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.	White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule ¹ . • A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion ^{clxxxii, clxxxiii, cxlix, cxliv} . • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges). <u>Information Sources</u> • MNRF District Office • Natural Heritage Information Center (NHIC) • Reports and other information available from CAs • Field Naturalist Clubs	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. • Corridors that lead to a deer wintering yard should be unbroken by roads and residential areas. • Corridors should be at least 200m wide ^{cxlix} with gaps <20m ^{cxlix} and if following riparian area with at least 15m of vegetation on both sides of waterway ^{cxlix} . Shorter corridors are more significant than longer corridors ^{cxlix} . • SWHMiST ^{cxlix} Index #39 provides development effects and mitigation measures.	Deer wintering habitat was not identified. Deer movement corridors are not present within or adjacent to the subject property. Not SWH.

Significant Wildlife Habitat Assessment Tables

Table 6. Exceptions for Ecodistricts within Ecoregion 6E.

	Wildlife Habitat and Species	Candidate SWH			Confirmed SWH	Study Area
		Ecosites	Habitat Description	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
EcoDistrict: 6E-14						
Rationale: The Bruce Peninsula has an isolated and distinct population of black bears. Maintenance of large woodland tracks with mast producing tree species is important for bears. cbxxxvi, ccxvii	Mast Producing Areas Black Bear	All Forested habitat represented by ELC Community Series: FOM FOD	- Black bears require forested habitat that provides cover, winter hibernation sites, and mast producing tree species. cbxxxv, cbxxxvii, cbxxxviii, cbxxxix, cxc, cxci, cxcii, cxciii, ccxvii - Forested habitats need to be large enough to provide cover and protection for black bears ccxvii.	Woodland ecosites >30ha with mast-producing tree species, either soft (cherry) or hard (oak and beech), Information Sources Important forest habitat for black bears may be identified by OMNRF.	- All woodlands > 30 ha with a 50% composition of these ELC Vegetation Types are considered significant: FOM1-1 FOM2-1 FOM3-1 FOD1-1 FOD1-2 FOD2-1 FOD2-2 FOD2-3 FOD2-4 FOD4-1 FOD5-2 FOD5-3 FOD5-7 FOD6-5 • SWHMiST cxlix Index #3 provides development effects and mitigation measures.	Woodland area is too small (<30ha) within and adjacent to the subject property. Not SWH.

Table 6. Exceptions for Ecodistricts within Ecoregion 6E.

	Wildlife Habitat and Species	Candidate SWH			Confirmed SWH	Study Area
		Ecosites	Habitat Description	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
EcoDistrict: 6E-17						
<u>Rationale:</u> Sharp-tailed grouse only occur on Manitoulin Island in Ecoregion 6E, Leks are an important habitat to maintain their population	Lek Sharp-tailed Grouse	CUM CUS CUT	• The lek or dancing ground consists of bare, grassy or sparse shrubland. There is often a hill or rise in topography^{ccxix}. • Leks are typically a grassy field/meadow >15h with adjacent shrublands and >30ha with adjacent deciduous woodland. Conifer trees within 500m are not tolerated. ^{ccxix}	Grasslands (field/meadow) are to be >15ha when adjacent to shrubland and >30ha when adjacent to deciduous woodland ^{ccxix} . • Grasslands are to be undisturbed with low intensities of agriculture (light grazing or late haying) • Leks will be used annually if not destroyed by cultivation or invasion by woody plants or tree planting^{ccxix} Information Sources • OMNRF district office • Bird watching clubs • Local landowners • Ontario Breeding Bird Atlas	Studies confirming lek habitat are to be completed from late March to June. • Any site confirmed with sharp-tailed grouse courtship activities is considered significant • The field/meadow ELC ecosites plus a 200 m radius area with shrub or deciduous woodland is the lek habitat • SWHMIST^{cxlix} Index #32 provides development effects and mitigation measures	Grassland areas are too small (<15ha) within and adjacent to the subject property. Not SWH.

Appendix II
SAR and SCC Screening

Species at Risk (SAR) and Species of Special Concern (SCC) Screening Table

Common Name	Scientific Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	NRSI Observed	Habitat Source	Habitat Preference	Suitable Habitats within Study Area	Suitable Habitats within Subject Property	Rationale
Vascular Plants												
Butternut	<i>Juglans cinerea</i>	S2?	END	E	E	Schedule 1	No	Michigan Flora Online (A. A. Reznicek, E. G. Voss, & B. S. Walters. 2011)	Stream banks and swamps, as well as upland beech-maple, oak-hickory, and mixed hardwood stands.	No	No	Upland beech-maple, oak-hickory, and mixed hardwood stands are not present within or adjacent to the subject property.
Black Ash	<i>Fraxinus nigra</i>	S4	END	T	NS	No schedule	No	COSEWIC assessment and status report on the Black Ash <i>Fraxinus nigra</i> in Canada (COSEWIC 2018)	Black Ash is predominantly a wetland species of swamps, floodplains and fens. It has an intermediate light requirement and a tendency toward greater abundance in more alkaline sites. Most sites in which it is dominant are flood prone, where its high tolerance of seasonal flooding appears to offer a competitive advantage. Black Ash also occurs widely in moist upland forests, but generally at lower densities than in wet areas.	Yes	Yes	Suitable habitat is present within the subject property. Black Ash was recorded in the SWM4-1 community during 2022 field surveys.
Birds												
Blue-winged Teal	<i>Spatula discors</i>	S3B,S4M					No	Cornell Lab of Ornithology 2024	Inhabits shallow ponds and wetlands across much of North America. Prefers grasslands bordering small potholes and other freshwater wetlands.	No	No	Suitable habitat is not present within or adjacent to the subject property. Blue-winged Teal was not recorded during 2022 field surveys.
Chimney Swift	<i>Chaetura pelagica</i>	S3B	THR	T	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Commonly found in urban areas near buildings; nests in chimneys, hollow trees, and crevices of rock cliffs. Feeds over open water.	No	No	Buildings with chimneys are present within and adjacent to the subject property. However, Red-Headed Woodpecker was not recorded during 2022 field surveys.
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	S3	END	E	E	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Open, deciduous forest with little understory; fields, parks or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees. Requires cavity trees with at least 40 cm dbh.	No	No	Deciduous forests are present within the subject property. However, Red-Headed Woodpecker was not recorded during 2022 field surveys.
Eastern Wood-Pewee	<i>Contopus virens</i>	S4B	SC	SC	SC	Schedule 1	No	Species at Risk in Ontario (MECP 2024)	Mid-canopy layer of forest clearings and edges of deciduous and mixed forest. Abundant in intermediate-age mature forest stands with little understory vegetation.	Yes	Yes	Edges of deciduous and mixed forests are present within the subject property. Eastern Wood-Pewee was recorded during 2022 field surveys.
Barn Swallow	<i>Hirundo rustica</i>	S4B	SC	SC	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Farmlands, rural areas and other open or semi-open areas near body of water. Nests almost exclusively on human-made structures such as open barns, buildings, bridges and culverts.	No	No	Farmlands and human-made structures are present within and adjacent to the subject property. However, Barn Swallow was not recorded during 2022 field surveys.
Purple Martin	<i>Progne subis</i>	S3B					No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Open, trees areas such as farmland, parks, yards, marshes; usually near large bodies of water; colonial; nests in tree cavities, cliff ledges; most common in nest boxes; requires open space for foraging; prefers trees >15 cm dbh.	No	No	Large bodies of water are not present within or adjacent to the subject property.
Bank Swallow	<i>Riparia riparia</i>	S4B	THR	T	T	Schedule 1	No	Recovery Strategy for the Bank Swallow in Ontario (Falconer et al. 2016)	Nests in burrows in natural and human-made settings with vertical faces in silt and sand deposits. Usually on banks of river and lakes, but also found in sand and gravel pits.	No	No	Banks of rivers and lakes as well as sand and gravel pits are not present within or adjacent to the subject property.

Wood Thrush	<i>Hylocichla mustelina</i>	S4B	SC	T	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Carolinian and Great Lakes-St. Lawrence forest zones. Undisturbed moist mature deciduous or mixed forest with deciduous sapling growth. Near pond or swamp. Must have some trees higher than 12 m.	No	No	Large deciduous and mixed forests are present within the subject property. However, Wood Thrush was not recorded during 2022 field surveys.
Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	THR	SC	T	Schedule 1	No	Recovery Strategy for the Bobolink and Eastern Meadowlark in Ontario (McCracken et al. 2013)	Large (>10 ha), open expansive grasslands, pastures, hayfields, meadows or fallow fields with dense ground cover. Occasionally nest in large (>50 ha) fields of winter wheat and rye in southwestern Ontario.	No	No	Large (>10ha), open expansive grasslands, pastures, hayfields, meadows, or fallow fields are not present within or adjacent to the subject property.
Eastern Meadowlark	<i>Sturnella magna</i>	S4B,S3N	THR	T	T	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Open pastures, hayfields, grasslands or grassy meadows with elevated singing perches (small trees, shrubs or fence posts). Also weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields or other open areas. Generally prefers larger tracts of habitat >10 ha, but will sometimes use smaller tracts.	No	No	Open grasslands or grassy meadows are not present. Larger tracts (>10ha) of habitat are not present.
Reptiles and Amphibians												
Snapping Turtle	<i>Chelydra serpentina</i>	S4	SC	SC	SC	Schedule 1	No	Species at Risk in Ontario (MECP 2024)	Slow-flowing rivers and streams, lakes, and permanent or semi-permanent wetlands with soft substrates and vegetation. Key habitat requirements: open areas with structures for basking, open sand or gravel areas for nesting, shallow areas with soft substrates to bury in, soft banks or substrates for hibernation.	No	No	Suitable habitat is not present within or adjacent to the subject property.
Mammals												
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	S3	END	E	NS	No schedule	No	COSEWIC Assessment and Status Report on the Hoary Bat <i>Lasiurus cinereus</i> Eastern Red Bat <i>Lasiurus borealis</i> Silver-haired Bat <i>Lasionycteris noctivagans</i> in Canada (COSEWIC 2023)	Roosts primarily in cavities, crevices, and exfoliating bark of typically large-diameter trees in forests and occasionally in or on buildings. Forages in forests of any age, along forest edges and in openings in forests. Primarily overwinters within the U.S.	Yes	Yes	Potential bat roosting trees were identified within the subject property during 2022 field surveys.
Eastern Red Bat	<i>Lasiurus borealis</i>	S3	END	E	NS	No schedule	No	COSEWIC Assessment and Status Report on the Hoary Bat <i>Lasiurus cinereus</i> Eastern Red Bat <i>Lasiurus borealis</i> Silver-haired Bat <i>Lasionycteris noctivagans</i> in Canada (COSEWIC 2023)	Roosts in foliage of trees; reproductive roosting occurs in upper foliage of typically large-diameter, super-canopy trees in deciduous and coniferous forests of any age. Males occasionally roost in shrubs or saplings. Primarily overwinters within the U.S.	Yes	Yes	Potential bat roosting trees were identified within the subject property during 2022 field surveys.
Hoary Bat	<i>Lasiurus cinereus</i>	S3	END	E	NS	No schedule	No	COSEWIC Assessment and Status Report on the Hoary Bat <i>Lasiurus cinereus</i> Eastern Red Bat <i>Lasiurus borealis</i> Silver-haired Bat <i>Lasionycteris noctivagans</i> in Canada (COSEWIC 2023)	Roosts in foliage of trees; reproductive roosting occurs in upper foliage of typically large-diameter, super-canopy trees in deciduous and coniferous forests of any age. Forages in the open, such as open wetlands, grasslands and fields with patchy tree cover. Primarily overwinters in the U.S.	Yes	Yes	Potential bat roosting trees were identified within the subject property during 2022 field surveys.
Eastern Small-footed Myotis	<i>Myotis leibii</i>	S2S3	END				No	Recovery Strategy for the Eastern Small-footed Myotis (<i>Myotis leibii</i>) in Ontario (Humphrey, C. 2017)	Roosts, including maternity roosts, in crevices in open, sunny, rocky habitats and in buildings. Hibernates in caves or mines. Hunts in forests and wetlands.	No	No	Rocky habitats, caves, and mines are not present within or adjacent to the subject property.
Little Brown Myotis	<i>Myotis lucifugus</i>	S3	END	E	E	Schedule 1	No	Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fotherby, 2019)	Uses caves, quarries, tunnels, hollow trees or buildings for roosting. Winters in humid caves. Maternity sites in dark warm areas such as attics and barns. Feeds primarily in wetlands and forest edges.	Yes	Yes	Potential bat roosting trees were identified within the subject property during 2022 field surveys.
Northern Myotis	<i>Myotis septentrionalis</i>	S3	END	E	E	Schedule 1	No	Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fotherby, 2019)	Roosts in houses and man-made structures but prefers hollow trees or under loose bark. Hibernates in mines or caves. Hunts within forest, below the canopy.	Yes	Yes	Potential bat roosting trees were identified within the subject property during 2022 field surveys.
Tri-colored Bat	<i>Perimyotis subflavus</i>	S3?	END	E	E	Schedule 1	No	Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fotherby, 2019)	Roosts and maternity colonies in older forests and occasionally in barns or other structures. Forage over water and along streams in the forest. Hibernates in caves.	Yes	Yes	Potential bat roosting trees were identified within the subject property.

