Goldfield 1
Scoped Environmental Impact Study

NATURAL RESOURCE SOLUTIONS INC.

Prepared for:
Incon – Goldfield 1
7-521 Nottinghill Road
London, ON N6K 4L4

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TABLE OF CONTENTS

List of Tables

List of Maps

List of Appendices

1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained in April 2018 by the former landowner to complete an Environmental Impact Study (EIS) for proposed medium and low-density residential development, located in the City of London, Ontario. This EIS has been developed in accordance with the City of London's Environmental Management Guidelines (2007) and in agreement with the scoping meeting held with agency staff on April 18, 2018 (MacKay pers. comm. 2018). The EIS is being submitted on behalf of the current landowner, Incon.

For the purposes of this report, the term "subject lands" refers to the two adjacent properties owned by Incon (Map 1). The term "study area" refers to the subject lands plus lands within approximately 1km. Detailed biological surveys were undertaken by NRSI on the subject lands. Legacy data collected from background sources and agency consultation encompassed the study area to ensure that all surrounding natural features were considered.

The subject lands (Map 1), approximately 14ha in area, are located in south London and are bounded by Wharncliffe Road South, Exeter Road and White Oak Road within the City's Southwest Area Secondary Plan (City of London 2019a) area (Part of Lot 33, Concession 2, in the City of London). At the time that the natural heritage surveys were undertaken in 2018, the surrounding landscape was comprised of commercial businesses fronting onto Exeter Road to the south with agricultural lands to the west ("Richardson Farms" and Pincombe SWM Block #3) and north, and a natural feature to the east ("Johnstone Lands"). The lands to the north and west (Richardson Farms) are now being developed and have undergone grading and servicing. The future extension of Bradley Avenue borders the northern extent of the property.

The subject lands are largely in annual row crop agriculture with cultural features and small wetlands in the northwest and south within the Exeter Road parcel. Headwater drainage features originate to the north and northwest of the property, which merge immediately south of the plantation. The drainage channel traverses the agricultural field and continues to the southeast of the property. Tree Protection Areas, which are

indicated on Schedule D-11 of the City's Tree Protection By-law (no. C.P.-1515-228) (City of London 2017), are present in the northwest and southern portions of the subject lands. The woodlot that once existed in the southern portion of the subject lands was cleared in full sometime after 2006; likely in 2008 or 2009. The removal of topsoil in this area may have resulted in the formation of the two small wetland areas which are present today. The natural feature to the immediate east of the subject lands is also considered a Tree Protection Area, as well as an area of "Environmental Review" in the London Plan (City of London 2019b). The lands to the immediate east are also identified as 'Unevaluated Veg Patch', with a 'Potential Upland Corridor' and 'Unevaluated Corridor' in the Southwest Area Plan (2019a). The London Plan (2019b) identifies that area as 'Woodlands' with 'Valleylands', 'Unevaluated Wetlands', and a 'Potential Naturalization Area'. 'Significant Valleyland' is located immediately south of Exeter Road.

Refer to Map 1 for the study area and aerial imagery of the site. The study area is located within Ecoregion 7E.

The subject lands are zoned as Low-Density Residential and Multi-Family, Medium Density Residential with no areas identified as Open Space or Environmental Review in the Southwest Area Plan (City of London 2019a). The London Plan (City of London 2019b) does not indicate any Natural Heritage System components within the subject lands (wetlands, woodlands, unevaluated vegetation patches, etc.). The natural feature to the east is identified as an unevaluated vegetation patch and is being considered for designation as an Environmentally Significant Area as indicated during the scoping meeting with agency staff (MacKay pers. comm. 2018).

This report summarizes background information on natural heritage features, as well as results of original field surveys of vascular flora, breeding birds, herpetofauna, mammals and aquatic habitat for the subject lands. An analysis of impacts is based on a comparison of the Draft Plan of Subdivision to the characterization of the natural features found within the subject lands.

Tree inventories have been completed. Two reports have been prepared, due to the subject lands being evaluated in separate components over the years. The Tree Inventory Report prepared by NRSI in 2018 provides detail on the trees at the south end of the subject lands, as well as a few trees along the Bradley Road extension in the northwest. The Tree Inventory Report prepared by NRSI in 2020 provides detail on the trees in the northwest quadrant of the subject lands, including the 7 trees inventoried in the 2018 report. The two Tree Inventory Reports will be consolidated at detailed design. Both reports outline the health and condition of inventoried trees on site at the time of assessment. As a formal grading plan has not yet been developed, a retention analysis, tree protection measures and recommended compensation are not included in these reports. A Tree Protection Plan will be required once the extent of grading is known. Although this EIS will refer to components of the Tree Inventory Reports, the reader is directed to the separate reports for further information pertaining to the inventoried trees within the subject lands.

Proposed Undertaking

Incon is proposing to develop the subject lands as a medium and low-density residential subdivision. The development is being coordinated with proposed developments both to the east and west of the Goldfield 1 lands. The extension of Bradley Avenue will border the northern edge of the proposed subdivision. Natural heritage features are to be partially protected in the northwest portion of the subject property, but otherwise compensated for within a proposed 'complete corridor'. The complete corridor, in accordance with the *Dingman Creek Subwatershed: Stormwater Servicing Study Master Plan and Schedule B Municipal Class Environmental Assessment* (i.e. "Dingman EA"; Aquafor Beech Ltd 2020), is to manage stormwater, provide recreational opportunities (i.e. walking trail), and compensate for small wetland areas to be removed through the course of development.

Project Scoping

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 reported from, or have potential to occur within the study area. Background

information on the natural environmental features within the study area was gathered from the following sources:

- Upper Thames River Conservation Authority (UTRCA)
- City of London
- Natural Heritage Information Centre (NHIC) database (MNRF 2020a)
- Land Information Ontario (LIO) data base mapping
- Southwest Area Secondary Plan (City of London 2019a)
- Middlesex Natural Heritage System Study (UTRCA 2014)
- Dingman Creek Watershed Report Card (UTRCA 2017)
- Dingman Creek Subwatershed Study (Delcan 2005)
- Dingman Creek Subwatershed: Stormwater Servicing Study Master Plan and Schedule B Municipal Class Environmental Assessment (Aquafor Beech Ltd 2020)
- The London Plan (City of London 2019b)
- Species at Risk in Ontario (SARO) List (MECP 2020)
- Fisheries and Oceans Canada's Aquatic Species at Risk Maps (DFO 2020a)
- Ontario Breeding Bird Atlas (OBBA) (BSC et al. 2006)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2020)
- Atlas of the Mammals of Ontario (Dobbyn 1994)
- Ontario Butterfly Atlas (MacNaughton et al. 2020)
- Ontario Odonata Atlas (MNRF 2020b)

Initial wildlife species lists were compiled to provide information on species reported from the vicinity of the subject lands using the various atlases listed above. Currently, the NHIC does not have any rare species records for the square overlapping the subject lands. The atlases provide data based on 10x10km survey squares; information on species from the square that overlaps the study area was compiled (square 17MH75). These initial species lists informed the scope and type of wildlife field surveys required as outlined in the following sections.

Based on the initial species lists, a number of Species at Risk (SAR) and Species of Conservation Concern (SCC) were identified as having records from within the vicinity of subject lands. SAR are those listed on the Species at Risk in Ontario List (MECP 2020).

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 by COSSARO as Endangered or Threatened are protected by the *Endangered Species Act* (ESA), 2007, which includes protection to their habitat, and are referred to herein as "regulated SAR".

Species considered Special Concern are included in the definition of SCC, which includes the following:

- species designated provincially as Special Concern,
- species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the NHIC, and
- species that are designated federally as Threatened or Endangered by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC), but not provincially by the COSSARO. If these species are listed under the *Species at Risk Act* (SARA) under Schedule 1, they are protected by the federal Act, but not provincially by the ESA.

Species at Risk and Species of Conservation Concern Habitat Screening

A preliminary screening exercise was conducted on these species to identify which species have suitable habitat within the study area. This involved cross-referencing the preferred habitat for reported SAR with habitats known to occur within the subject lands or adjacent lands. This was completed to ensure that the potential presence of all SAR and SCC within the study area was adequately assessed in this EIS. The preliminary screening exercise was subsequently updated following completion of all field surveys to provide a more fulsome assessment of significant species and their habitats within the subject lands. The screening table is provided in Appendix I.

Significant Wildlife Habitat Screening

A preliminary screening for the presence of Significant Wildlife Habitat (SWH) was also completed for the study area. The Significant Wildlife Habitat Technical Guide (SWHTG) is a guideline document that outlines the types of habitats that the Ministry of Natural Resources and Forestry (MNRF) considers significant in Ontario, as well as criteria to identify these habitats (OMNR 2000, MNRF 2015). The SWHTG groups SWH into five

broad categories: seasonal concentration areas, rare vegetation communities, specialized wildlife habitat, habitats of Species of Conservation Concern, and animal movement corridors. Following completion of all field studies, the screening document was updated to verify which SWH types had been confirmed as present or absent, or remain as candidate habitats. The SWH screening tables are provided in Appendix II.

EIS Scope

Based on the approach described above, the scope of the EIS was discussed during a consultation meeting held on April 18, 2018 between NRSI, UTRCA, City of London, and the City of London's Environmental and Ecological Planning Advisory Committee (EEPAC). The scope of the EIS was determined to include the following:

- 3 season vegetation inventory
- 2 breeding bird surveys
- 1 migratory bird survey
- 3 anuran call counts
- Incidental wildlife observations for reptiles, mammals, and insects (cover board surveys not necessary)
- SAR and SWH assessments
- Aquatic habitat assessment (electro-fishing not necessary)
- Assessment of valleylands, linkages, and significant woodlands

In addition, it was noted that an archaeological study and fulsome hydrogeological assessment was needed within the subject lands. Another scoping meeting with the new project team was held February 17, 2021 and the Scoping Checklist was confirmed with agency staff via email and circulated March 17, 2021. The Scoping Checklist is attached in Appendix III.

2.0 Relevant Policies, Legislation, and Planning Studies

For the purposes of this report, information relating to the natural heritage features within the subject lands and adjacent areas was collected and assessed for significance. To help inform suitable land-use concepts, guide the layout of development, and identify areas to be protected, these features are evaluated against the following relevant policies, legislation, and planning studies as outlined in Table 1 below.

Table 1. Relevant Policies, Legislation and Planning Studies

Policy/Legislation/ Plan	Description	Project Relevance

Provincial Policy Statement (OMMAH 2020)	• Issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the 2014 PPS.
	• Section 2.1 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'.
	• The Natural Heritage Reference Manual (MNR 2010) and the SWHTG (MNR 2000) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.
	• Development and/or site alteration is not permitted within Provincially Significant Wetlands. Development and/or site alteration is not permitted within other significant features or on adjacent lands to the natural heritage features and areas unless it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.
		• Based on the analysis completed for this study, natural features were identified within the study area which have implications under the PPS, include:
		  • Wetlands,
		  • Woodlands,
		  • Habitat for Endangered and Threatened species, and
		  • Significant Wildlife Habitat

Endangered Species Act (2007)	• The ESA came into effect in 2007. • The ESA prohibits killing, harming, harassing or capturing Endangered and Threatened species and protects their habitats from damage and destruction.	• Regulated SAR were identified as having the potential to occur within the study area based on the habitats present. • Field surveys determined that two cavity trees are present in the hedgerow which may constitute habitat for roosting SAR bats. • The removal of these trees would require that bat acoustic surveys be conducted in June of any given year, prior to removal. • SAR grassland birds were documented off-property and their habitat protection does not affect the subject lands.
Canadian Fisheries Act (1985, amended August 2019)	• Manages threats to all fish and fish habitats in Canada. • The Act prohibits harmful alteration, disruption or destruction of fish habitat (HADD). • DFO has developed an online, self-assessment tool, where proponents can determine whether their projects require DFO	• The approach to stormwater management may have implications on fish habitat downstream of the subject lands.

Policy/Legislation/ Plan	Description	Project Relevance
	review based on the type of water body the work is occurring in and the nature of the proposed activity.	• The feature through the field offers limited to no use as fish habitat and only conveys spring flows for a short period. • Channel realignment would need to follow mitigation and best practices as per DFO recommendations to avoid serious harm.

The London Plan (2019b)	• The City of London's new Official Plan, 'The London Plan', outlines current policies for the protection of natural features within the City of London and which represent a constraint to development.
	• The London Plan was adopted by Council and the Province in 2016 and consolidated in 2019.
	• All wetlands, regardless of size, are protected under the Natural Heritage System policies.
	• Environmental Policy 1334 (subject to LPAT appeal) notes that the City, in consultation with the UTRCA, may consider replacement of wetlands, where appropriate, to achieve no net loss in wetland area.
		• An EIS is required as development is proposed to occur within 120m of designated natural heritage features identified on Map 5 (Natural Heritage) of The London Plan, that include:
		  • Unevaluated Wetland,
		  • Unevaluated Vegetation Patch,
		  • Valleyland, and
		  • Potential Naturalization Area

Southwest Area Plan (2019a)	• The Southwest Area Plan is a Secondary Plan that applies to lands in the southwest area of the City of London and was created to guide long-term management and approval of growth. • It generally provides a greater level of detail than the London Plan/Official Plan. • The Southwest Area Plan was prepared in 2016 and updated in 2019.	• Serves as a review of planning applications which is used in conjunction with the other policies in the Official Plan. • The subject lands are zoned entirely as residential. • The natural feature to the east of the subject lands is identified as Open Space and Environmental Review and the Draft Plan of Subdivision will need to include appropriate buffers for this feature.
Dingman Creek Subwatershed Study (2005)	• Applies to lands in the Dingman Creek subwatershed area, including lands in the south portion of the City of London • To develop a plan for the protection, enhancement and restoration of natural heritage features under present conditions as land use changes occur.	• Establishes goals and objectives for various subwatershed components, including natural heritage features, in order to maintain and enhance the ecological health of the Dingman Creek system.

Policy/Legislation/ Plan	Description	Project Relevance
		• Goals relating to enhancing the hydrologic regime, protecting surface water quality and establishing a healthy terrestrial ecosystem will all be achieved through buffering and naturalization within the subject lands.
Dingman Creek Environmental Assessment (Aquafor Beech Ltd. 2020)	• The "Dingman EA" provides a stormwater servicing strategy for the Dingman Creek subwatershed, considering flooding, erosion, groundwater, wildlife, aquatic habitat, and natural corridor development. • Water quality and quantity control is recommended through both Low Impact Development (LID) and end-of-pipe facilities.	• The subject lands fall within the White Oaks – East tributary area. • The drainage feature within the subject lands is identified as a 'complete corridor'. The complete corridor is to be designed to convey water, people, and wildlife.
City of London Environmental Management Guidelines (2007)	• Outlines policy guidelines, standards, process and procedures for the preparation and review of Environmental Impact Studies, determination of buffers and setbacks, evaluation of significant woodlands, and stormwater management facilities as required by the province and the City of London. • The Environmental Management Guidelines are currently being updated.	• As this development application will occur within 120m of a significant natural heritage feature, an EIS is required and as such, the Environmental Management Guidelines are to be followed through the project steps including data collection standards and guidelines for determining setbacks and ecological buffers.
UTRCA Regulation 157/06	• Regulation issued under Conservation Authorities Act, R.S.O. 1990. • Through this regulation, the UTRCA has the responsibility to regulate activities in natural and hazardous areas (i.e. areas in and near rivers, streams, floodplains, wetlands, and slopes).	• UTRCA Regulated Areas fall within the subject lands as a result of wetland on the adjacent property to the east and a portion of the watercourse which bisects the agricultural field. • The Regulation identifies that "*no person shall undertake development or permit another person to undertake development in or on the areas within the jurisdiction of the Authority (UTRCA)*" such as wetland, river or stream valleys. • A permit is required from the UTRCA to undertake work within the Regulation Limit.

Policy/Legislation/ Plan	Description	Project Relevance
		• Channel realignment will require that water balance is maintained for the channel and the overall subject lands. • Timing windows for channel works will apply.

3.0 Field Methods

Terrestrial and aquatic field surveys were undertaken within the subject lands to characterize natural features and identify significant and sensitive natural heritage features and species that have potential to be adversely affected by the proposed development. A total of 10 field visits were completed between April and October 2018, with additional field work completed in early 2020. Property access was restricted to the northern 3/4 in the early spring, but was later granted for the southern Exeter Road parcel as well (south of the east-west hedgerow). Surveys completed June 11, 2018 and later were completed within the entire subject lands. Details of the field surveys are summarized in Table 2. The locations of specific monitoring stations are shown on Map 2. Surveys were completed in accordance with provincial and local guidance documents.

During the field work program, all observations of mammals, herpetofauna, butterflies, dragonflies, and damselflies were documented on all field visits. This included actual direct observations of individuals, as well as signs of wildlife presence (i.e. tracks, scats, dens, nests etc.).

Table 2. Field Survey Summary

Survey Type	Protocol	Date
2018		
Calling Anuran Survey 1	BSC 2009	April 26
Ecological Land Classification; Spring Vascular Flora Inventory; Bat Habitat Assessment, Snake Area Search	Lee et al. 1998; Systematic search by ELC polygon; OMNR 2011/MNRF 2017	May 11
Calling Anuran Survey 2	BSC 2009	May 26
Breeding Bird 1; Summer Vascular Flora Inventory; Snake Area Search	OBBA 2001; Systematic search by ELC polygon	June 11
Breeding Bird 2; Snake Area Search	OBBA 2001	June 21
Calling Anuran Survey 3	BSC 2009	June 23
Wetland Boundary and Dripline GPS Survey; Snake Area Search	OWES 2014	October 4
Fall Vascular Flora Inventory; Aquatic Habitat Assessment, Snake Area Search	Search by ELC polygon	October 13
Tree Inventory; Bat Habitat Assessment	Tree Protection By-law 2016; Tree Planting and Protection Guidelines 2018; OMNR 2011/MNRF 2017	October 15-16
2020		
Tree Inventory of woodland in northwest corner of subject lands		January 17, 21, 31
Aquatic Habitat Assessment		February 1

3.1 Terrestrial Surveys

3.1.1 Vegetation Surveys

Vegetation community delineation was completed using aerial photography and field investigations, and was refined during the 3-season vascular plant inventory. Vegetation communities were delineated according to the standard Ecological Land Classification (ELC) System for southern Ontario (Lee et al. 1998) and are shown on Map 2. ELC vegetation communities are consistent with the surveyed feature boundaries as described in Section 3.1.6 of this report. Details of each vegetation community were recorded including species composition, dominance, uncommon species or features, and evidence of human impact. All observed species of vascular flora were recorded during the spring, summer, and fall surveys.

3.1.2 Breeding Bird Surveys

Breeding bird surveys were completed according to standardized protocol which consisted of point count surveys at two locations, at least 250m apart, within the subject lands (Map 2). Surveys occurred between dawn and 1000hrs. Two surveys were undertaken at least 10 days apart and during suitable weather conditions. All visual and auditory observations of birds were recorded throughout the subject lands, as well as the highest level of breeding evidence exhibited for each species observed (OBBA 2001). Incidental observations of birds were noted on most other surveys as well.

3.1.3 Reptile Surveys

Although suitable habitat for SAR snakes is not present within the subject lands, five area search surveys were completed to search for snakes and to inform whether any hibernaculum are present. Biologists conducted systematic searches of all ELC communities focusing on areas which provide suitable basking and cover habitat.

3.1.4 Amphibian Surveys

Evening anuran (frog and toad) call surveys were conducted according to the standardized Marsh Monitoring Program protocol (BSC 2009) at 4 stations (Map 2). Monitoring focused on calling frogs and toads during 3-minute call counts, which included call intensity and an estimated number of individuals. Additional information, including survey time, air and water temperature, pH, wind speed, and cloud cover were recorded at each survey station. Vernal pools which may provide salamander habitat are not present on the property.

3.1.5 Mammal Surveys

Surveys for bat roosting habitat were conducted within the subject lands. Little Brown Myotis (*Myotis lucifugus*), a SAR, is known from the vicinity and roosts in tree cavities, hollows, or under loose bark, as well as within buildings (OMNR 2000). To address potential bat habitat presence within treed areas of the subject lands, NRSI staff undertook an assessment of suitable tree habitat features, including snags, cavities, exfoliating bark, and leaf clusters, in accordance with MNRF standardized protocol (OMNR 2011, MNRF 2017). The bat habitat assessment was completed during both leaf-on and leaf-off conditions. No structures (i.e. buildings) which could provide bat roosting habitat are present within the subject lands.

Information considered (and recorded, where applicable) for cavity trees included tree species, location, diameter at breast height (DBH), canopy cover, tree height, decay class according to Watt and Caceres (1999), and number of potentially suitable cavities. Other criteria were also considered, including the use of cavities by other wildlife, the potential for cavities to be used by predators, supporting/surrounding habitat, and other characteristics which may contribute to the habitat requirements of these species, such as temperature regulation.

3.1.6 Natural Feature Boundary Delineation

The woodland dripline and the wetland boundary in the northwest of the site were delineated and surveyed by NRSI biologists on October 4, 2018. The wetland features in the south of the property were surveyed April 12, 2021. The boundaries of these features were not verified by agency staff, but were identified and surveyed by NRSI biologists certified in the Ontario Wetland Evaluation System (OWES) process. All appended mapping reflects the boundaries and their buffers as surveyed by NRSI.

3.1.7 Aquatic Surveys

Aquatic habitat assessments were conducted on October 13, 2018 and February 1, 2020 to characterize the drainage feature within the subject lands. Air photography was reviewed to assess the location and conditions of the feature where it extends off property to the west and east. The following information was recorded during the assessments:

- substrate type,
- depth, width, etc.,
- bank stability,
- aquatic vegetation cover.

A fulsome headwater drainage feature assessment according to the appropriate protocol was not required for the subject lands, nor was sampling of habitat for fish or benthic macroinvertebrates (personal correspondence with UTRCA staff).

4.0 Existing Conditions

4.1 Soils, Terrain and Drainage

The study area lies within the Upper Thames River watershed, which falls under the jurisdiction of the UTRCA. The Upper Thames watershed is 3,420km^2 (UTRCA 2017), and contains 28 subwatersheds. The Dingman Creek subwatershed, where the subject lands are located, has many areas that are considered significant groundwater recharge areas and highly vulnerable aquifers. Map 6 of the London Plan (City of London 2019b) indicates that there are no identified Significant Groundwater Recharge Area (SGRA) or Highly Vulnerable Aquifer area (HVA) designations within the subject lands.

The drainage feature/headwater drainage feature which bisects the agricultural field originates to the northwest of the site near Wharncliffe Road South, flows across the subject lands and southward down the eastern property boundary. The feature eventually passes beneath Exeter Road and connects with Dingman Creek approximately 1.5km to the south of the subject lands.

Topography within the site is gently sloping to the south with existing elevation in the northern extent of the property approximately 269masl and 264masl in the southern extent. Surface flows drain to the southeast via the headwater drainage feature. Small wetland features are present within localized topographic depressions in the northwest and far south of the subject lands. Grades in the southern portion of the subject lands have been altered due to previous clearing and topsoil removal which resulted in rutting, the creation of a soil berm, and exposure of underlying clay subsoil.

The surficial soils within the study area are generally described as silt loam and silty clay loam with varying permeability (Hagerty and Kingston 1992). Soil cores collected on-site during ELC surveys identified effective textures as predominantly silt loam. The marsh in the northwest contains a shallow profile of organic soils (3-5cm), while the wetland features in the south have established on low-permeability mineral soils which were exposed during the grading activities.

4.2 Designated Natural Areas

According to The London Plan (City of London 2019b), there are no designated natural areas located within the subject lands. The property to the immediate east contains an Unevaluated

Wetland, Unevaluated Vegetation Patch, Valleyland, and is identified as a Potential Naturalization Area (City of London 2019a and b).

The Dingman EA has identified a “complete corridor” across the subject lands. The complete corridor is to be designed as a continuous natural area to convey water, people, and wildlife, with a width of 50-100m (Aquafor Beech 2020).

4.3 Vegetation

4.3.1 Vegetation Communities

The majority of the subject lands consist of a large agricultural field, with cultural plantation, thicket and meadow communities located in the northwest and south portions of the property. A summary of ELC vegetation communities identified within the subject lands and adjacent lands is provided in Table 3. ELC communities are shown on Map 2.

