# NATURAL ENVIRONMENT REPORT (Level I & II)

Aggregate Resources Act Application

Elliot Pit, Municipality of Thames Centre

26 January 2021

TERRASTORY
environmental consulting inc.

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## Aggregate Resources Act Application
## Elliot Pit, Municipality of Thames Centre

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# 1 INTRODUCTION

## 1.1 Study Background

Terrastory Environmental Consulting Inc. (hereinafter "Terrastory") was retained by 5026367 Ontario Inc. (hereinafter "the Applicant") to prepare this Level I & II Natural Environment Report (NER) in support of a Category 3, Class A pit application pursuant to the *Aggregate Resources Act* (ARA) in the Municipality of Thames Centre (hereinafter "the Municipality"). The extraction area is referred to herein as "Elliot Pit". The lands proposed for licensing are situated within an approximately 36 hectare (89 acre) parcel located northwest of the intersection of Thorndale Road and Nissouri Road (County Road 27) in the community of Thorndale. The Subject Property is primarily designated Agricultural per Schedule A of the Municipality's Official Plan (OP) and zoned Agricultural per Map 13 of Zoning By-law No. 75-2006. The Deciduous Woodlot in the northwest corner of the Subject Property is designated Natural Area and zoned Environmental Protection (EP). The location of the Study Area within its broader landscape setting is shown in **Figure 1**. The following terminology is employed throughout this NER to describe certain noteworthy areas and features which are shown spatially on **Figure 1**:

- **Site** – proposed area to be licensed.
- **Subject Property** – parcel/property in which the ARA licence is situated.
- **Adjacent Lands** – areas within 120 meters of the Site.
- **Study Area** – Site, Subject Property, and Adjacent Lands collectively.
- **Deciduous Woodlot** – approximately 6.33 hectare (15.65 acre) deciduous forest in the northwestern corner of the Subject Property.
- **Deciduous Hedgerow** – approximately 0.32 hectare (0.79 acre) hedgerow dominated by mature deciduous trees (particularly Common Hackberry) along the western boundary of the Subject Property/Site.

The licence application includes a 14.2 ha licensed area and 12.0 ha extraction area, with an annual tonnage limit of 300,000 tonnes. The operations plan consists of three (3) phases of extraction/rehabilitation (A-C) overlapping two (2) areas (Areas 1 and 2) and proceeding westward from a 0 m setback on the eastern licence boundary. The Site will remain in agricultural use until extraction commences and will be returned to agricultural use when extraction is complete. Portable processing equipment will be shifted to accommodate different phases of aggregate extraction. Entrance to and exit from the Site will be gained from Thorndale Road. No below-water extraction is proposed.

## 1.2 Study Purpose

This Level I & II NER has been prepared to address the requirements of the ARA and its associated regulation (O. Reg. 244/97) and policy standards. ARA licence applications must be made in accordance with the Provincial Standards (i.e., Aggregate Resources of Ontario: Provincial Standards, Version 1.0) per section 7 of O. Reg. 244/97. The Provincial Standards for Category 3, Class A pit licences require the submission of a supporting NER which may be either a Level I or II assessment depending upon the natural features present on or within 120 of the Site. "Site" is defined per section 1 of the ARA as "*the land or land under water to which a licence or permit or an application therefor relates*".

Per MNRF's Natural Environment Report Standards policy document (No. A.R. 2.01.07; OMNR 2006), the purpose of a Level I NER is to describe the existing natural environmental conditions on and within 120 m of the Site, and to determine whether any of the following natural features are present:

- Significant Wetlands;
- Habitat of Endangered and Threatened Species;
- Significant Areas of Natural and Scientific Interest (ANSIs);
- Significant Woodlands (south and east of the Canadian Shield);
- Significant Valleylands (south and east of the Canadian Shield);
- Significant Wildlife Habitat (SWH); and,
- Fish Habitat.

When any of the above natural features are identified through a Level I NER, a Level II NER is required to assess the potential for negative impacts on the identified significant natural feature(s). If potential impacts are identified, the Level II NER must provide recommendations for appropriate preventative, mitigative, and remedial measures. As certain significant natural features were known within the Study Area at project commencement (i.e., Significant Woodland), this NER satisfies the requirements for both a Level I and II assessment.

In addition to satisfying ARA requirements, this NER is also submitted in support of Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications to the Municipality to facilitate aggregate extraction. This NER further considers and assesses consistency of the licence application with other applicable natural heritage policies including the Provincial Policy Statement (PPS), provincial *Endangered Species Act* and federal *Fisheries Act*.

# 2 APPROACH AND METHODS

This study is composed of five (5) discrete components which are bulleted below and further described in the following sections.

- **Acquire background biophysical information and mapping** available for the Study Area and local landscape (see **Section 2.1**).
- **Conduct site assessments and ecological surveys** to field-verify the accuracy of the acquired background biophysical information and collect additional biophysical information as necessary (see **Section 2.2**).
- **Assess the significance** of the biophysical information collected and natural features identified within the context of applicable natural heritage and environmental policies (see **Section 2.3**).
- **Predict the effects** of the application on the identified significant natural features and natural environment, particularly the net effects once mitigation measures and technical recommendations are implemented (see **Section 2.4**).
- **Determine whether the proposed application addresses applicable natural heritage and environmental policies** at municipal, provincial, and federal levels (see **Section 2.5**).

All items associated with the preparation of this Level I & II NER – including background information gathering, site assessments and surveys, graphics, and reporting – were undertaken by Terrastory's Senior Ecologist/President (T. Knight). A curriculum vitae is provided in **Appendix 1**.

## 2.1 Background Biophysical Information Assessment

This study is supported by background biophysical information and mapping acquired and reviewed from a variety of sources which are listed below in **Table 1**.

**Table 1.** Background Biophysical Information Acquired and Reviewed.

| Type of Information Acquired | Description |
|---|---|
| Ortho-rectified Aerial Photographs | • 1954, 2006, 2009, 2012-2013, 2015-2018. |
| Natural Feature Mapping | • Municipality of Thames Centre Official Plan (October 2020) Schedules.<br>• County of Middlesex Official Plan (2006 consolidation) Schedules.<br>• Land Information Ontario (LIO) accessed via MNRF's "Make a Map" web-based platform (accessed 18 December 2020).<br>• Upper Thames River Conservation Authority (UTRCA) regulation mapping (accessed 18 December 2020). |
| Physiographic Resource Mapping and Datasets | • Topographic Survey of the Subject Property.<br>• Provincial Digital Elevation Model.<br>• Ontario Well Records (publicly-available).<br>• The Soils of Middlesex County (Hagerty and Kingston 1992).<br>• Agricultural Information Atlas (accessed 18 December 2020).<br>• Bedrock Topography and Overburden Thickness Mapping (Gao et al. 2006).<br>• Paleozoic Geology of Southern Ontario (Armstrong and Dodge 2007).<br>• Surficial Geology of Southern Ontario (Ontario Geological Survey 2010).<br>• Physiography of Southern Ontario (Chapman and Putnam 1984). |
| Ecological Resource Mapping and Datasets | • Natural Heritage Information Centre (NHIC) database accessed via MNRF's "Make a Map" web-based platform (squares: 17MH8672, 17MH8671, 17MH8772, 17MH8771; accessed 18 December 2020).<br>• iNaturalist "(NHIC) Rare species of Ontario" project (accessed 18 December 2020).<br>• iNaturalist "Herps of Ontario" project (accessed 18 December 2020).<br>• Ontario Breeding Bird Atlas (OBBA) database and the Atlas of the Breeding Birds of Ontario, 2001–2005 (Cadman et al. 2007) (square: 17MH87).<br>• Ontario Butterfly Atlas database (square: 17MH87; accessed 18 December 2020).<br>• Aquatic Species at Risk Maps by Fisheries and Oceans Canada (accessed 18 December 2020).<br>• Atlas of the Mammals of Ontario (Dobbyn 2005). |
| Natural Heritage Objectives and Strategies | • Middlesex Natural Heritage Systems Study (UTRCA 2014).<br>• Plover Mills Corridor Watershed Report Card (UTRCA 2017).<br>• Great Lakes Conservation Blueprint for Terrestrial Biodiversity, Volume 2 (Henson and Brodribb 2005).<br>• Great Lakes Conservation Blueprint for Aquatic Biodiversity, Volume 2 (Phair et al. 2005) |

## 2.2 Site Assessments and Surveys

The acquired background information per **Table 1** helped direct several site assessments and surveys carried out by Terrastory staff (T. Knight). **Table 2** below indicates the primary assessments/surveys performed during each site visit, weather conditions, and time on-site.

**Table 2.** Site Assessments and Ecological Surveys performed within the Subject Property.

| Date | Assessments/Surveys Performed | Terrastory Staff | Weather Conditions | Time On-site |
|---|---|---|---|---|
| 4 June 2020 | Breeding bird survey #1, spring vascular plant survey, incidental observations. | T. Knight | Air Temperature 16-26°C; Beaufort Wind 0-3; Cloud Cover 0%; No Precipitation. | 6:45-12:30 |
| 28 June 2020 | Breeding bird survey #2, incidental observations. | T. Knight | Air Temperature 17-20°C; Beaufort Wind 2; Cloud Cover 0%; No Precipitation. | 8:15-10:00 |
| 29 July 2020 | Ecological Land Classification, summer vascular plant survey, natural feature mapping, incidental observations. | T. Knight | Hot, partly cloudy. | 9:45-14:30 |
| 15 September 2020 | Fall vascular plant survey, finalize natural feature mapping, incidental observations. | T. Knight | Air Temperature 19°C; partly cloudy. | 12:45-15:00 |

The site assessments and surveys centred on characterizing the land use (e.g., historical development patterns, existing built features, land maintenance, etc.), physiographic (e.g., topography, drainage, surface water features, etc.), and ecological (e.g., vegetation, wildlife, habitats, etc.) conditions and features of the Subject Property and (where appropriate) Adjacent Lands. All land-use, physiographic, and ecological information described for Adjacent Lands was collected from either current aerial photographs or observations from inside the Subject Property and/or publicly-accessible areas (e.g., rights-of-way, etc.). The locations and boundaries of significant natural features and/or habitats were recorded on-site with a high-accuracy GPS (Mesa II) supported by representative photographs.

In addition to collecting general biophysical information, the following targeted assessments (i.e., feature- or species-specific surveys) were undertaken:

- **Vegetation Mapping according to Ecological Land Classification (ELC):** Vegetation communities on the Subject Property were characterized and mapped according to Ecological Land Classification (Lee et al. 1998) and the 2008 update to the Vegetation Type List (Lee 2008). Vegetation communities were initially identified based on current aerial photographs and then verified and refined (as necessary) on-site. ELC mapping was scaled to the finest level of resolution deemed appropriate (i.e., either Ecosite or Vegetation Type). Vegetation communities mapped on Adjacent Lands were delineated predominantly via aerial photograph interpretation.
- **Vascular Plant Survey:** Vascular plants were recorded based on a comprehensive area search ("wandering transects") within naturally-occurring (i.e., non-planted) or naturalizing areas of vegetation. Particular effort was paid to areas with the greatest potential to support significant vascular plants (i.e., designated Species at Risk, provincially rare, etc.) and areas with the greatest potential for impact based

on the proposed development plan. Nomenclature and common names for the recorded vascular plant species are generally consistent with the Southern Ontario Vascular Plant Species List (Bradley 2013) except where a name change has more recently been adopted by NHIC.

- **Breeding Bird Surveys according to the Ontario Breeding Bird Atlas Protocol:** Two (2) rounds of breeding bird surveys were conducted in accordance with the Ontario Breeding Bird Atlas (OBBA) protocol (Bird Studies Canada et al. 2001). Surveys occurred within the appropriate season (May 24–July 10), time of day (between dawn and approximately 5 hours after dawn), and weather conditions (no rain, wind speed ≤3 on the Beaufort Wind Scale). While the OBBA protocol recommends that stations be situated at least 300 m apart (to avoid double counting), the stations established herein were often closer together to ensure more comprehensive survey coverage. Surveys occurred for a minimum duration of 10 minutes at each station.

## 2.3 Significance Assessment

### 2.3.1 Definitions and Criteria

"Significant natural features" as described herein represent natural features and habitats that have recognized status (and therefore policy significance) within the planning jurisdiction in which an application is proposed. Significant natural features are defined herein to include those outlined in the Natural Environment Report Standards policy document (No. A.R. 2.01.07; OMNR 2006), namely:

- Significant Wetlands;
- Habitat of Endangered and Threatened Species;
- Significant Areas of Natural and Scientific Interest (ANSIs);
- Significant Woodlands (south and east of the Canadian Shield);
- Significant Valleylands (south and east of the Canadian Shield);
- Significant Wildlife Habitat (SWH); and
- Fish Habitat

It is noted that the County OP provides provisions that consider and/or protect additional natural features beyond the requirements of the ARA Provincial Standards. The potential presence of these regionally significant features are outlined in section 2.2.1.1 of the County OP and include:

- Natural Hazards (e.g., steep slopes, unstable soils, fill regulated areas);
- Natural Environment Areas (e.g., floodplains, flood regulated watercourses, wetlands);
- Natural Heritage Features (e.g., significant woodlands, wildlife habitat, aquatic ecosystems, river, stream, ravines, and upland corridors, ANSIs, etc.); and
- Groundwater Features (e.g., recharge areas, discharge/headwater areas, well-head protection areas).

Criteria used to determine the presence or absence of the above significant natural features within the Study Area were considered from a variety of sources including the Natural Heritage Reference Manual (MNR 2010a) and (for Significant Wildlife Habitat) the Ecoregion 6E Criteria Schedule (MNRF 2015).

Like significant natural features, "significant species" represent individuals of wild species which have recognized status (and therefore policy significance) within the planning jurisdiction in which an application is proposed. Significant species are defined herein to include:

- Species designated Endangered, Threatened, or Special Concern under O. Reg. 230/08 pursuant to the provincial *Endangered Species Act, 2007*.
- Species designated Provincially Rare (i.e., S1, S2, or S3) by NHIC.
- Species considered Regionally Rare in Middlesex County pursuant to the *List of the Vascular Plants of Ontario's Carolinian Zone* (Oldham 2017).

### 2.3.2 Determination

After collecting the background biophysical information and conducting the site assessments the data was interpreted to determine whether any significant natural features and/or significant species occur within the Study Area. If a natural feature or species met the significance criteria, it is considered "confirmed". If a natural feature or species may be present within the Study Area and/or Adjacent Lands given the prevailing biophysical or habitat conditions but was not confirmed based on either background or site-specific biophysical data, it is considered potential or "candidate". Candidate significant natural features and species are treated as confirmed where no additional information is available.

## 2.4 Effects Assessment and Mitigation

The potential ecological effects of an application can be understood spatially as zones that radiate outward from the direct project footprint (e.g., building envelope, etc.) and associated areas of site alteration (e.g., grading, etc.). While the greatest potential for effects typically occurs within areas directly subject to development or disturbance, surrounding areas may also be affected indirectly. Such indirect effects can include light or noise pollution that affects wildlife communities on Adjacent Lands, or degradation of water quality within a downstream receptor resulting from sediment runoff during extraction.

The following five-pronged approach is employed herein to assess the effects of an application on significant natural features and species and (where warranted) the natural environment in general:

1. **Scope** the effects assessment to environmental components that warrant consideration. The effects assessment herein centres principally on significant natural features and species (i.e., those that have policy significance within the planning jurisdiction, as defined in **Section 2.3**) but may also consider general environmental effects where warranted.
2. **Identify the predicted direct and indirect effects** of the application on each significant natural feature or species during all project stages (i.e., pre- to -post-development) in the absence of mitigation. Direct effects are those where there is a cause-effect relationship between a proposed activity and an effect on a natural feature or species (e.g., tree clearance within a building footprint, etc.). Indirect effects result when an activity is linked to a direct effect through a chain of foreseeable interactions or steps.
3. **Evaluate the significance** of the predicted effects for each environmental component based on their attributes (i.e., spatial extent, magnitude, timing, frequency, and duration) and likelihood (i.e., high, medium, low).