Woodland Vole	<i>Microtus pinetorum</i>	S3?	SC	SC	SC	Schedule 1	No	Species at Risk in Ontario (MECP 2022)	Mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow.	No	No	Suitable habitat is not present within or adjacent to the subject property.
American Badger (Southwestern Ontario population)	<i>Taxidea taxus jacksoni</i>	S1	END	E	E	Schedule 1	No	Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000)	Open grasslands and oak savannahs; dens in new hole or enlarged existing hole; sometimes makes food caches	No	No	Open grasslands and oak savannahs are present within or adjacent to the subject property.
Butterflies												
Monarch	<i>Danaus plexippus</i>	S2N,S4B	SC	E	E	Schedule 1	No	Species at Risk in Ontario (MECP 2024)	Adults found in a diversity of habitats with a variety of wildflowers. Caterpillars are confined to meadows and open areas where milkweeds grow (larval food plants).	No	No	Monarch host plant, Common Milkweed (<i>Asclepias syriaca</i>), is present within the subject property. However, Monarch was not recorded during 2022 field surveys.
Fish												
Silver Shiner	<i>Notropis photogenis</i>	S2S3	THR	T	T	Schedule 1	No	Species at Risk in Ontario (MECP 2024)	Moderate to large size streams with swift currents, free of weeds, with clean gravel or boulder bottoms. Gravel riffles needed for spawning (June-July).	No	No	Moderate to large size streams are not present within or adjacent to the subject property.
Black Redhorse	<i>Moxostoma duquesnei</i>	S2	THR	T	T	Schedule 1	No	Species at Risk in Ontario (MECP 2024)	Pools and riffle areas of medium-sized rivers and streams, usually less than two metres deep. Usually few aquatic plants, a moderate to fast current, and a sandy or gravel bottom. In the spring, adults migrate to breeding habitat where eggs are laid on gravel in fast water.	No	No	Medium-sized rivers and streams are not present within or adjacent to the subject property.
Greater Redhorse	<i>Moxostoma valenciennesi</i>	S3					No	Freshwater Fishes of Ontario (Holm, Mandrak & Burridge, 2022)	Clear large streams or rivers with sand, gravel, or boulder substrates. Species is intolerant to turbid conditions.	No	No	Clear large streams or rivers are not present within or adjacent to the subject property.

Reference List

Sidney W. Dunkle. 2000. Oxford Press.

All About Birds, The Cornell Lab of Ornithology. 2024. Cornell University. Available: <https://www.allaboutbirds.org/guide/>

COSEWIC. 2012. COSEWIC assessment and status report on the Buff-breasted Sandpiper *Tryngites subruficollis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 44 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

COSEWIC. 2023. COSEWIC assessment and status report on the Hoary Bat *Lasiurus cinereus*, Eastern Red Bat *Lasiurus borealis* and Silver-haired Bat, *Lasionycteris noctivagans*, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xvi + 100 pp.

COSEWIC. 2022. COSEWIC assessment and status report on the Northern Oak Hairstreak *Satyrion favonius* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 41 pp. (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>).

Holm, E., Mandrak, N., Burridge, M. (2022). Fish guide to freshwater fishes of Ontario. Royal Ontario Museum.

A. A. Reznicek, E. G. Voss, & B. S. Walters. Michigan Flora Online. University of Michigan. Published: February 2011. Available: <https://michiganflora.net/browse.aspx>.

Falconer, M., K. Richardson, A. Heagy, D. Tozer, B. Stewart, J. McCracken, and R. Reid. 2016. Recovery Strategy for the Bank Swallow (*Riparia riparia*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. ix + 70 pp.

McCracken, J.D., R.A. Reid, R.B. Renfrew, B. Frei, J.V. Jalava, A. Cowie, and A.R. Couturier. 2013. Recovery Strategy for the Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vii + 76 pp.

Humphrey, C. 2017. Recovery Strategy for the Eastern Small-footed Myotis (*Myotis leibii*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources and Forestry, Peterborough, Ontario. vii + 76 pp.

Humphrey, C. and H. Fotherby. 2019. Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*) in Ontario. Ontario Recovery Strategy Series. Prepared by the Ministry of the Environment, Conservation and Parks, Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide. Appendix G: Wildlife Habitat Matrices and Habitat Descriptions for Rare Vascular Plants. October 2000.

Ministry of the Environment, Conservation, and Parks (MECP). 2022. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2022-04-01. Available: <https://www.ontario.ca/page/species-risk-ontario>

Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>

Government of Canada. 2022. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2022-05-11. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>

Ministry of Natural Resources (MNR). 2024. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-12-02. Available: <https://www.ontario.ca/page/get-natural-heritage-information>

Appendix III
SWH Screening

Significant Wildlife Habitat Assessment Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ¹	ELC Ecosite Codes ¹	Candidate SWH Habitat Criteria and Information Sources ¹	Confirmed SWH Defining Criteria ¹	Study Area Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)					
Rationale: Habitat important to migrating waterfowl.	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	Fields with sheet water during Spring (mid March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available ^{CHW1} . <u>Information Sources</u> • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs) • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Field Naturalist Clubs • Ducks Unlimited Canada • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{CCW1} • Any mixed species aggregations of 100 or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat ^{CHW1} . • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMI-ST ^{CHW1} Index #7 provides development effects and mitigation measures.	Grassland habitat within and adjacent to the subject property are too small to support species aggregations of 100 or more waterfowl individuals. Not SWH.
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)					
Rationale: Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked Duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). <u>Information Sources</u> • Environment Canada • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100' or more of listed species for 7 days ¹ , results in > 700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH ^{CHW1} . • The combined area of the ELC ecosites and a 100m radius area is the SWH ^{CHW1} . • Wetland area and shorelines associated with sites identified within the SWHTG ^{CHW1} Appendix K ^{CHW1} are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{CCW1} • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWHMI-ST ^{CHW1} Index #7 provides development effects and mitigation measures.	Swamp maple deciduous habitat within the centre of the subject property is too small to support waterfowl species aggregations of 100 or more individuals for 7 days. Not SWH.
Wildlife Habitat: Shorebird Migratory Stopover Area					
Rationale: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin Whimbrel	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groyne and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. <u>Information Sources</u> • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Centre (NHIC) Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area ^{CHW1} . • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{CCW1} • SWHMI-ST ^{CHW1} Index #8 provides development effects and mitigation measures.	No shorelines of lakes or rivers are located within or adjacent to the subject property. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ²	ELC Ecosite Codes ¹	Candidate SWH Habitat Criteria and Information Sources ¹	Confirmed SWH Defining Criteria ¹	Study Area Assessment Details
Wildlife Habitat: Raptor Wintering Area					
Rationale: Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl <u>Special Concern:</u> Short-eared Owl Bald Eagle	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class: Forest: FOD, FOM, FOC Upland: CUM, CUT, CUS, CUW	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering sites need to be > 20 ha ^{cdxiii, cdxix} with a combination of forest and upland. ^{vi, xxi, xxi, xxi, xxi, xxi} Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands ^{cdxix} Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water, large trees and snags available for roosting <u>Information Sources</u> • OMNRF Ecologist or Biologist • Field Natural Clubs • Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Reports and other information available from Conservation Authorities CAs.	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years) ^{cdxix} for a minimum of 20 days by the above number of birds • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{cccx} • SWHMIT ^{cdxix} Index #10 and #11 provides development effects and mitigation measures.	Field area within or adjacent to the subject property likely actively disturbed for agriculture. Suitable habitat is not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Bat Hibernacula					
Rationale: Bat hibernacula are rare habitats in Ontario landscapes.	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH • The locations of bat hibernacula are relatively poorly known. <u>Information Sources</u> • OMNRF for possible locations and contact for local experts • Natural Heritage Information Center (NHIC) Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts. • Clubs that explore caves (eg. Sierra Club) • University Biology Departments with bat experts.	• All sites with confirmed hibernating bats are SWH. • The habitat area includes a 200m radius around the entrance of the hibernaculum ^{cdxii} , ^{ccxi} for most. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects" ^{cccv} • SWHMIT ^{cdxix} Index #1 provides development effects and mitigation measures.	No caves, mine shafts, underground foundations and Karsts are known from this area. Suitable habitat is not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Bat Maternity Colonies					
Rationale: Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	Maternity colonies can be found in tree cavities, vegetation and often in buildings ^{xxi, xxx, xxx, xxx, xxx} (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario ^{ccii} • Maternity colonies located in Mature deciduous or mixed forest stands ^{cdxix, ccc} with >10/ha large diameter (>25cm dbh) wildlife trees ^{ccxi} • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 ^{cccv} or class 1 or 2 ^{ccxi} • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred ^{ccx} <u>Information Sources</u> • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts.	• Maternity Colonies with confirmed use by: • >10 Big Brown Bats • >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for wind Power Projects" ^{cccv} • SWHMIT ^{cdxix} Index #12 provides development effects and mitigation measures.	Woodland area (SWM4-1, SWD6-3, FOD5-1 and FOC4) may provide suitable habitat within and adjacent to the subject property. Candidate SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ²	ELC Ecosite Codes ¹	Candidate SWH Habitat Criteria and Information Sources ¹	Confirmed SWH Defining Criteria ³	Study Area Assessment Details
Wildlife Habitat: Turtle Wintering Area					
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Midland Painted Turtle <u>Special Concern:</u> Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles - ELC Community Classes: SW, MA, OA and SA; ELC Community Series: FEO and BOO Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen ^(CX, CX, CX, C68) . • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. <u>Information Sources</u> • EIS studies carried out by Conservation Authorities. • Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • OMNRF ecologist or biologist • Natural Heritage Information Center (NHIC)	• Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May) ^(C6) . • Congregation of turtles is more common where wintering areas are limited and therefore significant ^(CX, CX, CX, C6) . • SWHMST ^(C68) Index #28 provides development effects and mitigation measures for turtle wintering habitat.	Deep water bodies are not present within the subject property. Suitable habitat is not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Snake Hibernaculum					
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	<u>Snakes:</u> Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake <u>Special Concern:</u> Milksnake Eastern Ribbonsnake <u>Lizard:</u> <u>Special Concern</u> (Southern Shield population): Five-lined Skink	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. The existence of features that go below the fence line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line ^(C68, I, B, C6) . • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. • Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures ccii. <u>Information Sources</u> • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells). • Reports and other information from CAs. • Local Field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. clubs • Natural Heritage Information Center (NHIC) • OMNRF ecologist or biologist may be aware of locations of wintering skinks	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or: individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or: individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct). • <u>Note:</u> If there are Special Concern Species present, then site is SWH • <u>Note:</u> Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWH ¹ • SWHMST ^(C68) Index #13 provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for skink is significant. • SWHMST ^(C68) Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.	Rock piles or slopes, old stone fences, and abandoned foundation are not present within or adjacent to the subject property. Suitable habitat is not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Coloniality - Nesting Bird Breeding Habitat (Bank and Cliff)					
Rationale: Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow populations are declining in Ontario.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. <u>Information Sources</u> • Reports and other information available from CAs • Ontario Breeding Bird Atlas ^(C6) • Bird Studies Canada; <i>NatureCounts</i> http://www.birdscanada.org/birdmon/ • Field Naturalist clubs	Studies confirming: • Presence of 1 or more nesting sites with 8 ^(C68) or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests ^(C68) • Field surveys to observe and count swallow nests are to be completed during the breeding season Evaluation methods to follow 'Bird and Bird Habitats: Guidelines for Wind Power Projects' ^(C68) • SWHMST ^(C68) Index #4 provides development effects and mitigation measures	Exposed soil banks are not present. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ²	ELC Ecosite Codes ¹	Candidate SWH Habitat Criteria and Information Sources ¹	Confirmed SWH Defining Criteria ¹	Study Area Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)					
Rationale: Large Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	- Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. - Most nests in trees are 11 to 15m from ground, near the top of the tree. <u>Information Sources</u> - Ontario Breeding Bird Atlas^{ccv}, colonial nest records. - Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNR). - NHIC Mixed Wader Nesting Colony - Aerial photographs can help identify large heronries - Reports and other information available from CAs - MNR District Offices - Local naturalist clubs	Studies confirming: - Presence of 5' or more active nests of Great Blue Heron or other listed species. - The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH^{cc, ccvi} - Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells - SWHMIST²⁰¹⁶ Index #5 provides development effects and mitigation measures.	Lakes, islands, and peninsulas are not present within the subject property. On-site wetland habitat is not suitable to support colonies. Suitable habitat not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Ground)					
Rationale: Colonies are important to local bird populations, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6 MAS1 – 3 CUM CUT CUS	- Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. - Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. <u>Information Sources</u> - Ontario Breeding Bird Atlas^{ccv}, rare/colonial species records. - Canadian Wildlife Service - Reports and other information available from CAs - Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area - MNR District Offices - Field naturalist clubs	Studies confirming: - Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern¹. - Presence of 5 or more pairs for Brewer's Blackbird. - Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. - The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH^{cc, ccvi} - Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccv} - SWHMIST²⁰¹⁶ Index #6 provides development effects and mitigation measures.	Rocky islands or peninsula not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Migratory Butterfly Stopover Areas					
Rationale: Butterfly stopovers areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral <u>Special Concern:</u> Monarch	Combination of ELC Community Series: Need to have present one Community Series from each landclass: <u>Field:</u> CUM CUS CUT <u>Forest:</u> FOC FOM FOD CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario^{cdix}. - The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south^{xxxi, xxxii, xxxiv, xxxv, xxxvi}. - The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat^{cdviii, cdix}. - Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes^{xxxi, xxxii, xxxiv, xli}. <u>Information Sources</u> - OMNRF (NHIC) - Agriculture Canada in Ottawa may have list of butterfly experts. - Field Naturalist Clubs - Toronto Entomologists Association - Conservation Authorities	Studies confirm: - The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)^{xxii}. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day^{xxxi}, significant variation can occur between years and multiple years of sampling should occur^{xli}. - Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD - MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. - SWHMIST²⁰¹⁶ Index #16 provides development effects and mitigation measures.	Subject and adjacent property are not within 5 km of Lake Ontario. Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species ²	ELC Ecosite Codes ¹	Candidate SWH Habitat Criteria and Information Sources ¹	Confirmed SWH Defining Criteria ¹	Study Area Assessment Details
Wildlife Habitat: Landbird Migratory Stopover Areas					
Rationale: Sites with a high diversity of species as well as high number are most significant	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.htm All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997, Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	Woodlots need to be >10 ha ¹ in size and within 5km ^{10, 11} of Lake Ontario. • If multiple woodlands are located along the shoreline, those woodlands <2km from Lake Ontario are more significant ^{10,11} • Sites have a variety of habitats; forest, grassland and wetland complexes ^{10,11} . • The largest sites are more significant ^{10,11} • Woodlots and forest fragments are important habitats to migrating birds ^{10,11} , these features located along the shore and located within 5km of Lake Ontario are Candidate SWH ^{10,11} . <u>Information Sources</u> • Bird Studies Canada • Ontario Nature • Local birders and naturalist club • Ontario Important Bird Areas (IBA) Program	Studies confirm: • Use of the woodlot by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Apr/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{10,11} • SWHMI ^{10,11} Index #9 provides development effects and mitigation measures.	On-site woodlands are not within 5 km of Lake Ontario. Suitable habitat is not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Deer Yarding Areas					
Rationale: Winter habitat for deer is considered to be the main factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.	White-tailed Deer	Note: OMNRF to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include: FOM, FOC, SWM and SWC. Or these ELC Ecosites: CUP2 CUP3 FOD3 CUT	• Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. • The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60% ^{12,13} • OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual" ^{12,13} • Woodlots with high densities of deer due to artificial feeding are not significant.	No Studies Required: • Snow depth and temperature are the greatest influence on deer use of winter yards. The greatest depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH ^{12,13} . • Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum I and Stratum II Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO). • Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations ^{12,13} . • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMI ^{12,13} Index #2 provides development effects and mitigation measures.	Deer yarding habitat not identified within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Deer Winter Congregation Areas					
Rationale: Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions ^{14,15}	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50ha may also be used.	• Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on MNRF studies or assessment. • Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands ^{14,15} . • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha ^{14,15} . • Woodlots with high densities of deer due to artificial feeding are not significant. <u>Information Sources</u> • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF ^{14,15} . • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF ^{14,15} . • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques ^{14,15} , ground or road surveys, or a pellet count deer density survey ^{14,15} . • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMI ^{14,15} Index #2 provides development effects and mitigation measures.	Woodlots >100ha are not present within or adjacent to the subject property. The area has not been mapped by the MNRF. Not SWH.