Table 3. Vegetation Communities Identified Within the Subject lands

ELC Ecosite Type	ELC Description	Environmental Characteristics
Wetland		
MAM2	Mineral Meadow Marsh Ecosite	Two other areas of marsh are present within the subject lands; the first in the northwest within the conifer plantation and the second in the southeast. The northern feature contains Reed-canary Grass along with Broad-leaved Cattail (*Typha latifolia*), Fox Sedge (*Carex vulpinoidea*), American Great Bulrush (*Schoenoplectus tabernaemontani*), and Lined Bulrush (*Scirpus pendulus*). The southern feature has bare soils likely resulting from grading and is comprised of Reed-canary Grass, Common Water-plantain (*Alisma plantago-aquatica*), and Common Reed (*Phragmites australis* ssp. *autralis*). Both features contain hydric soils with mottling at 10-25cm, confirming wetland conditions. The northern feature directs surface flow to the south and into the headwater drainage feature that crosses the agricultural field. The southern feature is isolated and collects surface water from a small catchment. Terrestrial Crayfish chimneys, a Significant Wildlife Habitat type, were observed in the southern MAM2 feature.
SWT2	Mineral Thicket Swamp Ecosite	This community is dominated by a dense shrub layer of Pussy Willow, Slender Wilow (*Salix petiolaris*), and Peach-leaved Willow (*S. amygdaloides*).
Cultural		
CUP	Cultural Plantation	A mid-age stand of Colorado Spruce (*Picea pungens*) and Norway Spruce (*P. glauca*) is present in the northwest corner

ELC Ecosite Type	ELC Description	Environmental Characteristics
		of the subject lands. The trees are generally in good health but are planted in a high density resulting in limited cover of shrubs and herbaceous species. The foundation of a structure is present on the northern edge of this plantation.
CUT	Cultural Thicket	The southern portion of the subject lands contains an area of cultural thicket. Red Panicled Dogwood (*Cornus foemina* ssp. *racemosa*) is the dominant shrub throughout this community with Willow shrubs and scattered Eastern Cottonwood (*Populus deltoides*) beginning to establish. The Willow species scattered throughout this community (Slender Willow, Pussy Willow, etc.) can be found in both wetland and fresh-moist upland communities; however, soil mottling and an analysis of the associate species in these locations indicated fresh-moist upland conditions and not wetland. The western extent of thicket would have existed as deciduous forest prior to the clearing that occurred after 2006 and ruts caused by heavy machinery are present throughout.
CUM	Cultural Meadow	Cultural meadow is present in both the northern and southern portions of the subject lands. In the north, this habitat is dominated by Smooth Brome (*Bromus inermis*) with other non-native species such as Canada Thistle (*Cirsium arvense*) and Dame's Rocket (*Hesperis matronalis*) throughout. In the south, the meadow areas are a mixture of Reed-canary Grass, Tall Fescue (*Festuca arundinacea*), Canada Goldenrod (*Solidago canadensis*), and Bird's-foot trefoil (*Lotus corniculatus*). Heavy machinery has created ruts throughout the meadow and a topsoil berm is present along the north edge (to the south of the hedgerow). Monarch butterflies (*Danaus plexippus*) were observed within the southern meadow area.
H1	Hedgerow	A mid-age deciduous hedgerow is present and spans west-east across the subject lands at the south end of the agricultural field. This hedgerow may be a remnant from the larger forest that was removed to the south in approximately 2006. The hedgerow is approximately 20m wide and shows some woodland-like qualities with canopy structure and woodland understory. Tree composition within this feature is dominated by American Basswood (*Tilia americana*) with large numbers of Sugar Maple (*Acer saccharum*) and Bitternut Hickory (*Carya cordiformis*) also present. White Ash (*Fraxinus americana*) and Hop Hornbeam (*Ostrya virginiana*) occur sporadically throughout the feature. Along the southern edge of the hedgerow, young to mid-age Trembling Aspen (*Populus tremuloides*) and Eastern Cottonwood (*P. deltoides*) have established forming a transition into the cultural thicket community. The shrub layer is dominated by European Buckthorn (*Rhamnus cathartica*) and saplings of American Basswood and White Ash. The groundcover is sparse and includes Garlic Mustard (*Alliaria petiolata*), White Avens

ELC Ecosite Type	ELC Description	Environmental Characteristics
		(*Geum canadense*), and Canada Enchanter's Nightshade (*Circaea canadense*). The hedgerow contains piles of field stones with the topsoil berm present to the south of the feature.

The agricultural field within the subject lands was planted in soybeans in 2018. The property to the immediate east was not accessed, but was verified from the property line as predominantly non-native thicket with an area of non-native thicket swamp and graminoid marsh present in the central-western portion of the feature. The lands to the west of the subject lands are comprised of agricultural field and bare soil.

4.3.2 Vascular Flora

A total of 97 vascular plant species were inventoried within the subject lands, of which 59 species are considered native to Ontario. A complete list of these species is appended to this report (Appendix IV).

Problematic non-native invasive species which are widespread within the site include European Buckthorn and Glossy Buckthorn (*Frangula alnus*). European Buckthorn is most abundant among the native trees which comprise the hedgerow, while Glossy Buckthorn occurs sporadically throughout the cultural thicket community. Both species compromise natural habitats dominated by native species resulting in lowered species diversity and degraded wildlife habitat.

No federally or provincially significant plant species were observed within the subject lands. The details for two regionally significant vascular plant species which were observed are provided in Table 4 below and indicated on Map 3.

Table 4. Regionally Significant Vascular Flora Observed in the Subject Lands

Scientific Name	Common Name	S-Rank[1]	Location of Species Observation
Rosa carolina	Carolina Rose	S4	CUT – within Exeter Road parcel south of hedgerow
Ulmus thomasii	Rock Elm	S4?	H1 – hedgerow along eastern boundary of Exeter Road parcel

[1]MNRF 2020a

S-Rank	
S4	Apparently Secure
S#?	Rank Uncertain

Several Carolina Rose shrubs were observed throughout the cultural thicket community that is present to the south of the hedgerow. This species is typically found in dry forests, fields and fencerows (Reznicek et al. 2011). The grading which has occurred in the southern portion of the subject lands has removed much of the topsoil and in turn created wetter conditions at the surface which are not conducive to this species, which likely reflects drier conditions that were present prior to the clearing and disturbance which occurred.

A single Rock Elm was noted from the far southeast corner of the subject lands, within the hedgerow (Map 3). The tree was surveyed as part of the tree inventory and was noted to be in good condition and has a 15cm DBH. This species has a distinctive ridged, corky bark and prefers mixed hardwood forests and rich forests along rivers (Reznicek et al. 2011).

4.4 Wildlife

4.4.1 Birds

A total of 91 species are reported from the vicinity of the subject lands based on the OBBA (BSC et al. 2006). The OBBA data includes those species that have been observed in the area (10 x 10km range), are known to nest in the area, and/or have exhibited some evidence of breeding in the area. A total of 30 species were documented within the subject lands during NRSI field surveys. Of the birds observed, 20 species exhibited signs of breeding, such as males singing, individuals on a territory, pairs and agitated individuals. A Great-Horned Owl pellet was found in January 2020, as well as a stick nest within the plantation (CUP). The stick nest did not appear in use in 2020 (NRSI, field work for adjacent landowner). Refer to Appendix V for a list of bird species found in the study area.

Background information and a SAR and SCC screening that was conducted to inform the background review indicated that eight significant bird species are reported from within the study area (Appendix I). Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) were observed during breeding bird surveys in 2018 from lands adjacent to the the subject lands. Both species are listed as Threatened provincially, affording individuals and their habitat protection under the ESA. Suitable habitat for these species is not found within the subject lands, as the cultural meadow habitat (CUM) on which they rely, is too small to meet their needs.

Bobolink

NRSI biologists observed one Bobolink, a singing male, on June 11, 2018. The bird was present in the vicinity of the overgrown baseball diamonds to the west of the subject lands. The bird was not observed within the subject lands. By October 2018 it was noted that the baseball diamonds had been graded in full and the habitat is no longer present. Breeding bird surveys completed in 2020 for the adjacent lands did not observe this species.

Eastern Meadowlark

A single Eastern Meadowlark was documented approximately 300m to the north of the subject lands on June 21, 2018. The singing male was observed in a small cultural meadow located between Paul Peel Avenue and the Tepperman's commercial building to the north. The bird was not observed within the subject lands. The property from which it was observed is being developed by others.

4.4.2 Herpetofauna

According to the Ontario Reptile and Amphibian Atlas (Ontario Nature 2020), 26 species of herpetofauna are reported from within 10km of the subject lands. NRSI biologists documented approximately 9 Western Chorus Frogs (*Pseudacris triseriata*) calling from wetlands within the property to the east on April 26, 2018. This species is considered threatened federally (COSEWIC 2020), but is not considered at risk provincially (MNRF 2020a). As noted in Section 1.2, species which are considered threatened federally but are not listed provincially are considered a Species of Conservation Concern which is protected as SWH under the Provincial Policy Statement (OMMAH 2020).

No other observations of reptiles or amphibians were made during the course of the 2018 surveys. Standing water was not observed within the subject lands in May or June. Similarly, standing water was not observed in the Exeter Road parcel in June; however it is possible that the two small marsh features may have contained standing water earlier in the spring (parcel was not included in project scope prior to June 11; i.e. no property access provided on Exeter Road parcel prior to June 11). A complete list of herpetofauna reported from the study area is included in Appendix VI.

Background information indicated that 7 significant herpetofauna species are reported from within the study area (Appendix I). Suitable habitat is not present within the subject lands for any of these species, other than Western Chorus Frog, but that species was not observed on site.

4.4.3 Mammals

According to the Mammal Atlas of Ontario (Dobbyn 1994), 32 mammal species are reported from within 10km of the subject lands. During field surveys, 5 of these species were observed within the subject lands including Coyote (*Canis latrans*), Eastern Cottontail (*Sylvilagus floridanus*), Eastern Gray Squirrel (*Sciurus carolinensis*), Raccoon (*Procyon lotor*), and White-tailed Deer (*Odocoileus virginianus*). An active Coyote den was present within the berm of topsoil located near the hedgerow in 2018, as well as in the plantation in January 2020. A complete list of mammals reported from the study area, based on background information and observations made as part of this study, is included in Appendix VII.

An assessment of trees which could provide bat roosting habitat was conducted during the leaf-off and leaf-on conditions (April and October 2018). It was determined that two trees which could provide suitable bat roosting habitat are present within the hedgerow in the southern portion of the property. Specifically, these are Tree 758 (Sugar Maple) and Tree 828 (American Basswood). These trees are shown on Map 3. Suitable features include holes or deep cracks in the stem of a tree as well as clusters of leaves in the canopy of oak trees. The presence of suitable habitat features for SAR bats are subject to the regulations of the ESA.

4.4.4 Insects

Lepidoptera

According to the Ontario Butterfly Atlas (Macnaughton et al. 2020), 58 butterfly species are reported from the study area (with 2 additional potential species observed to the genus level

only). NRSI biologists observed 5 butterfly species during field surveys within the subject lands including Monarch, which is a SCC. Other species observed included Cabbage White (*Pieris rapae*), Clouded Sulphur (*Colias philodice*), Northern Crescent (*Phyciodes cocyta*), and an unidentified Duskywing species (*Erynnis* sp.). Monarch was observed incidentally on two occasions within the cultural meadow in the Exeter Road parcel. The host plant, Common Milkweed (*Asclepias syriaca*), is present in small numbers within this area and along the edges of the agricultural field. A complete list of butterfly species reported from the study area is provided in Appendix VIII. Further discussion of Monarch is provided in Section 5.5.

Odonata

According to the Ontario Odonata Atlas database (MNRF 2020b), 34 dragonfly and damselfly species are reported from the study area. NRSI biologists observed a single Common Green Darner (*Anax junius*) within the small marsh feature in the southwest portion of the property. A complete list of species reported from the study area is provided in Appendix IX.

4.5 Aquatic Habitat

Headwater features contribute to the overall health and function of a watershed and include non-permanently flowing drainage features that may not have defined bed or banks, first-order and zero-order intermittent and ephemeral channels, swales, and headwater wetlands. A headwater feature originates approximately 400m northwest of the subject lands near Wharncliffe Road South. The drainage feature passes through the conifer plantation in the northwest of the subject lands, receiving surface water from the meadow marsh wetland and continues across the agricultural field in a southeast direction. Within the plantation and marsh, the drainage channel appears to be dug, with vertical edges. At the eastern boundary of the subject lands, the channel runs in a north-south direction before directing flows off-site to the southeast. This headwater feature ultimately connects with Dingman Creek approximately 1.5km south of the subject lands. Although NRSI biologists were not on site prior to April 26, 2018, this channel was dry with small, isolated pools of water present throughout the course of the 2018 surveys. Spring freshet conditions were evident as indicated by pooling and muddy substrates. Approximately 250m to the south of the property, in the vicinity of Exeter Road, the drainage feature appears to contain a greater depth of water for much of the year and functions as a permanent watercourse.

Reach 1 originates northwest of the Goldfield 1 Lands. At the time of assessment, February 1, 2020, water entered the conifer plantation along the west edge, flowing southeast through the

marsh (MAM2), and exiting the plantation along the south edge, where it merges with Reach 2 (refer to Map 2). Several large pools are present within the plantation, which are 1.0-1.5m deep and approximately 2.0m across. These pools appear to be caused by broken farm tiles, which are approximately 0.3m in diameter. The water from the tiles is eroding the soil as it flows to the surface, creating the pools/sink holes. Reach 1 exits the marsh at its southeast corner, where it is eroding soil and flows south for a short distance. Although the Reach 1 channel is visible through the field, the feature was dry on February 1, 2020, as the main flow was noted to go underground just south of the plantation. Approximately 20m south of the plantation, the water resurfaces for a short distance (30m) before going underground and flowing through tile drains once again. The dry channel turns to the south and flows along the eastern property boundary. Here, Reach 1 flows through a channel with established terrestrial grasses that connects a series of pools. Just north of the east-west hedgerow (H1, Map 2), Reach 1 turns and flows east onto neighbouring lands. Fish habitat is not present within Reach 1 due to its poor connectivity, terrestrial grasses within the channel, and extensive tile drainage. Approximately 1km downstream of the subject lands, near Blakie Road, the UTRCA conducted fish sampling in the summer of 2019. These surveys found three species with cool water preference: Brook Stickleback (*Culaea incontans*), Creek Chub (*Semotilus atromaculatus*), and White Sucker (*Catostomus commersoni*), (Pratt pers. comm. 2021).

Reach 2 drains the lands to the north of the subject lands and historically would have been ploughed and cropped as active agricultural land. Reach 2 has undefined flows from the lands to the north, which become channelized at the northern property boundary. Here, the channel is well defined, but intermittent in nature, based on the lack of vegetation, lack of iron staining or visible groundwater inputs, and infilling of fine sediments. Reach 2 ranges in width from 0.15-0.70m and in depth from 0-0.30m. It meanders with a 2-3m amplitude, for approximately 57m in a series of pools and flats before it becomes indistinct overland flow for approximately 55m. It channelizes again upon entering the marsh, at approximately the mid-way point within the plantation. Within the marsh, Reach 2 merges with the Reach 1 (Map 2). Reach 2 does not provide fish habitat.

Photographs of the subject lands, including the channel are provided in Appendix X.

5.0 Significance and Sensitivity of Natural Features

The natural environment constraints analysis is used to identify natural features that are sensitive to disturbance based on the rarity or significance of the feature and its functions, as well as policies inhibiting development within them. These areas are identified as "constraints" and are discussed in the context of natural heritage policies governing their protection. Conversely, opportunities for development may occur outside of these natural environment constraints within the subject lands. Results of this analysis have been provided as input to the proposed development plan in order to avoid and reduce impacts to natural features and functions. A summary of this analysis for the subject lands is discussed below. Significant species and natural features as documented during field studies or determined through this analysis are shown on Map 3. Based on discussion with City staff during the pre-consultation meeting (MacKay pers. comm. 2018), the natural feature to the east of the subject lands is to be regarded as significant.

5.1 Wetlands

Wetland mapping available through the MNRF (MNRF 2020a) does not indicate the presence of any evaluated Provincially Significant Wetland on or adjacent to the subject lands. UTRCA mapping (UTRCA 2018) indicates the presence of wetland associated with the watercourse on the property to the east. The extent of this wetland, using data obtained from the UTRCA, is shown on Map 3. Although NRSI biologists did not access this property to observe the feature, air photography interpretation suggests it is comprised of a graminoid marsh with a fringe of thicket swamp; presumably non-native thicket swamp given the prevalence of European Buckthorn visible from the property line. The wetland unit on the adjacent parcel was previously identified as containing Forb-Mineral Meadow Marsh (MAM2-10), Deciduous Swamp (SWD), and Thicket Swamp (SWT) (Earth Tech Canada Inc. 2008). During 2018 surveys it was noted that the edge of the feature appears to be characterized by a band of Hawthorn Thicket at the field edge and in this sense, the wetland extent as shown on Map 3 takes a conservative approach to wetland buffering. It is noted that Map 5 of the London Plan (City of London 2019b) shows a much smaller wetland on the adjacent parcel with the extent of wetland restricted to the valleyland of the mapped watercourse.

Through field surveys, three small wetland features were identified in the northwest and south portions of the subject lands. While the southeast marsh feature provides SWH (terrestrial crayfish habitat) and the northwest marsh conveys surface water to the channel, none of the on-

site wetlands are considered significant or have reason for inclusion of these units into an existing Provincially Significant Wetland (PSW) complex based on their small size, distance from a PSW, and absence of SAR habitat. The boundaries of the wetlands on the subject lands were delineated and surveyed with a sub-metre accuracy GPS unit by NRSI biologists. The wetland off site to the east was not surveyed, and in this area the existing UTRCA wetland boundary layer was utilized (Map 3).

The marsh (MAM2) in the northwest portion of the subject property is 0.133ha in size; the southeastern marsh (MAM2) is 0.089ha; and the southeastern swamp thicket (SWT) is 0.134ha in size.

5.2 Significant Woodlands

The London Plan (2016c) identifies Significant Woodlands, however none are identified within the subject lands.

The cultural plantation (CUP, Map 2) is approximately 0.5ha in area and was assessed for significance using the framework outlined in the Guidelines for the Evaluation of Ecologically Significant Woodlands (City of London 2006). Plantation forests may qualify as significant and are deemed such if one 'high' criteria standard or five 'medium criteria standards are met.

The plantation fulfills a high value for Criterion 1 (Site Protection) due to the presence of the marsh within the plantation and the role of this marsh as a headwater feature. A review of the remaining criteria does not indicate that other items are fulfilled; however, based on the hydrological feature alone, the plantation is considered significant.

The dripline in the northwest was delineated and surveyed by an NRSI biologist, as well as the dripline along the eastern subject lands boundary.

5.3 Environmentally Significant Areas

The City of London recognizes Environmentally Significant Areas (ESA), which are shown on Map 5 (Natural Heritage) of The London Plan (City of London 2019b) and is consistent with the ESA mapping provided in the original Dingman Creek Subwatershed Study (Delcan 2005). No ESAs are identified within the subject lands, but the adjacent property to the east is identified as an Unevaluated Vegetation Patch and is zoned as Environmental Review. This parcel is being considered for ESA designation and this EIS has assumed the feature to be significant.

The Natural Heritage Study completed by AECOM (2010) for the Southwest Area Plan stated the following about this area, identified as Patch #10094: "*[The patch] is considered to be [a] significant component of the natural heritage system with three (3) High scores and one (1) Medium. Furthermore, we would predict that with site-specific field information patch no. 10094 would likely be considered an Environmentally Significant Area (ESA).*"

5.4 Significant Wildlife Habitat

Based on background information review, desktop analysis, and field studies, one SWH type for was confirmed for the subject lands: Habitat for SCC (Terrestrial Crayfish). Although two cavity trees are present within the hedgerow along the southern subject lands limit, SWH for Seasonal Concentration Areas (Bat Maternity Colony) is only considered for forest ELC types (FOD and FOC) and not hedgerows. The significance of these trees is addressed as potential SAR habitat under Section 5.6. All other candidate SWH types were ruled out as not occurring within the subject lands. Full results of the SWH assessment are provided in Appendix II.

5.4.1 Seasonal Concentration Areas

No seasonal concentration areas are found within the subject lands.

5.4.2 Rare Vegetation Communities

No rare vegetation communities are found within the subject lands.

5.4.3 Specialized Wildlife Habitat

No Specialized wildlife habitat types are found within the subject lands.

5.4.4 Habitat for Species of Conservation Concern

Terrestrial Crayfish

Surveys conducted in 2018 identified numerous Terrestrial Crayfish chimneys located in the MAM2 marsh feature in the southeast corner of the subject lands. This low-lying area contains hydric soils which provide suitable crayfish habitat. At least 10 of the chimney structures were observed by NRSI biologists. The marsh is identified as SWH for Terrestrial Crayfish.

Special Concern and Rare Wildlife Species (Monarch)

Monarch butterflies were observed on two occasions within the cultural meadow in the Exeter Road parcel. This species is listed as Special Concern provincially (MECP 2020). This species requires Milkweed (*Asclepias* spp.) as a host plant and nectars on a variety of wildflower

species. Common Milkweed is present in small numbers within the cultural meadow and along the agricultural field margins. Given the low numbers of Milkweed and the disturbed nature of the subject lands including the meadow, SWH for Monarch is not present.

5.4.5 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (OMNR 2000). The potential for animal movement corridors to occur in the subject lands is contingent on confirming Amphibian Breeding Habitat (Wetland) SWH or Deer Wintering Habitat SWH (MNRF 2015); neither of these confirmed habitats were identified within the subject lands and as such the SWH type is not present.

5.5 Habitat of Endangered and Threatened Species

Confirmed habitat for Bobolink and Eastern Meadowlark was observed adjacent to the subject lands during breeding bird surveys. A singing male Bobolink was observed in the vicinity of the overgrown baseball diamonds to the west of the subject lands. As of October 2018, this area had been graded and the habitat destroyed.

A singing male Eastern Meadowlark was observed to the north of the subject lands, in the small field to the south of the Tepperman's building on Wharncliffe Avenue South. This field is 200m north of the subject lands and implications of the ESA do not have bearing on the proposed development.

As noted in Section 4.4.3, two cavity trees which may provide habitat for roosting SAR bats were documented within the east-west hedgerow (H1) within the subject lands. The Alymer District MECP should be contacted as they may require acoustic and visual monitoring of the trees during the maternity roosting period (June).

5.6 Fish and Fish Habitat

The channel on the subject lands is intermittent and was noted to contain only sporadic shallow pools of water between April and October during 2018 field surveys. As a headwater feature to Dingman Creek, the section of channel on site does not constitute direct fish habitat. The Class EA for the White Oak Area (AECOM 2014) identifies the feature on the subject lands as a Class F Drain which connects with an ephemeral flow feature originating on the property to the east. Permanent fish habitat is found east of the subject lands, where this drainage feature connects

with a watercourse. Field surveys by the UTRCA downstream (south) of the subject lands found fish species that prefer cool water habitat (see Section 4.5).

It is not anticipated that the realignment of the channel within the subject lands would result in harm to fish. As an intermittent feature, the channel relays spring flows only for a short period of time and does not offer use as spawning, rearing, or foraging habitat for fish. SAR mapping available through the Department of Fisheries and Oceans website (DFO 2018a) indicates that neither the tributary nor Dingman Creek (at its confluence with the tributary) provide SAR habitat.

6.0 Buffers

Buffers are generally required for natural heritage features such as woodlands, wetlands, and SWH to protect them from impacts during development. Wetland and woodland buffers are required to protect the form and function of these features and protect the species that inhabit them. The UTRCA has required a 10m woodland dripline buffer and 15m wetland buffer for the features within the subject lands, which are agreed to in principle. However, natural heritage features are not being retained within the subject lands, but will be recreated within the complete corridor. The buffers are shown on Map 3, for information purposes only, as they relate to compensation, as discussed below.

Buffers are recommended from the woodland and wetland complex located immediately to the east of the subject lands. Those lands are going through a development application as well, but as no decisions have yet been made, appropriate buffers are recommended based on current conditions of those lands. Should development be approved east of the Goldfield 1 subject lands, buffers will not be required on the Goldfield 1 property. Currently, an extension of Paulpeel Avenue is proposed immediately east of the Goldfield 1 subject lands. If this road extension is approved, this would negate the need for buffers on the Goldfield 1 subject lands.