4. Where the potential for negative effects are anticipated, **recommend ecologically-meaningful mitigation measures** to avoid such impacts first (where possible), and where impacts cannot be avoided to minimize, compensate, and/or enhance as appropriate.
5. **Identify the predicted residual or net effect**s of the application assuming implementation of all recommended mitigation measures.

Per step 4, mitigation measures are offered where the potential for negative effects are anticipated to a degree that cannot be supported given the prevailing policy context. Whenever possible, Terrastory works iteratively with the project team as a means to identify extraction options that avoid negative effects first; options that would minimize or mitigate such negative effects are less preferred and considered secondarily. In general, avoidance measures that have already been incorporated into the application or project design are not duplicated as technical recommendations herein. The Site Plans (phasing, operations, and rehabilitation) are described in **Section 5** while the effects assessment and recommended mitigation measures are provided in **Section 6**.

## 2.5 Natural Heritage Policy Context

There is an overlapping municipal, provincial, and federal policy framework respecting the protection of natural heritage features and areas across southern Ontario. These requirements include objectives, policies, and directives which are principally contained in federal and provincial statutes, regulations, policy statements, Official Plans, and guidance documents. The overarching natural heritage policy framework directing development activities within the Subject Property is outlined below in **Table 3**. A determination of whether the applications considered herein address such policies is provided in **Section 7**.

**Table 3.** Applicable Natural Heritage Policies.

| Level of Government | Natural Heritage or Environmental Policy Requirements |
|---|---|
| Municipal | Municipality of Thames Centre Official Plan (October 2020 consolidation).<br>County of Middlesex Official Plan (2006 consolidation). |
| Provincial | *Aggregate Resources Act* (ARA), R.S.O. 1990, c. A.8, including<br>• Ontario Regulation 244/97 – General<br>• Provincial Standards of Ontario – Category 3, Class A Pit Above Water<br>• Natural Environment Report Standards (A.R. 2.01.07)<br>Provincial Policy Statement 2020, pursuant to the *Planning Act*, R.S.O. 1990, c. P.13, including:<br>• Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005 (MNR 2010a).<br>• Significant Wildlife Habitat Technical Guide (MNR 2010b).<br>• Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF 2015).<br>• Significant Wildlife Habitat Mitigation Support Tool (MNRF 2014).<br>*Endangered Species Act* (ESA), S.O. 2007, c. 6, including:<br>• Ontario Regulation 230/08 – Species at Risk in Ontario List.<br>• Ontario Regulation 242/08 – General.<br>*Fish and Wildlife Conservation Act,* S.O. 1997, c. 41. |
| Federal | *Fisheries Act*, R.S.C. 1985, c. F-14, including: |

| Level of Government | Natural Heritage or Environmental Policy Requirements |
|---|---|
| | • Fish and Fish Habitat Protection Policy Statement (DFO 2019). |
| | *Migratory Birds Convention Act*, S.C. 1994, c. 22, including: |
| | • Migratory Birds Regulations, C.R.C., c. 1035. |

# 3 EXISTING BIOPHYSICAL CONDITIONS

The following is a description of the biophysical features and conditions of the Site, which are shown spatially on **Figure 2**. Representative photographs are provided in **Appendix 2**.

## 3.1 Land-use and Landscape Setting

The Site is situated in a rural yet urbanizing setting with a mixture of land-uses and land cover classes including agricultural fields (mostly cash crops), small woodlots, manufacturing buildings, and new subdivisions. The North Thames River flows in a southerly direction about 350 m west of the Site. New subdivisions associated with the community of Thorndale were recently constructed on the east side of Nissouri Road.

## 3.2 Physical Setting

### 3.2.1 Bedrock Geology

The bedrock underlying the Subject Property is characterized as Devonian-aged (i.e., 458 to 470 million-year-old) fossiliferous limestone and minor dolostone associated with the Dundee Formation (Armstrong and Dodge 2007). In Ontario, the Dundee Formation subcrops (i.e., acts as the stratigraphic unit closest to the ground surface) from Long Point to the shoreline of Lake Huron across most of Huron County. Bedrock was not encountered within the Site in any borehole advanced as part of the Hydrogeological Assessment (EXP 2020) but is expected to be at an elevation of generally 20-25 m below the ground surface based on bedrock topography mapping (Gao et al. 2006) and a review of publicly-available water well records.

### 3.2.2 Surficial Geology and Groundwater Resources

The Site is situated within the Stratford Till Plain physiographic region (Chapman and Putnam 1984), which is comprised of ground moraine interrupted by several terminal moraines. The extreme northern portion of the Site is mapped as a sandy silt loam till associated with the Arva Moraine (Ontario Geological Survey 2010). The Arva Moraine was deposited near the terminus of the previous glacial age by the Huron Lobe which advanced southward from Lake Huron. A soils assessment in association with Ecological Land Classification vegetation mapping (see **Section 3.3.1**) confirmed the preponderance of silty substrate in the Deciduous Woodlot. The remainder of the Subject Property contains ice-contact stratified gravel (and minor sand) of glaciofluvial outwash origin.

Boreholes advanced in support of the Hydrogeological Assessment (EXP 2020) revealed the presence of silty fill beneath the topsoil in the northern portion of the Site. Beneath the topsoil or fill were layers of sand or sand/gravel of varying depths (approximately 1.5–>8 m), which generally overlies sandy silt till. Depth of the sand/gravel deposit is typically greatest in the southern and

western portions of the Site, while till is found nearer to the ground surface in the northcentral and northeastern portions of the Site.

Based on the results of the Hydrological Assessment (EXP 2020), stabilized groundwater elevations within the Site were found to range between approximately 3 to 8 m below the ground surface based on monthly measurements between March and November 2020. The overall groundwater flow is interpreted to be southwestward, generally towards the North Thames River. The groundwater elevation appears to intercept a variety of strata depending on location, including both sand/gravel deposits and till.

### 3.2.3 Topography, Drainage, and Surface Water Features

The Site sits between approximately 284-281 metres above sea level (masl). Overland runoff is conveyed towards the centre of the site (which sits at 281 masl). Topographic contours (LiDAR) and overall direction of surface runoff are indicated on **Figure 2**. There is an absence of significant surface erosion, watercourses, or swales, indicating that stormwater runoff likely tends to sheet flow or is absorbed into the surficial soils.

An unnamed Municipal Drain meanders southward onto the Subject Property north of the Site, eventually discharging into the North Thames River to the west. This Municipal Drain is considered Class F (intermittent flow) and does not appear to have a surface expression; it is assumed to be buried.

## 3.3 **Ecological Setting**

### 3.3.1 Vegetation Communities

The majority of the Site (>95%) was under active agricultural production (corn) in 2020. Vegetation communities with the Site and Adjacent Lands are described below and mapped in **Figure 2**.

The Deciduous Woodlot represents mature deciduous forest (FODM5-9) dominated by Sugar Maple (*Acer saccharum*) with lesser proportions of Bitternut Hickory (*Carya cordiformis*), American Beech (*Fagus grandifolia*), and Black Cherry (*Prunus serotina*). The sub-canopy and regenerating layers are also dominated by Sugar Maple with abundant White Ash (*Fraxinus americana*). The groundcover contains Jack-in-the-Pulpit (*Arisaema triphyllum*), Mayapple (*Podophyllum peltatum*), Enchanters Nightshade (*Circaea canadensis*), Yellow Avens (*Geum aleppicum*), and Garlic Mustard (*Alliaria petiolata*). Overall, the forest understory is noticeably open with limited regenerating woody vegetation. Greater proportions of upland sedges were documented along the northern forest boundary, represented by Nerveless Woodland Sedge (*Carex leptonervia*), Thin-leaf Sedge (*Carex cephaloidea*), and Hairy Wood Sedge (*Carex hirtifolia*).

Contiguous with the southwest corner of the Deciduous Woodland is a Deciduous Hedgerow (FODM11) dominated by Common Hackberry (*Celtis occidentalis*), Sugar Maple, and Black Walnut (*Juglans nigra*). Herbicide spraying as part of the adjacent agricultural operation appears to have affected leaf physiology in 2020 as evidenced by deformed and scorched leaves along the dripline edge. The southwest corner of the Subject Property is occupied by a few large Black Walnut along with lesser proportions of Common Hackberry and Sugar Maple. This area contains manicured grass and is not considered a natural vegetation community.

A naturalized conifer hedgerow (FOCM5) dominated by Norway Spruce (*Picea abies*) occurs on Adjacent Lands along the eastern boundary of the Subject Property. A few Manitoba Maple (*Acer negundo*) and European Buckthorn (*Rhamnus cathartica*) were also documented in this community.

A variety of vegetation communities including mixed meadows (MEM), a mixed regenerating thicket (THMM1), and an open water pond (OAO) are present on Adjacent Lands to the west. These vegetation communities are delineated on **Figure 2** via aerial photograph interpretation.

### 3.3.2 Vascular Plants

A total of 173 vascular plant species were recorded within the Subject Property (see **Appendix 3**). The following species at risk and provincially rare species were documented:

- **Butternut (*Juglans cinerea*)** – Two (2) Butternut were documented in the vicinity of the residence/barn on the Subject Property just northeast of Adjacent Lands. This species is provincially and federally Endangered.
- **Cream Violet (*Viola striata*)** – This species was documented at two (2) locations along the western boundary the Deciduous Woodlot, including one (1) location on Adjacent Lands to the north. This species is provincially rare (S3).

A fulsome discussion of the documented locations of Butternut and Cream Violet is provided in the significance assessments for Endangered Species (see **Section 4.3.4**) and Significant Wildlife Habitat (see **Section 4.2.7**), respectively.

### 3.3.3 Breeding Birds

Breeding bird surveys were undertaken at six (6) stations across the Subject Property on 24 May and 1 July 2019. A total of 41 bird species were recorded. The assemblage and abundance of birds recorded generally reflects the prevailing structure and composition of on-site vegetation communities and variable habitats of the Study Area (e.g., deciduous forest, hedgerows, tilled agricultural fields). The locations of each survey station are shown on **Figure 2** while the full survey results indicating each species' breeding status by survey station can be found in **Appendix 4**. The locations of significant bird species recorded are shown on **Figure 2**. A general summary of the breeding bird communities present within the Study Area is provided below.

Station BB-1 captured wooded areas surrounding a small open water pond in the northeast corner of the Subject Property. Bird species considered confirmed or probable breeders at this station include (amongst others) Cedar Waxwing (*Bombycilla cedrorum*), Chipping Sparrow (*Spizella passerina*), Common Grackle (*Quiscalus quiscula*), European Starling (*Sturnus vulgaris*), Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospiza melodia*), and Warbling Vireo (*Vireo gilvus*). Barn Swallow (*Hirundo rustica*) were noted flying into a barn north of the residence, which is indicative of nesting within this structure. Station BB-2 surveyed the hedgerow along the northern boundary of the Subject Property. Bird species considered confirmed or probable breeders at this station include (amongst others) American Goldfinch (*Spinus tristis*), Brown-headed Cowbird (*Molothrus ater*), Field Sparrow (*Spizella pusilla*), Savannah Sparrow (*Passerculus sandwichensis*), and Song Sparrow.

Stations BB-3 and BB-4 surveyed the Deciduous Woodlot. American Robin (*Turdus migratorius*), Black-capped Chickadee (*Poecile atricapillus*), Blue Jay (*Cyanocitta cristata*), Eastern Wood-pewee (*Contopus virens*), Great Crested Flycatcher (*Myrarchus crinitus*), Rose Breasted Grosbeak (*Pheucticus*

*ludovicianus*), and Song Sparrow are considered probable breeders here. An active Red-tailed Hawk (*Buteo jamaicensis*) nest and recently fledged young were also documented.

Station BB-5 surveyed the Deciduous Hedgerow, in which a variety of bird species occupying early successional habitats were recorded such as Red-winged Blackbird and Song Sparrow. An Eastern Meadowlark (*Sturnella magna*) was noted vocalizing in the mixed meadow on Adjacent Lands to the west.

Three (3) significant bird species were recorded during the targeted breeding bird surveys: 1) Barn Swallow, 2) Eastern Meadowlark, and 3) Eastern Wood-pewee. All documented locations of these species within the Study Area along with their habitat requirements are described in the significance assessments in **Section 4**.

### 3.3.4 Incidental Wildlife

A variety of wildlife were recorded incidentally during the course of the 2020 fieldwork program. Red-backed Salamander (*Plethodon cinereus*) was documented under cover objects (mostly coarse woody debris) in several locations within the Deciduous Woodlot. Several mammal species were also recorded in the Deciduous Woodlot including Eastern Chipmunk (*Tamias striatus*), Eastern Grey Squirrel (*Sciurus carolinensis*), and White-tailed Deer (*Odocoileus virginianus*). Hackberry Emperor (*Asterocampa celtis*) was observed at two (2) locations near the Deciduous Hedgerow and is expected to be utilizing the mature Common Hackberry in this area for ovipositing. A pond in the northeastern portion of the Subject Property (not mapped as it is outside of Adjacent Lands) appears to have been stocked with Goldfish (and perhaps other fish), and also contains Northern Leopard Frog (*Lithobates pipiens*) and Green Frog (*Rana clamitans*). A Midland Painted Turtle (*Chrysemys picta* spp. *marginata*) was observed deceased (roadkill) on the west side of Nissouri Road adjacent to the Subject Property.

# 4 SIGNIFICANCE ASSESSMENT

Based on the biophysical information collected during background information gathering (per **Table 1**) and the results of the site assessments and surveys (per **Sections 2.2** and **3**), **Table 4** below provides a determination of the presence (or potential presence) of each significant natural feature considered herein. Shaded rows denote features which were confirmed or may be present within the Site or Adjacent Lands and are considered further as part of the effects assessment in **Section 5**. Significant natural feature mapping is provided in **Figure 3**.

**Table 4.** Summary of the Assessment of Significant Natural Features within the Site and Adjacent Lands.

| Significant Natural Feature | Status within the Site | Status on Adjacent Lands (i.e., <120 m from the Site) |
|---|---|---|
| **Significant Natural Features per ARA Provincial Standards** | | |
| Significant Wetlands | **Absent**. | **Absent**. |
| Significant Woodlands | **Present**. See **Section 4.1.** | **Present**. See **Section 4.1.** |
| Significant Valleylands | **Absent**. | **Absent**. |
| Significant Wildlife Habitat | **Confirmed/Candidate**. See **Section 4.2.** | **Confirmed/Candidate**. See **Section 4.2.** |

| Significant Natural Feature | Status within the Site | Status on Adjacent Lands (i.e., <120 m from the Site) |
|---|---|---|
| Significant Areas of Natural and Scientific Interest | **Absent**. | **Absent**. |
| Habitat of Endangered and Threatened Species (per ESA) | **Candidate**. See **Section 4.3.** | **Confirmed**. See **Section 4.3.** |
| Fish Habitat (per *Fisheries Act*) | **Absent**. See **Section 4.4.** | **Absent**. See **Section 4.4.** |
| **County Natural System (certain components not considered by ARA Provincial Standards)** | | |
| Natural Hazards, Natural Environment Areas, Natural Heritage Features, Groundwater Features | **Confirmed**. See **Section 4.5.** | **Confirmed**. See **Section 4.5.** |

## 4.1 Significant Woodlands

The Deciduous Woodlot is a designated Significant Woodland per Appendix A of the Municipality's OP and Schedule C of the County's OP. The dripline of the Deciduous Woodlot (as field verified and recorded by Terrastory staff) is shown on **Figure 3**.

An assessment of potential effects to the Significant Woodland associated with the proposed pit operations plan is provided in **Section 6.1**.