Significant Wildlife Habitat Assessment Tables

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Cliff and Talus Slopes					
Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	Most cliff and talus slopes occur along the Niagara Escarpment. <u>Information Sources</u> • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF District • Natural Heritage Information Center (NHIC) has location information on their website • Local naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes ^{xxviii} • SWHMIST ^{cdix} Index #21 provides development effects and mitigation measures.	Vegetation community not present within or adjacent to the subject property. Not SWH.
Sand Barrens					
Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	Any sand barren area, >0.5ha in size. <u>Information Sources</u> • OMNRF Districts. • Natural Heritage Information Center (NHIC) has location information on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens ^{xxviii} • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics) ¹ . • SWHMIST ^{cdix} Index #20 provides development effects and mitigation measures.	Vegetation community not present within or adjacent to the subject property. Not SWH.
Alvar					
Rationale: Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregion 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 Five Alvar Indicator Species: 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema branchiatum These indicator species are very specific to Alvars within Ecoregion 6E	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoo geographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover ^{xxviii} .	An Alvar site > 0.5 ha in size ^{xxvii} . <u>Information Sources</u> • Alvars of Ontario (2000), Federation of Ontario Naturalists ^{xxvi} . • Ontario Nature – Conserving Great Lakes Alvars ^{xxviii} . • Natural Heritage Information Center (NHIC) has location information on their website • Field Naturalist clubs • Conservation Authorities	Field studies identify four of the five Alvar indicator species ^{xxvi} . ^{cdix} at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses ^{xxvii} . • SWHMIST ^{cdix} Index #17 provides development effects and mitigation measures.	Vegetation community not present within or adjacent to the subject property. Not SWH.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Old Growth Forest					
Rationale: Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland Stands areas 30ha or greater in size or with at least 10 ha interior habitat assuming 100m buffer at edge of forest f. Information Sources • OMNRF Forest Resource Inventory mapping • OMNRF Forester, Ecologist or Biologist • Field Local naturalists clubs • Conservation Authorities • Sustainable Forestry License (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat ^{cwhii} • The stand will have experienced no recognizable forestry activities ^{cwhii} • The area of Forest Ecosites combined to make up the stand is the SWH. • Determine ELC Vegetation Type for forest stand ^{cwhii} • SWHDSS ^{cdis} Index #23 provides development effects and mitigation measures.	Old Growth Forest not present within or adjacent to the subject property. Not SWH.
Savannah					
Rationale: Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.	• No minimum size to site Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • Natural Heritage Information Center (NHIC) has location information on their website • OMNRF Ecologists • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in ^{low} Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used ^{cwhii} . • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics sp.). • SWHMIST ^{cdis} Index #18 provides development effects and mitigation measures.	Vegetation community not present within or adjacent to the subject property. Not SWH.
Tallgrass Prairie					
Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.	• No minimum size to site Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNRF Districts • Natural Heritage Information Center (NHIC) has location information available on their website • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in ^{low} Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used ^{cwhii} . • Area of the ELC Ecosite is the SWH • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST ^{cdis} Index #19 provides development effects and mitigation measures.	vegetation community not present within or adjacent to the subject property. Not SWH.
Other Rare Vegetation Communities					
Rationale: Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG ^{cwhii} . Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M ^{cwhii} The OMNR/NHIC will have up to date listing for rare vegetation communities. Information Sources • Natural Heritage Information Center (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG ^{cwhii} . • Area of the ELC Vegetation Type polygon is the SWH. • SWHMIST ^{cdis} Index #37 provides development effects and mitigation measures.	No other rare vegetation communities are present within or adjacent to the subject property. Not SWH.

Significant Wildlife Habitat Assessment Tables

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Nesting Area					
Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends 120m ^{C6bii} from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur ^{C6bii} . • Upland areas should be at least 120m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. <u>Information Sources</u> • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNR Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from CAs	Studies confirm: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{C6c} • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m ^{C6bii} from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMIST ^{C6bii} Index #25 provides development effects and mitigation measures.	Field surveys confirmed that waterfowl are not nesting in high enough numbers within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat					
Rationale: Nest sites are fairly uncommon in Eco-region 6E are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey <u>Special Concern:</u> Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). <u>Information Sources</u> • Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data. • OMNR Districts • Sustainable Forestry License (SFL) companies will identify additional nesting locations through field operations. • Check the Ontario Breeding Bird Atlas ^{C6c} or Rare Breeding Birds in Ontario for species documented • Reports and other information available from CAs. • Field naturalists clubs	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area ^{C6bii} . • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the SWH ^{C6cvi} , maintaining undisturbed shorelines with large trees within this area is important ^{C6bii} . • For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH ^{C6c} , ^{C6cvi} . Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat ^{C6d} . • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant ^{C6cvi} . • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" ^{C6c} • SWHMIST ^{C6bii} Index #26 provides development effects and mitigation measures	Lakes, ponds, rivers, and wetlands with productive fishing waters are not present. Suitable habitat is not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Woodland Raptor Nesting Habitat					
Rationale: Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat ^(WOODS, 10000, XC, XCL, XCH, XCH, XCH, XCH, XCH) . Interior habitat determined with a 200m buffer ^{C6bii} . • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Cooper's hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <u>Information Sources</u> • OMNR • Check the Ontario Breeding Bird Atlas ^{C6c} or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from CAs	Studies confirm: • Presence of 1 or more active nests from species list is considered significant ^{C6bii} . • Red-shouldered Hawk and Northern Goshawk – a 400m radius around the nest or 28ha area of habitat is the SWH ^{C6bii} . • Barred Owl – a 200m radius around the nest is the SWH ^{C6bii} . • Broad-winged Hawk and Coopers Hawk – a 100m radius around the nest is the SWH ^{C6cvi} . • Sharp-shinned Hawk – a 50m radius around the nest is the SWH ^{C6cvi} . • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMIST ^{C6bii} Index #27 provides development effects and mitigation measures.	Natural or conifer plantation woodland/forest stands >30ha in size is not present within or adjacent to the subject property. Not SWH.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species ²	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Turtle Nesting Area					
Rationale: These habitats are rare and when identified will often be the only breeding site for local populations of turtles	Midland Painted Turtle <u>Special Concern:</u> Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) ^{CAN1} or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Center (NHIC) • Field Naturalist clubs and landowners	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH¹ • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH^{CAN1}. • Travel routes from wetland to nesting area are to be considered within the SWH^{CAN1}. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWHMIST^{CAN1} Index #28 provides development effects and mitigation measures for turtle nesting habitat.	Exposed mineral soil areas are not present. Suitable habitat not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Seeps and Springs					
Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system ^{CAN1, CAN2} . • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species^{CAN1, CAN2, CAN3, CAN4, CAN5, CAN6, CAN7, CAN8, CAN9, CAN10, CAN11, CAN12, CAN13, CAN14, CAN15, CAN16, CAN17, CAN18, CAN19, CAN20, CAN21, CAN22, CAN23, CAN24, CAN25, CAN26, CAN27, CAN28, CAN29, CAN30, CAN31, CAN32, CAN33, CAN34, CAN35, CAN36, CAN37, CAN38, CAN39, CAN40, CAN41, CAN42, CAN43, CAN44, CAN45, CAN46, CAN47, CAN48, CAN49, CAN50, CAN51, CAN52, CAN53, CAN54, CAN55, CAN56, CAN57, CAN58, CAN59, CAN60, CAN61, CAN62, CAN63, CAN64, CAN65, CAN66, CAN67, CAN68, CAN69, CAN70, CAN71, CAN72, CAN73, CAN74, CAN75, CAN76, CAN77, CAN78, CAN79, CAN80, CAN81, CAN82, CAN83, CAN84, CAN85, CAN86, CAN87, CAN88, CAN89, CAN90, CAN91, CAN92, CAN93, CAN94, CAN95, CAN96, CAN97, CAN98, CAN99, CAN100, CAN101, CAN102, CAN103, CAN104, CAN105, 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Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

[illegible]

Significant Wildlife Habitat Assessment Tables

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species ¹	ELC Ecosite Codes ¹	Candidate SWH Habitat Criteria and Information Sources ¹	Confirmed SWH Defining Criteria ¹	Study Area Assessment Details
Wildlife Habitat: Marsh Bird Breeding Habitat					
Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan <u>Special Concern:</u> Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	- Nesting occurs in wetlands - All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present^{CCOV}. - For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. <u>Information Sources</u> - Contact OMNRF, wetland evaluations are a good source of information. - Field naturalist clubs - Natural Heritage Information Center (NHIC) Records - Reports and other information available from CAs. - Ontario Breeding Bird Atlas^{CCV}	Studies confirm: - Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species¹. - Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH¹. - Area of the ELC ecosite is the SWH - Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. - Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{CCB}. - SWHMI^{CCB} Index #35 provides development effects and mitigation measures	Field surveys did not observe marsh bird breeding occurring within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Open Country Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow <u>Special Concern:</u> Short-eared Owl	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) >30 ha ^{CH, CHA, CHB, CHC, CHD, CHE, CHF, CHG, CHH, CHI, CHJ, CHK, CHL, CHM, CHN, CHO, CHP, CHQ, CHR, CHS, CHT, CHU, CHV, CHW, CHX, CHY, CHZ} . Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years) ¹ . Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. <u>Information Sources</u> - Agricultural land classification maps, Ministry of Agriculture. - Ask local birders - Ontario Breeding Bird Atlas^{CCV} - Reports and other information available from CAs.	Field Studies confirm: - Presence of nesting or breeding of 2 or more of the listed species. - A field with 1 or more breeding Short-eared Owl is to be considered SWH. - The area of SWH is the contiguous ELC ecosite field areas. - Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. - Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{CCB}. - SWHMI^{CCB} Index #32 provides development effects and mitigation measures.	Grassland areas are too small (<30 ha) to support open country bird breeding habitat. Indicator birds also not observed. Suitable habitat is not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix.	Indicator spp.: Brown Thrasher Clay-coloured Sparrow Common spp.: Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher <u>Special Concern:</u> Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	Large field areas succeeding to shrub and thicket habitats>10ha ^{CHW} in size. - Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years)¹. Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species ^{CHW} . Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. <u>Information Sources</u> - Agricultural land classification maps Ministry of Agriculture - Local bird clubs - Ontario Breeding Bird Atlas^{CCV} - Reports and other information available from CAs	Field Studies confirm: - Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species¹. - A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. - The area of the SWH is the contiguous ELC ecosite field/thicket area. - Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories - Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{CCB}. - SWHMI^{CCB} Index #33 provides development effects and mitigation measures.	Field areas succeeding to shrub and thicket habitats are too small (<10ha). Suitable habitat is not present within or adjacent to the subject property. Not SWH.

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species ¹	ELC Ecosite Codes ¹	Candidate SWH Habitat Criteria and Information Sources ¹	Confirmed SWH Defining Criteria ¹	Study Area Assessment Details
Wildlife Habitat: Terrestrial Crayfish					
Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. ^{ccii}	Chimney or Digger Crayfish: (<i>Fallicambarus fodiens</i>) Devil Crawfish or Meadow Crayfish: (<i>Cambarus Diogenes</i>)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM	Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites ^{ccii} • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH • Surveys should be done April to August during in temporary or permanent water Note the presence of burrows or chemistry are often the only indicator of presence, observance or collection of individuals is very difficult ^{ccii} • SWHMI ^{ccix} Index #36 provides development effects and mitigation measures.	Terrestrial crayfish and burrows were not observed along edges of on-site wetlands during field surveys. Suitable habitat is not present within or adjacent to the subject property. Not SWH
Wildlife Habitat: Special Concern and Rare Wildlife Species					
Rationale: These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites ^{booi} . Information Sources • Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website: "Get Information": http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas ^{ccv} • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWHMI ^{ccix} Index #37 provides development effects and mitigation measures.	Eastern Wood-Pewee was observed on the subject property in the FOD5-1 forest community and SWM4-1 swamp community. Confirmed SWH.

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E.

	Wildlife Species ¹		Candidate SWH	Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Amphibian Movement Corridors					
Rationale: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	Movement corridors between breeding habitat and summer habitat ^{cxliiv, cxlv, cxlvi, cxlvii, cxlviii, cxlix, cxlxx, cxlxi} . Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule ⁱ . <u>Information Sources</u> • MNRF District Office • Natural Heritage Information Center NHIC • Reports and other information available from CAs • Field Naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant ^{cxlix} . • Corridors should have at least 15m of vegetation on both sides of waterway ^{cxlix} or be up to 200m wide ^{cxlix} of woodland habitat and with gaps <20m ^{cxlix} . • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat ^{cxlix} . • SWHMiST ^{cxlix} Index #40 provides development effects and mitigation measures.	Movement corridors meeting the criteria for provincial significance are not present within or adjacent to the subject property. Not SWH.
Wildlife Habitat: Deer Movement Corridors					
Rationale: Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.	White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule ⁱ . • A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion ^{cxlxxii, cxlxxiii, cxlix, cxcliv} . • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges). <u>Information Sources</u> • MNRF District Office • Natural Heritage Information Center (NHIC) • Reports and other information available from CAs • Field Naturalist Clubs	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. • Corridors that lead to a deer wintering yard should be unbroken by roads and residential areas. • Corridors should be at least 200m wide ^{cxlix} with gaps <20m ^{cxlix} and if following riparian area with at least 15m of vegetation on both sides of waterway ^{cxlix} . Shorter corridors are more significant than longer corridors ^{cxlix} . • SWHMiST ^{cxlix} Index #39 provides development effects and mitigation measures.	Deer wintering habitat was not identified. Deer movement corridors are not present within or adjacent to the subject property. Not SWH.