7.0 Complete Corridor

The Dingman Creek Subwatershed Municipal Class Environmental Assessment (DCEA) identified a "complete corridor" across the subject lands, within an area identified as White Oak 3 – West area. As per the DCEA (p. 155 and 173),

> *"The complete corridor approach is intended to provide sufficient width to accommodate both aquatic and terrestrial ecological function within the corridor (in addition to stormwater, planning, and other similar considerations). It typically encompasses a minimum of 30 m on either side of a watercourse for a total corridor width of 60 m (Environment Canada, 2013). However, exact corridor widths must be established based on-site conditions (i.e., the ecological features and functions present) and the specific goals/targets for the site."*
>
> *"For the purposes of this EA study, the complete corridor associated with the White Oak 3 - West pond shall be objectives-based and shall incorporate the following components:*
> - *A multi-use pedestrian pathway linking with the subdivision to the north;*
> - *All buffer requirements, subject to the significance of the channel and adjacent Natural Heritage Features;*
> - *All minimum compensation requirements included in the subdivision and stormwater infrastructure EISs;*
> - *Relocation/compensation for any additional features found within the development lands identified through the Planning Act process to be mitigated;*
> - *Headwater Drainage Feature protection and mitigation;*
> - *Restoration efforts as appropriate to the watercourse channel and the riparian corridor, to improve upon existing habitat and enhance connectivity between natural heritage features located along the corridor; and,*
> - *Stormwater volume control requirements […].*
>
> *"In the City's Official Plan, urban channel corridor widths may have a minimum width of 30 m and significant corridors have a minimum width of 60 m. Including the buffers and pathway, the corridor is anticipated to range in width between 50 m and 100 m in width."*

Stantec has prepared a complete corridor concept, which integrates a naturalized and restored watercourse corridor with stormwater management (SWM), a trail, and compensation for wetland and tree removal. It also integrates compensation for the removal of a headwater drainage feature on the Goldfield property immediately to the north. The proposed corridor width through the subject lands is 60m.

8.0 Impact Analysis and Recommendations

This EIS has been prepared for the subject lands with reference to the proposed Draft Plan of Subdivision (MHBC, July 12, 2021). The proposed development is shown on Map 4.

8.1 Description of the Proposed Undertaking

The proponent is proposing to develop a subdivision comprised of high, medium, and low-density housing, as well as associated roadways, servicing and SWM. The northern extent of the development will connect with the future extension of Bradley Avenue. A street will connect to Exeter Road in the south. The proposed Draft Plan is shown on Map 4. The high density block located at the north end of the subject lands is anticipated to include mid- and/or high-rise apartment buildings. The low density development is planned for the central portion of the subject lands and will be comprised of 115 lots. Two medium density blocks are planned for the south end of the subject lands, which are proposed as cluster townhouse development for 130 units in total. A complete corridor, as envisioned in the DCEA (Aquafor Beech 2020), is a minimum of 60m across and is located across the northern portion of the site, and along the eastern boundary of the subject lands. The complete corridor will contain the realigned intermittent channel that currently crosses the subject lands. The plantation, wetlands, SWH, and trees are all proposed for removal, but will be compensated for within the complete corridor.

A preliminary SWM strategy has been prepared by Stantec (2021) and is to mimic pre-development conditions. SWM will include a third pipe sewer, rear-yard infiltration galleries, a dry SWM facility, oil-grit separators (OGS), and on-site controls for the medium density blocks. The third pipe system will collect clean runoff from single-family lots and discharge this water to the realigned channel. Shallow infiltration galleries are proposed for most single-family lots to meet water balance objectives. The dry SWM facility will collect all road runoff from the traditional storm sewer system and handle all major flows from the single lots. OGS will provide enhanced level water treatment before water discharges into the SWM facility. The SWM facility will outlet to the realigned channel.

The medium density blocks will receive onsite SWM controls. Block 70 and 81 will discharge to the realigned channel with enhanced water quality treatment. Block 80 will discharge to the Exeter Road sewer system, also after meeting enhanced water quality treatment.

8.2 Approach to Impact Analysis

Potential impacts arising from the proposed development are determined by comparing the details of the proposed development with the characteristics of the existing natural features and their functions. The following is a description of the types of impacts which will be discussed.

- Direct impacts to the natural features within the subject lands and adjacent lands associated with disruption or displacement caused by the actual proposed ‘footprint’ of the undertaking.
- Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality.
- Induced and cumulative 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 over time.

8.3 Evaluations of the Potential Effects, Mitigation and Net Effects

Impacts, mitigation measures and net effects associated with the proposed development are detailed in Table 5.

Table 5. Impact Assessment and Net Effects

Source of Potential Impact	Direct or Indirect Impact	Ecological Feature or Function Effected	Potential Impact	Mitigation Measures	Net Impact
Land Use Impacts					
Land use designation Development design and location Increased edge effects Interruption or change of surface water and ground- water flows (water balance) Increased hard surface/decrease in infiltration Interruption of corridors Flora	Direct	Significant Woodland Wetland Trees SWH Intermittent drainage channel Groundwater resources Removal of significant flora	-Removal of natural heritage features (woodland, wetlands, SWH, drainage channel) -Wetland removal: 0.36ha NW: 0.133ha SW:0.134ha SE: 0.089ha With buffers: 1.53ha NW: 0.579ha SW:0.550ha SE: 0.399ha -Tree removal: approx. 800 trees in fair to excellent condition (Tree Preservation and Protection Plan to be completed at detailed design) -Changes to water balance, increased runoff due to increased impermeable surface area -Changes to hydrology relating to the removal of drainage tile	-Appropriately designed SWM and drainage on-site to maintain the water balance to acceptable standards. -Implementation of LID measures included in SWM strategy to capture, treat, and infiltrate flows to mitigate effects of post-development water balance. -Increased topsoil depth of 300-400mm in yards and greenspace areas is recommended to reduce runoff, promote infiltration and vegetation growth. -Dense restoration plantings in buffer area adjacent to wetland and woodland to the east to limit public incursion into the natural feature, if applicable (i.e., if no development is approved to the east). -Fencing of east side of high-density Block 81 adjacent to buffer (if applicable). -Preparation of a TPP to identify tree protection and compensation. -Compensation of woodland, wetland, and tree removal within complete corridor. A Compensation Plan is to be prepared and integrated with the design of the complete corridor. -Wildlife salvage prior to wetland removal (e.g. relocation of Terrestrial Crayfish to newly created wetlands in complete corridor). -Transplant significant flora (Carolina Rose and Rock Elm) into complete corridor. -Compensation of HDF from Goldfield property (north of Bradley Avenue extension) within complete corridor to account for 0.114ha (see Appendix XI).	Through implementation of recommended mitigation measures, the development will not have a significant negative impact on natural features.
Construction Impacts			-	-	
Site grading, during construction activities (erosion from runoff and sedimentation)	Indirect	Local watercourses, natural features on- and off-site	-Potential for soil erosion and sedimentation of channel and downstream watercourse, as well as natural features -Potential impact to tree root zones	-An Erosion and Sediment Control (ESC) plan is recommended to be prepared to help control and reduce the sediment load of runoff which may flow towards nearby surface water features. -Regular monitoring of sediment fences and other ESC measures during construction, particularly following large rain events. -Monitoring of construction activities to ensure no additional ESC concerns. -Implement sediment control measures at the discharge point of any dewatering systems for servicing trenches/excavations.	The implementation of an ESC plan will limit the potential for negative impacts to natural features.
Site clearing and vegetation removal Drainage of wetlands Fragmentation of habitat and linkages	Direct and Indirect	Natural features on-site	-Disruption to migratory birds and their nests -Soil instability, resulting in erosion and sedimentation -Tree removal -Disruption to local wildlife	-Vegetation removal is recommended to occur outside of the breeding and nesting season for migratory birds, approximately April 1 to August 31 for bird species in wetland and open habitats (CWS 2017a,b). -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. -Stabilize soils following vegetation removal and grading, by seeding the area with appropriate cover crop (e.g. Annual Rye, *Lolium multiflorum*) to reduce the potential for sedimentation and erosion. Maintain vegetation wherever possible. -Restoration plan for complete corridor to include suitable native trees, shrubs, and/or seed mixes that are appropriate to site conditions. Seed mix is recommended to include plant species favorable to Monarch butterfly such as Milkweed, Goldenrod, and Aster. -Bat habitat assessment should be undertaken on the two cavity trees within the hedgerow. Additional surveys, and/or habitat compensation (i.e. bat box installation) to be discussed with MECP and City of London should any confirmed SAR bat habitat be proposed for removal. -Compensation for wetland and tree removal as identified above. -Complete corridor will provide a linkage for wildlife and connection between habitat features.	The completion of vegetation removal outside of wildlife timing windows and the installation of naturalized plantings will not have a significant negative impact on natural features. The potential removal of SAR bat habitat would implement mitigation outlined in the associated permitting. Compensation measures identified for wetland and tree removal will mitigate negative impact.

Source of Potential Impact	Direct or Indirect Impact	Ecological Feature or Function Effected	Potential Impact	Mitigation Measures	Net Impact
Land Use Impacts					
Scarring and damage to vegetation by machinery Decreased health of vegetation from dust and sedimentation Introduction of non-native species	Direct and Indirect	Natural features off-site	-Damage to vegetation from construction activities	-Buffer to woodland and wetland located to the east (if applicable). -Prepare TPP at detailed design to identify tree protection measures. -Install silt fencing at grading limits to demarcate construction zone and establish separation to adjacent natural features. -Develop and implement an ESC plan. -Follow City of London's Clean Equipment Protocol to minimize risk of spreading invasive species. -Import clean fill only to prevent introduction of invasive species.	The implementation of an ESC plan and TPP will limit the potential for negative impacts to trees and their root zones. Adherence to the Clean Equipment Protocol and avoiding introduced fill will minimize potential for non-native species introduction.
Machinery maintenance	Direct and Indirect	Natural features on- and off-site	-Potential contamination of soil, vegetation, water	-All machinery maintenance to be done in a designated area at a high elevation point on-site, where possible. -Implement Best Management Practices, spill action response plan, and spill contingency plan for fuel handling, storage, and on-site equipment maintenance activities. -Contractors on-site should ensure construction equipment is in good working order. Equipment operators should have spill containment kits available.	Adherence to best management practices for re-fueling and materials storage and having spill contingency measures in place at all times will result in no significant negative impact on natural features.
Stormwater Management Development Impacts			-	-	
Erosion and sedimentation related to construction	Indirect	Local watercourses, natural features off-site	-Potential for soil erosion and sedimentation of local watercourses and natural features	-Develop and implement an ESC plan. -Develop and implement a stream restoration plan for relocating and naturalizing the intermittent drainage channel into the complete corridor.	The implementation of an ESC plan will limit the potential for negative impacts to natural features.
Alterations to surface water flow patterns and groundwater properties Impact on receiving watercourse	Direct	Local watercourses and groundwater resources	-Changes to water balance, increased runoff -Increased water temperature to downstream watercourse -Potential for sedimentation of watercourse	-Inclusion of LID measures in SWM strategy, to capture, treat, and infiltrate flows to achieve water balance, as well as to mitigate temperature increases. -Robust erosion and sediment control is recommended during and after construction to prevent uncontrolled sediment release into the newly created drainage feature. -Channel realignment works to adhere to DFO best practices (DFO 2018b) including work in dry conditions, use of sufficient erosion and sediment control and re-vegetation of the excavated soils of the new channel through the implementation of a restoration plan. -Turbidity monitoring to be undertaken during any dewatering activities.	The channel realignment and installation of naturalized buffer plantings will not have a significant negative impact on natural features. Channel works will result in an increase in native species cover and connectivity of wildlife habitat.
Roads and Utility Corridor Impacts				-	
Drainage Mortality of wildlife	Direct and Indirect	Groundwater resources Wildlife	-Changes to water balance -Wildlife mortality	-Appropriately designed SWM and drainage on-site to maintain the water balance to acceptable standards. -Use of LID measures proposed to capture and infiltrate runoff, thereby reducing the variation between pre-development and post-development conditions. -Appropriate culverts to provide wildlife movement opportunities at road crossings of complete corridor -Limiting speed along roads	Proper SWM design and the use of LID will ensure that the development does not have a significant negative impact on site drainage. Significant wildlife movement in this urban area is not reported, but ensuring wildlife crossings are integrated with road crossings of complete corridor will ensure impact to wildlife is low.
Land Use Management Impacts			-	-	

Source of Potential Impact	Direct or Indirect Impact	Ecological Feature or Function Effected	Potential Impact	Mitigation Measures	Net Impact
Land Use Impacts					
Property maintenance Yard waste disposal Non-native species planting Domestic pets Lighting Property encroachments	Indirect	Local environment	-Potential impact to complete corridor and natural feature to east	-Buffer to woodland and wetland to east (if applicable). -Implement Best Management Practices for lighting infrastructure to effectively direct light and minimize disruption to local wildlife. -Limit use of commercial fertilizers in landscaped areas. -Limit use of salts or other additives for ice and snow control on the roadways. -Native tree species should comprise a large portion of street tree planting. -Fencing of lots backing onto complete corridor -Fencing of east side of high-density Block 81 adjacent to buffer (if applicable) -Homeowner education package to provide best management practices with regards to the natural environment -Provide educational signage within the complete corridor to educate residents on the corridor and natural heritage. Sign topics may include: complete corridor design and purpose, along with wetlands and best management practices for homeowners	The naturalized channel will improve filtering of runoff which flows toward Dingman Creek during spring freshet. No significant negative impacts are anticipated.

9.0 Environmental Management and Monitoring Plan

The primary objective of the Environmental Management and Monitoring Plan is to restore the function and structure of features which are removed and to enhance the buffer areas on-site. The existing channel which crosses the agricultural field will be realigned within the complete corridor. The complete corridor will integrate natural channel design with stormwater management, wetland and tree compensation, and recreation (i.e. trail).

A monitoring plan is intended to protect the natural heritage system during and post-construction by ensuring tree protection and sediment fencing are installed properly and maintained. Monitoring will also ensure that naturalization plantings achieve a target rate of survival.

9.1 Restoration and Enhancement

The following recommendations are provided for the enhancement of buffer areas and the complete corridor.

- Buffer areas within existing agricultural field, where applicable, should be naturalized through the planting of native trees, shrubs and herbaceous groundcover. The complete corridor is also to be naturalized in the same way. All species should be native to Middlesex County, commercially available and suited to early succession conditions. A mixture of caliper, potted and plug stock is recommended. Guidance for species selection is outlined in the *Guide to Plant Selection for Natural Heritage Areas and Buffers* (City of London 1994). Tender documents should stipulate a target survival rate of 70% of all tree and shrub stock at the end of two years following installation with no bare soils and representation of the seeded native herbaceous species evident. The inclusion of a diversity of native trees and shrubs in these naturalization plantings will improve diversity within the adjacent natural features.
- The complete corridor should be naturalized to include meanders and native species plantings. The naturalized channel will enhance wildlife habitat and act to filter sediment and pollutants from the surface water which ultimately flows into Dingman Creek.

9.2 Monitoring

The following are recommendations for monitoring to be conducted on site prior to, during and following construction:

- Inspection of all Tree Protection Zone and Construction Delineation Area fencing prior to commencement of grading to ensure that fence placement reflects the extent of the identified natural feature buffers, where applicable.
- Regular monitoring of tree protection fences, sediment fences and other ESC measures, particularly following large rain events, to be completed during construction.
- Inspection of planted tree and shrub stock and herbaceous vegetation to evaluate survival and success of establishment and identify need for replacement plantings for any dead material, to be completed post-construction, 2 years following the date of installation.
- Monitoring of the realigned channel for the establishment of Common Reed coinciding with monitoring of the naturalization plantings. Management activities to be recommended, should Common Reed be detected during this two-year period.

An environmental monitoring program is to be prepared and include items identified in Section 8 of the Hydrogeological Assessment (LDS 2021).

10.0 Summary

Recommendations for impact avoidance, as well as mitigation measures have been provided herein. Assuming the recommendations and mitigation measures provided in this report are followed, negative impacts to the natural environment will be avoided.

Species at Risk

- Bat acoustic surveys are required for Trees 758 and 828, prior to removal. In the event that a tree has confirmed use by a SAR bat species, permitting and compensation measures (bat box installation) will be required through the Aylmer District MECP.

Vegetation Removal and Site Grading

- Prepare a TPP to identify tree protection, removal, and compensation.
- Vegetation removal to occur outside of the breeding and nesting season for migratory birds and bats, approximately April 1 to October 31.
- A nest search allowing for clearing within 48 hours of the search may be completed should vegetation clearing need to occur within the April 1 to August 31 window where there is no bat habitat.
- Transplant significant species into complete corridor.
- Wildlife salvage and relocation into complete corridor (e.g. Terrestrial Crayfish)

Construction Activities

- A sediment and erosion control plan is to be prepared and implemented.
- Install silt fencing at construction limits to demarcate construction zone.
- Channel realignment works to be completed between June and August to avoid spring freshet and allow time for revegetation prior to winter.

Stormwater Management

- Site grading and channel realignment to maintain conveyance of flows and surface water contribution to downstream watercourse.
- Standard mitigation measures relating to erosion and sediment control implemented prior to, during, and after construction.
- Maintain water balance of the site, including the realigned channel and wetland compensation areas.

Ecological Restoration and Enhancement

- Develop a Compensation Plan to mitigate for wetland removal, tree removal, and to provide compensation for the Goldfield HDF that was removed.
- Native species plantings in the complete corridor and buffer areas, where applicable, to enhance and protect natural features adjacent to future development. Seed mixtures for restoration areas is recommended to include plant species favorable to pollinators such as Milkweeds, Goldenrods (*Solidago* spp.), and Asters (*Symphyotrichum* spp.), among others.

Monitoring

- Inspection of Tree Protection Zone and Construction Delineation Area fencing prior to site clearing and grading to ensure buffers (where applicable) have been properly delineated.
- Regular monitoring of sediment fences and other ESC measures, particularly following large rain events.
- Monitoring of native species plantings in the complete corridor and buffer areas (where applicable) at the end of two years following the planting to determine success.
- Monitor realigned channel for potential establishment of Common Reed and make recommendations for management if it is detected within two years following the installation of the tree and shrub plantings.

11.0 References

AECOM. 2010. “Draft” Southwest Area Plan – Natural Heritage Study. March 12, 2010. Project Number 60118887.

AECOM. 2014. Addendum to the Municipal Class Environmental Assessment “Schedule B” for Storm/Drainage and Stormwater Management Servicing Works for the White Oak Area.

Aquafor Beech Ltd. 2020. Dingman Creek Subwatershed: Stormwater Servicing Study Master Plan and Schedule B Municipal Class Environmental Assessment.

Bird Studies Canada, 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. http://www.birdsontario.org/atlas/aboutdata.jsp?lang=en

Bird Studies Canada. 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. February 2009.

Canadian Wildlife Service (CWS). 2017a. Core Nesting Periods of Migratory Birds in Canada. https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_fig04_1

Canadian Wildlife Service (CWS). 2017b. Migratory Birds Convention Act (MBCA) and Regulations. http://www.ec.gc.ca/nature/default.asp?lang=En&n=7CEBB77D-1

City of London. 1994. Guide to Plant Selection for Natural Heritage Areas and Buffers.

City of London. 2006. Guidelines for the Evaluation of Ecologically Significant Woodlands.

City of London. 2007. Environmental Management Guidelines. Revised January 2007.

City of London. 2017. Tree Protection By-law No. C.P.-1515-228

City of London. 2018. Design Specification & Requirements Manual. Updated: July 2018.

City of London. 2019a. Southwest Area Secondary Plan. Updated December 13, 2019. London, ON.

City of London. 2019b. The London Plan. Adopted by City Council June 23, 2016, approved by the Province December 28, 2016. Consolidated November 13, 2019.

Department of Fisheries and Oceans (DFO). 2020. Aquatic Species at Risk Map. Available online: http://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

Department of Fisheries and Oceans (DFO). 2018b. Measures to avoid causing harm to fish and fish habitat. Available online: http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html

Delcan Corporation. 2005. Dingman Creek Subwatershed Update: Volume 1 Main Report. Prepared for the Corporation of the City of London. April 2005.

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

Earth Tech. Canada Inc. 2008. Central Longwoods Natural Heritage Study Constraints and Opportunities Report

Government of Canada. 2020. Species at Risk Public Registry: Species Index. http://www.sararegistry.gc.ca/sar/index/default_e.cfm

Government of Canada. 1985. Fisheries Act (R.S.C., 1985, c. F-14).

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

Hagerty, T.P. and M.S. Kingston. 1992. The Soils of Middlesex County.

LDS. 2021. Hydrogeological Assessment, Proposed Residential Development 234 Exeter Road & 1160 Wharncliffe Road South, London. LDS Project No. GE-00420. August 4, 2021.

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., R. Layberry, C. Jones and B. Edwards. 2020. Ontario Butterfly Atlas Online. http://www.ontarioinsects.org/atlas_online.htm

Natural Resource Solutions Inc. (NRSI). 2018. Bradley Avenue South Tree Inventory Report – Existing Conditions.

Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp

Ontario Breeding Bird Atlas (OBBA). 2001. Guide for Participants. Atlas Management Board, Federation of Ontario Naturalists, Don Mills.

Ontario Ministry of Environment, Conservation and Parks (MECP). 2020. Species at Risk in Ontario (SARO) List. Available at: http://www.ontario.ca/environment-and-energy/species-risk-ontario-list

Ontario Ministry of Municipal Affairs and Housing (OMMAH). 2020. Provincial Policy Statement. Under the Planning Act. Toronto, ON.

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

Ontario Ministry of Natural Resources and Forestry (MNRF). 2015. Significant Wildlife Habitat Ecoregion 7E Criterion Schedule: Addendum to Significant Wildlife Habitat Technical Guide. MNRF, January 2015.

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

Ontario Ministry of Natural Resources and Forestry (MNRF). 2020a. Natural Heritage Information Centre (NHIC): Natural Heritage Information: https://www.ontario.ca/page/get-natural-heritage-information

Ontario Ministry of Natural Resources and Forestry (MNRF). 2020b. Ontario Odonata Atlas Database. Natural Heritage Information Centre, Ontario Ministry of Natural Resources and Forestry. Species list from atlas square 17MH75 queried in December 2020.

Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide. October 2000.

Ontario Ministry of Natural Resources (OMNR). 2010. Natural Heritage Reference Manual for Policies of the Provincial Policy Statement, Second Edition. March 18, 2010.

Ontario Ministry of Natural Resources (OMNR). 2011. Bats and Bat Habitats Guidelines for Wind Power Projects. July 2011.

Ontario Nature. 2020. Reptiles and Amphibians of Ontario Range Maps. https://ontarionature.org/oraa/maps/

Paulson, D. 2011. Dragonflies and Damselflies of the East. Princeton University Press.

Reznicek, A.A., E.G. Voss, and B.S. Walters. 2011. Michigan Flora Online. University of Michigan, February 2011. http://www.michiganflora.net/home.aspx

Stantec. 2021. Fluvial Geomorphological Assessment – 234 Exeter Road, London, Ontario. August 6, 2021.

Stantec. 2021. Letter Report Re: FPR Application – 1160 Wharncliffe Rd and 334 Exeter Rd, London, Ontario – Preliminary Stormwater Management Strategy. September 17, 2021.

Upper Thames River Conservation Authority (UTRCA). 2014. Middlesex Natural Heritage Systems Study. Middlesex County, Ontario.

Upper Thames River Conservation Authority (UTRCA). 2017. Dingman Creek Watershed Report Card. London, ON.

Upper Thames River Conservation Authority (UTRCA). 2018. Regulation Limit Mapping Created October 4, 2018.

Watt, R.W. and M.C. Caceres. 1999. Managing for Snags in the Boreal Forest of Northeastern Ontario. Ontario Ministry of Natural Resources. Northeastern Science and Technology. Technical Note – 016. 20p.

Authorities Consulted

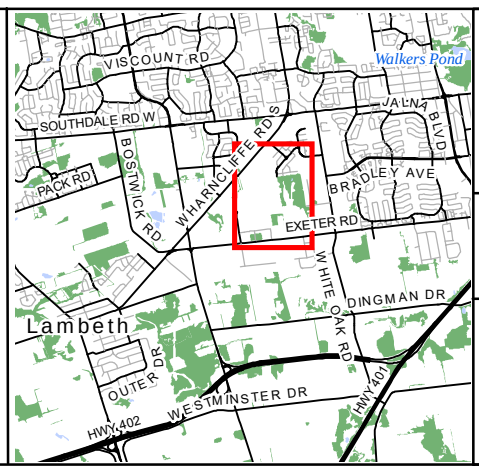
MacKay, James. 2018. Ecologist, City of London. Personal Communication (Agency Project Scoping Meeting), April 18, 2018.