## 4.2 Significant Wildlife Habitat

An assessment of the likelihood that any candidate or confirmed SWH features or areas occur within the Site is provided in **Appendix 5**. Based on the results of this assessment, three (3) SWH types are considered further through this study:

- Seasonal Concentration Areas of Animals
    1. Bat Maternity Colonies
    2. Reptile Hibernaculum
- Habitat of Species of Conservation Concern
    3. Special Concern and Rare Wildlife Species

Also based on this assessment, a total of six (6) Special Concern or provincially rare species are considered to have a possible likelihood of occurrence on the Subject Property given their habitat associations and current distribution in southern Ontario (or were confirmed during the 2020 fieldwork program):

1) Eastern Wood-pewee (*Contopus virens*)
2) Hackberry Emperor (*Asterocampa celtis*)
3) Tawny Emperor (*Asterocampa clyton*)
4) Monarch (*Danaus plexippus*)
5) Yellow-banded Bumblebee (*Bombus terricola*)
6) Cream Violet (*Viola striata*)

A general description of each SWH type and Special Concern/provincially rare species and their habitats within the Site is offered below. An assessment of potential effects to the

candidate/confirmed SWH features and Special Concern/provincially rare species associated with the proposed pit operations plan is provided in **Section 6.2**.

### 4.2.1 Bat Maternity Colonies

Big Brown Bat (*Eptesicus fuscus*) and Silver-haired Bat (*Lasionycteris noctivagans*) form maternity colonies that roost with pups in various features, particularly cracks, cavities, or loose bark associated with large-diameter trees (≥25 cm diameter at breast height), snags, and buildings. Snags/cavity trees in earlier stages of decay (i.e., decay classes 1-3) may be preferred.

The Deciduous Woodlot contains larger-diameter snags and cavity trees, and therefore provides candidate significant habitat for bat maternity colonies. Neither roost density surveys nor ultrasonic acoustic monitoring were undertaken through this study as the Deciduous Woodlot will be protected from extraction by an ecologically appropriate setback.

### 4.2.2 Reptile Hibernaculum

Snakes in Ontario hibernate in areas which provide access below the frost line or that do not freeze during winter. A wide array of features may function as snake hibernacula, including natural (e.g., small mammal burrows, crevices in bedrock, etc.) and human-built (e.g., rock piles, old stone foundations, etc.) features. Survey methodologies for confirming snake use of a potential hibernacula typically involve spring or (less preferred) fall surveys to identify congregations of snakes near their point of exit or emergence from a hibernaculum; however, such surveys may still produce a false negative (i.e., fail to successfully identify hibernacula) given the camouflaged, cryptic nature of snakes and variability in emergence/exit dates.

Candidate snake hibernacula, particularly small mammal burrows and small rock piles, were noted within the Deciduous Woodlot and in other parts of the Study Area (beyond the Site and Adjacent Lands). The Site is routinely tilled and maintained for cash crops; therefore, it is unlikely to support congregations of overwintering snakes (significant or otherwise).

### 4.2.3 Eastern Wood-pewee

Eastern Wood-pewee is designated Special Concern in Ontario per O. Reg. 230/08 pursuant to the *Endangered Species Act* (ESA) and is federally designated Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). This species is most commonly associated with relatively open, deciduous and mixed forests of various sizes, as well as forest edges and other areas with relatively continuous canopy cover (e.g., parks, cemeteries, etc.). This species' preference for open forests and forest edges may be attributed to its aerial foraging behaviour (COSEWIC 2012). Territory sizes were shown to average approximately 1.75 ha (representing a circle with a radius of 75 m) in a study in southern Ontario (as cited in COSEWIC 2012).

Eastern Wood-pewee was documented as a probable breeder (i.e., recorded in the same general location on two separate occasions ≥7days apart) at BB-4 in the Deciduous Woodlot.

### 4.2.4 Hackberry Emperor and Tawny Emperor

Hackberry Emperor and Tawny Emperor have a provincial rank of S3 (Vulnerable) and are therefore considered provincially rare. In Ontario, both species oviposit on Common Hackberry and Dwarf Hackberry (*Celtis tenuifolia*) and can generally be found in a variety of treed vegetation communities (e.g., forests, savannahs, hedgerows) containing their host plant. Adults may be

observed along forest edges, clearings, and trails (which provide thermoregulation opportunities) or nectaring on fermenting fruit or tree sap. Tawny Emperor is often overlooked due to its tendency to frequent the upper canopy. Both species visit wildflowers for nectar sources infrequently and likely do not contribute meaningfully to pollination. The primary flight period for adults of both species in the Carolinian Zone typically extends from mid/late June to early October.

Hackberry Emperor was documented at two (2) locations along the edge of the Deciduous Hedgerow (see **Figure 3**) which contains abundant Common Hackberry. Based on the time of year these individuals were documented (i.e., late June), it is likely they were reared from foliage associated with any number of mature Common Hackberry trees in the adjacent Deciduous Hedgerow. While Tawny Emperor was not observed, targeted butterfly surveys were not undertaken through this application and potential ovipositing habitat for this species is also present within the Deciduous Hedgerow.

### 4.2.5 Monarch

Monarch is designated Special Concern in Ontario per O. Reg. 230/08 pursuant to the ESA and is federally designated Endangered by COSEWIC. Monarch is well-known to be host-specific and oviposits exclusively on species of milkweed (*Asclepias* spp.). This species is a generalist forager and may nectar in any area with wildflowers.

Monarch was observed within the Subject Property and is expected to be relatively common in the wider landscape. While no confirmed breeding via observations of ovipositing individuals, eggs, or caterpillars was documented, the presence of Common Milkweed (*Asclepias syriaca*) indicates that Monarch may breed within the Subject Property.

### 4.2.6 Yellow-banded Bumble Bee

Yellow-banded Bumble Bee is designated Special Concern in Ontario per O. Reg. 230/08 pursuant to the ESA and is federally designated Special Concern by COSEWIC. This species occupies a range of open areas that contain nectaring sites and nests underground in abandoned rodent burrows or decomposing logs, typically in woodlands.

Current records in southern Ontario suggest that this species is associated with more densely forested landscapes north of the Carolinian zone. Notwithstanding this, given that the Subject Property provides potentially suitable nectaring, nesting, and overwintering habitat for this species, and bumble bee surveys were not undertaken as part of this study, the Study Area is assumed to contain suitable habitat for Yellow-banded Bumble Bee.

### 4.2.7 Cream Violet

Cream Violet has a provincial rank of S3 (Vulnerable) and is therefore considered provincially rare. In Ontario, this species can be found in rich deciduous forests, thickets by streams, and occasionally in swamps.

This species was documented in two (2) locations in the Deciduous Woodlot. Both populations contained several dozen individuals.

## 4.3 Habitat of Endangered and Threatened Species

An assessment of the likelihood that any Endangered and Threatened species or their habitats occur within the Subject Property or Adjacent Lands is provided in **Appendix 6**. A total of six (6) Endangered or Threatened species are considered to have a possible likelihood of occurrence on the Subject Property given their habitat associations and current distribution in southern Ontario (or were confirmed through the 2020 fieldwork program):

1) Little Brown Myotis (*Myotis lucifugus*)
2) Northern Myotis (*Myotis septentrionalis*)
3) Tri-colored Bat (*Perimyotis subflavus*)
4) Barn Swallow (*Hirundo rustica*)
5) Eastern Meadowlark (*Sturnella magna*)
6) Butternut (*Juglans cinerea*)

A general description of each Endangered/Threatened species and their habitat is offered below. An assessment of potential effects to these Endangered/Threatened species associated with the proposed pit operations plan is provided in **Section 6.3**.

### 4.3.1 Endangered Bats

Little Brown Myotis, Northern Myotis, and Tri-colored Bat have the potential to roost and forage within the Study Area. Each of these bat species is designated Endangered in Ontario per O. Reg. 230/08 pursuant to the ESA and are federally designated Endangered by COSEWIC. Little Brown Myotis and Northern Myotis form maternity colonies that roost in large-diameter trees with cracks, crevices, and/or exfoliating bark; Little Brown Myotis will also frequently roost in buildings (e.g., attics, barns, etc.). Roosting sites for Tri-colored Bat maternity colonies are less understood but have been documented in dead or dying leaf clusters of oaks (*Quercus* spp.) and maples (*Acer* spp.), along with live foliage and buildings (Humphrey and Fotherby 2019). Individuals (i.e., non-reproductive females and males) of all three bat species may roost in smaller diameter trees and other spaces (e.g., beneath house siding, etc.) which are not occupied by maternity colonies. Overwintering habitat includes caves and mines that maintain temperatures above 0°C. White Nose Syndrome (a fungal disease caused by an introduced pathogen) has devastated populations of each species across their ranges. The fungus causes hibernating individuals to become dehydrated, leading to excessive arousal, depleted fat reserves, and ultimately emaciation and/or death.

The Deciduous Woodlot contains larger-diameter snags and cavity trees, and therefore provides candidate roosting habitat for both maternity colonies and individuals of Little Brown Myotis and Northern Myotis. The Deciduous Woodlot is also dominated by mature Sugar Maple and therefore may also support roosting by Tri-colored Bat. Neither roost density surveys nor ultrasonic acoustic monitoring were undertaken through this study as the Deciduous Woodlot will be protected from extraction by an ecologically appropriate setback.

### 4.3.2 Barn Swallow

Barn Swallow is designated Threatened in Ontario per O. Reg. 230/08 pursuant to the ESA and is federally designated Threatened by COSEWIC. Prior to European settlement Barn Swallow nested in or on natural features (e.g., caves, cliff faces, etc.); today most nesting is associated with built structures such as barns, bridge/culvert undersides, and awnings/overhangs on the sides of buildings (COSEWIC 2011a). Foraging habitat includes a variety of open areas such as agricultural

lands, old fields, and open water. Foraging distances from nest sites depend on habitat quality and social characteristics, but have been found to extend greater than one (1) kilometre (Brown and Brown 1999) though may only average a few hundred metres for most forays (Turner 1981).

Several Barn Swallow was documented flying into a barn just north of the residence on the Subject Property, which is indicative of nesting. This species was also documented foraging over the agricultural fields at BB-6.

### 4.3.3 Eastern Meadowlark

Eastern Meadowlark is designated Threatened in Ontario and federally designated Threatened by COSEWIC. This species may have been rare in southern Ontario prior to European settlement and was likely associated with tallgrass prairie habitats in the southwest. Eastern Meadowlark is considered area-sensitive and may tolerate greater shrub cover (i.e., up to 25%) than other grassland bird species that occupy similar habitats (COSEWIC 2011b).

Eastern Meadowlark was documented as a possible breeder (i.e., recorded once during the breeding season) in a meadow habitat on Adjacent Lands to the west. A review of aerial photographs suggests that this meadow may be maintained (i.e., cut, possibly for hay) in some years.

### 4.3.4 Butternut

Butternut is designated Endangered in Ontario per O. Reg. 230/08 pursuant to the *Endangered Species Act* (ESA) and is also listed as Endangered on Schedule 1 of the *Species at Risk Act*. This species occupies a wide variety of woodland types in southern Ontario and may be found in most treed habitats (including hedgerows) except the wettest or driest. Butternut requires partial sun exposure to carry out its physiological processes, but individuals may persist in shaded forests as canopy constituents or seedlings/saplings awaiting release. The abundance and condition of Butternut throughout eastern North America is in serious decline due to Butternut Canker (*Ophiognomonia clavigignenti-juglandacearum*), a fungal disease introduced to North America in the mid-nineteenth century.

Butternut was documented at two (2) locations on the Subject Property northeast of Adjacent Lands, approximately 150 m from the limit of extraction (see **Figure 3**).

## 4.4 Fish Habitat

The Municipal Drain mapped from the northern portion of the Subject Property lacks a surface expression and appears to be buried. No surface water features that could support fish (directly or indirectly) are present within the Study Area, with the exception of an isolated pond on the Subject Property along Nissouri Road. This pond is not directly connected to any other surface water bodies and is approximately 250 m from the proposed limit of extraction.

## 4.5 County Natural System

The Deciduous Woodlot is a designated Significant Woodland per Schedule C of the County's OP. The presence of Significant Woodland indicates that the Deciduous Woodlot forms part of the County Natural System and is therefore subject to applicable policies outlined in section 2.2.1 of the County OP.

# 5 PHASING, OPERATIONS, AND REHABILITATION PLANS

The Applicant is applying for a new Category 3, Class A licence to facilitate above-water pit extraction within the Site. The ARA plans are provided in **Appendix 7**. The total area to be licensed, extracted, and rehabilitated is as follows:

- Total area to be licensed: 14.2 hectares
- Total area to be extracted: 12.0 hectares
- Total area to be rehabilitated: 12.0 hectares

The operations plan consists of three (3) phases of extraction/rehabilitation (A-C) overlapping with two (2) areas (Areas 1 and 2), generally proceeding westward from a 0 m setback on the eastern licence boundary. The Site will remain in agricultural use until extraction commences. Extraction will generally proceed as follows:

- Establish the entrance/exit and haul road into the Site at Thorndale Road.
- Construct the proposed scale, scalehouse, and/or office and fuel storage areas.
- Construct or upgrade the perimeter fencing.
- Prior to extraction, strip topsoil and overburden separately and use the materials to construct acoustic berms #1 and #2.
- Commence above-water extraction of Area 1 in a westerly direction.
- Following completion of extraction in Area 1, begin stripping topsoil and overburden separately and use to construct acoustic berm #2.
- Begin extraction of Area 2 in a westerly direction, completing the rehabilitation of Area 1 and depleted portions of Area 2.
- Following completion of extraction in Area 2, remove the scale and scalehouse and all scrap and equipment, while completing rehabilitation of remaining areas using topsoil and overburden stockpiled in the acoustic berms.
- Return the Site to agriculture.

# 6 EFFECTS ASSESSMENT AND MITIGATION

The purpose of this NER is to present a biophysical characterization of the Study Area as a means to identify the potential for adverse effects on the natural environment and natural heritage features stemming from the proposed pit extraction activities. Several significant natural features and species were documented (or may occur) within the Site pursuant to the assessments in **Section 3.3.4**. The following effects assessment provides an evaluation of the potential for the proposed pit application to result in negative effects to such environmental components and offers technical recommendations to mitigate such effects where warranted. Certain technical recommendations offered herein apply to several natural features and/or species simultaneously; as such, all technical recommendations should be read and considered in their entirety. The baseline or existing conditions against which the application is assessed are treated as the state of the Site at the time of the site assessments. The effects assessment herein is based on the Site Plans provided in **Appendix 7**.

All pits and quarries in Ontario are subject to a set of standards and conditions which are specific to the type of licence being applied for. The effects assessment herein assumes that all pit operations

within the Site will be undertaken consistent with the Prescribed Conditions for Category 3, Class A licences and the Operational Standards which pertain to all licence categories. Such conditions and standards that have bearing on protection of the natural environment are not duplicated as technical recommendations herein as they already represent licence requirements. Relevant Prescribed Standards and Operational Standards include the following:

- Dust will be mitigated, and the use of dust suppressants will be applied to internal haul roads and processing areas as required (Prescribed Standard 3.1 and 3.2).
- A Spills Contingency Program will be developed prior to site preparation (Prescribed Standard 3.5).
- Fuel storage tanks will be installed and maintained according to the *Gasoline Handling Act* (Prescribed Standard 3.6).
- If required, an Environmental Compliance Approval will be secured for water discharged off-site (Prescribed Standard 3.7).
- If required, a Permit to Take Water will be secured (Prescribed Standard 3.9).
- Topsoil will be stripped sequentially prior to aggregate extraction (Operational Standard 5.4).
- Topsoil and overburden stripped during the operation will be stored separately with vegetated stable slopes (Operational Standard 5.6).
- Adequate vegetation will be established and maintained to control erosion of any berm or stockpile (Operational Standard 5.7).
- Scrap cannot be located within 30 m of any body of water and 30 metres from the boundary of the Site (Operational Standard 5.9).
- Excavation is to be set back 15 metres from the boundaries of the Site and 30 metres from any body of water that is not the result of excavation below the water table (Operational Standard 5.10).
- All excavation faces are to be stabilized to prevent erosion (Operational Standard 5.12).
- All stripped topsoil or overburden will be used in the rehabilitation of the Site (Operational Standard 5.17).
- Adequate vegetation is established and maintained to control erosion of any topsoil or overburden replaced for rehabilitation purposes (Operational Standard 5.18).
- Rehabilitation will ensure adequate drainage and vegetation is provided and any compaction is alleviated (Operational Standard 5.21).