Significant Wildlife Habitat Assessment Tables

Table 6. Exceptions for Ecodistricts within Ecoregion 6E.

	Wildlife Habitat and Species	Candidate SWH			Confirmed SWH	Study Area
		Ecosites	Habitat Description	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
EcoDistrict: 6E-14						
Rationale: The Bruce Peninsula has an isolated and distinct population of black bears. Maintenance of large woodland tracks with mast producing tree species is important for bears. ^{cbooxvi, ccxvii}	Mast Producing Areas Black Bear	All Forested habitat represented by ELC Community Series: FOM FOD	- Black bears require forested habitat that provides cover, winter hibernation sites, and mast producing tree species. ^{cbooxv, cbooxvii, cbooxviii, cbooxix, cxix, cxci, cxclii, cxcliii, ccxvii} - Forested habitats need to be large enough to provide cover and protection for black bears ^{ccxvii}	Woodland ecosites >30ha with mast-producing tree species, either soft (cherry) or hard (oak and beech). Information Sources Important forest habitat for black bears may be identified by OMNRF.	- All woodlands > 30 ha with a 50% composition of these ELC Vegetation Types are considered significant: FOM1-1 FOM2-1 FOM3-1 FOD1-1 FOD1-2 FOD2-1 FOD2-2 FOD2-3 FOD2-4 FOD4-1 FOD5-2 FOD5-3 FOD5-7 FOD6-5 - SWHMiST ^{cxlix} Index #3 provides development effects and mitigation measures.	Woodland area is too small (<30ha) within and adjacent to the subject property. Not SWH.
EcoDistrict: 6E-17						
Rationale: Sharp-tailed grouse only occur on Manitoulin Island in Ecoregion 6E, Leks are an important habitat to maintain their population	Lek Sharp-tailed Grouse	CUM CUS CUT	- The lek or dancing ground consists of bare, grassy or sparse shrubland. There is often a hill or rise in topography^{ccxix}. - Leks are typically a grassy field/meadow >15h with adjacent shrublands and >30ha with adjacent deciduous woodland. Conifer trees within 500m are not tolerated. ^{ccxix}	Grasslands (field/meadow) are to be >15ha when adjacent to shrubland and >30ha when adjacent to deciduous woodland ^{ccxix} . - Grasslands are to be undisturbed with low intensities of agriculture (light grazing or late haying) - Leks will be used annually if not destroyed by cultivation or invasion by woody plants or tree planting^{ccxix} Information Sources - OMNRF district office - Bird watching clubs - Local landowners - Ontario Breeding Bird Atlas	Studies confirming lek habitat are to be completed from late March to June. - Any site confirmed with sharp-tailed grouse courtship activities is considered significant - The field/meadow ELC ecosites plus a 200 m radius area with shrub or deciduous woodland is the lek habitat - SWHMiST ^{cxlix} Index #32 provides development effects and mitigation measures	Grassland areas are too small (<15ha) within and adjacent to the subject property. Not SWH.

Appendix IV
Vascular Flora Species Reported from the Study Area

Plant Species Reported from the Study Area - 52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs (Project #3289)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Waterloo Region	NHIC Data*	NRSI Observed	FOD5-1 (with CUT1 inclusion)	CUT1 (CUM1 inclusion)	SWM4-1 (with SAF1-3, FOC4, and SWD6-3 inclusions)
		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Richardson & Martin 1999	MNR 2024b	NRSI Results from 2022			
Pteridophytes	Ferns & Allies											
Dryopteridaceae	Wood Fern Family											
<i>Athyrium filix-femina</i>	Common Lady Fern	S5							X	X		
<i>Cystopteris bulbifera</i>	Bulblet Fern	S5							X	X		X
<i>Dryopteris clintoniana</i>	Clinton's Wood Fern	S4							X			X
<i>Dryopteris cristata</i>	Crested Wood Fern	S5							X			X
<i>Dryopteris intermedia</i>	Evergreen Wood Fern	S5							X	X		
<i>Dryopteris marginalis</i>	Marginal Wood Fern	S5							X			X
<i>Matteuccia struthiopteris</i>	Ostrich Fern	S5							X			X
<i>Onoclea sensibilis</i>	Sensitive Fern	S5							X	X		X
<i>Polystichum acrostichoides</i>	Christmas Fern	S5							X	X		
Equisetaceae	Horsetail Family											
<i>Equisetum arvense</i>	Field Horsetail	S5							X			X
Osmundaceae	Royal Fern Family											
<i>Osmundastrum cinnamomeum</i>	Cinnamon Fern	S5							X			X
<i>Parathelypteris noveboracensis</i>	New York Fern	S4S5							X	X		X
Gymnosperms	Conifers											
Cupressaceae	Cypress Family											
<i>Thuja occidentalis</i>	Eastern White Cedar	S5							X	X		X
Pinaceae	Pine Family											
<i>Tsuga canadensis</i>	Eastern Hemlock	S5							X	X		X
Taxaceae	Yew Family											
<i>Taxus canadensis</i>	Canada Yew	S4							X	X		X
Dicotyledons	Dicots											
Aceraceae	Maple Family											
<i>Acer negundo</i>	Manitoba Maple	S5							X	X	X	
<i>Acer platanoides</i>	Norway Maple	SE5							X		X	
<i>Acer rubrum</i>	Red Maple	S5							X			X
<i>Acer saccharinum</i>	Silver Maple	S5							X		X	
<i>Acer saccharum</i>	Sugar Maple	S5							X	X	X	X
<i>Acer spicatum</i>	Mountain Maple	S5							X			X
<i>Acer x freemanii</i>	Freeman's Maple	SNA							X	X		X
Anacardiaceae	Sumac or Cashew Family											
<i>Rhus typhina</i>	Staghorn Sumac	S5							X		X	
<i>Toxicodendron radicans</i>	Poison Ivy	S5							X	X		
Apiaceae	Carrot or Parsley Family											
<i>Cicuta maculata</i>	Spotted Water-hemlock	S5							X			X
<i>Daucus carota</i>	Wild Carrot	SE5							X		X	
<i>Hydrocotyle americana</i>	American Water-pennywort	S4S5							X			X
Araliaceae	Ginseng Family											
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	S5							X			X
Aristolochiaceae	Duchman's-pipe Family											
<i>Asarum canadense</i>	Canada Wild-ginger	S5							X	X		
Asclepiadaceae	Milkweed Family											
<i>Asclepias syriaca</i>	Common Milkweed	S5							X		X	
Asteraceae	Composite or Aster Family											
<i>Ambrosia artemisiifolia</i>	Common Ragweed	S5							X	X		
<i>Ambrosia trifida</i>	Great Ragweed	S5							X	X		X
<i>Arctium minus</i>	Common Burdock	SE5							X		X	
<i>Bidens vulgata</i>	Tall Beggarticks	S5							X	X		
<i>Cirsium arvense</i>	Creeping Thistle	SE5							X	X		
<i>Erigeron annuus</i>	Annual Fleabane	S5							X		X	
<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	S5							X	X	X	
<i>Erigeron strigosus</i>	Rough Fleabane	S5							X	X		
<i>Eupatorium perfoliatum</i>	Common Boneset	S5							X			X

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Waterloo Region	NHIC Data*	NRSI Observed	FOD5-1 (with CUT1 inclusion)	CUT1 (CUM1 inclusion)	SWM4-1 (with SAF1-3, FOC4, and SWD6-3 inclusions)
		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Richardson & Martin 1999	MNR 2024b	NRSI Results from 2022			
<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed	S5							X			X
<i>Lactuca biennis</i>	Tall Blue Lettuce	S5							X			X
<i>Lapsana communis</i>	Common Nipplewort	SE5							X	X		
<i>Nabalus altissimus</i>	Tall Rattlesnakeroot	S5							X	X		
<i>Solidago altissima</i>	Tall Goldenrod	S5							X		X	
<i>Solidago canadensis</i>	Canada Goldenrod	S5							X	X		
<i>Solidago flexicaulis</i>	Zigzag Goldenrod	S5							X	X		
<i>Solidago gigantea</i>	Giant Goldenrod	S5							X		X	X
<i>Symphyotrichum lanceolatum</i>	Panicled Aster	S5							X	X		
<i>Symphyotrichum lateriflorum</i>	Calico Aster	S5							X	X		
<i>Symphyotrichum novae-angliae</i>	New England Aster	S5							X		X	
<i>Symphyotrichum puniceum</i>	Swamp Aster	S5							X			X
<i>Tussilago farfara</i>	Colt's-foot	SE5							X			X
Balsaminaceae	Touch-me-not Family											
<i>Impatiens capensis</i>	Spotted Jewelweed	S5							X	X		X
Berberidaceae	Barberry Family											
<i>Caulophyllum thalictroides</i>	Giant Blue Cohosh	S5							X	X		
<i>Podophyllum peltatum</i>	May-apple	S5							X	X		X
Betulaceae	Birch Family											
<i>Betula alleghaniensis</i>	Yellow Birch	S5							X	X		X
Boraginaceae	Borage Family											
<i>Hackelia virginiana</i>	Virginia Stickseed	S5					R*		X	X		
<i>Myosotis scorpioides</i>	True Forget-me-not	SE5							X			X
<i>Myosotis sylvatica</i>	Woodland Forget-me-not	SE4							X			X
Brassicaceae	Mustard Family											
<i>Alliaria petiolata</i>	Garlic Mustard	SE5							X	X	X	
<i>Cardamine diphylla</i>	Two-leaved Toothwort	S5							X	X		
<i>Hesperis matronalis</i>	Dame's Rocket	SE5							X	X		X
<i>Nasturtium officinale</i>	Watercress	SE							X			X
Campanulaceae	Bellflower Family											
<i>Lobelia siphilitica</i>	Great Blue Lobelia	S5							X			X
Caprifoliaceae	Honeysuckle Family											
<i>Lonicera morrowii</i>	Morrow's Honeysuckle	SE3							X	X		
<i>Lonicera tatarica</i>	Tatarian Honeysuckle	SE5							X	X	X	
<i>Lonicera x bella</i>	(<i>Lonicera morrowii</i> X <i>Lonicera tatarica</i>)	SNA							X			X
<i>Sambucus canadensis</i>	Common Elderberry	S5							X	X		X
<i>Sambucus racemosa</i>	Red Elderberry	S5							X	X		
<i>Viburnum opulus</i> var. <i>opulus</i>	Cranberry Viburnum	SE4?							X	X		
Cornaceae	Dogwood Family											
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	S5							X	X		X
<i>Cornus sericea</i>	Red-osier Dogwood	S5							X	X	X	
Cucurbitaceae	Gourd Family											
<i>Echinocystis lobata</i>	Wild Mock-cucumber	S5							X	X		
Euphorbiaceae	Spurge Family											
<i>Acalypha rhomboidea</i>	Common Three-seeded Mercury	S5							X	X		
Fagaceae	Beech Family											
<i>Fagus grandifolia</i>	American Beech	S4							X	X		
<i>Quercus macrocarpa</i>	Bur Oak	S5							X	X		
Geraniaceae	Geranium Family											
<i>Geranium robertianum</i>	Herb-Robert	S5							X	X	X	X
Grossulariaceae	Currant Family											
<i>Ribes americanum</i>	Wild Black Currant	S5							X			X
<i>Ribes cynosbati</i>	Prickly Gooseberry	S5							X	X		
<i>Ribes rubrum</i>	Northern Red Currant	SE5							X		X	X
<i>Ribes triste</i>	Swamp Red Currant	S5							X			X
Hydrophyllaceae	Water-leaf Family											
<i>Hydrophyllum virginianum</i>	Virginia Waterleaf	S5							X	X		