Pratt, Stefanie. 2021. Land Use Planner, Upper Thames River Conservation Authority. Personal Communication (Email to Katharina Richter), March 11, 2021.

MAPS

Legend

- Subject Lands
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Wooded Area
- Tree Protection Area (City of London Tree Protection Bylaw, Schedule D)



Map 1

Goldfield 1

Study Area

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 250 300 Meters

N

Project: 2524
Date: October 6, 2021
NAD83 - UTM Zone 17
Scale 1:5,000 (11x17")

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478400 478600 478800 479000

4753200 4753000 4752800 4752600 4752400 4752200

CUM
CUP
CUM
MAM2
CUM
CUM
MAM2
Reach 1
Reach 2
BMB-001
ANR-001
ANR-002
ANR-003
ANR-004
H1
CUT
CUM
BMB-002
SWT2
MAM2
CUT
Graded / Bare
CUT
EXETER ROAD

Legend

- Subject Lands
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Reach Break
- Anuran Monitoring Station (ANR)
- Breeding Bird Monitoring Station (BMB)
- Ecological Land Classification (ELC)
  - (CUM) Cultural Meadow
  - (CUP) Plantation
  - (CUT) Cultural Thicket
  - (H1) Hedgerow
  - (SWT2) Mineral Thicket Swamp Ecosite
- ELC Inclusion
  - (CUM) Cultural Meadow
  - (MAM2) Mineral Meadow Marsh Ecosite

Map 2

Goldfield 1

Vegetation Communities and Monitoring Stations

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Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 Meters

N

Project: 2524
Date: September 27, 2021
NAD83 - UTM Zone 17
Scale 1:3,000 (11x17")

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478600 478800 479000

4753200 4753000 4752800 4752600 4752400 4752200

CUM
CUP
MAM2
CUM
CUM
CUM
MAM2

H1
CUT
CUM
SWT2
CUT
MAM2
CUT
Graded/Bare
CUT

EXETER ROAD

Legend

- Subject Lands
- Wetland (UTRCA)
- Surveyed Dripline
- Surveyed Wetland Boundary
- 10m Dripline Buffer
- 15m Wetland Buffer
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/ Drainage Feature
- Intermittent Watercourse/ Drainage Feature
- Ecological Land Classification (ELC)
- ELC Inclusion

Constraints

Regionally Significant Species
- Rock Elm
- Carolina Rose

SAR Habitat
- Cavity Tree (Bat Habitat)

Confirmed SWH
- Terrestrial Crayfish Habitat
- Special Concern Wildlife (W. Chorus Frog)

Map 3

Goldfield 1

Opportunities and Constraints

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0 50 100 150 200 Meters

N

Project: 2524
Date: October 6, 2021
NAD83 - UTM Zone 17
Scale 1:3,000 (11x17")

Path: X:\2073_BradleyAvenueScopedEIS\NRSI_2524_Map3_Constraints_3K_2021_10_06_MV.mxd

Legend

- Subject Lands
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Reach Break
- Draft Plan of Subdivision
- Adjacent Plan
- Complete Corridor
- Ecological Land Classification (ELC)
- (CUM) Cultural Meadow
- (CUP) Plantation
- (CUT) Cultural Thicket
- (H1) Hedgerow
- (SWT2) Mineral Thicket Swamp Ecosite
- ELC Inclusion
- (CUM) Cultural Meadow
- (MAM2) Mineral Meadow Marsh Ecosite

Map 4

Goldfield 1

Draft Plan of Subdivision

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0 50 100 150 200 Meters

N

Project: 2524
Date: October 7, 2021
NAD83 - UTM Zone 17
Scale 1:3,000 (11x17")

Path: X:\2073_BradleyAvenueScopedEIS\NRSI_2524_Map4_DraftPlan_3K_2021_10_06_MV.mxd

APPENDIX I

Species at Risk and Species of Conservation Concern Screening

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA[4]	Background Source	Observed by NRSI	Habitat Preference[5,6]	Suitable Habitat Present	Carried Forward to EIS?	Rationale
Plants											
Castanea dentata	American Chestnut	S1S2	END	END	Schedule 1	NHIC 2020	No	Moist to well drained forests on sand, occasionally heavy soils.	Possible	Yes	Species is not present. All trees were inventoried.
Birds											
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	T	Schedule 1	BSC et al. 2006	No	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water.	No	No	Suitable habitat is not present within the subject property.
Chordeiles minor	Common Nighthawk	S4B	SC	T	Schedule 1	BSC et al. 2006	No	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	No	No	Suitable habitat is not present within the subject property.
Contopus virens	Eastern Wood-pewee	S4B	SC	SC		BSC et al. 2006	No	Prefers mid-age forest with clearings and edges.	No	No	Suitable habitat is not present within the subject property.
Riparia riparia	Bank Swallow	S4B	THR	T		BSC et al. 2006	No	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence.	No	No	Suitable habitat is not present within the subject property.
Hirundo rustica	Barn Swallow	S4B	THR	T		BSC et al. 2006	No	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	No	No	Suitable habitat is not present within the subject property.
Hylocichla mustelina	Wood Thrush	S4B	SC	T		BSC et al. 2006	No	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m.	No	No	Suitable habitat is not present within the subject property.
Dolichonyx oryzivorus	Bobolink	S4B	THR	T	No Schedule	BSC et al. 2006	Yes	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	**Yes**	**Yes**	Cultural meadow is present within the subject property, which is in close proximity to additional meadow adjacent to the property.
Sturnella magna	Eastern Meadowlark	S4B	THR	T	No Schedule	BSC et al. 2006	Yes	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	**Yes**	**Yes**	Cultural meadow is present within the subject property, which is in close proximity to additional meadow adjacent to the property.
Herpetofauna											
Graptemys geographica	Northern Map Turtle	S3	SC	SC	Schedule 1	Ontario Nature 2020	No	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water.	No	No	Suitable habitat is not present within the subject property.
Pseudacris triseriata pop. 2	W. Chorus Frog *(GLSL Pop.)*	S3	NAR	T	Schedule 1	Ontario Nature 2020	Yes	Inhabits forest openings, ponds, damp meadows, swamps and ditches.	Yes	Yes	Individuals were documented from the central portion of the natural feature to the east of the subject property.
Chelydra serpentina serpentina	Common Snapping Turtle	S3	SC	SC	Schedule 1	Ontario Nature 2020	No	Permanent or semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddybanks or bottoms. The species often uses soft soil or clean dry sand on south-facing slopes for nest sites and may nest at some distance from water.	No	No	Suitable habitat is not present within the subject property.
Emydoidea blandingii	Blanding's Turtle (Great Lakes/St Lawrence population)	S3	THR	T	Schedule 1	Ontario Nature 2020	No	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	No	No	Suitable habitat is not present within the subject property.

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA[4]	Background Source	Observed by NRSI	Habitat Preference[5,6]	Suitable Habitat Present	Carried Forward to EIS?	Rationale
Pantherophis gloydi (pop. 1)	Eastern Foxsnake (Georgian Bay Population)	S3	THR	E	Schedule 1	SAR Ontario	No	Individuals from the Georgian Bay population are usually found within 150 metres of the shore in rocky habitats spotted with trees and shrubs. During the winter, Eastern Foxsnakes hibernate in groups in deep cracks in the bedrock and in some man-made structures.	No	No	Suitable habitat is not present within the subject property.
Heterodon platirhinos	Eastern Hog-nosed Snake	S3	THR	T	Schedule 1	Ontario Nature 2020	No	The Eastern Hog-nosed Snake specializes in hunting and eating toads, and usually only occurs where toads can be found. Eastern Hog-nosed Snakes prefer sandy, well-drained habitats such as beaches and dry forests where they can lay their eggs and hibernate. They use their up-turned snout to dig burrows below the frost line in the sand where eggs are deposited.	No	No	Suitable habitat is not present within the subject property.
Regina septemvittata	Queensnake	S2	END	E	Schedule 1	Ontario Nature 2020	No	The Queensnake is an aquatic species that is seldom found more than a few metres from the water. It prefers rivers, streams and lakes with clear water, rocky or gravel bottoms, lots of places to hide, and an abundance of crayfish. Queensnakes will often hibernate in groups with other snakes, amphibians and even crayfish. Suitable hibernation sites (hibernacula) include abutments of old bridges and crevices in bedrock.	No	No	Suitable habitat is not present within the subject property.
Mammals											
Myotis lucifugus	Little Brown Myotis	S5	END	E	Schedule 1	Dobbyn 1994	No	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges	**Yes**	**Yes**	Two cavity trees within the hedgerow may provide suitable habitatfor SAR bat species.
Insects											
Asterocampa clyton	Tawny Emporer	S2S3				Macnaughton et al. 2020	No	Forests and hedgerows with abundant Common Hackberry (*Celtis occidentalis*).	No	No	Suitable habitat is not present within the subject property.
Asterocampa celtis	Hackberry Emporer	S2				Macnaughton et al. 2020	No	Forests and hedgerows with abundant Common Hackberry (*Celtis occidentalis*).	No	No	Suitable habitat is not present within the subject property.
Danaus plexippus	Monarch	S4	SC	SC		Macnaughton et al. 2020	Yes	Open areas with milkweed species (*Asclepias* spp.).	No	No	Monarch was observed within the subject property however suitable habitat is not present.
Erynnis brizo	Sleepy Duskywing	S1				Macnaughton et al. 2020	No	Forests and hedgerows with abundant Oak (*Quercus* spp.).	No	No	Suitable habitat is not present within the subject property.
Odonates (Dragon/Damsel Flies)											
Enallagma aspersum	Azure Bluet	S3				MNRF 2020	No	Boggy margins of ponds and swamps.	No	No	Suitable habitat is not present within the subject property.
Enallagma basidens	Double-striped Bluet	S3				MNRF 2020	No	Ponds and sheltered coves of lakes and streams.	No	No	Suitable habitat is not present within the subject property.
Lestes eurinus	Amber-winged Spreadwing	S3				MNRF 2020	No	Ponds and small lakes.	No	No	Suitable habitat is not present within the subject property.

[1]MNRF 2020a; [2]MNRF 2020b; [3]COSEWIC 2020; [4]Government of Canada 2020; [5]OMNR 2000; [6]Paulson 2011

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA[4]	Background Source	Observed by NRSI	Habitat Preference[5,6]	Suitable Habitat Present	Carried Forward to EIS?	Rationale

LEGEND
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
SH Possibly Extirpated (Historical)
S#? Rank Uncertain
B Breeding
N Non-breeding
COSSARO/COSEWIC
NAR Not at Risk
SC Special Concern
END/E Endangered
THR/T Threatened
SARA Schedule
Schedule 1 Officially Protected under SARA
Schedule 3 Special concern; may be reassessed for

APPENDIX II

Significant Wildlife Habitat Screening

Significant Wildlife Habitat Assessment Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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)					
Rationale: Habitat important to migrating waterfowl	American Black Duck Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler Tundra Swan	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. - Fields with seasonal flooding and waste grain in the Long Point, Rondeau, Lake. St. Clair, Grand Bend and Pt. Pelee areas may be important to Tundra Swans.	Fields with sheet water during Spring (mid March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available[cxlviii] Information Sources • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs) • Sites documented through waterfowl planning processes (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[í] or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependant on local site conditions and adjacent land use is the significant wildlife habitat[cxlviii]. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMIST[cxlix] Index #7 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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 Green-winged Teal American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Blue-winged Teal Hooded Merganser Common Merganser Red-breasted Merganser Lesser Scaup Greater Scaup Common Goldeneye Bufflehead Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Canvasback Redhead Ruddy Duck Brant White-winged Scoter Black Scoter	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). Information Sources • Environment Canada • Naturalist clubs often are aware of staging/stopover areas • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (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[i] or more of listed species for 7 days[i], results in >700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH[cxlix] • The combined area of the ELC ecosites and a 100m radius area is the SWH[cxlviii] • Wetland area and shorelines associated with sites identified within the SWHTG[cxlviii] Appendix K[cxlix] are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWHMIST[cxlix] Index #7 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. Information Sources • Western hemisphere shorebird reserve network • Canadian Wildlife Service (CWS) Ontario Shorebird Survey • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and > 1000[i] shorebird use days during spring or fall migration period (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period). • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100[i] Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area[cxlviii] • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #8 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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					
Rationale: Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl Special Concern: Short-eared Owl Bald Eagle	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class. Forest: FOD, FOM, FOC Upland: CUM, CUT, CUS, CUW Bald Eagle: Forest Community Series: FOD, FOM, FOC, SWD, SWM, or SWC, on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering (hawk/owl) sites need to be > 20ha[cxlviii, cxlix] with a combination of forest and upland[xvi, xvii, xviii, xix, xx, xxi]. Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands[cxlix] Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water and large trees and snags aviable for roosting[cxlix] Information Sources • OMNRF Districts • Natural clubs • Natural Heritage Information Centre (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Reports and other information available from CAs • Results of Christmas Bird Counts	Studies confirm the use of these habitats by: • One or more Short-eared Owls, or, One of more Bald Eagles or; at least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years)[cxlix] for a minimum of 20 days by the above number of birds[i]. • 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.	Suitable habitat not present within subject property. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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					
Rationale: Bat hibernacula, are rare habitats in all Ontario landscapes.	Big Brown Bat Eastern Pipistrelle/Tri-colored Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. Active mine sites should not be considered The locations of bat hibernacula are relatively poorly known. Information Sources • OMNRF for possible locations and contact for local experts • Natural Heritage Information Centre (NHIC) Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts • Clubs that explore caves (eg. Sierra Club) • University Biology Departments with bat experts	• All sites with confirmed hibernating bats are SWH[í]. • The area includes 200m radius around the entrance of the hibernaculum[cxlviii, ccvii, í]. for the development types and 1000m for wind farms [ccv.] • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the[ccv]."Bats and Bat Habitats: Guidelines for Wind Power Projects" [ccv] • SWHMIST[cxlix] Index #1 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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					
Rationale: Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	Maternity colonies can be found in tree cavities, vegetation and often in building [sxxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii]. • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii]. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3[ccxiv] or class 1 or 2[ccxii]. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx]. Information Sources • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts	Maternity Colonies with confirmed use by: • >10 Big Brown Bats[í] • >5 Adult Female Silver-haired Bats[í] • The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity colonies[í]. • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv]. • SWHMIST[cxlix] Index #12 provides development effects and mitigation measures.	Suitable habitat not present within subject property. Hedgerows do not constitute SWH for bats but there are considerations for SAR bats. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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					
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles: ELC Community Classes: SW, MA, OA and SA ELC Community Series: FEO and BOO Northern Map Turtle: Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxviii]. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH Information Sources • EIS studies carried out by Conservation Authorities • Field naturalists clubs • OMNRF Ecologist or Biologist • Natural Heritage Information Centre (NHIC)	• Presence of 5 over-wintering Midland Painted Turtles is significant[j]. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[j]. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – Apr)[cvii]. Congregation of turtles is more common where wintering areas are limited and therefore significant[cix, cx, cxi, cxii]. • SWHMIST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	Suitable habitat not present within subject property.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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: Reptile Hibernaculum					
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Special Concern: Milksnake Eastern Ribbonsnake	For all snakes, habitat may be found in any ecosite in southern Ontario other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. The existence of rock piles or slopes, stone fences, and crumbling foundations assist in identifying candidate SWH.	For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line[xliv, l, li, lii, cxii]. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Information Sources • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells). • Reports and other information available from CAs • Local naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • Natural Heritage Information Centre (NHIC)	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)[i]. • Note: If there are Special Concern Species present, then site is SWH • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWH[i]. • SWHMIST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula.	A foundation from an old residence is present at the northern edge of the conifer plantation. This plantation is somewhat isolated from other natural features and is a relatively small natural area to support large numbers of snakes. No snakes were observed on any surveys in 2018. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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)					
Rationale: Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are 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. Information Sources • Reports and other information available from CAs • Ontario Breeding Bird Atlas[ccv]. • Bird Studies Canada: Nature Counts http://www.birdscanada.org/birdmon/ • Field Naturalist clubs	Studies confirming: • Presence of 1 or more nesting sites with 8[cxlvix] or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests[ccvii]. • Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]. • SWHMIST[cxlix] Index #4 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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)					
Rationale: Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. Information Sources • Ontario Breeding Bird Atlas[ccv], colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • Natural Heritage Information Centre (NHIC) Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries. • Reports and other information available from CAs • MNRF District Offices • Field naturalist clubs	Studies confirming: • Presence of 2 or more active nests of Great Blue Heron or other list species. • The habitat extends from the the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH[cc, ccvii]. • Confirmation of active colonies must be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWHMIST[cxlix] Index #5 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

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

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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					
Rationale: Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter	Painted Lady Red Admiral Special Concern: Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: Field: CUM CUT CUS Forest: FOC FOD FOM CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10ha in size with a combination of field and forest habitat present, and will be located within 5km of Lake Ontario and Erie[cxlix]. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south [xxxii, xxxiii, xxxiv, xxxv, xxxvi]. • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat [cxlviii, cxlix]. • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes [xxxvii, xxxviii, xxxix, xl, xli]. Information Sources • MNRF District Offices • Natural Heritage Information Centre (NHIC) • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs • Toronto Entomologists Association • Conservation Authorities	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur[xl, xlii]. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD • MUD of >5000 or >3000 with the presence of Painted Ladies or White Admiral's is to be considered significant[i]. • SWHMIST[cxlix] Index #16 provides development effects and mitigation measures.	Suitable habitat not present within subject property. Property is greater than 5km from Lake Erie. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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					
Rationale: Sites with a high diversity of species as well as high numbers are most significant	All migratory songbirds Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html All migrant raptors species Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	Woodlots need to be >5 ha[i] in size and within 5km [iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Ontario and Erie. If woodlands are rare in an area of shoreline, woodland fragments 2-5ha can be considered for this habitat • If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Erie or Ontario are more significant[cxlix]. • Sites have a variety of habitats: forest, grassland and wetland complexes[cxlix]. • The largest sites are more significant[cxlix] • Woodlots and forest fragments are important habitats to migrating birds[ccxviii], these features located along the shore and located within 5km of Lake Ontario and Lake Erie are Candidate SWH[cxlviii]. Information Sources • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Ontario Important Bird Areas (IBA) Program	Studies confirm: • Use of the habitat by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates[i]. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (March/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]. • SWHMIST[cxlix] Index #9 provides development effects and mitigation measures.	Suitable habitat not present within subject property. Property is greater than 5km from Lake Erie. SWH type not present.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	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					
Rationale: Deer movement during winter in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions [cxlviii]	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations (CUP) smaller than 50 ha may also be used.	• Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots>50ha[í]. • Deer movement during winter in Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands[cxlviii]. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha[ccxxiv]. • Woodlots with high densities of deer due to artificial feeding are not significant[í]. Information Sources • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF[cxlviii]. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF[í]. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv], ground or road surveys, or a pellet count deer density survey[ccxxv]. • SWHMIST[cxlix] Index #2 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Significant Wildlife Habitat Assessment Tables

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

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. Information Sources • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii] • SWHMIST[cxlix] Index #21 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

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					
Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	A sand barren area >0.5ha in size Information Sources • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens[lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp)[i]. • SWHMIST[cxlix] Index #20 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

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					
Rationale: Alvars are extremely rare habitats in Ecoregion 7E	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 **Five Alvar Indicator Species:** 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum These indicator species are very specific to Alvars within Ecoregion 7E[cxlix]	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover[lxxviii].	An Alvar site > 0.5ha in size[lxxv]. Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie[cxcix]. Information Sources • Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi]. • Ontario Nature – Conserving Great Lakes Alvars[ccviii]. • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Staff • Field Naturalist clubs • Conservation Authorities	Field studies identify four of the five **Alvar indicator species**[lxxv] at a candidate Alvar site is Significant • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv]. • SWHMIST[cxlix] Index #17 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

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 and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old growth forests are characterized by heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland area is >0.5ha Information Sources • OMNRF Forest Resource Inventory mapping • OMNRF Districts • Field naturalist clubs • Conservation Authorities • Sustainable Forestry Licence (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat[cxlviii]. • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities [cxlviii] (cut stumps will not be present) • Determine ELC Vegetation Type for forest area containing the old growth characteristics[lxxviii]. • SWHMIST[cxlix] Index #23 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

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					
Rationale: Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)[cc].	No minimum size to site[i] Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location data available on their website • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in[lxxv] Appendix N should be present[i]. Note: Savannah plant spp. list from Ecoregion 7E should be used. • Area of the ELC Vegetation type is the SWH[lxxviii]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST[cxlix] Index #18 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

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					
Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)[cc].	No minimum size to site[i]. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • Natural Heritage Information Centre (NHIC has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in[lxxv] Appendix N should be present[i]. Note: Prairie plant spp. list from Ecoregion 7E should be used. • Area of the ELC Vegetation Type is the SWH[lxxviii]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST[cxlix] Index #19 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

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					
Rationale: Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii]. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M[cxlviii]. The OMNRF/NHIC will have up to date listing for rare vegetation communities. Information Sources • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii]. • Area of the ELC Vegetation Type polygon is the SWH. • SWHMIST[cxlix] Index #37 provides development effects and mitigation measures.	No other rare vegetation communities present within the subject property. SWH type not present.

Significant Wildlife Habitat Assessment Tables

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	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[cxlix] from a wetland (>0.5ha) or a wetland (>0.5ha) with small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur[cxlix]. • Upland areas should be at least 120m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. Information Sources • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards[i], or, • Presence of 10 or more nesting pairs for listed species including Mallards[i]. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMIST[cxlix] Index #25 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	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					
Rationale: Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey Special Concern: Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). Information Sources • Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario • MNRF values information (LIO/NRVIS) will list known nesting locations, Note: data from NRVIS is provided as a point format and does not include all the habitat. • Nature Counts, Ontario Nest Records Scheme data • OMNRF Districts • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented • Reports and other information available from CAs • Field naturalists clubs	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area[cxlviii]. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the SWH[ccvii], maintaining undisturbed shorelines with large trees within this area is important[cxlviii]. • For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH[cvi, ccvii]. Area of the habitat from 400-800m is dependant on site lines from the nest to the development and inclusion of perching and foraging habitat[cvi]. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for ≥3 years or suspected of not being used for >5 years before being considered not significant[ccvii]. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #26 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	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 are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	All natural or conifer plantation woodland/forest stands combined >30ha or with >4ha of interior habitat[lxxxviii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii]. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. Information Sources • OMNRF Districts • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from CAs	Studies confirm: • Presence of 1 or more active nests from species list is considered significant[cxlviii]. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha of habitat is the SWH[ccvii].(the 28ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) • Barred Owl – A 200m radius around the nest is the SWH[ccvii]. • Broad-winged Hawk and Coopers Hawk – A 100m radius around the nest is the SWH[ccvii]. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH[ccvii]. • Conduct field investigations from early March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMIST[cxlix] Index #27 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

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

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	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					
Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system[cxvii, cxlix]. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species[cxix, cxx, cxxi, cxxii, cxiii, cxiv]. <u>Information Sources</u> • Topographical Map • Thermography • Hydrological surveys conducted by CAs and MOE • Field naturalists and landowners • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped	Field Studies confirm: • Presence of a site with 2 or more[í] seeps/springs should be considered SWH. • The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation of the habitat[cxlviii]. • SWHMIST[cxlix] Index #30 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	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) >500m^2 (about 25m diameter) [ccvii] within or adjacent (within 120m) to a woodland (no minimum size)[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx]. Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat[cxlviii]. Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts and wetland evaluations • Field naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3. • A combination of observational study and call count surveys [cviii] will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230m radius of woodland area[lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi]. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWHMIST[cxlix] Index #14 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

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

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	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 Area-Sensitive Bird Breeding Habitat					
Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Pileated Woodpecker Special Concern: Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs. old) forest stands or woodlots >30ha[cv, cxxi, cxxii, cxxiii, cxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix]. • Interior forest habitat is at least 200m from forest edge habitat[clxiv]. Information Sources • Local birder clubs • Canadian Wildlife Service (CWS) for the location of forest bird monitoring • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species. • Reports and other information available from CAs	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species[i]. • Note: any site with breeding Cerulean Warblers or Canada Warbler is to be considered SWH[i]. • Conduct field investigations in early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHMIST[cxlix] Index #34 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Significant Wildlife Habitat Assessment Tables

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	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 Green Heron Trumpeter Swan Special Concern: Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites	• Nesting occurs in wetlands • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present[cxxiv]. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources • OMNRF Districts and wetland evaluations • Field naturalist clubs • Natural Heritage Information Centre (NHIC) • Reports and other information available from CAs • Ontario Breeding Bird Atlas[ccv]	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species[j]. • Note: any wetland with breeding of 1 or more Trumpeter Swans, Black Terns, Green Heron or Yellow Rail is SWH[j]. • Area of the ELC ecosite is the SWH • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #35 provides development effects and mitigation measures	Suitable habitat not present within subject property. SWH type not present.