Technical recommendations above and beyond the aforementioned conditions and standards are offered in **Section 6.4** to avoid and/or minimize impacts to the significant natural features identified. Certain technical recommendations apply to several natural features and/or species simultaneously; as such, all technical recommendations should read and considered in their entirety. All technical recommendations offered herein are incorporated into the ARA Site Plans provided in **Appendix 7** while the recommended feature and habitat setbacks from the Deciduous Woodlot are also shown on **Figure 3**.

## 6.1 Significant Woodlands

Where development and/or site alteration activities are proposed within or adjacent to forests or woodlands, adverse effects may occur via the following pathways:

- Direct vegetation removal (e.g., trees, shrubs, herbaceous vegetation, etc.), resulting in loss of woodland area and functions (e.g., wildlife habitat, carbon sequestration, runoff attenuation, etc.).
- Mechanical injury to the trunk, roots, branches, and/or foliage of retained woody vegetation.
- Soil compaction from the use of heavy machinery.
- Smothering or exposure of roots due to changes in grade.
- Noise and/or light pollution that may adversely affect the ability of woodland wildlife to successfully carry out their life processes (e.g., breeding, feeding, etc.).
- Increased human activity (i.e., encroachment) within or adjacent to the woodland which may result in soil compaction, dumping, etc.

The Deciduous Woodlot is a designated Significant Woodland per Appendix A of the Municipality's OP and Schedule C of the County's OP. The dripline of the Deciduous Woodlot is shown on **Figure 3**. The Operations Plan incorporates a 15 m setback from the dripline of the Significant Woodland as delineated by Terrastory in the field. As outlined in **Section 6.4**, the 15 m setback will be well-marked (i.e., staked, etc.) prior to adjacent pit operations and will become natural, self-sustaining vegetation to establish an enhanced buffer from extraction.

## 6.2 Significant Wildlife Habitat

Per the assessment in **Section 4.2**, a total of three (3) SWH types were considered further through this study:

- Seasonal Concentration Areas of Animals
    1. Bat Maternity Colonies
    2. Reptile Hibernaculum
- Habitat of Species of Conservation Concern
    3. Special Concern and Rare Wildlife Species

Also based on this assessment, a total of six (6) Special Concern or provincially rare species are considered to have a possible likelihood of occurrence on the Subject Property (or were confirmed) given their habitat associations and current distribution in southern Ontario:

1) Eastern Wood-pewee (*Contopus virens*)
2) Hackberry Emperor (*Asterocampa celtis*)
3) Tawny Emperor (*Asterocampa clyton*)
4) Monarch (*Danaus plexippus*)
5) Yellow-banded Bumblebee (*Bombus terricola*)
6) Cream Violet (*Viola striata*)

All SWH types and Special Concern/provincially rare species associated with the Deciduous Woodlot will be adequately protected by the recommended 15 setback (and additional technical recommendations outlined in **Section 6.4**). This includes candidate habitat for bat maternity colonies, candidate reptile hibernacula, probable breeding habitat for Eastern Wood-pewee, and two (2) populations of Cream Violet.

The Deciduous Hedgerow provides probable ovipositing habitat for Hackberry Emperor (given observation of adults nearby) and candidate ovipositing habitat for Tawny Emperor. The entire

hedgerow and dripline are contained within the 15 m setback from the licence boundary (required through Operational Standard 5.10). An acoustic berm has not been incorporated into the western licence boundary, thereby avoiding root impacts and maintaining the existing light regime to the hedgerow vegetation.

No specific recommendations are offered herein to minimize impacts to potential foraging and breeding habitat for Monarch or Yellow-banded Bumblebee. Both species are habitat generalists and abundant nectaring habitat exists within the wider landscape surrounding the Subject Property. Oviposition sites for Monarch (e.g., Common Milkweed), overwintering habitat for Yellow-banded Bumblebee, and general nectaring habitat for both species is present within the wider local landscape.

## 6.3 Habitat of Endangered and Threatened Species

Per the assessment in **Appendix 6**, a total of six (6) Endangered or Threatened species are considered to have a possible likelihood of occurrence on the Subject Property given their habitat associations and current distribution in southern Ontario (or were confirmed based on the 2020 fieldwork program):

1) Little Brown Myotis (*Myotis lucifugus*)
2) Northern Myotis (*Myotis septentrionalis*)
3) Tri-colored Bat (*Perimyotis subflavus*)
4) Barn Swallow (*Hirundo rustica*)
5) Eastern Meadowlark (*Sturnella magna*)
6) Butternut (*Juglans cinerea*)

No impacts to individuals or the habitat of Butternut or Barn Swallow are anticipated through this application. Both documented locations of Butternut and confirmed nesting habitat for Barn Swallow (i.e., barn northeast of the residence) occur on the Subject Project but beyond Adjacent Lands.

No impacts to individuals or the habitat of Eastern Meadowlark are anticipated through this application. Possible breeding habitat for this this species occurs on Adjacent Lands to the west at a sufficient distance from the limit of pit extraction.

Roosting habitat for Endangered bats (including both individuals and maternity colonies) is present within the Deciduous Woodlot, which will be protected by a 15 m setback. The Deciduous Hedgerow (which also contains mature trees) is also situated outside the extraction limit and will be protected through this application (to maintain probable ovipositing habitat for Hackberry Emperor). Notwithstanding this, it is possible that minor woody vegetation removal could be required (outside the Deciduous Woodlot and Deciduous Hedgerow) at some point during pit operations. As such, a timing restriction on vegetation removal is advised. To simplify the site plan requirements, the tree removal timing window recommended in **Section 6.4** combines both the principal bat activity period and bird nesting period (in Ecoregion 6E) to address overlapping requirements of the *Migratory Birds Convention Act* (protection of migratory bird nests) and *Fish and Wildlife Conservation Act* (protection of certain non-migratory bird nests).

### 6.4 Natural Environment Technical Recommendations

In addition to the 15 m dripline setback from the Deciduous Woodlot incorporated directly into the Operations Plan, the following measures are recommended and have been incorporated as Site Plan notes:

- **The 15 m setback from the dripline of the Deciduous Woodlot will be well-marked under the direction of a qualified Ecologist prior to the commencement of adjacent pit operations.**
- **The 15 m setback from the dripline of the Deciduous Woodlot will become natural, self-sustaining vegetation.**
- **The dripline of the Deciduous Hedgerow will be well-marked under the direction of a qualified Ecologist prior to the commencement of adjacent pit operations.**
- **All necessary removal of vegetation to support pit operations will be completed outside the primary bird nesting and bat activity periods (i.e., to be completed between October 1 and March 31).**

To minimize impacts to wildlife habitat and activities within the Deciduous Woodlot during future pit operations, the following measure is recommended:

- **Any necessary lighting to support pit operations will be directed away from the Deciduous Woodlot to the extent practicable.**

## 7 APPLICABLE NATURAL HERITAGE AND ENVIRONMENTAL POLICIES

The following sections summarize the various municipal, provincial, and federal environmental policies that apply to the proposed pit operations plan and describe how the recommendations provided in this study will address these policies (where applicable).

### 7.1 Municipality of Thames Centre Official Plan (October 2020 consolidation)

The Municipality's OP is a legal document prepared as required under section 14.7(3) of the *Planning Act*. An OP sets out goals, objectives, and policies that direct and manage land-use and future development activities and their effects on the social and natural environment of a municipality. Provincial plans that offer direction on matters of provincial interest are implemented principally through the Municipality's OP. Provided herein is a description of relevant environmental and natural heritage policies contained within the Municipality's OP and an assessment of whether the application addresses such policies.

The Subject Property is primarily designated Agricultural per Schedule A of the Municipality's Official Plan (OP) and zoned Agricultural per Map 13 of Zoning By-law No. 75-2006. The Deciduous Woodlot is designated Natural Area and zoned Environmental Protection (EP). The Deciduous Woodlot also contains a natural feature overlay designation (Significant Woodland - 4 Hectares or Greater in Area) per Appendix 1 of the Municipality's OP.

A list of key natural heritage provisions of the Municipality's OP that pertain to the pit application considered herein is provided below.

- **Section 3.2** outlines the Natural Heritage Feature and Natural Hazard Area policies.
- **Section 3.2.1** outlines the components of the Thames Centre "Green-space" System, which includes:
    - Group A Features – Provincially Significant Wetlands, Habitat for Endangered and Threatened Species, and Fish Habitat.
        - Development or site alteration is generally prohibited in Group A Features.
    - Group B Features – Regionally Significant Woodlands, Significant Woodlands and woodland patches identified by the Middlesex Natural Heritage Study, Significant Valleylands, Significant Wildlife Habitat, Provincially Significant ANSIs, Regionally Significant ANSIs, and ESAs.
        - Development and site alteration may be permitted in Group B Features provided no negative impacts to the features or their associated functions.
    - Group C Features – Stream Corridors and Floodplains, natural hazard lands.
        - Development and site alteration may be permitted where compliance with the natural heritage and hazard policies of the OP can be demonstrated and Conservation Authority requirements are addressed.
- **Section 3.2.2** offers the goals of the Natural Heritage "Green-Space" System, including (amongst others) 1) the identification, protection, and enhancement of natural and environmental features and functions, and 2) recognition that natural heritage and environmental features relate to one another and are best protected through a landscape approach.
- **Section 3.2.3.1** requires the submission of an Environmental Impact Study (EIS) in support of proposals for new development or site alteration where such applications are near or within the general locations of all Group A, B, or C Features.

The results of this study have confirmed the presence of the following Natural Heritage "Green-Space" System components:

- Candidate habitat for Endangered bats in the Deciduous Woodlot (Group A Feature).
- Significant Woodland and candidate/confirmed Significant Wildlife Habitat within the Deciduous Woodlot (Group B Feature).
- Confirmed Significant Wildlife Habitat (probable ovipositing habitat for Hackberry Emperor) in the Deciduous Hedgerow along the western boundary of the Site (Group B Feature).

Terrastory reviewed potential impacts to the identified Green-space System components in **Section 6** of this NER. The Site Plan includes an extraction setback of 15 m from the dripline of the Deciduous Woodlot, and no extraction or disturbances (i.e., acoustic berm) will extend within the dripline of the Deciduous Hedgerow (which contains SWH). Provided that Terrastory's recommended mitigation measures are implemented in full (per **Section 6.4**), no negative impacts are anticipated to any natural feature that forms part of the Municipality's Green-Space System.

## 7.2 Middlesex County Official Plan (2006 consolidation)

A list of key provisions from Middlesex County's OP that pertain to the protection of natural heritage features and areas are provided below.

- **Section 2.2.1** identifies the components of the County Natural System as including the following:
  - Natural Hazards (e.g., steep slopes, unstable soils, fill regulated areas);
  - Natural Environment Areas (e.g., floodplains, flood regulated watercourses, wetlands);
  - Natural Heritage Features (e.g., significant woodlands, wildlife habitat, aquatic ecosystems, river, stream, ravines, and upland corridors, ANSIs, etc.); and
  - Groundwater Features (e.g., recharge areas, discharge/headwater areas, well-head protection areas).
- **Section 2.2.1.2** provides general policies for the County's Natural System, including the need to direct new development away from the Natural System (where possible) and the need to prepare a Development Assessment Report (DAR) which summarizes the proposed development, on-site natural features, potential impacts, and recommended mitigation measures.
- **Section 2.2.1.3** provides more specific policies for the County's Natural System, including:
  - A prohibition on development in Natural Environment Areas on Schedule A and Significant portions of Endangered Species Habitats.
  - An allowance for limited development within portions of the County's Natural System where it can be demonstrated that no negative impact on the natural features or their ecological functions will occur.

The Deciduous Woodlot is a designated Significant Woodland per Schedule C of the County's OP and also contains candidate/confirmed SWH. As the Deciduous Woodlot is a Significant Woodland and the adjoining Deciduous Hedgerow contains confirmed SWH, these features form part of the County Natural System. Development in the vicinity of the County Natural System is subject to applicable Natural System Policies of the County OP.

The County's natural heritage policies are generally consistent with the Municipality's OP as described in **Section 7.1**. Given that Terrastory's technical recommendations have been incorporated into the ARA site plans, no impacts to any significant natural heritage feature protected by the County's OP are anticipated.

## 7.3 Aggregate Resources Act, R.S. O. 1990, c. A.8

The information and recommendations provided in this report satisfy the requirements for Natural Environment Level 1 and Level 2 Assessments pursuant to a Category 3, Class A licence:

> 2.2.1 Natural Environment Level 1: determine whether any of the following features exist on and within 120 metres of the site: significant wetland, significant portions of the habitat of endangered or threatened species, fish habitat, significant woodlands (south and east of the Canadian Shield), significant valley lands (south and east of the Canadian Shield), significant wildlife habitat and significant areas of natural and scientific interest; and

2.2.2 Natural Environment Level 2: impact assessment where the Level 1 identified any features on and within 120 metres of the site in order to determine any negative impacts on the natural features or ecological functions for which the area is identified, and any proposed preventative, mitigative or remedial measures.

The following significant natural features per ARA policies were identified within the Study Area:

- Significant Woodland (Deciduous Woodlot).
- Candidate or Confirmed Significant Wildlife Habitat, including:
  - Bat Maternity Colonies (candidate);
  - Reptile Hibernaculum (candidate);
  - Eastern Wood-pewee (confirmed);
  - Hackberry Emperor (confirmed) and Tawny Emperor (candidate);
  - Monarch (candidate);
  - Yellow-banded Bumble Bee (candidate); and
  - Cream Violet.
- Candidate or Confirmed Habitat of Endangered and Threatened Species, including:
  - Barn Swallow (confirmed nesting beyond Adjacent Lands);
  - Eastern Meadowlark (confirmed, Adjacent Lands only);
  - Butternut (confirmed, 2 individuals documented beyond Adjacent Lands);
  - Little Brown Myotis, Northern Myotis, and Tri-colored Bat (candidate).

The extraction limit incorporated into the Site Plan is set back 15 m from the dripline of the Deciduous Woodlot. This setback, in combination with additional technical recommendations outlined in **Section 6.4** and incorporated directly into the ARA site plans, allow for appropriate protection of all significant natural features overlapping with the Deciduous Woodlot and adjacent Deciduous Hedgerow consistent with the ARA Provincial Standards.

## 7.4 Provincial Policy Statement 2020, pursuant to the Planning Act, R.S.O. 1990, c. P. 13

The Provincial Policy Study (PPS) is promulgated under the authority of the *Planning Act* and came into effect on 1 May 2020. The PPS provides direction to municipalities on land-use matters of provincial interest and sets the policy framework for regulating the use and development of land. Municipal OP's must be consistent with the PPS. Per its preamble, the PPS *provides for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment*.

The principal PPS policies that apply to natural heritage protection are outlined in section 2.1. While recognizing that the natural heritage protection framework is not intended to limit the ability of agricultural uses to continue (Policy 2.1.9), the PPS instructs that *natural features and areas shall be protected for the long term* (Policy 2.1.1) and that their diversity and connectivity be *maintained, restored or, where possible, improved* (Policy 2.1.2). In Ecoregions 6E and 7E the PPS separates significant features into three categories:

1) Those in which development and site alteration are not permitted, including 1) Provincially Significant Wetlands and 2) Significant Coastal Wetlands (Policy 2.1.4);
2) Those in which development and site alteration are not permitted unless it can be demonstrated that no negative impacts on the significant natural feature and/or its functions

will occur, including: 1) Significant Woodlands, 2) Significant Valleylands, 3) Significant Wildlife Habitat, 4) Significant Areas of Natural and Scientific Interest, 5) Non-significant Coastal wetlands, and 6) Adjacent Lands (Policy 2.1.5 and 2.1.8).