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Waterloo Region	NHIC Data*	NRSI Observed	FOD5-1 (with CUT1 inclusion)	CUT1 (CUM1 inclusion)	SWM4-1 (with SAF1-3, FOC4, and SWD6-3 inclusions)
		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Richardson & Martin 1999	MNR 2024b	NRSI Results from 2022			
Juglandaceae	Walnut Family											
<i>Carya cordiformis</i>	Bitternut Hickory	S5							X	X	X	
<i>Juglans cinerea</i>	Butternut	S2?	END	E	E	Schedule 1		X				
<i>Juglans nigra</i>	Black Walnut	S4?					R+*		X	X	X	
Lamiaceae	Mint Family											
<i>Leonurus cardiaca</i>	Common Motherwort	SE5							X	X	X	
<i>Lycopus americanus</i>	American Water-horehound	S5							X			X
<i>Lycopus uniflorus</i>	Northern Water-horehound	S5							X			X
<i>Scutellaria lateriflora</i>	Mad Dog Skullcap	S5							X			X
Menispermaceae	Moonseed Family											
<i>Menispermum canadense</i>	Canada Moonseed	S4					R		X	X		
Moraceae	Mulberry Family											
<i>Morus alba</i>	White Mulberry	SE5							X	X		
Oleaceae	Olive Family											
<i>Fraxinus americana</i>	White Ash	S4							X	X	X	
<i>Fraxinus nigra</i>	Black Ash	S4	END	T	NS	No schedule			X			X
<i>Fraxinus pennsylvanica</i>	Green Ash	S4							X			X
Onagraceae	Evening-primrose Family											
<i>Circaea canadensis</i>	Broad-leaved Enchanter's Nightshade	S5							X		X	X
<i>Epilobium coloratum</i>	Purple-veined Willowherb	S5							X	X		
Oxalidaceae	Wood Sorrel Family											
<i>Oxalis stricta</i>	Upright Yellow Wood-sorrel	SE5							X	X		
Papaveraceae	Poppy Family											
<i>Chelidonium majus</i>	Greater Celandine	SE5							X	X		
<i>Sanguinaria canadensis</i>	Bloodroot	S5							X	X		
Polygonaceae	Smartweed Family											
<i>Fallopia convolvulus</i>	Black Bindweed	SE5							X	X		
<i>Rumex crispus</i>	Curly Dock	SE5							X		X	
<i>Rumex obtusifolius</i>	Bitter Dock	SE5							X	X	X	X
Ranunculaceae	Buttercup Family											
<i>Actaea pachypoda</i>	White Baneberry	S5							X	X		
<i>Actaea rubra</i>	Red Baneberry	S5							X			X
<i>Caltha palustris</i>	Yellow Marsh Marigold	S5							X			X
<i>Hepatica acutiloba</i>	Sharp-lobed Hepatica	S5							X	X		
<i>Ranunculus acris</i>	Tall Buttercup	SE5							X		X	
<i>Ranunculus caricetorum</i>	Northern Swamp Buttercup	S5							X			X
<i>Ranunculus recurvatus</i>	Hooked Buttercup	S5							X	X		X
<i>Ranunculus repens</i>	Creeping Buttercup	SE5							X	X		X
<i>Thalictrum dioicum</i>	Early Meadow-rue	S5							X	X		
Rhamnaceae	Buckthorn Family											
<i>Rhamnus cathartica</i>	Common Buckthorn	SE5							X	X	X	X
Rosaceae	Rose Family											
<i>Agrimonia gryposepala</i>	Hooked Agrimony	S5							X	X		X
<i>Fragaria vesca</i>	Woodland Strawberry	S5							X	X		X
<i>Fragaria virginiana</i>	Wild Strawberry	S5							X	X		
<i>Geum</i> sp.	Avens sp.								X	X	X	
<i>Geum aleppicum</i>	Yellow Avens	S5							X			X
<i>Geum canadense</i>	White Avens	S5							X	X		
<i>Geum urbanum</i>	Wood Avens	SE3							X	X	X	
<i>Geum x catlingii</i>	(<i>Geum canadense</i> X <i>Geum urbanum</i>)	SNA							X	X		
<i>Malus pumila</i>	Common Apple	SE4							X		X	
<i>Physocarpus opulifolius</i>	Eastern Ninebark	S5							X		X	
<i>Potentilla recta</i>	Sulphur Cinquefoil	SE5							X		X	
<i>Potentilla reptans</i>	Creeping Cinquefoil	SE2							X		X	
<i>Prunus serotina</i>	Black Cherry	S5							X	X	X	
<i>Prunus virginiana</i>	Choke Cherry	S5							X	X		
<i>Rosa multiflora</i>	Multiflora Rose	SE5							X		X	

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Waterloo Region	NHIC Data*	NRSI Observed	FOD5-1 (with CUT1 inclusion)	CUT1 (CUM1 inclusion)	SWM4-1 (with SAF1-3, FOC4, and SWD6-3 inclusions)
		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Richardson & Martin 1999	MNR 2024b	NRSI Results from 2022			
<i>Rubus idaeus</i>	Common Red Raspberry	S5							X	X	X	
<i>Rubus occidentalis</i>	Black Raspberry	S5							X		X	
<i>Rubus pubescens</i>	Dewberry	S5							X	X		X
Rubiaceae	Madder Family											
<i>Galium aparine</i>	Cleavers	S5							X	X	X	
<i>Galium mollugo</i>	Smooth Bedstraw	SE5							X		X	
<i>Galium triflorum</i>	Three-flowered Bedstraw	S5							X			X
Salicaceae	Willow Family											
<i>Populus deltoides</i>	Eastern Cottonwood	S5					R+		X		X	
<i>Populus tremuloides</i>	Trembling Aspen	S5							X			X
Saxifragaceae	Saxifrage Family											
<i>Mitella nuda</i>	Naked Mitrewort	S5							X			X
<i>Tiarella stolonifera</i>	Heart-leaved Foam-flower	S5							X	X		X
Scrophulariaceae	Figwort Family											
<i>Chelone glabra</i>	White Turtlehead	S5							X			X
Thymelaeaceae	Mezereum Family											
<i>Dirca palustris</i>	Eastern Leatherwood	S4							X	X		
Tiliaceae	Linden Family											
<i>Tilia americana</i>	American Basswood	S5							X	X	X	X
Ulmaceae	Elm Family											
<i>Celtis occidentalis</i>	Common Hackberry	S4					R*		X	X		
<i>Ulmus americana</i>	American Elm	S5							X	X		
Urticaceae	Nettle Family											
<i>Boehmeria cylindrica</i>	False Nettle	S5							X	X		X
<i>Laportea canadensis</i>	Wood Nettle	S5							X	X		X
<i>Pilea pumila</i>	Dwarf Clearweed	S5							X	X		X
Verbenaceae	Vervain Family											
<i>Verbena urticifolia</i>	White Vervain	S5							X	X		
Violaceae	Violet Family											
<i>Viola pubescens</i>	Yellow Violet	S5							X	X		X
Vitaceae	Grape Family											
<i>Parthenocissus vitacea</i>	Thicket Creeper	S5							X			X
<i>Vitis riparia</i>	Riverbank Grape	S5							X		X	
Monocotyledons	Monocots											
Araceae	Arum Family											
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	S5							X	X		X
Cyperaceae	Sedge Family											
<i>Carex albursina</i>	White Bear Sedge	S5							X			X
<i>Carex arctata</i>	Drooping Woodland Sedge	S5							X	X		
<i>Carex bromoides</i>	Brome-like Sedge	S5							X			X
<i>Carex communis</i>	Fibrous-root Sedge	S5							X	X		X
<i>Carex crinita</i>	Fringed Sedge	S5							X			X
<i>Carex cristatella</i>	Crested Sedge	S5							X			X
<i>Carex gracillima</i>	Graceful Sedge	S5							X	X		
<i>Carex granularis</i>	Limestone Meadow Sedge	S5							X	X		
<i>Carex hirtifolia</i>	Pubescent Sedge	S4S5							X	X		
<i>Carex intumescens</i>	Bladder Sedge	S5							X			X
<i>Carex laevivaginata</i>	Smooth-sheathed Sedge	S4					R		X			X
<i>Carex laxiflora</i>	Loose-flowered Sedge	S5							X	X		
<i>Carex peckii</i>	Peck's Sedge	S5							X	X		
<i>Carex pedunculata</i>	Long-stalked Sedge	S5							X	X		X
<i>Carex plantaginea</i>	Plantain-leaved Sedge	S5							X	X		
<i>Carex radiata</i>	Eastern Star Sedge	S5							X			X
<i>Carex rosea</i>	Rosy Sedge	S5							X	X		
<i>Carex scabrata</i>	Eastern Rough Sedge	S5					R		X			X
<i>Carex stipata</i>	Awl-fruited Sedge	S5							X			X
<i>Carex vulpinoidea</i>	Fox Sedge	S5							X			X

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		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Richardson & Martin 1999	MNR 2024b	NRSI Results from 2022			
<i>Carex woodii</i>	Wood's Sedge	S4					R*		X	X		
Juncaceae	Rush Family											
<i>Juncus tenuis</i>	Path Rush	S5							X	X		X
Lemnaceae	Duckweed Family											
<i>Lemna minor</i>	Lesser Duckweed	S5							X			X
Liliaceae	Lily Family											
<i>Allium tricoccum</i>	Wild Leek	S4							X	X		
<i>Lilium michiganense</i>	Michigan Lily	S4							X	X		X
<i>Maianthemum canadense</i>	Wild Lily-of-the-valley	S5							X	X		X
<i>Maianthemum stellatum</i>	Star-flowered False Solomon's Seal	S5							X			X
<i>Streptopus lanceolatus</i>	Rose Twisted-stalk	S5							X			X
<i>Trillium erectum</i>	Red Trillium	S5							X			X
<i>Trillium grandiflorum</i>	White Trillium	S5							X	X		
<i>Uvularia grandiflora</i>	Large-flowered Bellwort	S5							X	X		
Orchidaceae	Orchid Family											
<i>Epipactis helleborine</i>	Eastern Helleborine	SE5							X	X		
Poaceae	Grass Family											
<i>Dactylis glomerata</i>	Orchard Grass	SE5							X		X	
<i>Glyceria striata</i>	Fowl Mannagrass	S5							X	X		X
<i>Leersia oryzoides</i>	Rice Cutgrass	S5							X			X
<i>Leersia virginica</i>	Virginia Cutgrass	S4							X	X		
<i>Oryzopsis asperifolia</i>	White-grained Mountain-ricegrass	S5							X	X		
<i>Poa alsodes</i>	Grove Bluegrass	S4							X	X		
<i>Poa palustris</i>	Fowl Bluegrass	S5							X			X
<i>Poa pratensis</i>	Kentucky Bluegrass	S5							X		X	
<i>Poa trivialis</i>	Rough Bluegrass	SE3							X	X		X
<i>Setaria pumila</i>	Yellow Foxtail	SE5							X	X		
Total								1	191	113	44	93

*NHIC Atlas Square: 17NJ3521

References

Government of Canada. 2024. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2024-11-30. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>
Ministry of Natural Resources and Forestry (MNR). 2024a. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-12-02. Available: <https://www.ontario.ca/page/get-natural-heritage-information>
Ministry of Natural Resources (MNR). 2024b. Natural Heritage Information Centre (NHIC): Make a Natural Heritage Area Map Application. Published: 2014-07-17. Updated 2024-12-02. Available: <https://www.ontario.ca/page/make-natural-heritage-area-map>
Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>
Richardson, W. and V. Martin. 1999. Regional Municipality of Waterloo. Revisions to Waterloo Region's Significant Species List: Native Vascular Plant Component.

Appendix V
Bird Species Reported from the Study Area

Bird Species Reported from the Study Area - 52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs (Project #3289)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Region of Waterloo Status	OBBA*	NHIC Data**	NRSI Observed: Highest Level of Breeding Evidence	Residential	FOD5-1	OAGM1	SWM4-1	Other Observations
		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Martin 1996	BSC et al. 2006	MNR 2024b	NRSI Recorded in 2022					
Anatidae	Ducks, Geese & Swans														
<i>Aix sponsa</i>	Wood Duck	S5B,S3N					√*	PR							
<i>Anas platyrhynchos</i>	Mallard	S5						CO							
<i>Branta canadensis</i>	Canada Goose	S5						CO							
<i>Spatula discors</i>	Blue-winged Teal	S3B,S4M						CO							
Phasianidae	Partridges, Grouse & Turkeys														
<i>Bonasa umbellus</i>	Ruffed Grouse	S5						PO							
<i>Meleagris gallopavo</i>	Wild Turkey	S5						PO							
Columbidae	Pigeons & Doves														
<i>Columba livia</i>	Rock Pigeon	SNA						CO							
<i>Zenaidura macroura</i>	Mourning Dove	S5						PR		PO	PO				
Cuculiformes	Cuckoos & Anis														
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	S4S5B					√	PO							
Apodidae	Swifts														
<i>Chaetura pelagica</i>	Chimney Swift	S3B	THR	T	T	Schedule 1		PR							
Trochilidae	Hummingbirds														
<i>Archilochus colubris</i>	Ruby-throated Hummingbird	S5B					√	PO		OB					OB
Charadriidae	Plovers & Lapwings														
<i>Charadrius vociferus</i>	Killdeer	S4B						CO							
Scolopacidae	Sandpipers & Allies														
<i>Actitis macularia</i>	Spotted Sandpiper	S5B						PR							
<i>Scolopax minor</i>	American Woodcock	S4B						CO							
Ardeidae	Hérons & Bitterns														
<i>Ardea herodias</i>	Great Blue Heron	S4					√	PO		PO		PO		OB	
Cathartidae	Vultures														
<i>Cathartes aura</i>	Turkey Vulture	S5B,S3N					√	PR							
Accipitridae	Hawks, Kites, Eagles & Allies														
<i>Buteo jamaicensis</i>	Red-tailed Hawk	S5	NAR	NAR	NS	No schedule		CO		PR		PO	PR		
<i>Circus hudsonius</i>	Northern Harrier	S5B,S4N	NAR	NAR	NS	No schedule	√	PO							
Strigidae	Typical Owls														
<i>Bubo virginianus</i>	Great Horned Owl	S4						PO							
<i>Megascops asio</i>	Eastern Screech-Owl	S4	NAR	NAR	NS	No schedule		PR							
Alcedinidae	Kingfishers														
<i>Megasceryle alcyon</i>	Belted Kingfisher	S5B,S4N					√	CO							
Picidae	Woodpeckers														
<i>Colaptes auratus</i>	Northern Flicker	S5						CO		PO		PO			
<i>Dryobates pubescens</i>	Downy Woodpecker	S5						CO		PO				PO	
<i>Dryobates villosus</i>	Hairy Woodpecker	S5						CO							
<i>Melanerpes carolinus</i>	Red-bellied Woodpecker	S5					√			PO				PO	
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	S3	END	E	E	Schedule 1	√		X						
Falconidae	Caracaras & Falcons														
<i>Caracara plancus</i>	Crested Caracara	SNA													
<i>Falco sparverius</i>	American Kestrel	S4						CO							
Tyrannidae	Tyrant Flycatchers														
<i>Contopus virens</i>	Eastern Wood-Pewee	S4B	SC	SC	SC	Schedule 1		PR	X	CO	PO	PR		CO	PO
<i>Empidonax alnorum</i>	Alder Flycatcher	S5B					√	PO							
<i>Empidonax minimus</i>	Least Flycatcher	S5B					√	PO							
<i>Empidonax traillii</i>	Willow Flycatcher	S4B								PO				PO	
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	S5B						PR		PR		PR		PO	
<i>Sayornis phoebe</i>	Eastern Phoebe	S5B						CO							
<i>Tyrannus tyrannus</i>	Eastern Kingbird	S4B						CO							
Vireonidae	Vireos														
<i>Vireo gilvus</i>	Warbling Vireo	S5B						PR							
<i>Vireo olivaceus</i>	Red-eyed Vireo	S5B						CO		PR	PO	PR			
Corvidae	Crows & Jays														
<i>Corvus brachyrhynchos</i>	American Crow	S5						CO							
<i>Cyanocitta cristata</i>	Blue Jay	S5						CO		PO		PO	PO	PO	
Alaudidae	Larks														
<i>Eremophila alpestris</i>	Horned Lark	S4						CO							
Hirundinidae	Swallows														
<i>Hirundo rustica</i>	Barn Swallow	S4B	SC	SC	T	Schedule 1		CO							
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S4S5B					√*	CO							
<i>Progne subis</i>	Purple Martin	S3B					√*	CO							
<i>Riparia riparia</i>	Bank Swallow	S4B	THR	T	T	Schedule 1		CO							