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	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) >30ha[clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix]. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years)[i]. Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. Information Sources • Agricultural land classification maps Ministry of Agriculture • Local birder clubs • Ontario Breeding Bird Atlas[ccv] • EIS Reports and other information available from CAs	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species[i]. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #32 provides development effects and mitigation measures	Suitable habitat not present within subject property. SWH type not present.

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

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

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	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 (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish (*Cambarus Diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish	Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998.	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites[cci]. • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the large ecosite area is the SWH • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult [cci] • SWHMIST[cxlix] Index #36 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	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					
Rationale: These species are quite rare or have experienced significant population declines in Ontario	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites[lxxviii]. Information Sources • Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists and element occurrences for these species. • NHIC Website: "Get Information" http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas[ccv] • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat neess to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat for foraging habitat. • SWHMIST[cxlix] Index #37 provides development effects and mitigation measures.	Monarch (*Danaus plexippus*) was observed but suitable meadow or marsh habitat with abundant nectar sources is not present. Western Chorus Frog (*Pseudacris triseriata*) was documented calling from the wetland on the property to the east. **SWH type confirmed.**

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 7E.

	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 American Toad Blue-spotted Salamander Spotted Salamander Four-toed Salamander Gray Treefrog Northern Leopard Frog Pickerel Frog Western Chorus Frog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	Movement corridors between breeding habitat and summer habitat[clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi] Movement corridors must be considered when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule[í]. Information Sources • MNRF District Office • Natural Heritage Information Centre NHIC • Reports and other information available from CAs • Field naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant[cxlix]. • Corridors should have at least 15m of vegetation on both sides of waterwaycxlix or be up to 200m widecxlix of woodland habitat and with gaps <20m[cxlix] • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat[cxlix]. • SWHMIST[cxlix] Index #40 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 7E.

	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 American Toad Blue-spotted Salamander Spotted Salamander Four-toed Salamander Gray Treefrog Northern Leopard Frog Pickerel Frog Western Chorus Frog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	Movement corridors between breeding habitat and summer habitat[clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi] Movement corridors must be considered when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule[i]. Information Sources • MNRF District Office • Natural Heritage Information Centre NHIC • Reports and other information available from CAs • Field naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant[cxlix]. • Corridors should have at least 15m of vegetation on both sides of waterwaycxlix or be up to 200m widecxlix of woodland habitat and with gaps <20m[cxlix] • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat[cxlix]. • SWHMIST[cxlix] Index #40 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

APPENDIX III
Scoping Checklist

Appendix A

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title:

Date Submitted:

Proponent:

Qualifications

Primary Consultant:

Key contact person:

Other consultant / field personnel:

- Hydrogeology / Hydrology:
- Biological – Flora:
- Biological – Fauna:
- Other:

Context for Background Information

Subwatershed:

Tributary Fact Sheet Number:

Planning / Policy Area:

Technical Advisory Review Team

- Ecologist Planner:
- Planner for File:
- EEPAC:
- Conservation Authority:
- Ministry of Natural Resources:
- Ministry of Municipal Affairs and Housing:
- Ministry of Agriculture and food:
- Other Review Groups (e.g., Community Associations , Field Naturalists):

1.0 DESCRIPTION OF THE ENVIRONMENT (FEATURES)

Purpose: To have a clear understanding of the current status of the land, and the proposed "development" or land use change.

1.1 Mapping (Location and Context)

Current Aerial Photography

Land Use - Excerpts of the Official Plan for the City of London Ontario Schedules A, B, showing a 5-10 km radius of subject site

Terrain setting @ 1:10,000 - 1:15,000 scale showing landscape features, subwatershed divides

Existing Environmental Resources showing @1:2,000 - 1:5,000 showing Vegetation, Hydrology, contours, linages.

Environmental Plan or Strategy from Subwatershed reports (tributary fact sheet), Community (Area) Plans, or other

1.2 Description of Site, Adjacent lands, Linage with Natural Heritage System

List all supporting studies and reports available to provide background summary (e.g. subwatershed, hydrological, geo-technical, natural heritage etc.).

Check the first box if the information is relevant and required as part of this study. Check the second box if sufficient data is available.

1.2.1 Terrain Setting

Soils (surface and subsurface)

Glacial geomorphology - landform type

Subwatershed

Topographic features

Ground water discharge

Shallow ground water/baseflow

Ground water discharge/aquifer

Aggregate resources

1.2.2 Hydrology

Hydrological catchment boundary and of wetlands + determine the catchment areas of all wetlands

Surface drainage pattern

Watercourses (Permanent, Intermittent)

Stream order (Headwater, 1st, 2nd, 3rd or higher)

Agricultural Drains

Downstream receiving watercourse

Hazard Line (Map 6)

1.2.3 Natural Hazards

100 year Erosion Line

Floodline mapping

Max line mapping – UTRCA mapping + text based regulated areas

1.2.4 Vegetation

Vegetation patch Number

System (Terrestrial, Wetland, Aquatic)

Cover (Open, Shrub, Treed)

Community Type(s)

ELC Community Class (Bluff, Forest, Swamp, Tallgrass Prairie, Savannah & Woodland, Fen, Bog, Marsh, Open Water, Shallow Water)
ELC Community Sites

Rare Vegetation Communities

1.2.5 Flora

Flora (Inventory dates, Source)

Rare Flora (National, Provincial, Regional)

1.2.6 Fauna

Fauna (Inventory dates; sources)

Breeding Birds

Migratory Birds

Amphibians

Reptiles

Mammals

Butterflies

Odonata

Other

Partners In Flight (PIF)

Rare Fauna

1.2.7 Wildlife Habitat + as per MNRF 2015 Criteria, as amended from time to time, and all applicable Official Plan policies and In-force London Plan policies

Species-At-Risk Regulated Habitat critical habitat mapping

Winter habitat for deer, wild turkey

Waterfowl Habitat (wetlands, poorly drained landscape - bottomlands, beaver ponds, seasonally flooded areas, staging areas, feeding areas)

Colonial Birds Habitat

Hibernacula

Habitat for Raptors

Forests with springs or seeps

Ephemeral ponds

Wildlife trees (snags, cavities, x-large trees > 65 cm DBH)

Forest Interior Birds

Area-sensitive birds

1.2.8 Aquatic Habitat

(SWS Aquatic Resource Management Reports)

Fish Communities

Fish spawning areas

Fish migration routes

Thermal refuge for fish

Benthic inventory

Substrate

Riparian habitat (extent and type)

1.2.9 Linkages and Corridors

(The diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible. PPS 2.3.3)

Valleylands

Significant Watercourses (Thames River, Stoney Creek, Medway Creek, Dingman Creek, Pottersburg Creek, Wabuno Creek, Mud Creek, Stanton Creek (Drain), Kelly Creek (Drain)

Upland Corridors / species migration routes

Big Picture Cores and Corridors

Linkages between aquatic and terrestrial areas (riparian habitat, runoff)

Groundwater connections

Patch clusters (mosaic of patches in the landscape)

1.3 Social Values

1.3.1 Human Use Values

Recreational linkages for hiking, walking

Nature appreciation, aesthetics

Education, research

Cultural / traditional heritage

Social (parks and open space)

Resources Products (e.g. timber, fish, furbearers, peat)

Aggregate Resources

1.3.2 Land Use - Cultural

Archaeological (pre 1500)

Historical (post 1500 - present)

Adjacent historical and archeological

Future

1.3.3 Land Use - Active

Archaeological (pre 1500)

Historical (post 1500 - present)

Adjacent historical and archeological

Future

1.3.4 Other

2.0 EVALUATION OF SIGNIFICANCE

Components of the Natural Heritage System
The policies in Section 15.4 apply to recognized and potential components of the natural heritage system as delineated on Schedule 'B' or features that may be considered for inclusion on Schedule 'S'. They also address the protection of environmental quality and ecological function with respect to water quality, fish habitat, groundwater recharge, headwaters and aquifers.

A component of a Subject Lands Status Report that is required to be included in the EIS is the evaluation of significance of all potential natural heritage features and areas recognized by In-force London Plan policies and/ or Official Plan policies.

A component of a Subject Lands Status Report that is required to be included in the EIS is the confirmation and mapping of boundaries of all natural heritage features and areas.

2.1 Environmentally Significant Areas

Identified Environmentally Significant Areas (ESA)

Name

Potential ESAs - Expansion of an Existing ESA

Name

Potential ESA - Area not associated with an existing ESA

Name

2.2 Wetlands

Provincially Significant Wetlands

Name

Wetlands

Name

Unevaluated Wetlands

2.3 Areas of Natural and Scientific Interest

Provincial Life Science ANSI

Regional Life Science ANSI

Earth Science ANSI

2.4 Habitat of Species-At-Risk (SAR)

Endangered

Threatened

Vulnerable / Special Concern

2.5 Woodlands and Vegetation Patches

Significant Woodlands

Unevaluated Vegetation Patches and/ or other patches > 0.5ha

2.6 Corridors and Linkages

River, Stream and Ravine Corridors

Upland Corridors

Naturalization and Anti-fragmentation Areas

3.0 IDENTIFICATION AND DESCRIPTION OF FUNCTIONS

Ecological Functions the natural processes, products or services that species and non-living environments provide or perform within or between ecosystems and landscapes. Check those functions that will be required to assess for the study (key and supporting functions).

3.1 Biological Functions

Habitat (provision of food, shelter for species)

Limiting habitat

Species life histories (reproduction and dispersal)

Habitat guilds

Indicator species

Keystone species

Introduced species

Predation / parasitism

Population dynamics

Vegetation structure, density and diversity

Food chain support

Productivity

Diversity

Carbon cycle

Energy cycling

Succession and disturbance processes

Relationships between species and communities

3.2 Hydrological and Wetland Functions

Groundwater recharge and discharge (hydrogeology)

Water storage and release (fluvial geomorphology)

Maintaining water cycles (water balance)

Water quality improvement

Flood damage reduction

Shoreline stabilization / erosion control

Sediment trapping

Nutrient retention and removal / biochemical cycling

Aquatic habitat (fish, macroinvertebrates)

3.3 Landscape Features and Functions

Size

Connections, corridors and linkages

Proximity to other areas / natural heritage features (e.g. woodlands, wetlands, valleylands, water, etc.)

Fragmentation

3.4 Functions, Benefits and Values of Importance to Humans

Contributing to healthy and productive landscapes

Improving air quality by supplying oxygen and absorbing carbon dioxide

Converting and storing atmospheric carbon

Providing natural resources for economic benefit

Providing green space for human activities

Aesthetic and quality-of-life benefit

Environmental targets and/or environmental management strategies

4.0 ADDITIONAL COMPONENTS AND NOTES

- EIS to show and demonstrate conformity with the Provincial Policy Statement (2020), in-force London Plan (as of Nov. 2019) policies, and current Official Plan policies (1989), Environmental Management Guidelines (2006).

APPENDIX IV

Vascular Flora Reported from the Study Area

Vascular Plant Species Reported From the Study Area

Scientific Name	Common Name	CC	CW	Weed	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Middlesex County[5]	NHIC Data[1]	NRSI Observed
Pteridophytes	**Ferns & Allies**										
Equisetaceae	**Horsetail Family**										
Equisetum arvense	Field Horsetail	0	0		S5				C		X
Gymnosperms	**Conifers**										
Pinaceae	**Pine Family**										
Picea glauca	White Spruce	6	3		S5				I		X
Picea pungens	Colorado Spruce			NA	SE1				I		X
Dicotyledons	**Dicots**										
Aceraceae	**Maple Family**										
Acer negundo	Manitoba Maple	0	-2		S5				C		X
Acer platanoides	Norway Maple		5	-3	SE5				IU		X
Acer saccharum ssp. *nigrum*	Black Maple	7	3		S4?				C		X
Anacardiaceae	**Sumac or Cashew Family**										
Toxicodendron radicans ssp. *negundo*	Poison-ivy	5	-1		S5				X		X
Toxicodendron rydbergii	Poison-ivy	0	0		S5				X		X
Apiaceae	**Carrot or Parsley Family**										
Daucus carota	Wild Carrot		5	-2	SE5				IC		X
Apocynaceae	**Dogbane Family**										
Apocynum cannabinum var. *cannabinum*	Indian Hemp		1		S5				C		X
Asclepiadaceae	**Milkweed Family**										
Asclepias syriaca	Common Milkweed	0	5		S5				C		X
Asteraceae	**Composite or Aster Family**										
Achillea millefolium ssp. *millefolium*	Common Yarrow		3	-1	SE?						X
Cirsium arvense	Canada Thistle		3	-1	SE5				IC		X
Cirsium vulgare	Bull Thistle		4	-1	SE5				I		X
Erigeron annuus	Daisy Fleabane	0	1		S5						X
Euthamia graminifolia	Flat-topped Bushy Goldenrod	2	-2		S5				C		X
Leucanthemum vulgare	Ox-eye Daisy		5	-1	SE5						X
Solidago canadensis	Canada Goldenrod	1	3		S5				X		X
Symphyotrichum novae-angliae	New England Aster	2	-3		S5				C		X
Balsaminaceae	**Touch-me-not Family**										
Impatiens capensis	Spotted Touch-me-not	4	-3		S5				C		X
Berberidaceae	**Barberry Family**										
Podophyllum peltatum	May-apple	5	3		S5				X		X

Scientific Name	Common Name	CC	CW	Weed	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Middlesex County[5]	NHIC Data[1]	NRSI Observed
Betulaceae	**Birch Family**										
Carpinus caroliniana ssp. *virginiana*	Blue Beech	6	0		S5				C		X
Corylus americana	American Hazel	5	4		S5				C		X
Ostrya virginiana	Hop Hornbeam	4	4		S5				C		X
Brassicaceae	**Mustard Family**										
Alliaria petiolata	Garlic Mustard		0	-3	SE5				IC		X
Hesperis matronalis	Dame's Rocket		5	-3	SE5				I		X
Caprifoliaceae	**Honeysuckle Family**										
Lonicera X *bella*	Bell's Honeysuckle		5	-3	SE2						X
Cornaceae	**Dogwood Family**										
Cornus foemina ssp. *racemosa*	Red Panicled Dogwood	2	-2		S5				X		X
Dipsacaceae	**Teasel Family**										
Dipsacus fullonum ssp. *sylvestris*	Wild Teasel		5	-1	SE5				IC		X
Fabaceae	**Pea Family**										
Medicago sativa ssp. *sativa*	Alfalfa		5	-1	SE5				IC		X
Robinia pseudo-acacia	Black Locust		4	-3	SE5				IC		X
Trifolium pratense	Red Clover		2	-2	SE5				I		X
Vicia cracca	Tufted Vetch		5	-1	SE5				I		X
Fagaceae	**Beech Family**										
Quercus macrocarpa	Bur Oak	5	1		S5				C		X
Castanea dentata	American Chestnut	8	5		S1S2	END	END	Schedule 1	R	X	
Juglandaceae	**Walnut Family**										
Carya cordiformis	Bitternut Hickory	6	0		S5				X		X
Juglans nigra	Black Walnut	5	3		S4				X		X
Lamiaceae	**Mint Family**										
Nepeta cataria	Catnip		1	-2	SE5				IC		X
Oleaceae	**Olive Family**										
Fraxinus americana	White Ash	4	3		S5				C		X
Ligustrum vulgare	Common Privet		1	-2	SE5				I		X
Ranunculaceae	**Buttercup Family**										
Ranunculus acris	Tall Buttercup		-2	-2	SE5				IC		X

Scientific Name	Common Name	CC	CW	Weed	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Middlesex County[5]	NHIC Data[1]	NRSI Observed
Rhamnaceae	**Buckthorn Family**										
Rhamnus cathartica	European Buckthorn		3	-3	SE5				IC		X
Frangula alnus	Glossy Buckthorn		-1	-3	SE5				IU		X
Rosaceae	**Rose Family**										
Crataegus species	Hawthorn species										X
Geum canadense	White Avens	3	0		S5				X		X
Malus domestica	Apple										X
Prunus avium	Cherry Plum		5	-2	SE4				IR		X
Rosa rubiginosa	Sweetbrier Rose		5	-1	SE4				I		X
Rubus allegheniensis	Alleghany Blackberry	2	2		S5				C		X
Rubus idaeus ssp. *idaeus*	Red Raspberry				SE1						X
Rubiaceae	**Madder Family**										
Galium mollugo	White Bedstraw		5	-2	SE5				I		X
Rutaceae	**Rue Family**										
Zanthoxylum americanum	American Prickly-ash	3	5		S5				C		X
Salicaceae	**Willow Family**										
Populus deltoides ssp. *deltoides*	Eastern Cottonwood	4	-1		S5				X		X
Populus tremuloides	Trembling Aspen	2	0		S5				X		X
Salix alba var. *vitellina*	Weeping Willow				SU						X
Salix matsudana	Corkscrew Willow										X
Salix petiolaris	Slender Willow	3	-4		S5				X		X
Scrophulariaceae	**Figwort Family**										
Verbascum thapsus	Common Mullein		5	-2	SE5				IC		X
Tiliaceae	**Linden Family**										
Tilia americana	American Basswood	4	3		S5				C		X
Ulmaceae	**Elm Family**										
Ulmus americana	White Elm	3	-2		S5				X		X
Vitaceae	**Grape Family**										
Parthenocissus vitacea	Woodbine	3	3		S5				X		X
Vitis riparia	Riverbank Grape	0	-2		S5				C		X
Monocotyledons	**Monocots**										
Alismataceae	**Water-plantain Family**										
Alisma plantago-aquatica	Common Water-plantain	3	-5		S5				C		X

Scientific Name	Common Name	CC	CW	Weed	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Middlesex County[5]	NHIC Data[1]	NRSI Observed
Araceae	**Arum Family**										
Arisaema triphyllum	Jack-in-the-pulpit	5	-2		S5				C		X
Cyperaceae	**Sedge Family**										
Carex gracillima	Graceful Sedge	4	3		S5				C		X
Carex spicata	Spiked Sedge		5	-1	SE5				IC		X
Carex vulpinoidea	Fox Sedge	3	-5		S5				C		X
Schoenoplectus tabernaemontani	American Great Bulrush	5	-5		S5				C		X
Scirpus pendulus	Lined Bulrush	3	-5		S5				C		X
Juncaceae	**Rush Family**										
Juncus effusus var. *solutus*	Soft Rush	4	-5		S5				X		X
Juncus tenuis	Path Rush	0	0		S5				X		X
Liliaceae	**Lily Family**										
Convallaria majalis	Lily-of-the-valley		5	-2	SE5				IR		X
Hemerocallis fulva	Orange Day-lily		5	-3	SE5				I		X
Poaceae	**Grass Family**										
Bromus inermis ssp. *inermis*	Awnless Brome		5	-3	SE5				IC		X
Dactylis glomerata	Orchard Grass		3	-1	SE5				IC		X
Festuca arundinacea	Tall Fescue		2	-1	SE5				IC		X
Festuca rubra ssp. *rubra*	Red Fescue		1	-1	S5				I		X
Phalaris arundinacea	Reed Canary Grass	0	-4		S5				X		X
Phleum pratense	Timothy		3	-1	SE5				IC		X
Phragmites australis	Common Reed	0	-4		S5				X		X
Poa pratensis ssp. *pratensis*	Kentucky Bluegrass	0	1		S5				C		X
Typhaceae	**Cattail Family**										
Typha latifolia	Broad-leaved Cattail	3	-5		S5				X		X
									Total	**0**	**81**

[1]MNRF 2018a; [2]MNRF 2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]Oldham 1993

APPENDIX V

Bird Species Reported from the Study Area

Bird Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	OBBA[5] 17MH75	NHIC Data[1]	NRSI Observed
Anatidae	**Ducks, Geese & Swans**							
Branta canadensis	Canada Goose	S5				CO		X
Aix sponsa	Wood Duck	S5				CO		
Anas platyrhynchos	Mallard	S5				CO		X
Lophodytes cucullatus	Hooded Merganser	S5B, S5N				CO		
Phasianidae	**Partridges, Grouse & Turkeys**							
Bonasa umbellus	Ruffed Grouse	S4				PO		
Meleagris gallopavo	Wild Turkey	S5				CO		PR
Columbidae	**Pigeons & Doves**							
Columba livia	Rock Pigeon	SNA				CO		
Zenaida macroura	Mourning Dove	S5				CO		PO
Cuculiformes	**Cuckoos & Anis**							
Coccyzus americanus	Yellow-billed Cuckoo	S4B				PO		
Coccyzus erythropthalmus	Black-billed Cuckoo	S5B				PO		
Caprimulgidae	**Goatsuckers**							
Chordeiles minor	Common Nighthawk	S4B	SC	SC	Schedule 1	PR		
Apodidae	**Swifts**							
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	T	Schedule 1	CO		
Trochilidae	**Hummingbirds**							
Archilochus colubris	Ruby-throated Hummingbird	S5B				PR		
Rallidae	**Railes, Gallinules & Coots**							
Rallus limicola	Virginia Rail	S5B				PR		
Porzana carolina	Sora	S4B				PR		
Charadriidae	**Plovers**							
Charadrius vociferus	Killdeer	S5B, S5N				CO		PO
Scolopacidae	**Waders**							
Scolopax minor	American Woodcock	S4B				PO		
Actitis macularia	Spotted Sandpiper	S5				PR		

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	OBBA[5] 17MH75	NHIC Data[1]	NRSI Observed
Ardeidae	**Herons & Bitterns**							
Ardea herodias	Great Blue Heron	S4B				PO		
Butorides virescens	Green Heron	S4B				CO		
Cathartidae	**Vultures**							
Cathartes aura	Turkey Vulture	S5B				CO		X
Accipitridae	**Hawks, Kites, Eagles & Allies**							
Accipiter striatus	Sharp-shinned Hawk	S5	NAR			CO		
Accipiter cooperii	Cooper's Hawk	S4	NAR	NAR		CO		X
Buteo jamaicensis	Red-tailed Hawk	S5	NAR	NAR		CO		
Strigidae	**Typical Owls**							
Megascops asio	Eastern Screech-Owl	S4	NAR	NAR		CO		
Bubo virgianus	Great Horned Owl	S4				CO		X
Alcedinidae	**Kingfishers**							
Megaceryle alcyon	Belted Kingfisher	S4B				PR		
Picidae	**Woodpeckers**							
Melanerpes carolinus	Red-bellied Woodpecker	S4				CO		
Sphyrapicus varius	Yellow-bellied Sapsucker	S5B				PR		
Picoides pubescens	Downy Woodpecker	S5				CO		
Picoides villosus	Hairy Woodpecker	S5				CO		
Colaptes auratus	Northern Flicker	S4B				CO		
Falconidae	**Caracaras & Falcons**							
Falco sparverius	American Kestrel	S4				PR		
Tyrannidae	**Tyrant Flycatchers**							
Contopus virens	Eastern Wood-Pewee	S4B	SC	SC		PO		
Empidonax traillii	Willow Flycatcher	S5B				PO		PO
Empidonax minimus	Least Flycatcher	S4B				PO		
Sayornis phoebe	Eastern Phoebe	S5B				CO		
Myiarchus crinitus	Great Crested Flycatcher	S4B				CO		
Tyrannus tyrannus	Eastern Kingbird	S4B				CO		
Vireonidae	**Vireos**							
Vireo gilvis	Warbling Vireo	S5B				CO		X
Vireo olivaceus	Red-eyed Vireo	S5B				CO		