3) Those in which development and site alteration are not permitted except in accordance with federal/provincial requirements, including: 1) fish habitat (Policy 2.1.6) and 2) habitat of Endangered and Threatened Species (Policy 2.1.7).

In considering the aforementioned PPS policies, it has been determined that the proposed pit operations plan addresses relevant natural heritage provisions of the PPS for the following reasons:

- Per **Table 4** of this report, no Significant Wetlands, Areas of Natural or Scientific Interest, or Valleylands are present within the Study Area.
- Per **Section 6** of this report, no negative impacts to the Significant Woodland and overlapping candidate/confirmed Significant Wildlife Habitat in the Deciduous Woodlot are anticipated given the setbacks incorporated into the proposed pit operations plan.
- Per **Section 6** of this report, no negative impacts to Significant Wildlife Habitat in the Deciduous Hedgerow are anticipated given the setbacks incorporated into the proposed pit operations plan.

## 7.5 Provincial Endangered Species Act, S.O. 2007, c. 6

The *Endangered Species Act* (ESA) is administered by MECP and protects designated Endangered and Threatened species in Ontario from being killed, harmed, or harassed (s. 9) or having their habitat damaged or destroyed (s. 10). The protection afforded to Endangered and Threatened species "habitat" is either prescribed by O. Reg. 242/08, or (for those species that lack regulated habitat) is defined as *an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding.* Activities that constitute habitat damage and/or destruction can only proceed subject to requirements of s. 17 or (in limited circumstances) an activity registration under O. Reg. 242/08.

A detailed assessment of potential Endangered and Threatened habitat within the Study Area is provided in **Appendix 6**. Per this assessment, and provided that relevant technical recommendations outlined in **Section 6.4** are implemented in full, it has been determined that the proposed development plan is consistent with the species and habitat protection provisions of the ESA.

## 7.6 Federal *Fisheries Act*, R.S.C. 1985, c. F-14

The amended federal *Fisheries Act* (Bill C-68) received Royal Assent in June 2019 while the updated fish and fish habitat protection provisions came into force in August 2019. Subsection 34.4(1) of the amended *Fisheries Act* prohibits all work, undertaking, or activity from causing the death of fish (other than fishing). Subsection 35(1) requires that project activities not result in the "*harmful alteration, disruption or destruction of fish habitat*" (HADD) unless undertaken in accordance with the requirements of a statutory exemption per subsection 35(2). Based on the Fish and Fish Habitat Protection Policy Statement (August 2019), HADD is interpreted by DFO to include "*any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes of fish*".

Surface water features that directly or indirectly support fish or fish habitat (as defined in the *Fisheries Act*) are absent from the Study Area.

### 7.7 Federal *Migratory Birds Convention Act*, S.C. 1994, c. 22

Section 6 of the Migratory Birds Regulations under the *Migratory Birds Convention Act, 1994* (MBCA) prohibits the disturbance or destruction of nests, eggs, or nest shelters of a migratory bird. The provincial *Fish and Wildlife Conservation Act, 1997* extends the protection of bird nests and eggs to certain species not listed under the Migratory Birds Regulations (e.g., Corvids, Strigids, Accipitrids, etc.).

Provided that the recommendations outlined in **Section 6.4** are implemented in full (i.e., prohibition on vegetation removal during the bird breeding season), no impacts to breeding birds or bird nests protected by the MBCA or FWCA are anticipated.

## 8 CONCLUSIONS

In accordance with the application standards for Category 3, Class A pit licences pursuant to the *Aggregate Resources Act*, the preceding Level I & II Natural Environment Report provides a detailed characterization of the natural environment occurring within and adjacent to the proposed Elliot Pit. This NER has been prepared in support of the ARA licence application along with Official Plan Amendment and Zoning By-law Amendment applications to the Municipality of Thames Centre. Included herein is a comprehensive approach to identifying the presence or absence of several significant natural features afforded varying degrees of protection by applicable environmental policies, particularly the ARA Provincial Standards, PPS, Municipal/County OPs, and *Endangered Species Act*. Potential negative impacts to the identified significant natural features are described with mitigation measures and technical recommendations offered to avoid or minimize such impacts and/or offer enhancements as appropriate.

Based on the findings presented in this report, the following natural features with ecological and/or policy significance have been identified within the Study Area:

- **Significant Woodland** and confirmed **Significant Wildlife Habitat** (Eastern Wood-pewee and Cream Violet) within the Deciduous Woodlot.
- Confirmed **Significant Wildlife Habitat** (Hackberry Emperor) within the Deciduous Woodlot.
- Other candidate **Significant Wildlife Habitats** (e.g., bat maternity colonies, etc.) within the Deciduous Woodlot.
- Potential roosting and feeding habitat for **Endangered Bats** in the Deciduous Woodlot.
- Possible breeding habitat for the **Eastern Meadowlark** on Adjacent Lands to the west.
- Two (2) documented locations of **Butternut** and a nesting area (barn) for **Barn Swallow** on the Subject Property (outside the Site and Adjacent Lands).

The extraction limit incorporates a 15 m dripline setback from the Deciduous Woodlot and 15 m setback from the western Site boundary (i.e., no extraction is proposed within the dripline of the Deciduous Hedgerow). The 15 m setbacks will become natural, self-sustaining vegetation, and no acoustic berms have been specified for these areas. Overall, it has been determined that no negative impacts to the above-noted significant natural features will occur provided that all technical

recommendations are implemented in full. The ARA Site Plan that directs and constrains pit operations (**Appendix 7**) incorporates all technical recommendations made herein.

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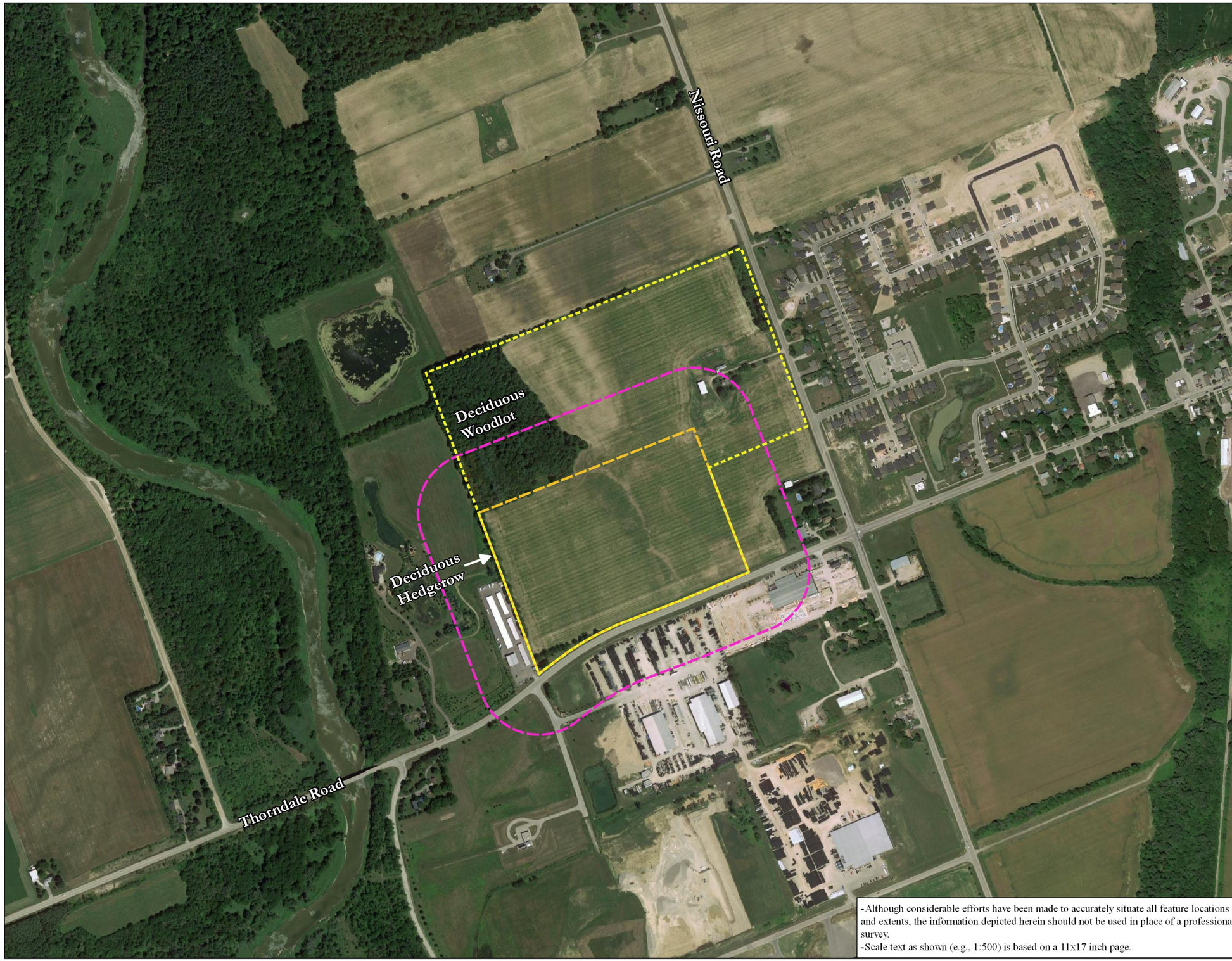
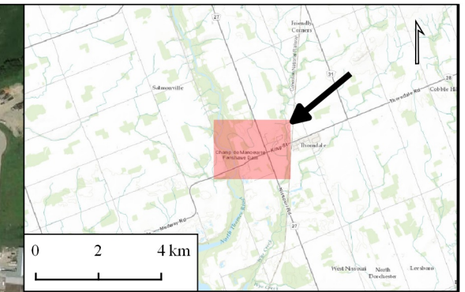



## Legend

Study Area

- Subject Property
- Site
- Adjacent Lands (Site + 120 m)

TERRASTORY
environmental consulting inc.

| 1:7,500 | 0 100 200 300 m |
|---|---|

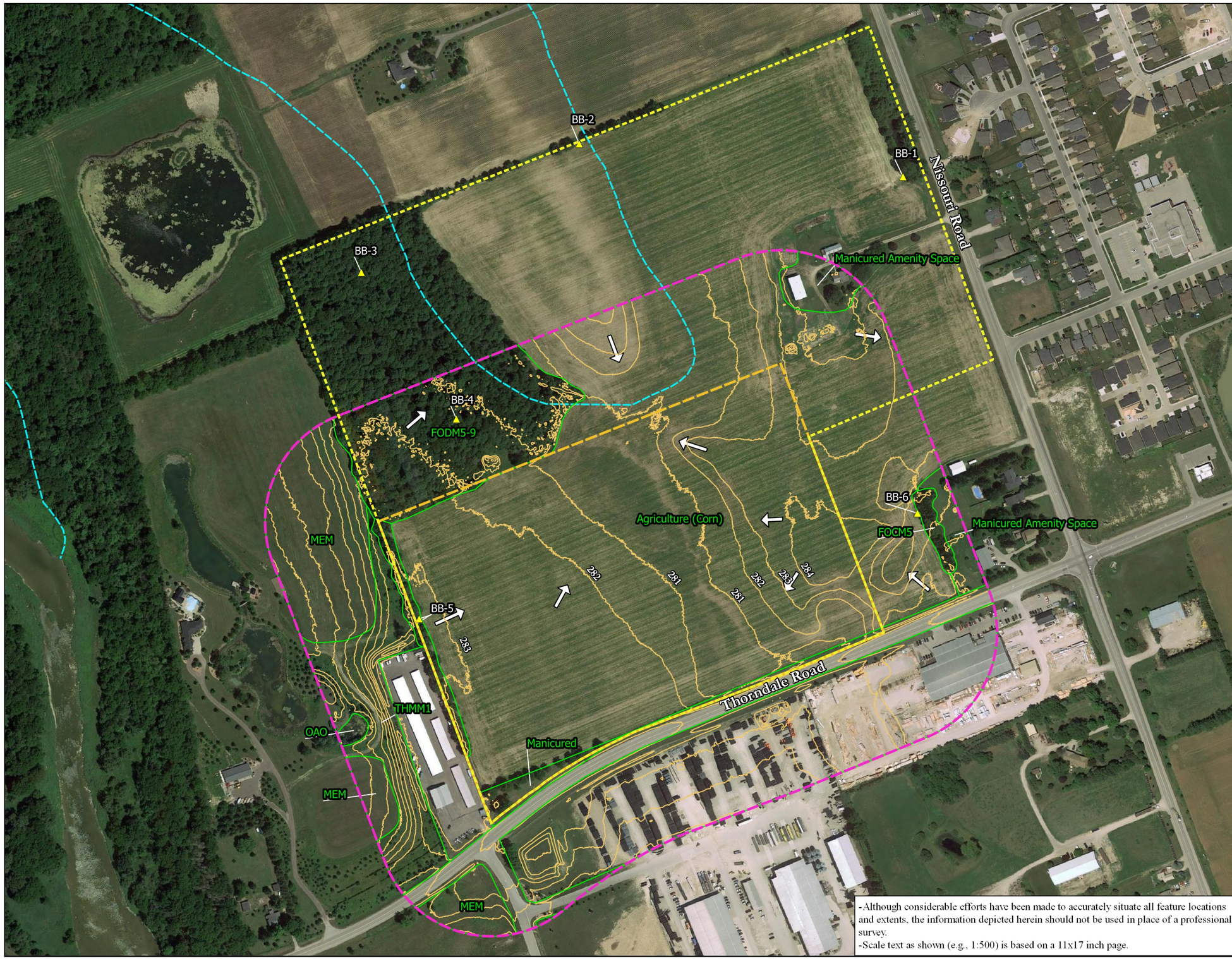
| N | Project No.: 2047 | By: TK | Date: 2020-12-21 |
|---|---|---|---|

**Orthophotograph Date:** July 2018 (Google Maps).

**Location:** 21875 Nissouri Road, Municipality of Thames Centre (Thorndale).

**Figure 1.** Location of the Site.

-Although considerable efforts have been made to accurately situate all feature locations and extents, the information depicted herein should not be used in place of a professional survey.
-Scale text as shown (e.g., 1:500) is based on a 11x17 inch page.