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		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Marlin 1996	BSC et al. 2006	MNR 2024b	NRSI Recorded in 2022					
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	S4B						PO							
<i>Tachycineta bicolor</i>	Tree Swallow	S4S5B						CO							
Paridae	Chickadees & Titmice														
<i>Poecile atricapillus</i>	Black-capped Chickadee	S5						CO		PR	PR	PO		PR	
Sittidae	Nuthatches														
<i>Sitta carolinensis</i>	White-breasted Nuthatch	S5						PO		PO		PO			
Certhiidae	Creepers														
<i>Certhia americana</i>	Brown Creeper	S5					√	PO							
Troglodytidae	Wrens														
<i>Troglodytes aedon</i>	House Wren	S5B						CO		PR	PO	PR		PR	
Polioptilidae	Gnatcatchers														
<i>Polioptila caerulea</i>	Blue-gray Gnatcatcher	S4B					√	PO							
Turdidae	Thrushes														
<i>Hylocichla mustelina</i>	Wood Thrush	S4B	SC	T	T	Schedule 1		PR	X						
<i>Sialia sialis</i>	Eastern Bluebird	S5B,S4N	NAR	NAR	NS	No schedule	√	CO							
<i>Turdus migratorius</i>	American Robin	S5						CO		PR	PR	PR			
Mimidae	Mockingbirds, Thrashers & Allies														
<i>Dumetella carolinensis</i>	Gray Catbird	S5B,S3N						CO		PO		PO		PO	
<i>Toxostoma rufum</i>	Brown Thrasher	S4B					√	CO							
Sturnidae	Starlings														
<i>Sturnus vulgaris</i>	European Starling	SNA						CO		PO	PO				
Bombycillidae	Waxwings														
<i>Bombycilla cedrorum</i>	Cedar Waxwing	S5						CO		PO	PO	PO		PO	
Passeridae	Old World Sparrows														
<i>Passer domesticus</i>	House Sparrow	SNA						CO		PO	PO				
Fringillidae	Finches & Allies														
<i>Haemorhous mexicanus</i>	House Finch	SNA						CO							
<i>Spinus tristis</i>	American Goldfinch	S5						CO		PO	PO	PO	PO	PO	
Passerellidae	New World Sparrows & Allies														
<i>Melospiza georgiana</i>	Swamp Sparrow	S5B,S4N						PO							
<i>Melospiza melodia</i>	Song Sparrow	S5						CO		PR	PO	PO	PO	PR	
<i>Passerculus sandwichensis</i>	Savannah Sparrow	S5B,S3N						CO		PO			PO		
<i>Poocetes gramineus</i>	Vesper Sparrow	S4B					√	PO							
<i>Spizella passerina</i>	Chipping Sparrow	S5B,S3N						CO		PR	PR			PO	
<i>Spizella pusilla</i>	Field Sparrow	S4B,S3N						PO							
<i>Zonotrichia albicollis</i>	White-throated Sparrow	S5					√	PO							
Icteridae	Troupials & Allies														
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	S5						CO		PO			PO		
<i>Dolichonyx oryzivorus</i>	Bobolink	S4B	THR	SC	T	Schedule 1		PR							
<i>Icterus galbula</i>	Baltimore Oriole	S4B						CO							
<i>Molothrus ater</i>	Brown-headed Cowbird	S5						PO		PR	PR			PO	
<i>Quiscalus quiscula</i>	Common Grackle	S5						CO		PO	PO		PO		
<i>Sturnella magna</i>	Eastern Meadowlark	S4B,S3N	THR	T	T	Schedule 1		PO							
Parulidae	Wood Warblers														
<i>Geothlypis philadelphia</i>	Mourning Warbler	S5B					√	PR							
<i>Geothlypis trichas</i>	Common Yellowthroat	S5B,S3N						PO							
<i>Mniotilta varia</i>	Black-and-white Warbler	S5B					√	PO							
<i>Seiurus aurocapilla</i>	Ovenbird	S5B					√	PR							
<i>Setophaga petechia</i>	Yellow Warbler	S5B						CO							
<i>Setophaga pinus</i>	Pine Warbler	S5B,S3N					√	PO							
<i>Setophaga ruticilla</i>	American Redstart	S5B					√	PR		PR		PR			
<i>Setophaga virens</i>	Black-throated Green Warbler	S5B					√	PO							
Cardinalidae	Cardinals, Grosbeaks & Allies														
<i>Cardinalis cardinalis</i>	Northern Cardinal	S5						CO		PR	PR	PO	PR		
<i>Passerina cyanea</i>	Indigo Bunting	S5B						PR		PR	PR	PR			
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	S5B						CO		PO		PO			
<i>Piranga olivacea</i>	Scarlet Tanager	S5B					√	PO							
Total								82	3	31	16	19	8	15	2

*OBBA Atlas Square: 17NJ32

**NHIC Atlas Square: 17NJ3521

References

Bird Studies Canada (BSC), Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources. 2006. Ontario Breeding Bird Atlas Database, 31 January 2008. <https://www.birdsontario.org/jsp/datasummaries.jsp>
Government of Canada. 2024. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2024-11-30. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>
Martin, V. 1996. Revisions to Waterloo Region's Significant Species List: Breeding Birds Component. Report to The Regional Municipality of Waterloo, April 16, 1996.

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Region of Waterloo Status	OBBA*	NHIC Data**	NRSI Observed: Highest Level of Breeding Evidence	Residential	FOD5-1	OAGM1	SWM4-1	Other Observations
		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Marlin 1996	BSC et al. 2006	MNR 2024b	NRSI Recorded in 2022					

Ministry of Natural Resources (MNR). 2024a. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-12-02. Available: <https://www.ontario.ca/page/get-natural-heritage-information>

Ministry of Natural Resources (MNR). 2024b. Natural Heritage Information Centre (NHIC): Make a Natural Heritage Area Map Application. Published: 2014-07-17. Updated 2024-12-02. Available: <https://www.ontario.ca/page/make-natural-heritage-area-map>

Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>

Appendix VI
Herpetofauna Species Reported from the Study Area

Reptile and Amphibian Species Reported from the Study Area - 52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs (Project #3289)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Region of Waterloo Status	ORAA*	NHIC Data**	NRSI Observed	Anuran Call Survey	Other Observations
		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	RMOW 1985	Ontario Nature 2019	MNR 2024b	NRSI Results from 2022		
Turtles												
<i>Chelydra serpentina</i>	Snapping Turtle	S4	SC	SC	SC	Schedule 1	C	X	X			
<i>Chrysemys picta marginata</i>	Midland Painted Turtle	S4		SC	SC	Schedule 1	C	X	X			
<i>Trachemys scripta</i>	Pond Slider	SNA						X				
Snakes												
<i>Lampropeltis triangulum</i>	Eastern Milksnake	S4	NAR	SC	SC	Schedule 1	√	X				
<i>Storeria occipitomaculata</i>	Red-bellied Snake	S5					C*	X				
<i>Thamnophis sirtalis sirtalis</i>	Eastern Gartersnake	S5					C	X				
Salamanders												
<i>Necturus maculosus</i>	Mudpuppy	S4	NAR	N-A	NS	No schedule	√	X				
<i>Plethodon cinereus</i>	Eastern Red-backed Salamander	S5					C	X				
Frogs and Toads												
<i>Anaxyrus americanus</i>	American Toad	S5					C	X		X	X	X
<i>Dryophytes versicolor</i>	Gray Treefrog	S5					C	X				
<i>Lithobates catesbeianus</i>	American Bullfrog	S4					√	X				
<i>Lithobates clamitans</i>	Green Frog	S5					C	X		X		X
<i>Lithobates pipiens</i>	Northern Leopard Frog	S5	NAR	NAR	NS	No schedule	C	X				
<i>Lithobates sylvaticus</i>	Wood Frog	S5					C	X		X	X	X
Total								14	2	3	2	3

*ORAA Atlas Square: 17NJ32

**NHIC Atlas Square: 17NJ3521

References

Government of Canada. 2024. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2024-11-30. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>

Ministry of Natural Resources (MNR). 2024a. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-12-02. Available: <https://www.ontario.ca/page/get-natural-heritage-information>

Ministry of Natural Resources (MNR). 2024b. Natural Heritage Information Centre (NHIC): Make a Natural Heritage Area Map Application. Published: 2014-07-17. Updated 2024-12-02. Available: <https://www.ontario.ca/page/make-natural-heritage-area-map>

Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>

Ontario Nature. 2019. Ontario Reptile and Amphibian Atlas Program: Interactive Range Maps. Accessed October 2019.

Regional Municipality of Waterloo (RMOW). 1985. Appendix 3: Reptiles and Amphibians in Environmentally Sensitive Policy Areas Technical Appendix. Approved by Council: 1986.

Appendix VII
Mammal Species Reported from the Study Area

Mammal Species Reported from the Study Area - 52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs (Project #3289)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Region of Waterloo Status	Ontario Mammal Atlas	NRSI Observed
		MNR 2024	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	RMOW 1985	Dobbyn 1994	NRSI Results from 2022
Didelphimorphia	Opossums								
<i>Didelphis virginiana</i>	Virginia Opossum	S4					R	X	
Eulipotyphla	Shrews, Moles, Hedgehogs, and Allies								
<i>Blarina brevicauda</i>	Northern Short-tailed Shrew	S5						X	
<i>Condylura cristata</i>	Star-nosed Mole	S5						X	
<i>Parascalops breweri</i>	Hairy-tailed Mole	S4					R	X	
<i>Sorex cinereus</i>	Masked Shrew	S5					G	X	
<i>Sorex fumeus</i>	Smoky Shrew	S5					R	X	
<i>Sorex palustris</i>	Water Shrew	S5					R	X	
Chiroptera	Bats								
<i>Eptesicus fuscus</i>	Big Brown Bat	S4						X	
<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S3	END	E	NS	No schedule		X	
<i>Lasiurus borealis</i>	Eastern Red Bat	S3	END	E	NS	No schedule		X	
<i>Lasiurus cinereus</i>	Hoary Bat	S3	END	E	NS	No schedule		X	
<i>Myotis leibii</i>	Eastern Small-footed Myotis	S2S3	END					X	
<i>Myotis lucifugus</i>	Little Brown Myotis	S3	END	E	E	Schedule 1		X	
<i>Myotis septentrionalis</i>	Northern Myotis	S3	END	E	E	Schedule 1		X	
<i>Perimyotis subflavus</i>	Tri-colored Bat	S3?	END	E	E	Schedule 1		X	
Lagomorpha	Rabbits and Hares								
<i>Lepus americanus</i>	Snowshoe Hare	S5					S	X	
<i>Lepus europaeus</i>	European Hare	SNA						X	
<i>Sylvilagus floridanus</i>	Eastern Cottontail	S5						X	
Rodentia	Rodents								
<i>Castor canadensis</i>	Beaver	S5					S	X	
<i>Erethizon dorsatum</i>	Porcupine	S5					S	X	
<i>Glaucomys sabrinus</i>	Northern Flying Squirrel	S5					R	X	
<i>Marmota monax</i>	Woodchuck	S5						X	
<i>Microtus pennsylvanicus</i>	Meadow Vole	S5						X	
<i>Microtus pinetorum</i>	Woodland Vole	S3?	SC	SC	SC	Schedule 1		X	
<i>Mus musculus</i>	House Mouse	SNA						X	
<i>Napaeozapus insignis</i>	Woodland Jumping Mouse	S5						X	
<i>Ondatra zibethicus</i>	Muskrat	S4						X	
<i>Peromyscus leucopus</i>	White-footed Mouse	S5						X	
<i>Peromyscus maniculatus</i>	Deer Mouse	S5						X	
<i>Rattus norvegicus</i>	Norway Rat	SNA						X	
<i>Sciurus carolinensis</i>	Eastern Gray Squirrel	S5						X	X
<i>Synaptomys cooperi</i>	Southern Bog Lemming	S4					R	X	
<i>Tamias striatus</i>	Eastern Chipmunk	S5						X	X
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	S5						X	
<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S5						X	
Canidae	Canines								
<i>Canis latrans</i>	Coyote	S5					S	X	
<i>Vulpes vulpes</i>	Red Fox	S5						X	
Felidae	Felines								
<i>Lynx rufus</i>	Bobcat	S4					R	X	
Mephitidae	Skunks and Stink Badgers								
<i>Mephitis mephitis</i>	Striped Skunk	S5						X	
Mustelidae	Weasels and Allies								
<i>Mustela richardsonii</i>	American Ermine	S5						X	
<i>Neogale frenata</i>	Long-tailed Weasel	S4					S	X	
<i>Neogale vison</i>	American Mink	S4					S	X	
<i>Taxidea taxus jacksoni</i>	American Badger (Southwestern Ontario)	S1	END	E	E	Schedule 1		X	
Procyonidae	Raccoons and Allies								
<i>Procyon lotor</i>	Northern Raccoon	S5						X	X
Ursidae	Bears								
<i>Ursus americanus</i>	American Black Bear	S5	NAR	NAR	NS	No schedule		X	
Artiodactyla	Deer and Bison								
<i>Odocoileus virginianus</i>	White-tailed Deer	S5						X	X
Total								46	4

*Mammal Atlas Square Number: NU

**NHIC Atlas Square: 17NJ3521

References

Dobbyn, J.S. 1994. Atlas of the Mammals of Ontario. Don Mills, Federation of Ontario Naturalists. 120p.

Government of Canada. 2024. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2024-11-30. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>

Ministry of Natural Resources (MNR). 2024. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-12-02. Available: <https://www.ontario.ca/page/get-natural-heritage-information>

Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>

Regional Municipality of Waterloo (RMOW). 1985. Appendix 4: Mammals in Environmentally Sensitive Policy Areas Technical Appendix. Approved by Council: 1986.