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	OBBA[5] 17MH75	NHIC Data[1]	NRSI Observed
Corvidae	**Crows & Jays**							
Cyanocitta cristata	Blue Jay	S5				CO		PR
Corvus brachyrhynchos	American Crow	S5B				CO		PO
Alaudidae	**Larks**							
Eremophila alpestris	Horned Lark	S5B				PR		PO
Hirundinidae	**Swallows**							
Progne subis	Purple Martin	S4B				PO		
Tachycineta bicolor	Tree Swallow	S4B				CO		
Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B				CO		
Riparia riparia	Bank Swallow	S4B	THR	T		CO		
Petrochelidon pyrrhonota	Cliff Swallow	S4B				CO		
Hirundo rustica	Barn Swallow	S4B	THR	T		CO		
Paridae	**Chickadees & Titmice**							
Poecile atricapillus	Black-capped Chickadee	S5				CO		
Sittidae	**Nuthatches**							
Sitta canadensis	Red-breasted Nuthatch	S5				CO		
Sitta carolinensis	White-breasted Nuthatch	S5				CO		
Troglodytidae	**Wrens**							
Troglodytes aedon	House Wren	S5B				CO		PO
Thryothorus ludovicianus	Carolina Wren	S4				CO		
Polioptilidae	**Gnatcatchers**							
Polioptila caerulea	Blue-gray Gnatcatcher	S4B				CO		
Turdidae	**Thrushes**							
Sialia sialis	Eastern Bluebird	S5B	NAR	NAR		CO		
Catharus fuscescens	Veery	S4B				PO		
Hylocichla mustelina	Wood Thrush	S4B	SC	T		PR		
Turdus migratorius	American Robin	S5B				CO		PO
Mimidae	**Mockingbirds, Thrashers & Allies**							
Dumetella carolinensis	Gray Catbird	S4B				CO		X
Toxostoma rufum	Brown Thrasher	S4B				CO		
Sturnidae	**Starlings**							
Sturnus vulgaris	European Starling	SNA				CO		X

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	OBBA[5] 17MH75	NHIC Data[1]	NRSI Observed
Bombycillidae	**Waxwings**							
Bombycilla cedrorum	Cedar Waxwing	S5B				CO		PO
Passeridae	**Old World Sparrows**							
Passer domesticus	House Sparrow	SNA				CO		X
Fringillidae	**Finches & Allies**							
Carpodacus mexicanus	House Finch	SNA				CO		
Spinus tristis	American Goldfinch	S5B				CO		PR
Parulidae	**Wood Warblers**							
Vermivora cyanoptera	Blue-winged Warbler	S4B				PR		
Geothylpis trichas	Common Yellowthroat	S5B				CO		
Setophaga ruticilla	American Redstart	S5B				PO		
Setophaga petechia	Yellow Warbler	S5B				CO		PO
Setophaga pensylvanica	Chestnut-sided Warbler	S5B				PO		
Setophaga pinus	Pine Warbler	S5B				PR		
Emberizidae	**New World Sparrows & Allies**							
Pipilo erythrophthalmus	Eastern Towhee	S4B				PR		
Spizella passerina	Chipping Sparrow	S5B				CO		
fringillidae	Field Sparrow	S4B				PR		PO
Pooecetes gramineus	Vesper Sparrow	S4B				PR		
Passerculus sandwichensis	Savannah Sparrow	S4B				CO		PO
Melospiza melodia	Song Sparrow	S5B				CO		PR
Melospiza georgiana	Swamp Sparrow	S5B				PO		
Cardinalidae	**Cardinals, Grosbeaks & Allies**							
Piranga olivacea	Scarlet Tanager	S4B				PO		
Cardinalis cardinalis	Northern Cardinal	S5				CO		PO
Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B				CO		
Passerina cyanea	Indigo Bunting	S4B				CO		
Icteridae	**Blackbirds**							
Dolichonyx oryzivorus	Bobolink	S4B	THR	T	No Schedule	PR		PR
Agelaius phoeniceus	Red-winged Blackbird	S4				CO		PR
Sturnella magna	Eastern Meadowlark	S4B	THR	T	No Schedule	CO		
Quiscalus quiscula	Common Grackle	S5B				CO		PO
Molothrus ater	Brown-headed Cowbird	S4B				CO		PO
Icterus spurius	Orchard Oriole	S4B				CO		
Icterus galbula	Baltimore Oriole	S4B				CO		X
					Total	**91**	**0**	**30**

[1]MNRF 2018a; [2]MNRF 2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]BSC et al. 2006

APPENDIX VI

Herpetofauna Species Reported from the Study Area

Reptile and Amphibian Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	ORAA[5]	NHIC Data[1]	NRSI Observed
Turtles								
Chelydra serpentina serpentina	Snapping Turtle	S3	SC	SC	Schedule 1	X		
Chrysemys picta marginata	Midland Painted Turtle	S5		SC		X		
Emydoidea blandingii	Blanding's Turtle (GLSL Pop.)	S3	THR	T	Schedule 1	X		
Graptemys geographica	Northern Map Turtle	S3	SC	SC	Schedule 1	X		
Trachemys scripta elegans	Red-eared Slider	SNA				X		
Snakes								
Heterodon platirhinos	Eastern Hog-nosed Snake	S3	THR	T	Schedule 1	X		
Lampropeltis triangulum	Eastern Milksnake	S4	NAR	SC	Schedule 1	X		
Opheodrys vernalis	Smooth Greensnake	S4				X		
Nerodia sipedon sipedon	Northern Watersnake	S5	NAR	NAR		X		
Regina septemvittata	Queensnake	S2	END	E	Schedule 1	X		
Storeria dekayi dekayi	Northern Brownsnake (Dekay's Brownsnake)	S5	NAR	NAR		X		
Thamnophis sirtalis sirtalis	Eastern Gartersnake	S5				X		
Pantherophis gloydi (pop. 1)	Eastern Foxsnake (Georgian Bay Population)	S3	THR	E	Schedule 1	X		
Salamanders								
Ambystoma maculatum	Spotted Salamander	S4				X		
Hemidactylium scutatum	Four-toed Salamander	S4	NAR	NAR		X		
Notophthalmus viridescens viridescens	Red-spotted Newt					X		
Plethodon cinereus	Eastern Red-backed Salamander	S5				X		
Toads and Frogs								
Anaxyrus americanus	American Toad	S5				X		
Hyla versicolor	Tetraploid Gray Treefrog	S5				X		
Pseudacris triseriata pop. 2	W. Chorus Frog *(GLSL Pop.)*	S3	NAR	T	Schedule 1	X		X
Pseudacris crucifer	Spring Peeper	S5				X		
Lithobates catesbeiana	American Bullfrog	S4				X		
Lithobates clamitans melanota	Northern Green Frog	S5				X		
Lithobates palustris	Pickerel Frog	S4	NAR	NAR		X		
Lithobates pipiens	Northern Leopard Frog	S5	NAR	NAR		X		
Lithobates sylvaticus	Wood Frog	S5				X		
					Total	**26**	**0**	**1**

[1]MNRF 2018a; [2]MNRF 2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]Ontario Nature 2018

Legend
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SNA Unranked
S#? Rank Uncertain
SARO/COSEWIC
END/E Endangered
THR/T Threatened
SC/SC Special Concern
NAR Not at Risk
SARA Schedule
Schedule 1 Officially Protected under SARA

APPENDIX VII

Mammal Species Reported from the Study Area

Mammal Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Ontario Mammal Atlas[5]	NHIC Data[1]	NRSI Observed
Didelphimorphia	**Opossums**							
Didelphis virginiana	Virginia Opossum	S4				X		
Insectivora	**Shrews and Moles**							
Blarina brevicauda	Northern Short-tailed Shrew	S5				X		
Condylura cristata	Star-nosed Mole	S5				X		
Parascalops breweri	Hairy-tailed Mole	S4				X		
Sorex cinereus	Masked Shrew	S5				X		
Sorex fumeus	Smoky Shrew	S5				X		
Chiroptera	**Bats**							
Eptesicus fuscus	Big Brown Bat	S4				X		
Lasionycteris noctivagans	Silver-haired Bat	S4				X		
Lasiurus borealis	Eastern Red Bat	S4				X		
Lasiurus cinereus	Hoary Bat	S4				X		
Myotis lucifugus	Little Brown Myotis	S4	END	E	Schedule 1	X		
Lagomorpha	**Rabbits and Hares**							
Lepus europaeus	European Hare	SNA				X		
Sylvilagus floridanus	Eastern Cottontail	S5				X		X
Rodentia	**Rodents**							
Castor canadensis	Beaver	S5				X		
Marmota monax	Woodchuck	S5				X		
Microtus pennsylvanicus	Meadow Vole	S5				X		
Mus musculus	House Mouse	SNA				X		
Ondatra zibethicus	Muskrat	S5				X		
Peromyscus leucopus	White-footed Mouse	S5				X		
Peromyscus maniculatus	Deer Mouse	S5				X		
Rattus norvegicus	Norway Rat	SNA				X		
Sciurus carolinensis	Eastern Gray Squirrel	S5				X		X
Tamiasciurus hudsonicus	Red Squirrel	S5				X		
Tamias striatus	Eastern Chipmunk	S5				X		
Zapus hudsonius	Meadow Jumping Mouse	S5				X		
Carnivora	**Carnivores**							
Canis latrans	Coyote	S5				X		X
Mephitis mephitis	Striped Skunk	S5				X		
Mustela frenata	Long-tailed Weasel	S4				X		
Mustela vison	American Mink	S4				X		
Procyon lotor	Northern Raccoon	S5				X		X
Vulpes vulpes	Red Fox	S5				X		

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Ontario Mammal Atlas[5]	NHIC Data[1]	NRSI Observed
Artiodactyla	**Deer and Bison**							
Odocoileus virginianus	White-tailed Deer	S5				X		X
					Total	**32**	**0**	**5**

[1]MNRF 2018a; [2]MNRF 2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]Dobbyn 1994

Legend
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SNA
SARO/COSEWIC
END/E Endangered
SARA Schedule
Schedule 1 Officially Protected under SARA

APPENDIX VIII

Butterfly Species Reported from the Study Area

Butterfly Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	TEA Atlas[5] (17MH75)	NRSI Observed
Hesperiidae	**Skippers**						
Anatrytone logan	Delaware Skipper	S4				X	
Ancyloxypha numitor	Least Skipper	S5				X	
Erynnis brizo	Sleepy Duskywing	S1				X	
Erynnis juvenalis	Juvenal's Duskywing	S5				X	
Erynnis species	Duskywing species						X
Erynnis baptisiae	Wild Indigo Duskywing	S4				X	
Erynnis icelus	Dreamy Duskywing	S5				X	
Euphyes vestris	Dun Skipper	S5				X	
Polites mystic	Long Dash Skipper	S5				X	
Polites peckius	Peck's Skipper	S5				X	
Polites themistocles	Tawny-edged Skipper	S5				X	
Thymelicus lineola	European Skipper	SNA				X	
Wallengrenia egeremet	Northern Broken Dash	S5				X	
Pompeius verna	Little Glassywing	S4				X	
Poanes hobomok	Hobomok Skipper	S5				X	
Epargyreus clarus	Silver-spotted Skipper	S4				X	
Papilionidae	**Swallowtails**						
Papilio cresphontes	Giant Swallowtail (Eastern Giant Swallowtail)	S4				X	
Papilio glaucus	Eastern Tiger Swallowtail	S5				X	
Papilio troilus	Spicebush Swallowtail	S4				X	
Papilio polyxenes	Black Swallowtail	S5				X	
Pieridae	**Whites and Sulphurs**						
Colias philodice	Clouded Sulphur	S5				X	X
Pieris oleracea	Mustard White	S4				X	
Pieris rapae	Cabbage White	SNA				X	X
Colias eurytheme	Orange Sulphur	S5				X	
Lycaenidae	**Harvesters, Coppers, Hairstreaks, Blues**						
Callophrys augustinus	Brown Elfin	S5				X	
Cupido comyntas	Eastern Tailed Blue	S5				X	
Lycaena epixanthe	Bog Copper	S4S5				X	
Lycaena phlaeas	American Copper	S5				X	
Satyrium calanus	Banded Hairstreak	S4				X	
Strymon melinus	Gray Hairstreak	S4				X	
Celastrina sp.	Azure Species	SNA				X	
Celastrina neglecta	Summer Azure	S5				X	

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	TEA Atlas[5] (17MH75)	NRSI Observed
Nymphalidae	**Brush-footed Butterflies**						
Aglais milberti	Milbert's Tortoiseshell	S5				X	
Asterocampa celtis	Hackberry Emperor	S2				X	
Asterocampa clyton	Tawny Emperor	S2S3				X	
Boloria bellona	Meadow Fritillary	S5				X	
Boloria selene	Silver-bordered Fritillary	S5				X	
Cercyonis pegala	Common Wood-Nymph	S5				X	
Chlosyne nycteis	Silvery Checkerspot	S5				X	
Coenonympha tullia	Common Ringlet	S5				X	
Danaus plexippus	Monarch	S2N, S4B	SC	END	Schedule 1	X	X
Euphydryas phaeton	Baltimore Checkerspot	S4				X	
Junonia coenia	Common Buckeye	SNA				X	
Lethe anthedon	Northern Pearly-Eye	S5				X	
Lethe eurydice	Eyed Brown / Northern Eyed Brown	S5				X	
Libytheana carinenta	American Snout	SNA				X	
Limenitis archippus	Viceroy	S5				X	
Limenitis arthemis astyanax	Red-spotted Purple	S5				X	
Megisto cymela	Little Wood-Satyr	S5				X	
Nymphalis antiopa	Mourning Cloak	S5				X	
Phyciodes cocyta	Northern Crescent	S5				X	X
Phyciodes tharos	Pearl Crescent	S4				X	
Polygonia comma	Eastern Comma	S5				X	
Polygonia comma	Eastern Comma/Hop Merchant	S5				X	
Polygonia interrogationis	Question Mark	S5				X	
Speyeria cybele	Great Spangled Fritillary	S5				X	
Vanessa atalanta	Red Admiral	S5				X	
Vanessa cardui	Painted Lady	S5				X	
Vanessa virginiensis	American Lady	S5				X	
Lethe appalachia	Appalachian Brown	S4				X	
Polygonia progne	Gray Comma	S5				X	
					Total	**60**	**5**

[1]MNRF 2018a; [2]MNRF2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]Macnaughton et al. 2018

LEGEND
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SNA Unranked
COSSARO/COSEWIC
SC Special Concern

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	TEA Atlas[5] (17MH75)	NRSI Observed
SARA Schedule							
Schedule 1 Officially protected under SARA							

APPENDIX IX

Odonata Species Reported from the Study Area

Dragonfly and Damselfly Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Odonata Atlas[5]	NRSI Observed
Calopterygidae	**Broadwinged Damselflies**						
Calopteryx maculata	Ebony Jewelwing	S5				X	
Hetaerina americana	American Rubyspot	S4				X	
Lestidae	**Spreadwings**						
Lestes congener	Spotted Spreadwing	S5				X	
Lestes dryas	Emerald Spreadwing	S5				X	
Lestes eurinus	Amber-winged Spreadwing	S3				X	
Lestes rectangularis	Slender Spreadwing	S5				X	
Lestes unguiculatus	Lyre-tipped Spreadwing	S5				X	
Coenagrionidae	**Narrow-winged Damselflies**						
Argia apicalis	Blue-fronted Dancer	S4				X	
Argia tibialis	Blue-tipped Dancer	S3				X	
Enallagma antennatum	Rainbow Bluet	S4				X	
Enallagma aspersum	Azure Bluet	S3				X	
Enallagma basidens	Double-striped Bluet	S3				X	
Enallagma boreale	Boreal Bluet	S5				X	
Enallagma ebrium	Marsh Bluet	S5				X	
Enallagma exsulans	Stream Bluet	S5				X	
Enallagma hageni	Hagen's Bluet	S5				X	
Ischnura posita	Fragile Forktail	S4				X	
Ischnura verticalis	Eastern Forktail	S5				X	
Nehalennia irene	Sedge Sprite	S5				X	
Aeshnidae	**Darners**						
Aeshna constricta	Lance-tipped Darner	S5				X	
Aeshna umbrosa	Shadow Darner	S5				X	
Anax junius	Common Green Darner	S5				X	X
Cordulegasteridae	**Spiketails**						
Cordulegaster diastatops	Delta-spotted Spiketail	S4				X	
Corduliidae	**Emeralds**						
Epitheca cynosura	Common Baskettail	S5				X	

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Odonata Atlas[5]	NRSI Observed
Libellulidae	**Skimmers**						
Celithemis elisa	Calico Pennant	S5				X	
Erythemis simplicicollis	Eastern Pondhawk	S5				X	
Leucorrhinia intacta	Dot-tailed Whiteface	S5				X	
Libellula pulchella	Twelve-spotted Skimmer	S5				X	
Libellula semifasciata	Painted Skimmer	S2				X	
Pachydiplax longipennis	Blue Dasher	S5				X	
Plathemis lydia	Common Whitetail	S5				X	
Sympetrum obtrusum	White-faced Meadowhawk	S5				X	
Sympetrum rubicundulum	Ruby Meadowhawk	S5				X	
Sympetrum vicinum	Auttumn Meadowlark	S5				X	
					Total	**33**	**1**

[1]MNRF 2020a; 2MNRF2020b; [3]COSEWIC 2020; [4]Government of Canada 2020; [5]MNRF 2020c

LEGEND	
SRANK	
S2	Imperiled
S3	Vulnerable
S4	Apparently Secure
S5	Secure

APPENDIX X

Subject Lands Photographs

Photograph1: Soybean field with cultural plantation at right, property to east at left. View to south. (October 13, 2018)

Photograph 2: Northeast corner of subject lands with adjacent parcel and wetland designation at right. View to north. (October 13, 2018)

Photograph 3: Intermittent channel along east side of property. View to north. (October 13, 2018)

Photograph 4: East side of property. View to north. (October 13, 2018)

Photograph 5: Cultural thicket community in Exeter Road parcel (southern portion of subject lands). (October 13, 2018)

Photograph 6: Meadow marsh community in south portion of subject lands. (October 13, 2018)

Photograph 7: Cultural meadow in southern portion of subject lands, hedgerow (H1) in background. View to north. (October 13, 2018)

Photograph 8: Marsh and plantation in northwest of subject lands. (January 31, 2020)

Photograph 9. Drainage Channel at south end of wetland and plantation. View to south. (January 31, 2020)

Photograph 10. Drainage channel on east side of subject lands. View south. (January 31, 2020)

APPENDIX XI

Correspondence with regards to Goldfield HDF

Subject: Re: Goldfield Development - Feature Description (proj2525, proj2524) - Lismer Lane
From: "Stefanie Pratt" <pratts@thamesriver.on.ca>
Date: 2021-01-07, 9:11 a.m.
To: "Katharina Richter" <krichter@nrsi.on.ca>
CC: "Brent Verscheure" <VerscheureB@thamesriver.on.ca>, "Joseph Lance" <jlance@nrsi.on.ca>, "Michael Pease" <mpease@london.ca>, "Mohamed Abuhajar" <mohamed@incon.ca>, bworrad@menearlaw.com, mvivian@london.ca, sallen@mhbcplan.com

Katharina,

The letter you have provided is sufficient to meet our requirements relating to the HDF on the Goldfield Lands. Block 2 may proceed through the DA process with the City. The Section 28 permit application, referenced in my email on November 30, 2020, can be completed for the apartment block to the south and include this information.

Additional discussion was included relating to a recommended corridor width for Goldfield 1 - as you have noted, the final corridor width will be determined through the Draft Plan process as additional information and technical studies are required to determine the final width. At this time, the UTRCA is not approving the recommended 15 m corridor width on the Goldfield 1 lands.

Given the number of reviews needed to complete this process, an additional review fee will be charged in the amount of $250 (50% of original).

Melanie/Michael, if you need any additional information from me, please advise.

Regards,

Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 2020-12-23 12:30 PM >>>
Stefanie,
Please see the response letter attached.
Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
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On 2020-12-22 4:26 p.m., Stefanie Pratt wrote:

> Katharina,
>
> This calculation of the HDF differs from that previously provided (was noted at 120 metres on various occasions). We've been trying to confirm this information since December 2019 and I'm not sure why it has changed now as we're nearing final approvals. It is my understanding that the feature has been removed from the landscape since we were out site in November 2019, and aerial image has been used to determine this length so it should be consistent? Typically the process is to ensure this information is obtained prior to removal, but since that is not the case we are trying to work with you.
>
> This isn't the only calculation that has changed since your initial assessment; the previous buffer recommendation was for a 15 metre wide corridor which has been reduced to 10 metres through this months correspondence. It is our understanding that you have used a 10 metre corridor in other jurisdictions for HDF's, however the justification you have provided isn't related to this site. This may be acceptable but please provide further explanation for this change.
>
> Given these changes and the spread of information across various emails, multiple letters, and drawings, it is most appropriate at this point in time to provide a revised letter to tie all of this information together (as mentioned in my November 30th email). This letter will ensure the most accurate and up to date information is available for future approvals. Please include the following information in the revised letter:
>
> - Purpose of letter - determine removal and compensation requirements of HDF
> - Summary of site visit discoveries - previous info on watercourse depth, width, vegetation, habitat, species observed, etc.
> - Description of length and buffers of HDF with appropriate justification (site specific)
> - Description of compensation - amount, generic characteristics to be created, and location (typically net environmental benefit)
> - Inclusion of Dingman EA generic info and how compensation will add to this
> - Appendix - figure provided last week
>
> Once these revisions have occurred, this should be the final piece for approvals to move forward.
>
> **Stefanie Pratt**
> Land Use Planner
> 1424 Clarke Road
> London, ON N5V 5B9
> t: 519-451-2800 ext. 430
> e: pratts@thamesriver.on.ca
>
> UPPER THAMES RIVER
> CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 12/17/2020 12:02 PM >>>
Stefanie,
Please see the attached map.
The HDF is 114.4m in length.
The area of its corridor is 0.114ha.

Regards,
Katharina.

Katharina Richter B.E.S.
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On 2020-12-14 12:47 p.m., Stefanie Pratt wrote:

> Good afternoon Katharina,
>
> Thank you for the providing the below description. As noted in my previous email, we will need a revised figure identifying the feature (noted at 120m in length) and its buffer. Once this is received, we can ensure appropriate comments are provided through the process to allow this file to move forward.
>
> Kind Regards,
>
> **Stefanie Pratt**
> Land Use Planner
> 1424 Clarke Road
> London, ON N5V 5B9
> t: 519-451-2800 ext. 430
> e: pratts@thamesriver.on.ca
>
> UPPER THAMES RIVER
> CONSERVATION AUTHORITY
>
> >>> Katharina Richter <krichter@nrsi.on.ca> 12/11/2020 8:53 AM >>>
> Stefanie,
> Thank you for your email from November 30, as well as for our discussion yesterday morning. As identified in my email to you from July 30, 2020 (below), the drainage feature on the Goldfield property (north of the future Bradley Avenue extension), was 120m in length prior to its removal. As mentioned, this feature was not observed by NRSI prior to its removal, but is estimated to have been a fairly insignificant headwater drainage feature (HDF) that collected runoff from the adjacent field. Prior to its removal, the area was dominated by grasses and old field species (i.e. cultural meadow). Trees in that area were inventoried by NRSI biologists on October 4, 2018. The drainage feature was not noted at that time, likely as it was dry, very narrow, and hidden by vegetation.
>
> A formal headwater drainage feature assessment had not been required of this feature. The 'Evaluation,

Classification and Management of Headwater Drainage Features Guidelines' (CVC & TRCA 2014) does not identify a corridor width for protected headwater features. Through other project experience NRSI has had, predominantly in the GTA, a 10m corridor width for HDFs has been deemed acceptable and approved. As such, if the same approach is taken for the HDF on the Goldfield property, at a length of 120m, this is an area of 1,200m2 (0.12ha/0.3ac). This area will be compensated for through habitat restoration on the Goldfield 1 lands, south of the Bradley Avenue extension.

Compensation details will be worked through during the Draft Plan approval process of the Goldfield 1 lands. However, at a high level, compensation will consist of trees, shrubs, and a herbaceous seed mix, all comprised of native species only. The compensation for the HDF will be natural and will contribute to the ecological value and function of the drainage feature corridor on the Goldfield 1 lands.

Regards,
Katharina.

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On 2020-11-30 10:51 a.m., Stefanie Pratt wrote:

> Good morning Katharina,
>
> I am following up from the email below to see if you have obtained any information from the City in regards to the Dingman EA and the Lismer Lane project. We have waited to provide a response to your previous information in an attempt to reduce duplication of efforts and ensure any revised letters included all available information.
>
> **Scott and Brian**, in response to your inquiries we have been reviewing information prepared by NRSI to address the watercourse feature that was located on Block 2 lands. This watercourse initiates on these lands before connecting into the southern system, acting as a headwater. This was confirmed through a site visit with City of London, UTRCA and NRSI staff in November 2019. Continual reference refers to it as a "Headwater Drainage Feature", however a full headwater drainage feature analysis (according to TRCA/CVC guidelines) was not requested. An analysis has been requested to determine the extent of the area that was removed and determine how this can be recreated/result in a net environmental benefit. UTRCA staff have agreed to allow this area to be compensated for and to tie into works proposed on the future Goldfield 1 Lands to the south.
>
> The added complication is the ongoing Dingman Subwatershed EA. This tributary has been identified as an area of interest for the City to undertake a complete corridor approach. The complete corridor approach will include future studies to determine how to appropriately accommodate a complete corridor on these lands (consideration for natural hazard and natural heritage), with consideration for future development plans as well. The calculations and works described below/through NRSI correspondence will need to form a part of any future corridor work.
>
> In the absence of the EA information, we recommend moving forward in the following manner:
>
> 1. The UTRCA will need a revised letter from NRSI connecting the information discussed via email with the existing data provided. Please include:
> a) A Figure identifying the extent of the headwater drainage feature prior to removal. Measurements should be

included to identify the length of the feature on the subject lands and the area (including buffers).
b) Text describing the feature prior to removal. This should include description of an appropriate buffer and why a total buffer width of 15 m was identified.
c) Recommendations for appropriate compensation. Total area and suggestions for what that compensation can include.