## Legend

Study Area

- Subject Property
- Site
- Adjacent Lands (Site + 120 m)

Survey Stations

- Breeding Bird Survey Stations

Biophysical Conditions - Terrastory

- Vegetation Communities
- Topographic Contours (Provincial DTM, 1 m)
- Runoff Direction
- Unnamed Municipal Drain (assumed buried)

**Vegetation Community Codes:**

UPLAND
FODM5-9: Dry - Fresh Sugar Maple - Hardwood Deciduous Forest
FODM11: Naturalized Deciduous Hedgerow
FOCM5: Naturalized Coniferous Hedgerow
THMM1: Dry - Fresh Mixed Regeneration Thicket
MEM: Mixed Meadow

WETLAND / AQUATIC
OAO: Open Aquatic

TERRASTORY
environmental consulting inc.

| 1:4,000 | 0 50 100 150 m |
|---|---|

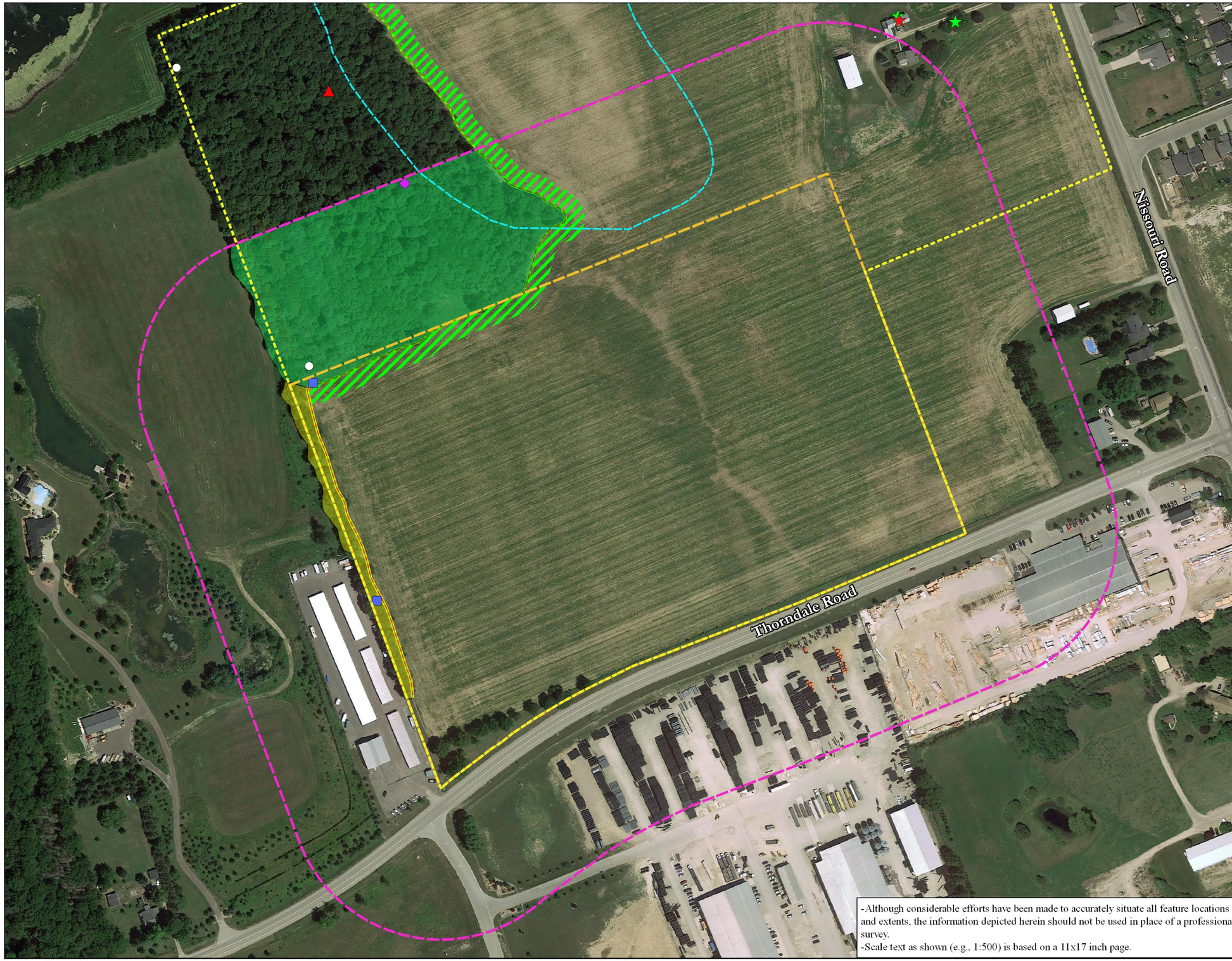
| N | Project No.: 2047 | By: TK | Date: 2020-12-21 |
|---|---|---|---|

**Orthophotograph Date:** July 2018 (Google Maps).

**Location:** 21875 Nissouri Road, Municipality of Thames Centre (Thorndale).

**Figure 2.** Biophysical Features and Conditions.

-Although considerable efforts have been made to accurately situate all feature locations and extents, the information depicted herein should not be used in place of a professional survey.
-Scale text as shown (e.g., 1:500) is based on a 11x17 inch page.




## Legend

Study Area

- Subject Property
- Site
- Adjacent Lands (Site + 120 m)

Biophysical Conditions - Terrastory

- Unnamed Municipal Drain (assumed buried)

Significant Natural Features - Terrastory

Species and/or Habitats of Conservation Interest

- Eastern Wood-pewee - Probable Breeding Location
- Hackberry Emperor - S3
- Cream Violet (Viola striata) - S3
- Red-tailed Hawk - Active Stick Nest

Significant Natural Features

- Significant Woodland
- Significant Wildlife Habitat (breeding habitat for Hackberry Emperor)

Provincially Endangered/Threatened Species

- Barn Swallow - Nesting Area
- Butternut (Juglans cinerea)

Significant Natural Feature Boundaries

- Dripline of Significant Woodland
- Dripline of Hedgerow containing Oviposition Habitat for Hackberry Emperor

Mitigation Measures Recommended - Terrastory

- 15 m Setback from Significant Woodland

TERRASTORY
environmental consulting inc.

1:3,000

0 25 50 75 100 m

| N | Project No.: 2047 | By: TK | Date: 2020-12-22 |
|---|---|---|---|

**Orthophotograph Date:** July 2018 (Google Maps).

**Location:** 21875 Nissouri Road, Municipality of Thames Centre (Thorndale).

**Figure 3.** Significant Natural Features.

-Although considerable efforts have been made to accurately situate all feature locations and extents, the information depicted herein should not be used in place of a professional survey.
-Scale text as shown (e.g., 1:500) is based on a 11x17 inch page.

# **Appendix 1.** Curriculum Vitae

TERRASTORY
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**Tristan L. Knight,** M.E.S., M.Sc.
**Senior Ecologist / President**
**Curriculum Vitae**

## CAREER HISTORY AND EDUCATION

| | |
|---|---|
| **2018–Present** | **Senior Ecologist / President, Terrastory Environmental Consulting Inc.** |
| 2014 – 2018 | Ecologist / Botanist, RiverStone Environmental Solutions Inc. |
| 2013–2014 | Watershed Restoration Technician, Credit Valley Conservation Authority |
| 2012–2013 | Terrestrial Ecologist, Aquafor Beech Ltd. |
| 2011–2012 | Wetland Biologist / Asst. SAR Biologist, Ontario Ministry of Natural Resources |
| 2009–2011 | Master of Science, SUNY College of Environmental Science and Forestry, Syracuse, NY, USA |
| 2007–2009 | Master of Environmental Studies, York University, Toronto, ON |
| 2003–2007 | Hons. Bachelor of Arts, University of Western Ontario, London, ON |

## RELEVANT CERTIFICATIONS AND TRAINING

| | |
|---|---|
| 2019 | Butternut Health Assessor renewal (#268) |
| 2018 | Certified Inspector of Sediment and Erosion Control training |
| 2016 | Tree Risk Assessment Qualification (TRAQ) |
| 2016 | Managed Forest Plan Approver (#421) |
| 2015 | Vegetation Sampling Protocol |
| 2014 | Ontario Stream Assessment Protocol |
| 2014 | Fish Identification "Level 2" |
| 2014 | Electrofishing "Class 2" |
| 2013 | ISA Certified Arborist #ON-1663A |
| 2012 | Ontario Benthos Biomonitoring Network |
| 2012 | Ontario Wetland Evaluation System Instructor |
| 2011 | Family-level Benthic Invertebrate ID Workshop |
| 2011 | Ontario Wetland Evaluation System |
| 2011 | Ecological Land Classification |

## PROFESSIONAL EXPERIENCE

Tristan has over ten years of experience as an environmental professional acting in diverse private- and public-sector roles. He applies intimate knowledge of the environmental policy context guiding development in Ontario to projects large and small. Tristan's regular client base spans the entire development industry and includes land developers, aggregate producers, municipal infrastructure, and green energy. Tristan is also a highly accomplished field ecologist with professional training in innumerable provincial collection protocols including Ecological Land Classification, Ontario Wetland Evaluation System, Ontario Stream Assessment Protocol, Ontario Benthos Biomonitoring Network, and Vegetation Sampling Protocol. He is an ISA-certified Arborist, ISA-qualified Tree Risk Assessor, Butternut Health Assessor, and Managed Forest Plan approver. He is also a former instructor of the Ontario Wetland Evaluation System certification course and a current instructor with the Ontario Master Naturalist Program (Lakehead University, Orillia Campus) and Ontario Natural Certification Course (Kortright Centre). Drawing on a diverse mixture of project management and field expertise, he is single-mindedly focused on generating high-quality deliverables that exceed expectations. Above all, Tristan undertakes his work with utmost integrity, objectiveness, and concern for detail.

The following is a selected list of Tristan's consulting project experience since founding Terrastory in February 2018.

## Environmental Impact Statements for Land Development (Large Residential)

2018-2020 **Environmental Impact Statement** in the Township of Severn in support of an estate residential subdivision.

- Three-season ecological surveys and assessments (amphibians, vascular plants, vegetation mapping, bats, etc.).
- Graphics, reporting, policy conformity assessments.

2019-present **Environmental Impact Statement** in the City of Welland for an 870 unit residential and mixed-use subdivision.

- Three-season ecological surveys and assessments (amphibians, breeding birds, bat acoustic monitoring, vascular plants, vegetation mapping, etc.).
- Graphics, reporting, policy conformity assessments.

2019 **Environmental Impact Statement** in the City of Orillia in support of a waterfront community.

- Three-season ecological surveys and assessments (e.g., breeding birds, vascular plants, vegetation mapping, bat habitat, aquatic habitat, etc.).
- Graphics, reporting, policy conformity assessments.

2020 **Environmental Impact Statement** in the City of Orillia in support of a waterfront community.

- Three-season ecological surveys and assessments (e.g., breeding birds, vascular plants, vegetation mapping, bat habitat, aquatic habitat, etc.).
- Butternut Health Assessment.
- Graphics, reporting, policy conformity assessments.

2020-present **Subwatershed Impact Study in the Town of Halton Hills** in support of a large warehouse distribution centre.

- Three-season ecological surveys and assessments (e.g., breeding birds, vascular plants, vegetation mapping, bat habitat, aquatic habitat, etc.).
- Graphics, reporting, policy conformity assessments.
- Review and integration of other technical disciplines including fluvial geomorphology, hydrogeology, hydrology and hydraulics, stormwater management, landscape architecture.

## Environmental Impact Statements for Land Development (Small Residential)

2018 **Environmental Impact Statement** in the County of Brant in support of a single-lot severance application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2018 **Environmental Impact Statement** in the City of Kawartha Lakes in support of a site plan and Kawartha Conservation permit application.

- Ecological and species at risk surveys.
- Wetland delineation.
- Graphics, reporting, policy conformity assessments.

2018 **Environmental Impact Statement** in the Township of Ramara in support of a severance application.

- Ecological and species at risk surveys.
- Wetland staking.
- Graphics, reporting, policy conformity assessments.

2018 **Environmental Impact Statement** in the City of Orillia in support of a site plan application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2018-2019 **Natural Heritage Evaluation** in the City of Burlington in support of a severance application and

Niagara Escarpment development permit.

- Ecological and species at risk surveys.
- Woodland dripline staking with agency staff.
- Graphics, reporting, policy conformity assessments.

2019 **Environmental Impact Statement** in the City of Thorold in support of a site plan application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Environmental Impact Statement** in the Town of Gravenhurst in support of a site plan application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Natural Heritage Evaluation** in the Township of King in support of a severance application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Environmental Impact Statement** in the County of Brant in support of a multi-lot severance application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Environmental Impact Statement** in the Township of Severn in support of a site plan application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Natural Heritage Evaluation** in the Town of Caledon in support of a site plan application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Natural Heritage Evaluation** in the Town of Whitchurch-Stouffville in support of a site plan and TRCA permit application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Environmental Impact Statement** in the Township of Wainfleet in support of a site plan application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Environmental Impact Statement** in the Township of Chatsworth in support of a site plan application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

## Environmental Impact Statements for Land Development (Other)

2018-2019 **Environmental Impact Statement** in the Township of Woolwich in support of a site plan application and GRCA permit application to construct a boardwalk trail.

- Three-season ecological surveys and assessments (e.g., breeding birds, vascular plants, wetland delineation, vegetation mapping, etc.).
- Wetland delineation with GRCA staff.
- Graphics, reporting, policy conformity assessments.

2018-2019 **Environmental Impact Statement** in the Town of Whitchurch-Stouffville in support of a site plan application to expand an existing cemetery.

- Tree inventory, terrestrial/wetland/aquatic surveys, Butternut Health Assessment.
- Graphics, reporting, policy conformity assessments.

2018 **Environmental Impact Statement** in the City of Welland in support of a site plan application to

construct a storage facility.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

## Natural Environment Reports for Aggregate Applications

2019-2020 **Natural Environment Report** in the Municipality of Thames Centre in support of an *Aggregate Resources Act* application and related *Planning Act* applications.

- Ecological and species at risk surveys (e.g., breeding birds, vegetation mapping, vascular plants, etc.).
- Graphics, reporting, policy conformity assessments.

2019-2020 **Natural Environment Report** in the Township of Huron East in support of an *Aggregate Resources Act* application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2019 **Natural Environment Report** in the County of Haldimand (Hagersville) in support of an *Aggregate Resources Act* application.

- Ecological and species at risk surveys.
- Graphics, reporting, policy conformity assessments.

2020 **Natural Environment Report** in the Municipality of Thames Centre (Thorndale) in support of an *Aggregate Resources Act* application and related *Planning Act* applications.

- Ecological and species at risk surveys (e.g., breeding birds, vegetation mapping, vascular plants, etc.).
- Graphics, reporting, policy conformity assessments.

## Arborist Report and Tree Preservation Plans

2018 **Arborist Report and Tree Preservation Plan** in the Town of Whitchurch-Stouffville in support of a cemetery expansion.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2018 **Arborist Report and Tree Preservation Plan** in the City of Hamilton in support of a condominium development.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2018 **Arborist Report and Tree Preservation Plan** in the City of Toronto in support of a cemetery expansion.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2018 **Arborist Report and Tree Preservation Plan** in the Town of Milton in support of a new school and block development plan.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2019 **Arborist Report and Tree Preservation Plan** in the Town of Caledon in support of a site plan application.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2019 **Tree Saving Plan** in the City of Thorold in support of a residential subdivision.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2019 **Arborist Report and Tree Preservation Plan** in the Town of Ajax in support of a condominium development.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2019 **Arborist Report and Tree Preservation Plan** in the City of Toronto in support of a condominium development.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2019 **Arborist Report and Tree Preservation Plan** in the City of Hamilton in support of an Enbridge gas pipeline expansion.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

2020 **Arborist Report and Tree Preservation Plan** in the City of Kitchener in support of a church conversion to residential purposes.

- Tree inventory, health assessment, structural assessment.
- Graphics, reporting, policy conformity assessments.

## Municipal Class Environmental Assessments

2020-ongoing **Municipal Class Environmental Assessment (Schedule A)** in the Township of Severn in support of a culvert replacement.

- Ecological and species at risk surveys (e.g., fish habitat assessment, vegetation surveys, etc.).
- Ecological input to alternatives assessment.
- Graphics, reporting, policy conformity assessments.

## Natural Heritage Constraints Analyses

2018 **Natural Heritage Constraints Analysis** in the Town of Bracebridge to assess development potential.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

2018 **Natural Heritage Constraints Analysis** in the Township of Puslinch to assess development potential.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

2018 **Natural Heritage Constraints Analysis** in the Town of East Gwillimbury to assess development potential.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

2018 **Natural Heritage Constraints Analysis** in the County of Brant to assess potential to construct a wind turbine and secure a future Renewable Energy Approval.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

2018 **Natural Heritage Constraints Analysis** in the City of Hamilton to assess development potential.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

2019 **Natural Heritage Constraints Analysis** in the City of Kawartha Lakes to assess development potential to expand an existing aggregate quarry.

- Terrestrial/wetland/aquatic surveys, species at risk surveys.
- Graphics, reporting, policy assessments.

2019 **Natural Heritage Constraints Analysis** in the Town of Oakville to assess development potential.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

2019 **Natural Heritage Constraints Analysis** in the City of Welland to assess development potential

for a large-scale residential condominium application.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

2019 **Natural Heritage Constraints Analysis** in the City of Kawartha Lakes to assess development potential for a large-scale residential subdivision.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

2019 **Natural Heritage Constraints Analysis** in the City of Welland to assess development potential on a brownfield for a large-scale residential subdivision.