Appendix VIII
Lepidoptera Species Reported from the Study Area

Butterfly Species Reported from the Study Area - 52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs (Project #3289)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Region of Waterloo Status	Ontario Butterfly Atlas*	NRSI Observed
		MNR 2024	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Linton 2012	Macnaughton et al. 2025	NRSI Results from 2022
Hesperiidae	Skippers								
<i>Anatrytone logan</i>	Delaware Skipper	S4					C	X	
<i>Ancyloxypha numitor</i>	Least Skipper	S5					UC	X	
<i>Erynnis baptisiae</i>	Wild Indigo Duskywing	S4					UK	X	
<i>Pholisora catullus</i>	Common Sootywing	S4					R	X	
<i>Poanes hobomok</i>	Hobomok Skipper	S5					C	X	
<i>Thymelicus lineola</i>	European Skipper	SNA					VC	X	
<i>Wallengrenia egeremet</i>	Northern Broken Dash	S5					C	X	
Papilionidae	Swallowtails								
<i>Heraclides cresphontes</i>	Giant Swallowtail	S4					UC	X	
<i>Papilio glaucus</i>	Eastern Tiger Swallowtail	S5					VC	X	
<i>Papilio polyxenes</i>	Black Swallowtail	S5					VC	X	
Pieridae	Whites and Sulphurs								
<i>Colias eurytheme</i>	Orange Sulphur	S5					VC	X	
<i>Colias philodice</i>	Clouded Sulphur	S5						X	
<i>Pieris rapae</i>	Cabbage White	SNA					VC	X	
<i>Pyrisitia lisa</i>	Little Yellow	SNA						X	
Lycaenidae	Harvesters, Coppers, Hairstreaks, Blues								
<i>Celastrina lucia</i>	Northern Spring Azure	S5						X	
<i>Celastrina neglecta</i>	Summer Azure	S5					VC	X	
<i>Celastrina sp.</i>	Azure species	SNA						X	
<i>Glaucopsyche lygdamus</i>	Silvery Blue	S5						X	
Nymphalidae	Brush-footed Butterflies								
<i>Aglais milberti</i>	Milbert's Tortoiseshell	S5					UC	X	
<i>Boloria bellona</i>	Meadow Fritillary	S5					VC	X	
<i>Boloria myrina</i>	Silver-bordered Fritillary	S5					R	X	
<i>Cercyonis pegala</i>	Common Wood-Nymph	S5					VC	X	
<i>Coenonympha californa</i>	Common Ringlet	S5					C	X	X
<i>Danaus plexippus</i>	Monarch	S2N,S4B	SC	E	E	Schedule 1	VC	X	
<i>Lethe antheodon</i>	Northern Pearly-Eye	S5					C	X	
<i>Libytheana carinenta</i>	American Snout	SNA					R	X	
<i>Limenitis archippus</i>	Viceroy	S5					VC	X	
<i>Limenitis arthemis arthemis</i>	White Admiral	S5					C	X	
<i>Limenitis arthemis astyanax</i>	Red-spotted Purple	S5					C	X	
<i>Nymphalis antiopa</i>	Mourning Cloak	S5					VC	X	
<i>Phyciodes cocyta</i>	Northern Crescent	S5					UC	X	
<i>Polygonia comma</i>	Eastern Comma	S5					VC	X	
<i>Polygonia interrogationis</i>	Question Mark	S5					VC	X	
<i>Speyeria cybele</i>	Great Spangled Fritillary	S5					VC	X	
<i>Vanessa atalanta</i>	Red Admiral	S5B					VC	X	
<i>Vanessa cardui</i>	Painted Lady	S5B					C	X	
Total								36	1

*TEA Atlas Square: 17NJ32

**NHIC Atlas Square: 17NJ3521

References

Government of Canada. 2024. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2024-11-30. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=>
Linton, J.E. 2012. The Butterflies of Waterloo Region: An Annotated Checklist, a Species Scarcity Ranking, and a Transect-Based Analysis of Urban vs. Rural Populations. Toronto Entomologists Association. 42p.
Macnaughton A., Layberry R., Cvasin R., Edwards B., and C. Jones. 2025. Ontario Butterfly Atlas. Updated February 2025. Available: <https://www.ontarioinsects.org/atlas/index.html>
Ministry of Natural Resources (MNR). 2024. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-12-02. Available: <https://www.ontario.ca/page/get-natural-heritage-information>
Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>

Appendix IX
Odonata Species Reported from the Study Area

Odonate Species Reported from the Study Area - 52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs (Project #3289)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Region of Waterloo Status	Odonate Atlas*	NRSI Observed
		MNR 2024	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	Region of Waterloo 1985	OOAD 2023	NRSI Results from 2022
Calopterygidae	Broadwinged Damselflies								
<i>Calopteryx maculata</i>	Ebony Jewelwing	S5					X	X	
Aeshnidae	Darners								
<i>Aeshna umbrosa</i>	Shadow Darter	S5					X	X	
Total								2	0

*Odonate Atlas Square Numbers: 17N32

References

Government of Canada. 2024. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2024-11-30. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>
Ministry of Natural Resources (MNR). 2024a. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-12-02. Available: <https://www.ontario.ca/page/get-natural-heritage-information>
Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>
Ontario Odonata Atlas Database (OOAD). 2023. Natural Heritage Information Centre, Ontario Ministry of Natural Resources and Forestry. Species data by 10x10 km square accessed on June 8, 2023
Regional Municipality of Waterloo. 1985. Environmentally Sensitive Policy Areas. Approved by Council: 1986.

Appendix X
Fish Species Reported from the Study Area

Fish Species Reported from the Study Area - 52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs (Project #3289)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Fisheries and Oceans SAR Data	Aquatic Resource Area Data	NHIC Data*	NRSI Observed
		MNR 2024a	MECP 2024	Government of Canada 2024	Government of Canada 2024	Government of Canada 2024	DFO 2025	MNR 2025	MNR 2024b	NRSI Results from 2022
Leuciscidae	Minnows									
<i>Nocomis biguttatus</i>	Hornyhead Chub	S4	NAR	NAR	NS	No schedule		X		
<i>Notropis photogenis</i>	Silver Shiner	S2S3	THR	T	T	Schedule 1			X	
<i>Notropis rubellus</i>	Rosyface Shiner	S4	NAR	NAR	NS	No schedule		X		
<i>Pimephales notatus</i>	Bluntnose Minnow	S5	NAR	NAR	NS	No schedule		X		
<i>Semotilus atromaculatus</i>	Creek Chub	S5						X		
Catostomidae	Suckers									
<i>Catostomus commersonii</i>	White Sucker	S5						X		
<i>Moxostoma duquesnei</i>	Black Redhorse	S2	THR	T	T	Schedule 1		X		
<i>Moxostoma valenciennesi</i>	Greater Redhorse	S3						X	X	
Ictaluridae	North American Catfishes									
<i>Ameiurus nebulosus</i>	Brown Bullhead	S5						X		
Salmonidae	Trouts and Salmon									
<i>Salvelinus fontinalis fontinalis</i>	Brook Trout	S5								X
Gasterosteidae	Sticklebacks									
<i>Culaea inconstans</i>	Brook Stickleback	S5						X		
Centrarchidae	Sunfishes and Basses									
<i>Lepomis gibbosus</i>	Pumpkinseed	S5						X		
<i>Micropterus dolomieu</i>	Smallmouth Bass	S5						X		
<i>Micropterus salmoides</i>	Largemouth Bass	S5						X		
Percidae	Perches and Darters									
<i>Etheostoma caeruleum</i>	Rainbow Darter	S4						X		
<i>Etheostoma microperca</i>	Least Darter	S4	NAR	NAR	NS	No schedule		X		
<i>Percina maculata</i>	Blackside Darter	S4						X		
TOTALS							0	15	2	1

References

Department of Fisheries and Oceans Canada (DFO). 2025. Aquatic Species at Risk Critical Habitat and Species at Risk Distribution Data. Updated: 2025-02-03. Available: <https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-e>

Government of Canada. 2024. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2024-11-30. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc>

Ministry of Natural Resources (MNR). 2025. Land Information Ontario: Ontario GeoHub. Aquatic Resource Area Survey Point Data. Published: 2009-06-08. Updated: 2025-02-04. Available: <https://geohub.lio.gov.on.ca/datasets/>

Ministry of Natural Resources (MNR). 2024a. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2024-12-02. Available: <https://www.ontario.ca/page/get-natural-heritage-inform>

Ministry of Natural Resources (MNR). 2024b. Natural Heritage Information Centre (NHIC): Make a Natural Heritage Area Map Application. Published: 2014-07-17. Updated 2024-12-02. Available: <https://www.ontario.ca/page/make-natural-heritag>

Ministry of the Environment, Conservation, and Parks (MECP). 2024. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2024-04-19. Available: <https://www.ontario.ca/page/species-risk-ontario>

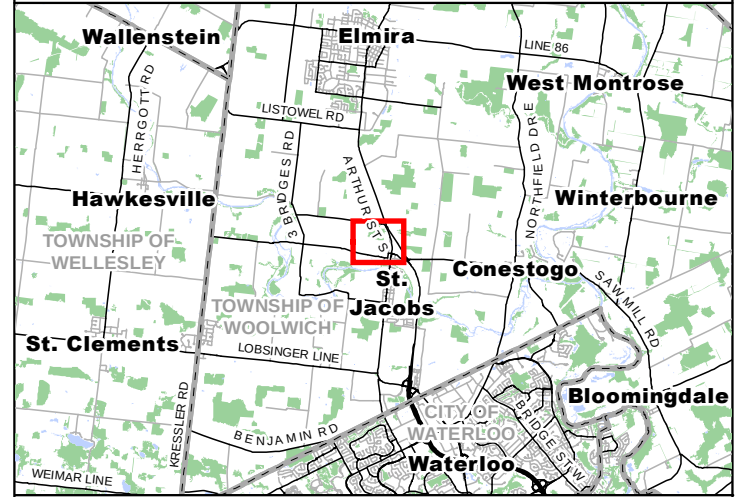
MAPS



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52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs EIS

Study Area and Background Review



Legend

Study Area

Subject Lands

Railway

Permanent Watercourse

Intermittent Watercourse

Municipal Drain

Water Body

Regulatory Floodplain (GRCA)

Wetland (GRCA)

Other Wetland (Non-PSW)

Unevaluated Wetland

Wooded Area

Regulation Limit (GRCA)

Aquatic Resource Area (ARA)

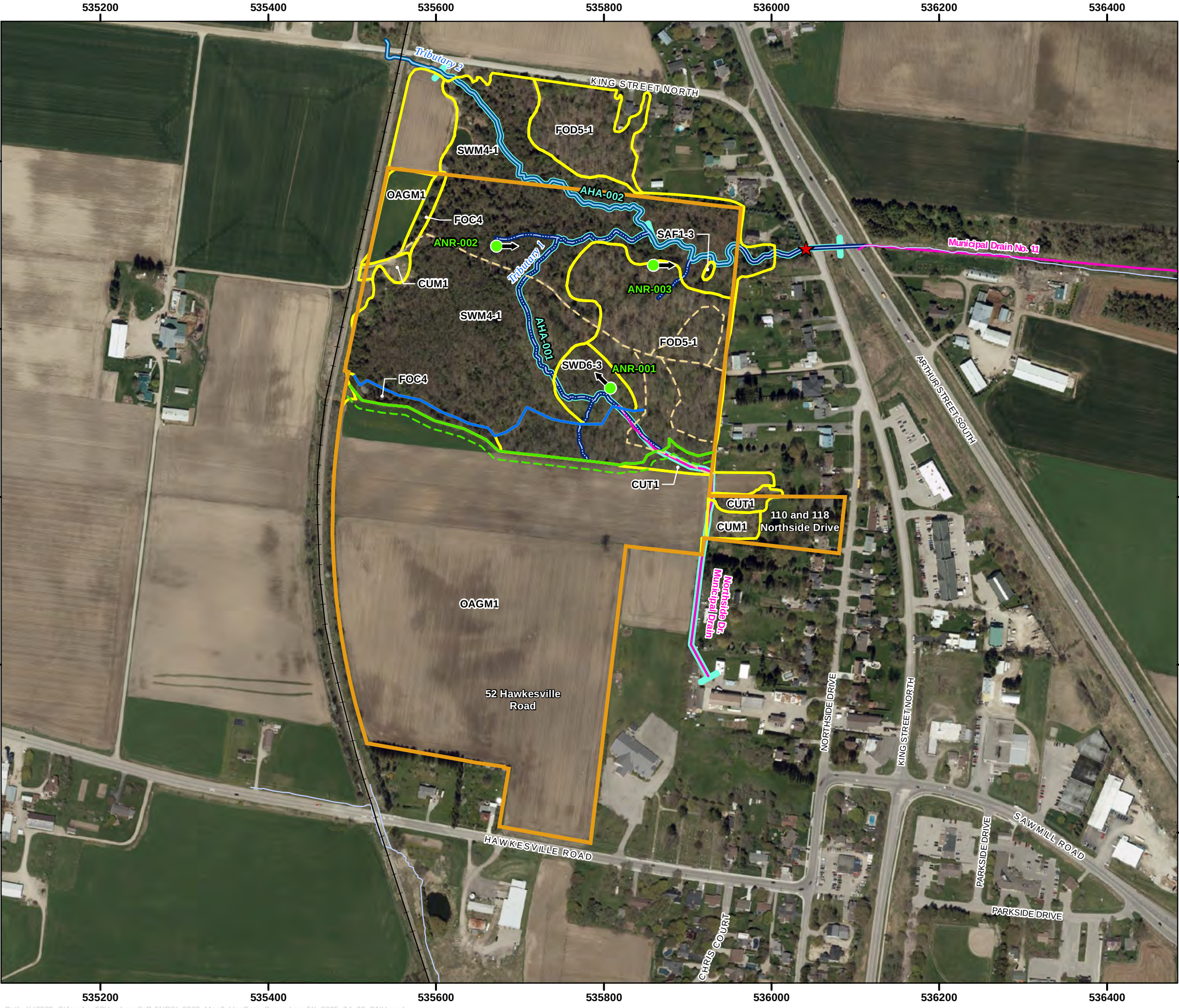
ARA Line Segment

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Project: 3289
Date: April 29, 2025