2. The applicant will need to obtain site plan approval/development agreement from the City for the proposed townhouse development. I have cc'ed Melanie Vivian (City planner and file handler).

3. A Section 28 permit application will be required.
a) Include complete engineer drawing set submitted to City and the revised letter
b) The fee for the permit will be $750 (minor alteration to watercourse)
c) Approval of this permit will allow development to proceed for both Block 2 and the apartment block

If you would like to discuss any of these details, please advise.

Kind Regards,

Stefanie Pratt
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UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 7/30/2020 12:50 PM >>>
Stefanie,
In the absence of a response from the City on the Dingman EA, I am forwarding you an updated Map 1 (attached) in response to your point #1, below.
The following text provides a response to your point #2:

On May 25, 2020, Reach 2 on the Goldfield site was surveyed. This reach is shown on Map 1, and is very consistent with City of London and UTRCA mapping, as shown on Figures 1 and 2 in NRSI's correspondence to you from December 18, 2019. This HDF portion is 45.1m in length, for a combined total length of 157.1m for Reach 2. It is acknowledged, that Reach 2 may have extended further north in the past, prior to site manipulation. It is not known where the HDF may have originated, but its furthest extent was likely as shown by the blue line in the figure below. The length of this HDF to the property line is 120m, for a potential total Reach 2 length of 232m.

April 29, 2011 (Google Earth)

Once I hear back from the City on the Dingman EA, I will respond with regards to your point #3.

-Katharina.

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On 2020-07-03 3:30 p.m., Katharina Richter wrote:

> Stefanie,
> Thank you for your email and comments. I will provide a response once I have the necessary information. Most importantly, we are awaiting responses on the Dingman EA from the City, which will affect the drainage feature corridor across the Goldfield lands.
> Regards,
> Katharina.
>
> Katharina Richter B.E.S.
> Senior Biologist
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On 2020-06-25 10:09 a.m., Stefanie Pratt wrote:

Hi Katharina,

We have undertaken a review of your drainage feature analysis prepared for the Goldfield lands, dated May 20, 2020. We have the following comments:

1. It was noted during previous email correspondence that the figure attached to this letter did not include the full extent of the drainage feature that this analysis was requested for. An updated drawing prepared by SBM (received May 26, 2020) included an "HDF Location Map" detail. Please revise your figure to include this segment of Reach 2 that was originally omitted.

2. As noted in your letter, earth-moving works began on the Goldfield Lands and have altered the character of Reach 2. Prior to these earth works, the HDF location would have extended further north as identified at the November 2019 site visit.

Later in this paragraph, a measurement for the length of Reach 2 is provided. Please revise this measurement to reflect the entirety of Reach 2, including the area shown on the SBM "HDF Location Map". Typically this measurement would also include the length of the feature that was altered due to earth-moving works.

3. In previous email correspondence you provided reference to the Dingman EA. The EA document for Stage 1 identifies that these reaches are located within the "Tributaries of Interest" associated with the White Oaks Drain. Reach 1 has been included within the EA analysis and recommendations for corridor width shall match with this document and may be refined based on site specific investigations prior to future development.

Your letter recommends that an appropriate corridor width for Reach 2 totals 15 metre wide (7.5 m on either side of feature). As we are seeking an net environmental benefit for the removal of Reach 2, all future corridor widths for Reach 1 shall include the recommendation from the EA (or site specific investigations for this reach) plus the width for Reach 2 for enhancement. The length of this additional corridor width for Reach 1 will directly relate to the revised calculation for the length of Reach 2.

Please provide a revised letter addressing these comments.

Stefanie Pratt
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UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 5/20/2020 12:12 PM >>>
Stefanie, Brent:
I was just forwarded email correspondence between Brent and Kyle Kane (SMB Ltd) (attached), implying that a full headwater drainage feature assessment (HDFA) is required on the Goldfield property. That had not been my understanding, and in fact I recollect it being stated that this was NOT required, when we met in November. Rather, a more detailed description of the drainage feature was requested, but not a full 3-visit assessment. This was stated in my letter from December 18, 2019, and I have received no requests for a

HDFA in any correspondence since that time (emails from Stefanie Pratt January 9, March 3, and April 14, 2020). The letter from Stefanie to Ms. Melanie Vivian (City of London), May 15, 2020, speaks of more information having been requested on the headwater drainage feature. I'd like to confirm that this is not a full assessment in accordance with the TRCA/CVC 2014 Guidelines. If such was required, the timing window for the first visit has been missed, since this should have been undertaken in April.

I did sent Stefanie a letter providing more information on the HDF and compensation/enhancement earlier today. Please review this and advise if anything else remains outstanding. The submission of the letter was delayed as we were awaiting responses on our questions to the City on the Dingman EA. These have not yet been received, but Stefanie's May 15 letter prompted today's submission.

Regards,
Katharina.

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On 2020-05-20 9:33 a.m., Katharina Richter wrote:

> Stefanie,
> The attached letter provides greater detail on the drainage features found within the Goldfield and Goldfield 1 properties, as well as additional detail on the proposed enhancement.
> Regards,
> Katharina.
>
> Katharina Richter B.E.S.
> Senior Biologist
> **Natural Resource Solutions Inc.**
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> @nrsinews
>
> On 2020-03-03 10:39 a.m., Stefanie Pratt wrote:
>
> > Hi Katharina,
> >
> > Further to our call, a meeting will likely not be required. *Please* provide a revised letter with further information pertaining to the evaluation of the existing feature and recommended compensation that will result in a net environmental benefit. A conceptual plan which identifies that this compensation can be achieved on adjacent lands would be beneficial.
> >
> > Thanks,

Stefanie Pratt
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UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 02/03/2020 10:03 AM >>>
Stefanie,
Please provide some dates for a meeting. Thank you!
-Katharina.

Katharina Richter B.E.S.
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On 2020-02-06 2:56 p.m., Katharina Richter wrote:

> Stefanie,
> Thanks for taking my call just now. As discussed, I'd like to set up a meeting with you to discuss the enhancement options of the watercourse south of the Bradley Avenue extension (Goldfield 1 development site). If you could, please suggest several dates so I can coordinate with Mohamed.
>
> I believe the Bradley Extension ROW is owned by the City, but I will ask Mohamed to confirm that.
>
> Regards,
> Katharina.

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On 2020-01-09 3:17 p.m., Stefanie Pratt wrote:

> Hi Katharina,
>
> Thank you for providing this information pertaining to the drainage feature identified on our site visit. After completing a preliminary review, we offer the following comments:

1. The UTRCA will require more detailed information pertaining to the enhancement occurring on the other Goldfield property to compensate for the removal of this feature. This should include information such as size of existing feature vs proposed enhancements/landscaping, details regarding planting/grading design, etc. The UTRCA generally requires a net environmental benefit in terms of size and quality of the feature.
2. Can you please confirm who the current owner the Bradley Extension ROW is? The feature also encroaches into this area.

If you have any questions, please reach out to Brent or myself.

Kind Regards,

UPPER THAMES RIVER
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Stefanie Pratt
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>>> Katharina Richter <krichter@nrsi.on.ca> 18/12/2019 10:39 AM >>>
> Stephanie,
Attached is a letter describing the drainage feature on the Goldfield development property, that was reviewed with you in the field on November 28, 2019.
Regards,
Katharina.
--

CELEBRATING 20 YEARS 1998 - 2018
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NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

December 23, 2020 Project 2525

Stefanie Pratt
Upper Thames River Conservation Authority
1424 Clarke Road
London, ON N5V 5B9

Dear Ms. Pratt,

RE: Goldfield Development – Removal and Compensation Requirements for the Headwater Drainage Feature

Natural Resource Solutions Inc. (NRSI) is working as the natural heritage consultant for Incon on their Goldfield and Goldfield 1 developments in London, Ontario. The subject properties are located south of Wharncliffe Road South, west of White Oak Road, and north of Exeter Road, surrounded by fields and other development sites. This letter is in response to your most recent email, dated yesterday, December 22, 2020, and aims to summarize all previous correspondence on the Goldfield headwater drainage feature (HDF), providing recommendations for its compensation as it has been removed. Previous correspondence is appended.

NRSI was originally retained by the previous landowner to undertake a tree inventory on the Goldfield property. The tree inventory was undertaken on October 4, 2018, which was the only field work undertaken at the time. The HDF was not noted during the tree inventory. It is likely that it was not observed as it was dry, very narrow, and hidden by vegetation.

A meeting was held on the Goldfield property with yourself and others on November 28, 2019, at which time the HDF was originally observed. At this time, tree removal had occurred and the land was altered, so the original condition and extent of the HDF could not be identified. A letter was submitted to you on December 18, 2019 to describe the drainage feature. An additional letter was submitted to you on May 20, 2020, that provided a more detailed description of the HDF to the south, located on the Goldfield 1 Lands, as well as compensation measures for the removal of the drainage feature on the Goldfield property.

The Goldfield HDF (also referred to as the upstream portion of Reach 2 in other correspondence) was first observed on November 28, 2019 with limited flow, due to recent rains. The feature was a maximum of 30cm wide and 5cm deep, flowing in a very shallow depression without defined bed or banks. Due to the tree cutting and felled trees remaining on site, some of the HDF was hidden beneath the debris. The HDF was situated within a disturbed meadow community dominated by a variety of grasses, before it pooled in vehicle tracks within the proposed Bradley Avenue right-of-way. On February 1, 2020, an aquatic habitat assessment was undertaken that described the Goldfield 1 HDF. The Goldfield HDF (upstream portion of Reach 2) was noted as having undefined flow on the Goldfield Lands and becoming channelized at the border with the Goldfield 1 Lands. Historically, the Goldfield HDF was dominated by grasses and old field species (i.e. cultural meadow) surrounding an old farmstead (now removed). Downstream, the Goldfield HDF/Reach 2 would have been ploughed and

cropped as active agricultural lands. The Goldfield HDF drained lands to the north and does not provide fish habitat.

The extent of the current HDF was surveyed May 25, 2020 (see map contained in correspondence from July 30, 2020), with a length of 45.1m on the Goldfield property. It is acknowledged that the Goldfield HDF likely extended further north in the past, prior to site manipulation. It is not known where the HDF may have originated, but its furthest extent was likely as shown in the attached Map 1. The alignment of the HDF on this map was determined in part by the survey of the existing HDF (May 25, 2020), as well as through air photo interpretation (see attached correspondence from December 18, 2019; July 30, 2020; and December 17, 2020). The HDF shown on Map 1 has a length of 114.4m on the Goldfield property. An earlier estimate of 120m (July 30, 2020) was based on less detailed mapping.

The 'Evaluation, Classification and Management of Headwater Drainage Features Guidelines' (CVC & TRCA 2014) does not identify a corridor width for protected HDFs. Through other project experience NRSI has had, predominantly in the Greater Toronto Area, a 10m corridor width for HDFs has been deemed acceptable and approved. Given the minor feature and function of the Goldfield HDF, the 10m corridor is sufficient. There is no wetland associated with the HDF and its riparian vegetation was comprised of a cultural meadow community. The Goldfield 1 HDF was noted to be dry with small, isolated pools of water present during field assessments in 2018 (see December 18, 2019 letter). The same can be anticipated for the Goldfield HDF, if not drier, given the smaller catchment and smaller nature of the feature. As such, at a length of 114.4m, within a 10m wide corridor, an area of 1,144m^2 (0.114ha/0.282ac) will be compensated for through habitat restoration on the Goldfield 1 lands, south of the Bradley Avenue extension.

Compensation details will be worked out during the Draft Plan approval process of the Goldfield 1 lands. However, at a high level, compensation will consist of trees, shrubs, and a herbaceous seed mix, all comprised of native species only. The compensation for the HDF will be natural and will contribute to the ecological value and function of the drainage feature corridor on the Goldfield 1 lands. As the compensation lands will be combined with the Goldfield 1 natural corridor approach, details of that provided below also apply to the compensation area.

Previous reporting and correspondence had noted that the Goldfield 1 HDF/Reach 1 is likely to be realigned east-west across the Goldfield 1 property and then along the eastern edge of the property. Tile drainage will be removed and a meandering channel will be created with a series of pools, riffles, and runs. The created watercourse is to be situated in a 15m wide naturalized corridor, with compensation lands for the removal of the Goldfield HDF added to this corridor. This corridor will be planted with native species, including trees, shrubs, and herbaceous species. A detailed watercourse restoration plan and planting plan will be provided to the Upper Thames River Conservation Authority (UTRCA) for review at the detailed design stage. The newly created channel and corridor will be monitored for several years to ensure the watercourse is functioning as designed and to ensure the plantings are establishing well. A detailed monitoring plan will also be provided at the detailed design stage. Additional proposed enhancement of the watercourse corridor to provide compensation for the Goldfield HDF had originally included the following:

- Topsoil depth of 0.40m
- Scarification of subsoils to 0.45m
- No trails to be included within the minimum 15m naturalized corridor
- Fencing along the corridor edge will be considered to reduce impact to the watercourse and corridor from adjacent land uses.

The 'Dingman Creek Subwatershed: Stormwater Servicing Study Master Plan and Schedule B Municipal Class Environmental Assessment' (Aquafor Beech Ltd. 2020) identified the Goldfield 1 HDF as the 'White Oaks – East tributary' (WCT-3) and placed it within a "complete corridor", which is to convey water, people, and wildlife. Section 8.6 of the Dingman EA describes the complete corridor approach envisioned for the City of London, with details on the White Oaks Drain corridor provided in Section 3.4.6.3. Including buffers and trail, the complete corridor is stated to range in width between 50 and 100m in the Dingman EA, although it states that exact corridor width should be established based on site conditions and site-specific goals and targets. The Goldfield 1 corridor width will be determined through the Draft Plan process of that site, in consultation with the City of London and the UTRCA.

Even a 15m wide corridor, as previously proposed for the Goldfield 1 property, would be a large improvement over current site conditions. Whereas much of the drainage feature is currently tile drained and is/was ploughed through during agricultural practices, the feature will be daylighted and protected through a natural corridor planted with native species. There is currently no riparian vegetation along the drainage features (both Reach 1 and Reach 2) within the Goldfield 1 property, other than where they flow through the plantation and marsh. Although the UTRCA generally protects watercourses within a 30m wide corridor, the drainage features within the Goldfield and Goldfield 1 lands are HDFs and not watercourses. The Goldfield 1 HDF will be naturalized through natural channel design, providing a variety of habitats, where now there is none.

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

Sincerely,
Natural Resource Solutions Inc.

Katharina Richter
Senior Biologist

MAP

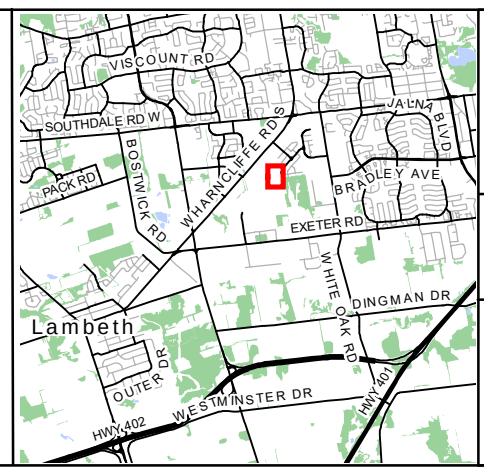
478600 478700 478800

4753400 4753300 4753200 4753100

PAULPEEL AVE

Goldfield Lands

Reach 2



Legend

- Subject Property
- Headwater Drainage Feature (HDF) (presumed original)
- HDF Corridor (10m)
- Reach Break
- Intermittent Watercourse/Drainage Feature

Map 1

Goldfield Lands

Headwater Drainage Feature

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 20 40 60 80 Meters

N

Project: 2525
Date: December 17, 2020
NAD83 - UTM Zone 17
Scale 1:1,000 (11x17")

Path: X:\2182_TreeInventory_BradleyAveN\NRSI_2525_Map1_DrainageFeatures_5K_2020_12_17_MV.mxd

APPENDIX I

Correspondence

December 18, 2019

Letter from NRSI to UTRCA

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

December 18, 2019 Project 2182

Stefanie Pratt
Upper Thames River Conservation Authority
1424 Clarke Road
London, ON N5V 5B9

Dear Ms. Pratt,

RE: Goldfield Development – Drainage Feature Description
North of the Bradley Avenue Extension

Natural Resource Solutions Inc. (NRSI) was retained by INCON Industrial (the Client) to undertake a Tree Protection Plan (TPP) for a proposed residential development in the City of London, Ontario, referred to as the "Goldfield" development. The TPP was submitted September 9, 2019, based on a tree inventory that was conducted October 4, 2018. The subject property is located north of the City's planned Bradley Avenue extension, west of White Oak Road. It is approximately 3.9 hectares in size and is legally described as Part of Lot 33, Concession 2. Most of the subject property is presently in agricultural production (soy in 2018). Some trees are located around the subject property's perimeter, and a small treed area was located in the southwest where a homestead once stood.

A site meeting took place on November 28, 2019 to review any natural heritage features on site. It was noted at this time that tree removal had taken place approximately two weeks prior. There are no wetlands within the subject property. A small drainage feature was noted, as heavy rains were experienced in the two days prior to the site meeting. Development has started on the property immediately to the north (Emily Carr development), which included tree removal along the northern subject property boundary. This letter characterizes the drainage feature and makes recommendations with regards to natural heritage enhancements on the lands south of the Bradley Avenue extension, which are also owned by the Client, and are referred to as the "Goldfield 1" development.

The drainage feature appears to be a headwater drainage feature (HDF). It was not observed on the October 2018 site visit. The HDF is not included in regulated area screening mapping from the Upper Thames River Conservation Authority (UTRCA).

The HDF was highlighted by UTRCA staff in the field, as a 'blue line' appears on City of London interactive mapping (Figure 1). A drainage feature does not appear in this area on City of London Official Plan Schedules.

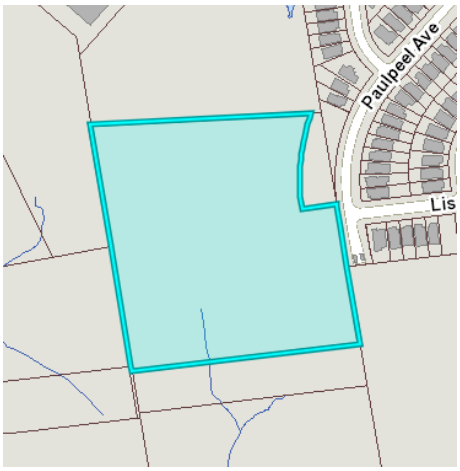


Figure 1. City of London Interactive Mapping

Mapping from the UTRCA also shows a potential watercourse in this area (Figure 2), but it is not included in their regulated area screening map.

Figure 2. UTRCA Regulated Area Screening Map (regulated areas shown in red hatching)

A drainage feature in this area is not discernable using air photos from Google Earth. The figures below show a variety of years available online, dating back to 2006.

Figure 3. May 2, 2006 (Google Earth)

Figure 4. April 29, 2011 (Google Earth)

Figure 5. September 27, 2013 (Google Earth)

Figure 6. October 22, 2015 (Google Earth)

Figure 7. July 2, 2018 (Google Earth)

As can be seen from Figures 3 to 7, there appears to be some minor field drainage moving south, partially to the southwest portion of the subject property that contained the trees. The agricultural field is ploughed and contains no defined features of any kind. Drainage can be identified through soils darkened by moisture (Figures 3, 4, 7), as well as by greener crops from moister ground (Figure 5).

On November 28, 2019, the HDF had limited flow. The feature was a maximum of 30cm wide and 5cm deep, flowing in a very shallow depression without defined bed or banks. Due to the tree cutting and felled trees remaining on site, some of the HDF was hidden beneath the debris. The HDF is situated within a disturbed meadow community dominated by a variety of grasses, before it pools within vehicle tracks within the proposed Bradley Avenue right-of-way. South of the future road, within the "Goldfield 1" property, is a cultural meadow and conifer planation comprised of Colorado Spruce (*Picea pungens*) and Norway Spruce (*P. glauca*). The plantation surrounds a small meadow marsh (MAM2) dominated by Reed-canary Grass (*Phalaris arundinacea*) along with Broad-leaved Cattail (*Typha latifolia*), Fox Sedge (*Carex vulpinoidea*), American Great Bulrush (*Schoenoplectus tabernaemontani*), and Lined Bulrush (*Scirpus pendulus*). Photos 1 to 6 show the HDF on November 28, 2019.

An intermittent channel was identified by NRSI biologists within the Goldfield 1 property in 2018. This headwater feature originates to the west of the Goldfield subject property (northwest of the Goldfield 1 property), closer to Wharncliffe Road South, passes through the conifer plantation, receiving surface water from the meadow marsh and continues southeast across the agricultural field. Within the plantation and marsh, the drainage channel appears to be dug, with vertical edges. This channel was described in the Draft Environmental Impact Study (EIS) (NRSI, January 2019) for the Goldfield 1 development as a headwater feature, ultimately connecting to Dingman Creek approximately 2.3km south of the Goldfield subject property. The channel was dry with small, isolated pools of water present throughout the period of 2018 field surveys, end of April to mid October 2018. Evidence of spring freshet conditions was evident in the spring (2018) as indicated by pooling and saturated substrates. In the vicinity of Exeter Road, the channel feature appears to contain a greater depth of water for much of the year and functions as a permanent watercourse.

The intermittent channel on the Goldfield 1 property will be retained by the proposed development of that property, although a reach may be realigned. Although the channel is regularly ploughed through south of the marsh, and contains no riparian vegetation, it will be buffered from development and its buffer naturalized with native species. This restoration plan will be addressed through the Goldfield 1 EIS and potential additional studies.

A formal HDF assessment is not required for the Goldfield subject property. The HDF has minimal function, likely only conveying water during more significant rainfall events and snowmelt. As such, the removal of the HDF can be mitigated through additional enhancements to the intermittent channel on the Goldfield 1 property.

Photo 1. North edge of the former treed area, where there is no feature. Felled trees remain.

Photo 2. Start of HDF at eastern edge of former treed area. View towards north.

Photo 3. View southeast. Narrow channel.

Photo 4. View south. Very little water.

Photo 5. Pooled water within future Bradley Avenue road allowance. View towards southwest.

Photo 6. View to the south with conifer plantation.

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

Sincerely,
Natural Resource Solutions Inc.

Katharina Richter

Katharina Richter
Senior Biologist

January 9, 2020

Email from UTRCA to NRSI

Subject: Re: Goldfield Development - Feature Description (proj2182) - Lismer Lane
From: "Stefanie Pratt" <pratts@thamesriver.on.ca>
Date: 2020-01-09, 3:17 p.m.
To: "Katharina Richter" <krichter@nrsi.on.ca>
CC: "Brent Verscheure" <VerscheureB@thamesriver.on.ca>, "Joseph Lance" <jlance@nrsi.on.ca>, "Mohamed Abuhajar" <mohamed@incon.ca>, dfitzger@london.ca

Hi Katharina,

Thank you for providing this information pertaining to the drainage feature identified on our site visit. After completing a preliminary review, we offer the following comments:

1. The UTRCA will require more detailed information pertaining to the enhancement occurring on the other Goldfield property to compensate for the removal of this feature. This should include information such as size of existing feature vs proposed enhancements/landscaping, details regarding planting/grading design, etc. The UTRCA generally requires a net environmental benefit in terms of size and quality of the feature.
2. Can you please confirm who the current owner the Bradley Extension ROW is? The feature also encroaches into this area.

If you have any questions, please reach out to Brent or myself.