- Site reconnaissance assessment.
- Graphics, reporting, policy assessments.

## Species at Risk Surveys and Recovery

2018 **Kentucky Coffee-tree Assessment** in the Town of Niagara-on-the-Lake in support of a residential subdivision.

- Inventory for Kentucky Coffee-tree.
- Graphics, reporting.
- Submission of Information Gathering Form to MNRF.

2018 **Species at Risk Assessment** in the County of Haldimand in support of a severance application.

- Species at Risk surveys (e.g., vascular plants, habitat-based assessment for other taxa).
- Graphics, reporting.
- Correspondence with MNRF.

2018 **Butternut Health Assessment** in the Town of Whitchurch-Stouffville in support of a cemetery expansion.

- Butternut Health Assessment.
- Submission of relevant reporting and correspondence with MNRF.

2018 **Golden-eye Lichen (Great Lakes population) Recovery Strategy** for the Ministry of the Environment, Conservation, and Parks.

2019 **Chimney Swift Surveys** in the City of Hamilton in support of a redevelopment plan.

- Chimney Swift entrance surveys.
- Graphics, reporting.

2019 **Bat Habitat Assessment** in the City of Hamilton in support of a site plan application.

- Habitat-based surveys.
- Graphics, reporting.

## Fish Habitat Impact Assessments

2018 **Fish Habitat Impact Assessment** in the Township of Muskoka Lakes in support of a site plan application.

- Aquatic habitat assessment.
- Graphics, reporting, policy conformity assessment.

2019 **Fish Habitat Impact Assessment** in the Township of Georgian Bay in support of a site plan application.

- Aquatic habitat assessment.
- Graphics, reporting, policy conformity assessment.

2020 **Fish Habitat Impact Assessment** in the Town of Huntsville in support of a severance application.

- Aquatic habitat assessment.
- Graphics, reporting, policy conformity assessment.

## Peer Review

2019 **Peer Review** in the Municipality of Clarington in reference to a subdivision application.

- Critical assessment of EIS in support of the subdivision.
- Presentation to Council (Oct. 2019).

2020-ongoing **Peer Review** in the Town of Huntsville in reference to an island-based development applciation.

- Critical assessment of EIS in support of the subdivision.
- LPAT preparation (ongoing)

## Managed Forest Plans

2019 **Managed Forest Plan** in the City of Hamilton (Stoney Creek) for a private client.
2020 **Managed Forest Plan** in the City of Hamilton (Flamborough) for a private client.
2020 **Managed Forest Plan** in the Town of Erin for a private client.

## Instruction

2018-2019 **Instructor** in Bryophyte Identification and Lichen Identification courses at the Master Naturalist Program at Lakehead University (Orillia campus).
2019 **Instructor** in Bryophyte Identification at the Ontario Natural Certification Course in the Kortright Centre (City of Vaughan).

# **Appendix 2.** Representative Photographs

**Photo 1.** Proposed extraction area with the Deciduous Woodlot in the background looking northwest.

**Photo 2.** Deciduous Woodlot.

**Photo 3.** Deciduous hedgerow looking north towards the Deciduous Woodlot.

**Photo 4.** Coniferous hedgerow looking north.

**Photo 5.** Butternut along the farm laneway looking west.

**Photo 6.** Butternut adjacent to the existing barn.

**Photo 7.** Barn where Barn Swallows appeared to be accessing nesting sites looking north.

**Photo 8.** Red-tailed Hawk nest in the Deciduous Woodlot.

**Photo 9.** Hackberry Emperor.

**Photo 10.** Cream Violet.

# **Appendix 3.** Vascular Plant List

| Scientific Name | Common Name | Family | S-Rank (per NHIC) | Coefficient of Conservatism | Coefficient of Wetness |
|---|---|---|---|---|---|
| *Abutilon theophrasti* | Velvetleaf | Malvaceae | SNA | n/a | 3 |
| *Acer x freemanii* | Freeman's Maple | Aceraceae | SNA | n/a | -5 |
| *Acer negundo* | Manitoba Maple | Aceraceae | S5 | 0 | 0 |
| *Acer nigrum* | Black Maple | Aceraceae | S4? | 7 | 3 |
| *Acer platanoides* | Norway Maple | Aceraceae | SNA | n/a | 5 |
| *Acer saccharum* | Sugar Maple | Aceraceae | S5 | 4 | 3 |
| *Achillea millefolium* | Common Yarrow | Asteraceae | SNA | n/a | 3 |
| *Alliaria petiolata* | Garlic Mustard | Brassicaceae | SNA | n/a | 0 |
| *Allium tricoccum* | Wild Leek | Liliaceae | S4 | 7 | 3 |
| *Amaranthus retroflexus* | Red-root Amaranth | Amaranthaceae | SNA | n/a | 3 |
| *Ambrosia artemisiifolia* | Common Ragweed | Asteraceae | S5 | 0 | 3 |
| *Anemone virginiana* | Tall Anemone | Ranunculaceae | S5 | 4 | 3 |
| *Apocynum cannabinum* | Hemp Dogbane | Apocynaceae | S5 | 3 | 0 |
| *Arctium lappa* | Great Burdock | Asteraceae | SNA | n/a | 3 |
| *Arctium minus* | Common Burdock | Asteraceae | SNA | n/a | 3 |
| *Arisaema triphyllum* | Jack-in-the-pulpit | Araceae | S5 | 5 | -3 |
| *Asclepias syriaca* | Common Milkweed | Asclepiadaceae | S5 | 0 | 5 |
| *Asparagus officinalis* | Garden Asparagus | Liliaceae | SNA | n/a | 3 |
| *Athyrium filix-femina* var. *angustum* | Northeastern Lady Fern | Dryopteridaceae | S5 | 4 | 0 |
| *Barbarea vulgaris* | Bitter Wintercress | Brassicaceae | SNA | n/a | 0 |
| *Bromus inermis* | Smooth Brome | Poaceae | SNA | n/a | 5 |
| *Capsella bursa-pastoris* | Common Shepherd's Purse | Brassicaceae | SNA | n/a | 3 |
| *Carex cephaloidea* | Thin-leaved Sedge | Cyperaceae | S4 | 6 | 3 |
| *Carex hirtifolia* | Pubescent Sedge | Cyperaceae | S4S5 | 5 | 5 |
| *Carex leptonervia* | Finely-nerved Sedge | Cyperaceae | S5 | 5 | 0 |
| *Carex radiata* | Eastern Star Sedge | Cyperaceae | S5 | 4 | 0 |
| *Carya cordiformis* | Bitternut Hickory | Juglandaceae | S5 | 6 | 0 |
| *Caulophyllum giganteum* | Giant Blue Cohosh | Berberidaceae | S5 | 5 | 5 |
| *Celtis occidentalis* | Common Hackberry | Ulmaceae | S4 | 8 | 0 |
| *Cerastium fontanum* | Common Mouse-ear Chickweed | Caryophyllaceae | SNA | n/a | 3 |
| *Chenopodium album* | White Goosefoot | Chenopodiaceae | SNA | n/a | 3 |
| *Circaea canadensis* | Broad-leaved Enchanter's Nightshade | Onagraceae | S5 | 2 | 3 |
| *Cirsium arvense* | Canada Thistle | Asteraceae | SNA | n/a | 3 |
| *Cirsium vulgare* | Bull Thistle | Asteraceae | SNA | n/a | 3 |
| *Convolvulus arvensis* | Field Bindweed | Convolvulaceae | SNA | n/a | 5 |
| *Cornus alternifolia* | Alternate-leaved Dogwood | Cornaceae | S5 | 6 | 3 |
| *Cornus racemosa* | Gray Dogwood | Cornaceae | S5 | 2 | 0 |
| *Cornus stolonifera* | Red-osier Dogwood | Cornaceae | S5 | 2 | -3 |
| *Crataegus calpodendron* | Pear Hawthorn | Rosaceae | S4 | 4 | 5 |
| *Crataegus monogyna* | English Hawthorn | Rosaceae | SNA | n/a | 3 |

| Scientific Name | Common Name | Family | S-Rank (per NHIC) | Coefficient of Conservatism | Coefficient of Wetness |
|---|---|---|---|---|---|
| *Dactylis glomerata* | Orchard Grass | Poaceae | SNA | n/a | 3 |
| *Daucus carota* | Wild Carrot | Apiaceae | SNA | n/a | 5 |
| *Digitaria sanguinalis* | Hairy Crabgrass | Poaceae | SNA | n/a | 3 |
| *Dipsacus fullonum* | Common Teasel | Dipsacaceae | SNA | n/a | 3 |
| *Dryopteris carthusiana* | Spinulose Wood Fern | Dryopteridaceae | S5 | 5 | -3 |
| *Echinochloa muricata* var. *microstachya* | Western Barnyard Grass | Poaceae | S5 | 4 | -5 |
| *Elymus repens* | Creeping Wildrye | Poaceae | SNA | n/a | 3 |
| *Elymus virginicus* var. *virginicus* | Virginia Wildrye | Poaceae | S5 | 5 | -3 |
| *Epifagus virginiana* | Beechdrops | Orobanchaceae | S5 | 6 | 5 |
| *Epilobium coloratum* | Purple-veined Willowherb | Onagraceae | S5 | 3 | -5 |
| *Epilobium parviflorum* | Small-flowered Willowherb | Onagraceae | SNA | n/a | 3 |
| *Equisetum arvense* | Field Horsetail | Equisetaceae | S5 | 0 | 0 |
| *Equisetum hyemale* ssp. *affine* | Common Scouring-rush | Equisetaceae | S5 | 2 | 0 |
| *Eragrostis minor* | Little Lovegrass | Poaceae | SNA | n/a | 5 |
| *Erigeron annuus* | Annual Fleabane | Asteraceae | S5 | 0 | 3 |
| *Erigeron canadensis* | Canada Horseweed | Asteraceae | S5 | 0 | 3 |
| *Erigeron philadelphicus* | Philadelphia Fleabane | Asteraceae | S5 | 1 | -3 |
| *Erythronium americanum* | Yellow Trout-lily | Liliaceae | S5 | 5 | 5 |
| *Euonymus obovatus* | Running Strawberry Bush | Celastraceae | S4 | 6 | 5 |
| *Euphorbia cyparissias* | Cypress Spurge | Euphorbiaceae | SNA | n/a | 5 |
| *Euphorbia maculosa* | Spotted Spurge | Euphorbiaceae | SNA | n/a | 3 |
| *Fagus grandifolia* | American Beech | Fagaceae | S4 | 6 | 3 |
| *Festuca rubra* | Red Fescue | Poaceae | S5 | 0 | 3 |
| *Fragaria virginiana* | Wild Strawberry | Rosaceae | S5 | 2 | 3 |
| *Frangula alnus* | Glossy Buckthorn | Rhamnaceae | SNA | n/a | 0 |
| *Fraxinus americana* | White Ash | Oleaceae | S4 | 4 | 3 |
| *Fraxinus pennsylvanica* | Green Ash | Oleaceae | S4 | 3 | -3 |
| *Galium aparine* | Cleavers | Rubiaceae | S5 | 4 | 3 |
| *Galium mollugo* | Smooth Bedstraw | Rubiaceae | SNA | n/a | 5 |
| *Geranium maculatum* | Spotted Geranium | Geraniaceae | S5 | 6 | 3 |
| *Geranium robertianum* | Herb-Robert | Geraniaceae | S5 | 2 | 3 |
| *Geum aleppicum* | Yellow Avens | Rosaceae | S5 | 2 | 0 |
| *Geum urbanum* | Wood Avens | Rosaceae | SNA | n/a | 5 |
| *Glechoma hederacea* | Ground Ivy | Lamiaceae | SNA | n/a | 3 |
| *Hemerocallis fulva* | Orange Daylily | Liliaceae | SNA | n/a | 5 |
| *Hepatica acutiloba* | Sharp-lobed Hepatica | Ranunculaceae | S5 | 8 | 5 |
| *Hesperis matronalis* | Dame's Rocket | Brassicaceae | SNA | n/a | 3 |
| *Hydrophyllum canadense* | Canada Waterleaf | Hydrophyllaceae | S4 | 8 | 0 |
| *Hydrophyllum virginianum* | Virginia Waterleaf | Hydrophyllaceae | S5 | 6 | 0 |
| *Impatiens capensis* | Spotted Jewelweed | Balsaminaceae | S5 | 4 | -3 |

| Scientific Name | Common Name | Family | S-Rank (per NHIC) | Coefficient of Conservatism | Coefficient of Wetness |
|---|---|---|---|---|---|
| *Juglans cinerea* | Butternut | Juglandaceae | S2? | 6 | 3 |
| *Juglans nigra* | Black Walnut | Juglandaceae | S4? | 5 | 3 |
| *Lactuca serriola* | Prickly Lettuce | Asteraceae | SNA | n/a | 3 |
| *Lamium purpureum* | Purple Dead-nettle | Lamiaceae | SNA | n/a | 5 |
| *Lapsana communis* | Common Nipplewort | Asteraceae | SNA | n/a | 3 |
| *Leonurus cardiaca subsp. cardiaca* | Common Motherwort | Lamiaceae | SNA | n/a | 5 |
| *Lepidium campestre* | Field Peppergrass | Brassicaceae | SNA | n/a | 5 |
| *Leucanthemum vulgare* | Oxeye Daisy | Asteraceae | SNA | n/a | 5 |
| *Lolium pratense* | Meadow Fescue | Poaceae | SNA | n/a | 3 |
| *Lonicera morrowii* | Morrow's Honeysuckle | Caprifoliaceae | SNA | n/a | 3 |
| *Maianthemum racemosum* | Large False Solomon's Seal | Liliaceae | S5 | 4 | 3 |
| *Malva neglecta* | Dwarf Cheeseweed | Malvaceae | SNA | n/a | 5 |
| *Medicago lupulina* | Black Medic | Fabaceae | SNA | n/a | 3 |
| *Oenothera biennis* | Common Evening Primrose | Onagraceae | S5 | 0 | 3 |
| *Onoclea sensibilis* | Sensitive Fern | Dryopteridaceae | S5 | 4 | -3 |
| *Oxalis stricta* | Upright Yellow Wood-sorrel | Oxalidaceae | S5 | 0 | 3 |
| *Parthenocissus vitacea* | Thicket Creeper | Vitaceae | S5 | 4 | 3 |
| *Parthenocissus quinquefolia* | Virginia Creeper | Vitaceae | S4? | 6 | 3 |
| *Persicaria maculosa* | Spotted Lady's-thumb | Polygonaceae | SNA | n/a | -3 |
| *Persicaria pensylvanica* | Pennsylvania Smartweed | Polygonaceae | S5 | 3 | -3 |
| *Phalaris arundinacea* | Reed Canary Grass | Poaceae | S5 | 0 | -3 |
| *Phleum pratense* | Common Timothy | Poaceae | SNA | n/a | 3 |
| *Phragmites australis ssp. australis* | European Reed | Poaceae | SNA | n/a | -3 |
| *Phytolacca americana* | Common Pokeweed | Phytolaccaceae | S4 | 3 | 3 |
| *Picea abies* | Norway Spruce | Pinaceae | SNA | n/a | 5 |
| *Pinus resinosa* | Red Pine | Pinaceae | S5 | 8 | 3 |
| *Pinus strobus* | Eastern White Pine | Pinaceae | S5 | 4 | 3 |
| *Plantago lanceolata* | English Plantain | Plantaginaceae | SNA | n/a | 3 |
| *Plantago major* | Common Plantain | Plantaginaceae | SNA | n/a | 3 |
| *Poa annua* | Annual Bluegrass | Poaceae | SNA | n/a | 3 |
| *Poa pratensis subsp. pratensis* | Kentucky Bluegrass | Poaceae | SNA | n/a | 3 |
| *Podophyllum peltatum* | May-apple | Berberidaceae | S5 | 5 | 3 |
| *Polygonum aviculare* | Prostrate Knotweed | Polygonaceae | S4? | 0 | 3 |
| *Populus alba* | White Poplar | Salicaceae | SNA | n/a | 5 |
| *Populus deltoides* | Eastern Cottonwood | Salicaceae | S5 | 4 | 0 |
| *Populus nigra* | Black Poplar | Salicaceae | SNA | n/a | 5 |
| *Potentilla recta* | Sulphur Cinquefoil | Rosaceae | SNA | n/a | 5 |
| *Prunus serotina* | Black Cherry | Rosaceae | S5 | 3 | 3 |
| *Prunus virginiana* | Choke Cherry | Rosaceae | S5 | 2 | 3 |
| *Quercus macrocarpa* | Bur Oak | Fagaceae | S5 | 5 | 3 |