NAD83 - UTM Zone 17
Size: 11x17"
1:4,500



Map 2

52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs EIS

Vegetation Communities and Survey Locations

Key Map

Legend

Subject Lands

Brook Trout Observation

Railway

Existing Trail

Permanent Watercourse

Intermittent Watercourse

Municipal Drain

Natural Watercourse

Coldwater Thermal Regime

Aquatic Habitat Area

NRSI Surveyed Wetland (GRCA confirmed September 11, 2024)

NRSI Surveyed Dripline (Region of Waterloo confirmed August 15, 2024)

Dripline Buffer (10m)

Anuran Survey Station (ANR)

Ecological Land Classification (ELC)

(CUM1) Mineral Cultural Meadow Ecosite

(CUT1) Mineral Cultural Thicket Ecosite

(FOC4) Fresh - Moist White Cedar Coniferous Forest Ecosite

(FOD5-1) Dry - Fresh Sugar Maple Deciduous Forest Type

(OAGM1) Agricultural

(SAF1-3) Duckweed Floating-leaved Shallow Aquatic Type

(SWD6-3) Swamp Maple Organic Deciduous Swamp Type

(SWM4-1) White Cedar-Hardwood Organic Mixed Swamp Type

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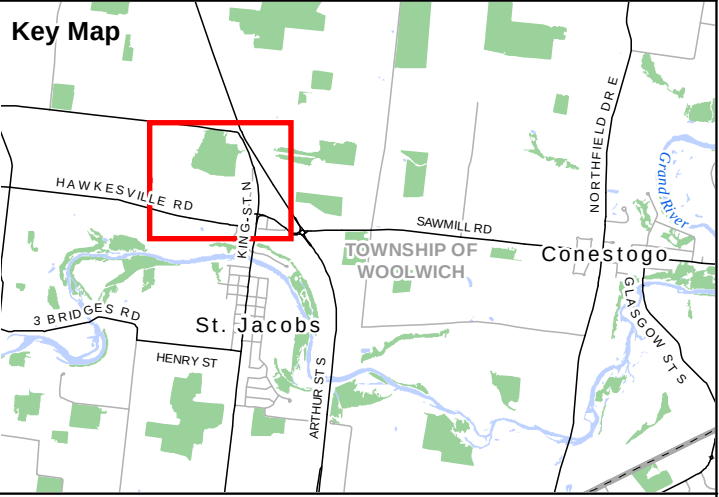
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52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs EIS

Significant Species Observations and Habitat



- Legend**
- Subject Lands

Brook Trout Observation

Eastern Wood-pewee Observation

Potential Bat Habitat Tree

Railway

Permanent Watercourse

Intermittent Watercourse

Municipal Drain

Natural Watercourse

Coldwater Thermal Regime

Black Ash SAR Habitat

Potential SAR Bat Roosting Habitat

Assumed Candidate Bat Maternity Colonies SWH

Ecological Land Classification (ELC)

(CUM1) Mineral Cultural Meadow Ecosite

(CUT1) Mineral Cultural Thicket Ecosite

(FOC4) Fresh - Moist White Cedar Coniferous Forest Ecosite

(FOD5-1) Dry - Fresh Sugar Maple Deciduous Forest Type

(OAGM1) Agricultural

(SAF1-3) Duckweed Floating-leaved Shallow Aquatic Type

(SWD6-3) Swamp Maple Organic Deciduous Swamp Type

(SWM4-1) White Cedar-Hardwood Organic Mixed Swamp Type
- Candidate Significant Wildlife Habitat**

Candidate Seeps and Springs

Confirmed Significant Wildlife Habitat

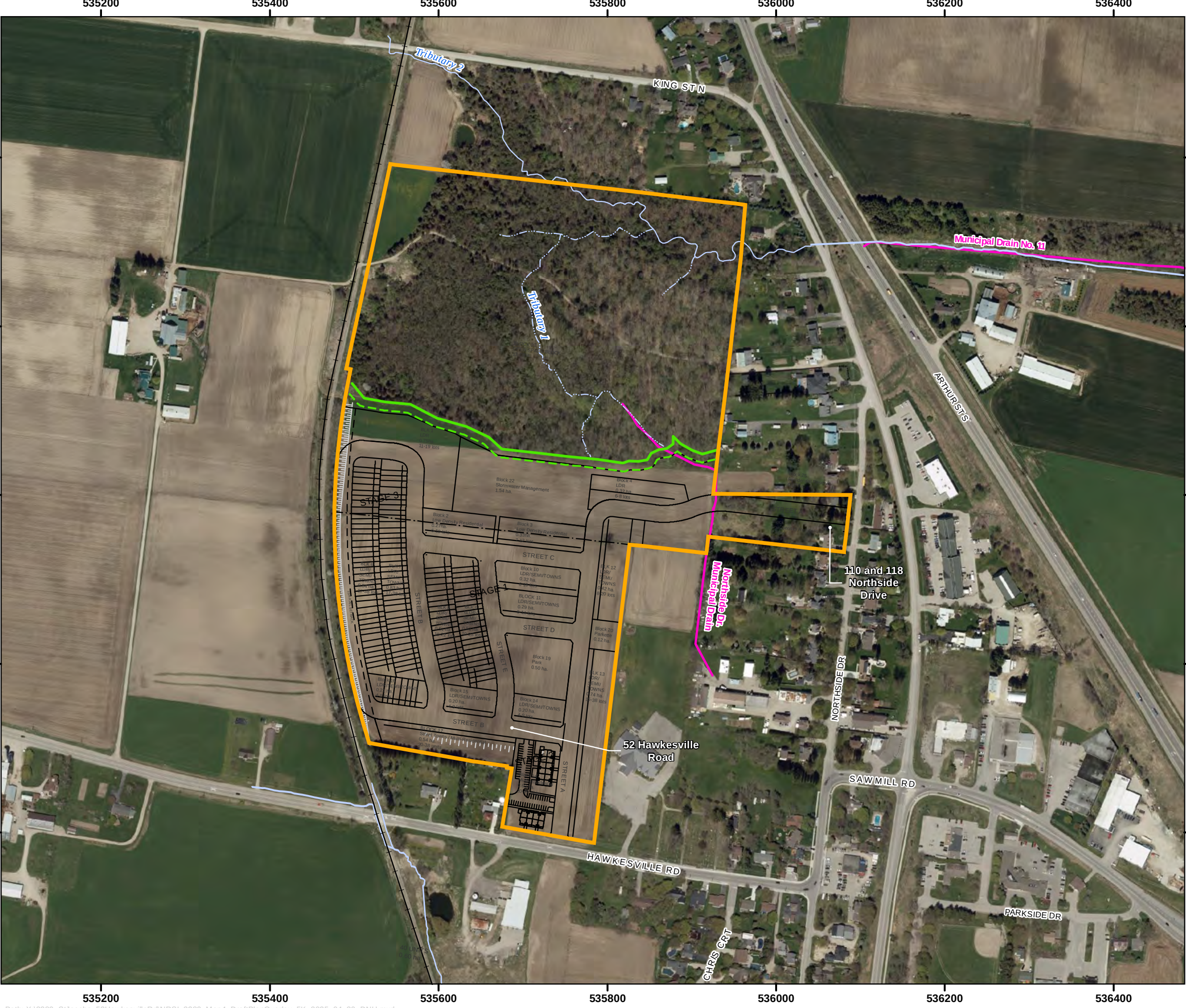
Eastern Wood-Pewee SWH

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Project: 3289 Date: April 29, 2025	NAD83 - UTM Zone 17 Size: 11x17" 1:4,500
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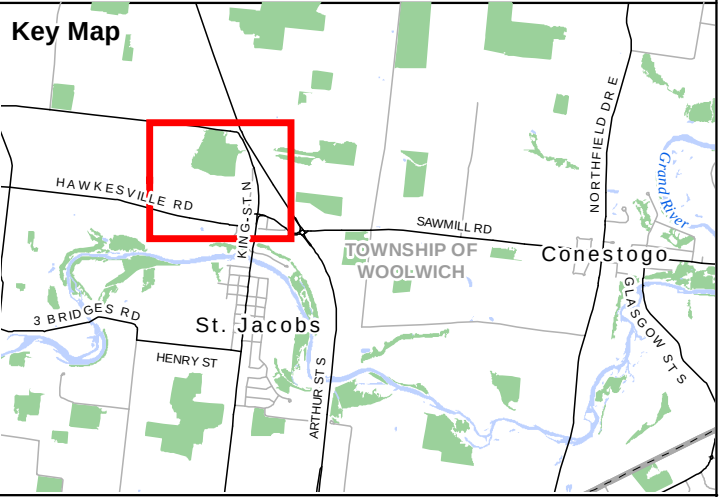
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52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs EIS

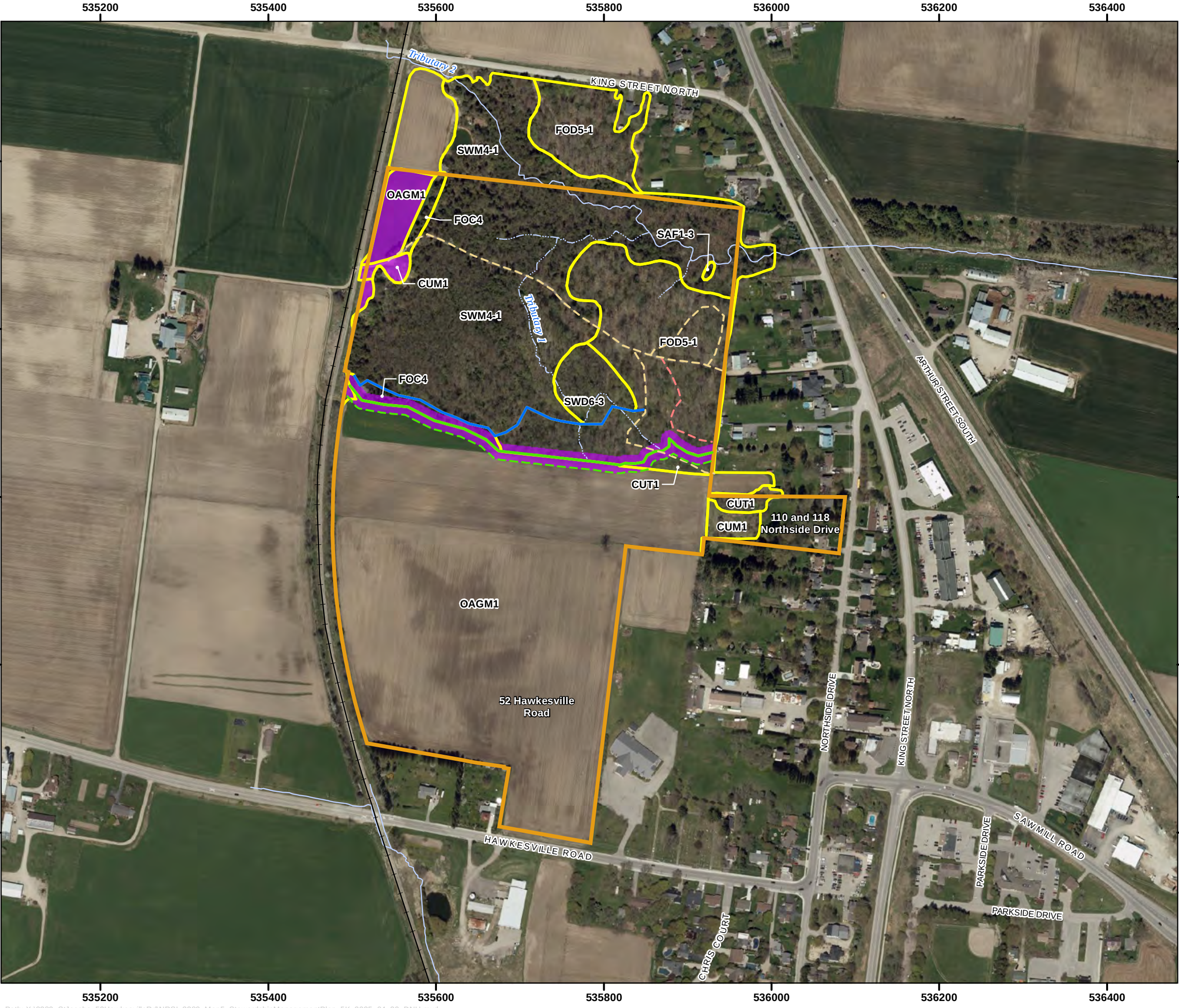
Draft Plan Overlay



- Legend**
- Subject Lands
 - Draft Plan
 - Proposed Grading
 - 15m Railway Setback
 - Railway
 - Permanent Watercourse
 - Intermittent Watercourse
 - Municipal Drain
 - NRSI Surveyed Dripline (Region of Waterloo confirmed August 15, 2024)
 - Dripline Buffer (10m)

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Project: 3289 Date: April 30, 2025	NAD83 - UTM Zone 17 Size: 11x17" 1:4,500
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Map 5

52 Hawkesville Rd., 110 and 118 Northside Drive, St. Jacobs EIS

Stewardship Management Plan

Key Map

Legend

Subject Lands	Ecological Land Classification (ELC)
Railway	(CUM1) Mineral Cultural Meadow Ecosite
Existing Trail	(CUT1) Mineral Cultural Thicket Ecosite
Trail Branch to be Restored	(FOC4) Fresh - Moist White Cedar Coniferous Forest Ecosite
Permanent Watercourse	(FOD5-1) Dry - Fresh Sugar Maple Deciduous Forest Type
Intermittent Watercourse	(OAGM1) Agricultural
NRSI Surveyed Wetland (GRCA confirmed September 11, 2024)	(SAF1-3) Duckweed Floating-leaved Shallow Aquatic Type
NRSI Surveyed Dripline (Region of Waterloo confirmed August 15, 2024)	(SWD6-3) Swamp Maple Organic Deciduous Swamp Type
Dripline Buffer (10m)	(SWM4-1) White Cedar-Hardwood Organic Mixed Swamp Type
Proposed Restoration/Enhancement Zone	

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Project: 3289
Date: April 29, 2025

NAD83 - UTM Zone 17
Size: 11x17"
1:4,500

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