Kind Regards,

UPPER THAMES RIVER
CONSERVATION AUTHORITY
Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

>>> Katharina Richter <krichter@nrsi.on.ca> 18/12/2019 10:39 AM >>>
> Stephanie,
Attached is a letter describing the drainage feature on the Goldfield development property, that was reviewed with you in the field on November 28, 2019.
Regards,
Katharina.
--

CELEBRATING 20 YEARS 1998 - 2018
Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
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Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

May 20, 2020

Letter from NRSI to UTRCA

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

May 20, 2020 Project 2182

Stefanie Pratt
Upper Thames River Conservation Authority
1424 Clarke Road
London, ON N5V 5B9

Dear Ms. Pratt,

RE: Goldfield Development and Goldfield 1 Development – Drainage Features

Natural Resource Solutions Inc. (NRSI) is working as the natural heritage consultant for INCON Industrial on their Goldfield and Goldfield 1 developments in London, Ontario. The subject properties are located south of Wharncliffe Road South, west of White Oak Road, and north of Exeter Road, surrounded by fields and other development sites. Following a meeting on the Goldfield property with yourself and others on November 28, 2019, a letter was submitted to you on December 18, 2019 to describe a drainage feature that was observed on the property. Today's additional letter provides a more detailed description of the drainage feature to the south, located on the Goldfield 1 Lands, as well as compensation measures for the removal of the drainage feature on the Goldfield site. This follows a telephone conversation between you and me on March 3, 2020, as well as a follow-up email sent by you on the same date. The drainage feature originating in the west and flowing through the Goldfield 1 site (south of the future Bradley Avenue extension) is referred to as Reach 1; the drainage feature originating on the Goldfield site (north of the future Bradley Avenue extension) is referred to as Reach 2 (see Map 1). Both reaches are headwater drainage features. As was stated on the site visit November 28, 2019, a formal headwater drainage feature assessment was not required.

An aquatic habitat assessment of Reach 1 and Reach 2 was undertaken by an aquatic biologist from NRSI on February 1, 2020. Reach 1 originates northwest of the Goldfield 1 Lands. At the time of assessment water was flowing southeast through the conifer plantation, entering along the west edge, through the marsh, and exiting the plantation along the south edge, where it merges with Reach 2. Several large pools are present within the plantation, which are 1.0-1.5m deep and approximately 2.0m across. These pools appear to be caused by broken farm tiles, which are approximately 0.30m in diameter. The water from the tiles is eroding the soil as it flows to the surface, creating the pools/sink holes. Reach 1 exits the marsh at its southeast corner, where it is eroding soil and flows south for a short distance. Although the Reach 1 channel is visible through the field, the feature was dry on February 1, 2020, as the main flow was noted to go underground just south of the plantation. Approximately 20m south of the plantation, the water re-emerges to the surface for a short distance (30m) before going underground and flowing through tile drains once again. The dry channel turns to the south and flows along the eastern property boundary. Here, Reach 1 flows through a channel with established terrestrial grasses that connects a series of pools. Within 5m of the southern Goldfield 1 property boundary, Reach 1 turns and flows east onto neighbouring lands. Fish habitat is not present within Reach 1, due to its poor connectivity, terrestrial grasses within the channel, and extensive tile drainage.

At the time of assessment, earth-moving works had begun on the Goldfield Lands and have altered the character of Reach 2. Reach 2 was described February 1, 2020 as having undefined flow from the Goldfield Lands and becoming channelized at the border with the Goldfield 1 Lands. Here, the channel is well defined, but intermittent in nature, based on the lack of vegetation, lack of iron staining or visible groundwater inputs, and infilling of fine sediments. Historically, Reach 2 would have been ploughed and cropped as active agricultural lands; it drains the lands to the north. Reach 2 ranges in width from 0.15-0.70m and in depth from 0-0.30m. It meanders with a 2-3m amplitude, for approximately 57m in a series of pools and flats before the channelization breaks down and it becomes overland flow for approximately 55m. It channelizes again upon entering the marsh, at approximately the mid-way point within the plantation. Within the marsh, Reach 2 merges with the Reach 1. Reach 2 does not provide fish habitat.

The removal of Reach 2 will be compensated for through the restoration and enhancement of Reach 1 during the development of the Goldfield 1 Lands. It is likely to be realigned east-west across the property and then along the eastern edge of the property. Tile drainage will be removed and a meandering channel will be created with a series of pools, riffles, and runs. The created watercourse is to be situated in a 15m wide naturalized corridor. This corridor will be planted with native species, including trees, shrubs, and herbaceous species. A detailed watercourse restoration plan and planting plan will be provided to the Upper Thames River Conservation Authority (UTRCA) for review at the detailed design stage. The newly created channel and corridor will be monitored for several years to ensure the watercourse is functioning as designed and to ensure the plantings are establishing well. A detailed monitoring plan will also be provided at the detailed design stage. Development of the Goldfield 1 Lands is in the early planning stages, and a Draft Plan of Subdivision has not yet been created. Additional proposed enhancement of the watercourse corridor includes:

- Topsoil depth of 0.40m
- Scarification of subsoils to 0.45m
- No trails to be included within the 15m naturalized corridor
- Fencing along the corridor edge will be considered to reduce impact to the watercourse and corridor from adjacent land uses.

The 15m wide, proposed corridor is seen as sufficient for the watercourse, as it will be a large improvement over current conditions. Whereas much of the drainage feature is currently tile drained and is/was ploughed through during agricultural practices, the feature will now be daylighted and protected through a natural corridor planted with native species. There is currently no riparian vegetation along the drainage features, other than where they flow through the plantation and marsh. Although the UTRCA generally protects watercourses within a 30m wide corridor, the drainage features within the Goldfield and Goldfield 1 lands are headwater drainage features and not watercourses. The drainage feature will be naturalized through natural channel design, providing a variety of habitats, where now there is none.

A tree inventory was conducted within the conifer plantation on January 17, 21, and 31, 2020. The following wildlife observations were made within the plantation:

- Great Horned Owl (*Bubo virginianus*) use of plantation (evidence in the form of an owl pellet),
- Stick nest present within plantation, indicating owl or raptor nesting,
- Several other common songbird species,
- Active Coyote (*Canis latrans*) den in plantation,

- White-tailed Deer (*Odocoileus virginianus*) trail through plantation, and
- Tracks of Eastern Cottontail (*Sylvilagus floridanus*) and Raccoon (*Procyon lotor*).

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

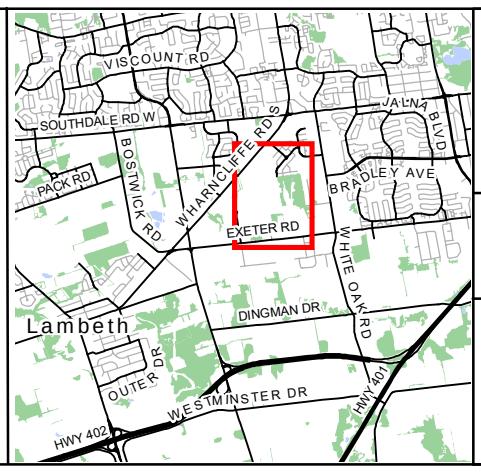
Sincerely,
Natural Resource Solutions Inc.

Katharina Richter
Senior Biologist

Enclosure
Map 1: Goldfield and Goldfield 1 Lands—Drainage Features

Legend

- Subject Property
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Reach Break
- Wooded Area



Map 1

Goldfield and Goldfield 1 Lands

Drainage Features

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 250 300 Meters

N

Project: 2182
Date: May 19, 2020
NAD83 - UTM Zone 17
Scale 1:5,000 (11x17")

Path: X:\2182_TreeInventory_BradleyAveN\NRSI_2182_Map1_DrainageFeatures_5K_2020_05_19_LEH.mxd

June 25, 2020

Email from UTRCA to NRSI

Subject: Re: Goldfield Development - Feature Description (proj2182) - Lismer Lane
From: "Stefanie Pratt" <PrattS@thamesriver.on.ca>
Date: 2020-06-25, 10:09 a.m.
To: "Brent Verscheure" <VerscheureB@thamesriver.on.ca>, "Katharina Richter" <krichter@nrsi.on.ca>
CC: "Joseph Lance" <jlance@nrsi.on.ca>, "Mohamed Abuhajar" <mohamed@incon.ca>

Hi Katharina,

We have undertaken a review of your drainage feature analysis prepared for the Goldfield lands, dated May 20, 2020. We have the following comments:

1. It was noted during previous email correspondence that the figure attached to this letter did not include the full extent of the drainage feature that this analysis was requested for. An updated drawing prepared by SBM (received May 26, 2020) included an "HDF Location Map" detail. Please revise your figure to include this segment of Reach 2 that was originally omitted.

2. As noted in your letter, earth-moving works began on the Goldfield Lands and have altered the character of Reach 2. Prior to these earth works, the HDF location would have extended further north as identified at the November 2019 site visit.

Later in this paragraph, a measurement for the length of Reach 2 is provided. Please revise this measurement to reflect the entirety of Reach 2, including the area shown on the SBM "HDF Location Map". Typically this measurement would also include the length of the feature that was altered due to earth-moving works.

3. In previous email correspondence you provided reference to the Dingman EA. The EA document for Stage 1 identifies that these reaches are located within the "Tributaries of Interest" associated with the White Oaks Drain. Reach 1 has been included within the EA analysis and recommendations for corridor width shall match with this document and may be refined based on site specific investigations prior to future development.

Your letter recommends that an appropriate corridor width for Reach 2 totals 15 metre wide (7.5 m on either side of feature). As we are seeking an net environmental benefit for the removal of Reach 2, all future corridor widths for Reach 1 shall include the recommendation from the EA (or site specific investigations for this reach) plus the width for Reach 2 for enhancement. The length of this additional corridor width for Reach 1 will directly relate to the revised calculation for the length of Reach 2.

Please provide a revised letter addressing these comments.

Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 5/20/2020 12:12 PM >>>
Stefanie, Brent:
I was just forwarded email correspondence between Brent and Kyle Kane (SMB Ltd) (attached), implying that a full

July 30, 2020

Email from NRSI to UTRCA

Subject: Re: Goldfield Development - Feature Description (proj2182) - Lismer Lane
From: Katharina Richter <krichter@nrsi.on.ca>
Date: 2020-07-30, 12:50 p.m.
To: Stefanie Pratt <PrattS@thamesriver.on.ca>
CC: Brent Verscheure <VerscheureB@thamesriver.on.ca>, Joseph Lance <jlance@nrsi.on.ca>, Mohamed Abuhajar <mohamed@incon.ca>

Stefanie,
In the absence of a response from the City on the Dingman EA, I am forwarding you an updated Map 1 (attached) in response to your point #1, below.
The following text provides a response to your point #2:

On May 25, 2020, Reach 2 on the Goldfield site was surveyed. This reach is shown on Map 1, and is very consistent with City of London and UTRCA mapping, as shown on Figures 1 and 2 in NRSI's correspondence to you from December 18, 2019. This HDF portion is 45.1m in length, for a combined total length of 157.1m for Reach 2. It is acknowledged, that Reach 2 may have extended further north in the past, prior to site manipulation. It is not known where the HDF may have originated, but its furthest extent was likely as shown by the blue line in the figure below. The length of this HDF to the property line is 120m, for a potential total Reach 2 length of 232m.

April 29, 2011 (Google Earth)

Once I hear back from the City on the Dingman EA, I will respond with regards to your point #3.

-Katharina.

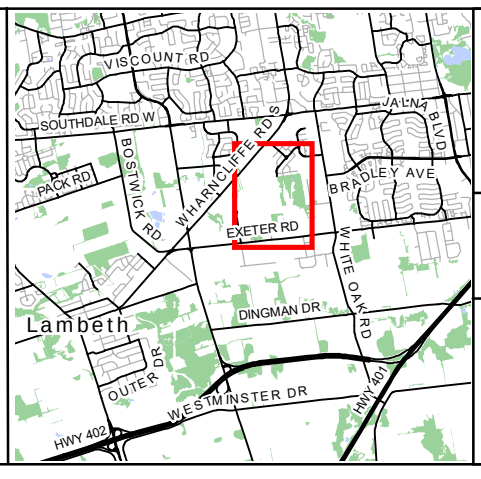
Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-07-03 3:30 p.m., Katharina Richter wrote:

> Stefanie,
> Thank you for your email and comments. I will provide a response once I have the necessary

Legend

- Subject Property
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Reach Break
- Wooded Area



Map 1

Goldfield and Goldfield 1 Lands

Drainage Features

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 250 300 Meters

N

Project: 2182
Date: July 6, 2020
NAD83 - UTM Zone 17
Scale 1:5,000 (11x17")

Path: X:\2182_TreeInventory_BradleyAveN\NRSI_2182_Map1_DrainageFeatures_5K_2020_07_06_GCS.mxd

information. Most importantly, we are awaiting responses on the Dingman EA from the City, which will affect the drainage feature corridor across the Goldfield lands.
Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-06-25 10:09 a.m., Stefanie Pratt wrote:

> Hi Katharina,
>
> We have undertaken a review of your drainage feature analysis prepared for the Goldfield lands, dated May 20, 2020. We have the following comments:
>
> 1. It was noted during previous email correspondence that the figure attached to this letter did not include the full extent of the drainage feature that this analysis was requested for. An updated drawing prepared by SBM (received May 26, 2020) included an "HDF Location Map" detail. Please revise your figure to include this segment of Reach 2 that was originally omitted.
>
> 2. As noted in your letter, earth-moving works began on the Goldfield Lands and have altered the character of Reach 2. Prior to these earth works, the HDF location would have extended further north as identified at the November 2019 site visit.
>
> Later in this paragraph, a measurement for the length of Reach 2 is provided. Please revise this measurement to reflect the entirety of Reach 2, including the area shown on the SBM "HDF Location Map". Typically this measurement would also include the length of the feature that was altered due to earth-moving works.
>
> 3. In previous email correspondence you provided reference to the Dingman EA. The EA document for Stage 1 identifies that these reaches are located within the "Tributaries of Interest" associated with the White Oaks Drain. Reach 1 has been included within the EA analysis and recommendations for corridor width shall match with this document and may be refined based on site specific investigations prior to future development.
>
> Your letter recommends that an appropriate corridor width for Reach 2 totals 15 metre wide (7.5 m on either side of feature). As we are seeking an net environmental benefit for the removal of Reach 2, all future corridor widths for Reach 1 shall include the recommendation from the EA (or site specific investigations for this reach) plus the width for Reach 2 for enhancement. The length of this additional corridor width for Reach 1 will directly relate to the revised calculation for the

Email from NRSI to UTRCA – December 17, 2020 (Mapped HDF)

Email from UTRCA to NRSI – December 14, 2020 (Request for map)

Email from NRSI to UTRCA – December 11, 2020 (Info on compensation)

Email from UTRCA to NRSI – November 30, 220 (Follow-up from June/July)

Subject: Re: Goldfield Development - Feature Description (proj2525, proj2524) - Lismer Lane
From: Katharina Richter <krichter@nrsi.on.ca>
Date: 2020-12-17, 12:02 p.m.
To: Stefanie Pratt <pratts@thamesriver.on.ca>, bworrad@menearlaw.com, sallen@mhbcplan.com
CC: Brent Verscheure <VerscheureB@thamesriver.on.ca>, Joseph Lance <jlance@nrsi.on.ca>, Michael Pease <mpease@london.ca>, Mohamed Abuhajar <mohamed@incon.ca>, mvivian@london.ca

Stefanie,
Please see the attached map.
The HDF is 114.4m in length.
The area of its corridor is 0.114ha.

Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
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(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-12-14 12:47 p.m., Stefanie Pratt wrote:

> Good afternoon Katharina,
>
> Thank you for the providing the below description. As noted in my previous email, we will need a revised figure identifying the feature (noted at 120m in length) and its buffer. Once this is received, we can ensure appropriate comments are provided through the process to allow this file to move forward.
>
> Kind Regards,
>
> **Stefanie Pratt**
> Land Use Planner
> 1424 Clarke Road
> London, ON N5V 5B9
> t: 519-451-2800 ext. 430
> e: pratts@thamesriver.on.ca
>
> UPPER THAMES RIVER
> CONSERVATION AUTHORITY
>
> >>> Katharina Richter <krichter@nrsi.on.ca> 12/11/2020 8:53 AM >>>

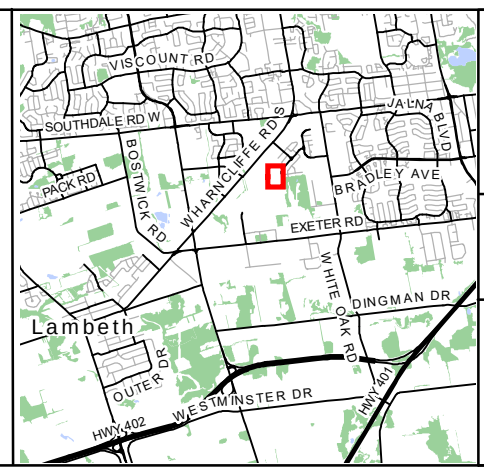
478600 478700 478800

4753400 4753300 4753200 4753100

PAULPEEL AVE

Goldfield Lands

Reach 2



Legend

- Subject Property
- Headwater Drainage Feature (HDF) (presumed original)
- HDF Corridor (10m)
- Reach Break
- Intermittent Watercourse/Drainage Feature

Map 1

Goldfield Lands

Headwater Drainage Feature

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 20 40 60 80 Meters

N

Project: 2525
Date: December 17, 2020
NAD83 - UTM Zone 17
Scale 1:1,000 (11x17")

Path: X:\2182_TreeInventory_BradleyAveN\NRSI_2525_Map1_DrainageFeatures_5K_2020_12_17_MV.mxd

Stefanie,
Thank you for your email from November 30, as well as for our discussion yesterday morning. As identified in my email to you from July 30, 2020 (below), the drainage feature on the Goldfield property (north of the future Bradley Avenue extension), was 120m in length prior to its removal. As mentioned, this feature was not observed by NRSI prior to its removal, but is estimated to have been a fairly insignificant headwater drainage feature (HDF) that collected runoff from the adjacent field. Prior to its removal, the area was dominated by grasses and old field species (i.e. cultural meadow). Trees in that area were inventoried by NRSI biologists on October 4, 2018. The drainage feature was not noted at that time, likely as it was dry, very narrow, and hidden by vegetation.

A formal headwater drainage feature assessment had not been required of this feature. The 'Evaluation, Classification and Management of Headwater Drainage Features Guidelines' (CVC & TRCA 2014) does not identify a corridor width for protected headwater features. Through other project experience NRSI has had, predominantly in the GTA, a 10m corridor width for HDFs has been deemed acceptable and approved. As such, if the same approach is taken for the HDF on the Goldfield property, at a length of 120m, this is an area of 1,200m2 (0.12ha/0.3ac). This area will be compensated for through habitat restoration on the Goldfield 1 lands, south of the Bradley Avenue extension.

Compensation details will be worked through during the Draft Plan approval process of the Goldfield 1 lands. However, at a high level, compensation will consist of trees, shrubs, and a herbaceous seed mix, all comprised of native species only. The compensation for the HDF will be natural and will contribute to the ecological value and function of the drainage feature corridor on the Goldfield 1 lands.

Regards,
Katharina.

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On 2020-11-30 10:51 a.m., Stefanie Pratt wrote:

> Good morning Katharina,
>
> I am following up from the email below to see if you have obtained any information from the City in regards to the Dingman EA and the Lismer Lane project. We have waited to provide a response to your previous information in an attempt to reduce duplication of efforts and ensure any revised letters included all available information.
>
> **Scott and Brian**, in response to your inquiries we have been reviewing information prepared by

NRSI to address the watercourse feature that was located on Block 2 lands. This watercourse initiates on these lands before connecting into the southern system, acting as a headwater. This was confirmed through a site visit with City of London, UTRCA and NRSI staff in November 2019. Continual reference refers to it as a "Headwater Drainage Feature", however a full headwater drainage feature analysis (according to TRCA/CVC guidelines) was not requested. An analysis has been requested to determine the extent of the area that was removed and determine how this can be recreated/result in a net environmental benefit. UTRCA staff have agreed to allow this area to be compensated for and to tie into works proposed on the future Goldfield 1 Lands to the south.

The added complication is the ongoing Dingman Subwatershed EA. This tributary has been identified as an area of interest for the City to undertake a complete corridor approach. The complete corridor approach will include future studies to determine how to appropriately accommodate a complete corridor on these lands (consideration for natural hazard and natural heritage), with consideration for future development plans as well. The calculations and works described below/through NRSI correspondence will need to form a part of any future corridor work.

In the absence of the EA information, we recommend moving forward in the following manner:

1. The UTRCA will need a revised letter from NRSI connecting the information discussed via email with the existing data provided. Please include:
a) A Figure identifying the extent of the headwater drainage feature prior to removal. Measurements should be included to identify the length of the feature on the subject lands and the area (including buffers).
b) Text describing the feature prior to removal. This should include description of an appropriate buffer and why a total buffer width of 15 m was identified.
c) Recommendations for appropriate compensation. Total area and suggestions for what that compensation can include.

2. The applicant will need to obtain site plan approval/development agreement from the City for the proposed townhouse development. I have cc'ed Melanie Vivian (City planner and file handler).

3. A Section 28 permit application will be required.
a) Include complete engineer drawing set submitted to City and the revised letter
b) The fee for the permit will be $750 (minor alteration to watercourse)
c) Approval of this permit will allow development to proceed for both Block 2 and the apartment block

If you would like to discuss any of these details, please advise.

Kind Regards,

Stefanie Pratt
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UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 7/30/2020 12:50 PM >>>
Stefanie,
In the absence of a response from the City on the Dingman EA, I am forwarding you an updated Map 1 (attached) in response to your point #1, below.
The following text provides a response to your point #2:

On May 25, 2020, Reach 2 on the Goldfield site was surveyed. This reach is shown on Map 1, and is very consistent with City of London and UTRCA mapping, as shown on Figures 1 and 2 in NRSI's correspondence to you from December 18, 2019. This HDF portion is 45.1m in length, for a combined total length of 157.1m for Reach 2. It is acknowledged, that Reach 2 may have extended further north in the past, prior to site manipulation. It is not known where the HDF may have originated, but its furthest extent was likely as shown by the blue line in the figure below. The length of this HDF to the property line is 120m, for a potential total Reach 2 length of 232m.

April 29, 2011 (Google Earth)

Once I hear back from the City on the Dingman EA, I will respond with regards to your point #3.

-Katharina.

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On 2020-07-03 3:30 p.m., Katharina Richter wrote:

December 22, 2020

Email from UTRCA to NRSI

Subject: Re: Goldfield Development - Feature Description (proj2525, proj2524) - Lismer Lane
From: "Stefanie Pratt" <pratts@thamesriver.on.ca>
Date: 2020-12-22, 4:26 p.m.
To: "Katharina Richter" <krichter@nrsi.on.ca>, bworrad@menearlaw.com, sallen@mhbcplan.com
CC: "Brent Verscheure" <VerscheureB@thamesriver.on.ca>, "Joseph Lance" <jlance@nrsi.on.ca>, "Michael Pease" <mpease@london.ca>, "Mohamed Abuhajar" <mohamed@incon.ca>, mvivian@london.ca

Katharina,

This calculation of the HDF differs from that previously provided (was noted at 120 metres on various occasions). We've been trying to confirm this information since December 2019 and I'm not sure why it has changed now as we're nearing final approvals. It is my understanding that the feature has been removed from the landscape since we were out site in November 2019, and aerial image has been used to determine this length so it should be consistent? Typically the process is to ensure this information is obtained prior to removal, but since that is not the case we are trying to work with you.

This isn't the only calculation that has changed since your initial assessment; the previous buffer recommendation was for a 15 metre wide corridor which has been reduced to 10 metres through this months correspondence. It is our understanding that you have used a 10 metre corridor in other jurisdictions for HDF's, however the justification you have provided isn't related to this site. This may be acceptable but please provide further explanation for this change.

Given these changes and the spread of information across various emails, multiple letters, and drawings, it is most appropriate at this point in time to provide a revised letter to tie all of this information together (as mentioned in my November 30th email). This letter will ensure the most accurate and up to date information is available for future approvals. Please include the following information in the revised letter:

- Purpose of letter - determine removal and compensation requirements of HDF
- Summary of site visit discoveries - previous info on watercourse depth, width, vegetation, habitat, species observed, etc.
- Description of length and buffers of HDF with appropriate justification (site specific)
- Description of compensation - amount, generic characteristics to be created, and location (typically net environmental benefit)
- Inclusion of Dingman EA generic info and how compensation will add to this
- Appendix - figure provided last week

Once these revisions have occurred, this should be the final piece for approvals to move forward.

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