| Scientific Name | Common Name | Family | S-Rank (per NHIC) | Coefficient of Conservatism | Coefficient of Wetness |
|---|---|---|---|---|---|
| *Ranunculus acris* | Tall Buttercup | Ranunculaceae | SNA | n/a | 0 |
| *Ranunculus recurvatus var. recurvatus* | Hooked Buttercup | Ranunculaceae | S5 | 4 | -3 |
| *Rhamnus cathartica* | Common Buckthorn | Rhamnaceae | SNA | n/a | 0 |
| *Rhus typhina* | Staghorn Sumac | Anacardiaceae | S5 | 1 | 3 |
| *Ribes americanum* | Wild Black Currant | Grossulariaceae | S5 | 4 | -3 |
| *Ribes cynosbati* | Prickly Gooseberry | Grossulariaceae | S5 | 4 | 3 |
| *Ribes rubrum* | Northern Red Currant | Grossulariaceae | SNA | n/a | 5 |
| *Rubus idaeus subsp. strigosus* | Wild Red Raspberry | Rosaceae | S5 | 2 | 3 |
| *Rubus occidentalis* | Black Raspberry | Rosaceae | S5 | 2 | 5 |
| *Rumex crispus* | Curly Dock | Polygonaceae | SNA | n/a | 0 |
| *Salix amygdaloides* | Peach-leaved Willow | Salicaceae | S5 | 6 | -3 |
| *Salix bebbiana* | Bebb's Willow | Salicaceae | S5 | 4 | -3 |
| *Salix interior* | Sandbar Willow | Salicaceae | S5 | 1 | -3 |
| *Salix x fragilis* | (Salix alba X Salix euxina) | Salicaceae | SNA | 0 | 0 |
| *Sambucus canadensis* | Common Elderberry | Caprifoliaceae | S5 | 5 | -3 |
| *Sambucus racemosa subsp. pubens* | Red Elderberry | Caprifoliaceae | S5 | 5 | 3 |
| *Setaria pumila* | Yellow Foxtail | Poaceae | SNA | n/a | 0 |
| *Setaria viridis* | Green Foxtail | Poaceae | SNA | n/a | 5 |
| *Silene latifolia* | White Campion | Caryophyllaceae | SNA | n/a | 5 |
| *Sinapis arvensis* | Corn Mustard | Brassicaceae | SNA | n/a | 5 |
| *Solanum dulcamara* | Bittersweet Nightshade | Solanaceae | SNA | n/a | 0 |
| *Solanum ptychanthum* | Eastern Black Nightshade | Solanaceae | S5 | 1 | 3 |
| *Solidago altissima* | Tall Goldenrod | Asteraceae | S5 | 1 | 3 |
| *Solidago gigantea* | Giant Goldenrod | Asteraceae | S5 | 4 | -3 |
| *Sonchus arvensis subsp. arvensis* | Smooth Sow-thistle | Asteraceae | SNA | n/a | 3 |
| *Sonchus arvensis subsp. uliginosus* | Smooth Sow-thistle | Asteraceae | SNA | n/a | 3 |
| *Sparganium emersum* | Green-fruited Burreed | Sparganiaceae | SU | 6 | -5 |
| *Stellaria media* | Common Chickweed | Caryophyllaceae | SNA | n/a | 3 |
| *Symphyotrichum lanceolatum* | Panicled Aster | Asteraceae | S5 | 3 | -3 |
| *Symphyotrichum lateriflorum var. lateriflorum* | Calico Aster | Asteraceae | S5 | 3 | 0 |
| *Symphyotrichum novae-angliae* | New England Aster | Asteraceae | S5 | 2 | -3 |
| *Symphyotrichum pilosum var. pilosum* | Old Field Aster | Asteraceae | S5 | 1 | 3 |
| *Symplocarpus foetidus* | Skunk Cabbage | Araceae | S5 | 7 | -5 |
| *Taraxacum officinale* | Common Dandelion | Asteraceae | SNA | n/a | 3 |
| *Thlaspi arvense* | Field Penny-cress | Brassicaceae | SNA | n/a | 5 |
| *Thuja occidentalis* | Eastern White Cedar | Cupressaceae | S5 | 4 | -3 |
| *Tilia americana* | American Basswood | Tiliaceae | S5 | 4 | 3 |
| *Toxicodendron radicans* | Poison Ivy | Anacardiaceae | S5 | 2 | 0 |
| *Tragopogon pratensis* | Meadow Goat's-beard | Asteraceae | SNA | n/a | 5 |
| *Trifolium repens* | White Clover | Fabaceae | SNA | n/a | 3 |

| Scientific Name | Common Name | Family | S-Rank (per NHIC) | Coefficient of Conservatism | Coefficient of Wetness |
|---|---|---|---|---|---|
| *Trillium erectum* | Red Trillium | Liliaceae | S5 | 6 | 3 |
| *Tulipa gesneriana* | Didier's Tulip | Liliaceae | SNA | n/a | 0 |
| *Tussilago farfara* | Colt's-foot | Asteraceae | SNA | n/a | 3 |
| *Verbena urticifolia* | White Vervain | Verbenaceae | S5 | 4 | 0 |
| *Veronica arvensis* | Corn Speedwell | Scrophulariaceae | SNA | n/a | 5 |
| *Veronica serpyllifolia subsp. serpyllifolia* | Thyme-leaved Speedwell | Scrophulariaceae | SNA | n/a | 0 |
| *Viburnum lantana* | Wayfaring-tree | Caprifoliaceae | SNA | n/a | 5 |
| *Viburnum opulus ssp. opulus* | Cranberry Viburnum | Caprifoliaceae | SNA | n/a | -3 |
| *Viburnum opulus ssp. trilobum* | Highbush Cranberry | Caprifoliaceae | S5 | 5 | -3 |
| *Vicia cracca* | Tufted Vetch | Fabaceae | SNA | n/a | 5 |
| *Viola pubescens* | Yellow Violet | Violaceae | S5 | 5 | 3 |
| *Viola striata* | Striped Cream Violet | Violaceae | S3 | n/a | -3 |
| *Vitis riparia* | Riverbank Grape | Vitaceae | S5 | 0 | 0 |

# **Appendix 4.** Breeding Bird Survey Results

**Table 1 . Results of Breeding Bird Surveys.**

| Common Name | Scientific Name | Breeding Bird Stations[1] and Breeding Status[2] | | | | | |
|---|---|---|---|---|---|---|---|
| | | BB-1 | BB-2 | BB-3 | BB-4 | BB-5 | BB-6 |
| American Crow | *Corvus brachyrhynchos* | | | Po | Po | Po | |
| American Goldfinch | *Spinus tristis* | | Pr | | | Po | Pr |
| American Robin | *Turdus migratorius* | Po | Po | | Pr | | Pr |
| Baltimore Oriole | *Icterus galbula* | Po | | Po | | Po | |
| **Barn Swallow** | ***Hirundo rustica*** | **Co** | | | | | **Po** |
| Belted Kingfisher | *Megaceryle alcyon* | Pr | | | | | |
| Black-billed Cuckoo | *Coccyzus erythropthalmus* | | | Po | | | |
| Black-capped Chickadee | *Poecile atricapillus* | | | | Pr | | Po |
| Blue Jay | *Cyanocitta cristata* | | Po | Po | Pr | | Po |
| Brown-headed Cowbird | *Molothrus ater* | | Pr | | | | Po |
| Canada Goose | *Branta canadensis* | | | Po | | | |
| Cedar Waxwing | *Bombycilla cedrorum* | Pr | | | | | Po |
| Chipping Sparrow | *Spizella passerina* | Pr | Po | | | Po | |
| Common Grackle | *Quiscalus quiscula* | Pr | | Po | | | Co |
| Common Yellowthroat | *Geothlypis trichas* | | | | | Po | |
| Eastern Kingbird | *Tyrannus tyrannus* | | Po | | | | |
| **Eastern Meadowlark** | ***Sturnella magna*** | | | | | **Po[3]** | |
| **Eastern Wood-pewee** | ***Contopus virens*** | | | | **Pr** | | |
| European Starling | *Sturnus vulgaris* | Pr | | | | | |
| Field Sparrow | *Spizella pusilla* | | Pr | | | | |
| Gray Catbird | *Dumetella carolinensis* | Po | | | | | |
| Great Blue Heron | *Ardea herodias* | O | | | | | O |
| Great Crested Flycatcher | *Myrarchus crinitus* | | | Pr | | | |
| Horned Lark | *Eremophila alpestris* | | | | | | Po |
| House Finch | *Haemorhous mexicanus* | | | | | | Po |
| Indigo Bunting | *Passerina cyanea* | | Po | Po | | | |
| Killdeer | *Charadrius vociferus* | | Po | | | | Po |
| Mourning Dove | *Zenaida macroura* | Po | | | | | |
| Northern Cardinal | *Cardinalis cardinalis* | Po | Po | | | | |
| Northern Flicker | *Colaptes auratus* | Po | | | Po | | |
| Red-eyed Vireo | *Vireo olivaceus* | | Po | | Po | | |
| Red-tailed Hawk | *Buteo jamaicensis* | | | | Co | O | |
| Red-winged Blackbird | *Agelaius phoeniceus* | Pr | | Pr[3] | | Pr | Po |
| Rose-breasted Grosbeak | *Pheucticus ludovicianus* | | | Pr | Po | | |
| Savannah Sparrow | *Passerculus sandwichensis* | | Pr | | | | |
| Song Sparrow | *Melospiza melodia* | Pr | Pr | | Pr | Pr | |
| Tree Swallow | *Tachycineta bicolor* | Po | | | | | Po |
| Turkey Vulture | *Cathartes aura* | O | | | | | |
| Warbling Vireo | *Vireo gilvis* | Pr | | | | Po | |
| White-breasted Nuthatch | *Sitta carolinensis* | | | Po | | | |
| Willow Flycatcher | *Empidonax traillii* | | | | | Po | |

[1] Locations of breeding bird survey stations are indicated on **Figure 2**.

[2] **Co** = Confirmed Breeder; **Pr** = Probable Breeder; **Po** = Possible Breeder; **O** = Observed (no evidence of breeding). Breeding status determined based on the results of the formal breeding bird surveys; where a higher level of breeding status was documented incidentally (i.e., during other field surveys), within the main body of the report (where applicable).

[3] Documented on Adjacent Lands (outside the Subject Property) only.

# **Appendix 5.** Significant Wildlife Habitat Assessment

# 1 RESULTS

**Table 1.** Results of the Significant Wildlife Habitat Assessment.

| Ecoregion 6E | Do any Features, Habitats, or Areas within the Site meet relevant criteria (Ecoregion 6E Criteria Schedule) as Candidate SWH? | Do any Features, Habitats, or Areas within the Site meet relevant criteria (Ecoregion 6E Criteria Schedule) as Confirmed SWH? | Likelihood that Negative Effects to SWH (i.e., "degradation that threatens the health and integrity" as defined in the 2020 PPS) will occur based on the Proposed Development Plan and any related Site Alteration Activities. |
|---|---|---|---|
| **Seasonal Concentration Areas of Animals** | | | |
| Waterfowl Stopover and Staging Areas (Terrestrial) | **No.** Meadows, fields, and/or thickets that annually flood during spring and could support significant congregations of migrating waterfowl are absent. | -- | -- |
| Waterfowl Stopover and Staging Areas (Aquatic) | **No.** Large surface water features (e.g., ponds, lakes, bays, coastal inlets, large watercourses, etc.) and/or wetlands that annually flood during spring and could support significant congregations of migrating waterfowl are absent. | -- | -- |
| Shorebird Migratory Stopover Areas | **No.** Unvegetated open areas adjacent to surface water features (e.g., shorelines, beaches, mudflats, etc.) which could support significant congregations of migrating shorebirds are absent | -- | -- |
| Raptor Wintering Areas | **No.** While forest and (to a lesser extent) meadow habitats are present within the Site and Adjacent Lands to the west, which may occasionally support wintering raptors, such habitats are too small to support significant congregations. Much of the Site was tilled and planted in corn in 2020, which provides minimal habitat for small mammals during winter (a major prey item). | -- | -- |
| Bat Hibernacula | **No.** Features that could support hibernating bats (e.g., caves, mine shafts, karsts, etc.) are absent. | -- | -- |
| Bat Maternity Colonies | **Yes.** Mature deciduous and mixed forests with a high-density (i.e., >10/ha) of large-diameter (i.e., ≥25 cm DBH) trees containing cracks/cavities may be present. | **Unknown.** Acoustic monitoring devices not deployed as part of this study. | **Negligible.** The limit of extraction will be set back a minimum of 15 m from the dripline of the Deciduous Woodlot, which has the greatest likelihood of supporting maternity colonies of Big Brown Bat or Silver-haired Bat. Any necessary removal of trees outside the Deciduous Woodlot, which in general are unlikely to support maternity roosts, will be subject to a timing restriction. See report for greater details. |
| Turtle Wintering Areas | **No.** Surface water features and/or wetlands with soft, muddy substrate which do not freeze to the bottom during winter are absent. | -- | -- |
| Reptile Hibernaculum | **Yes.** Features (e.g., small mammal burrows, rock crevices, etc.) and/or habitats that could provide snakes with access below the frost line are present within the Deciduous Woodlot. | **Unknown.** Spring emergence surveys to determine whether snake overwintering is occurring within the Site or Adjacent Lands was not undertaken as part of this study. | **Negligible.** Areas proposed for extraction are maintained for cash crops and do not contain features with a high potential to support significant congregations of overwintering snakes. |
| Colonially - Nesting Bird Breeding Habitat (Bank and Cliff) | **No.** Features that could support nesting by Cliff Swallow and Northern Rough-winged swallow (e.g., eroding banks, sandy hills, borrow pits, steep slopes, cliff faces, etc.) are absent. | -- | -- |
| Colonially - Nesting Bird Breeding Habitat Breeding Habitat (Tree/Shrubs) | **No.** Swamp and treed fen communities are absent. | -- | -- |

| Ecoregion 6E | Do any Features, Habitats, or Areas within the Site meet relevant criteria (Ecoregion 6E Criteria Schedule) as Candidate SWH? | Do any Features, Habitats, or Areas within the Site meet relevant criteria (Ecoregion 6E Criteria Schedule) as Confirmed SWH? | Likelihood that Negative Effects to SWH (i.e., "degradation that threatens the health and integrity" as defined in the 2020 PPS) will occur based on the Proposed Development Plan and any related Site Alteration Activities. |
|---|---|---|---|
| Colonially - Nesting Bird Breeding Habitat (Ground) | **No.** Rocky islands or peninsulas along lakes or large rivers are absent. | -- | -- |
| Migratory Butterfly Stopover Areas | **No.** A mixture of fields and forests within 5 km from the shoreline of Lake Ontario are absent. | -- | -- |
| Landbird Migratory Stopover Areas | **No.** While migrating landbirds may temporarily stopover within the Site or Adjacent Lands to feed and rest, it is unlikely that the Subject Property supports significant congregations of migrating landbirds as it is greater than 5 km from the shoreline of Lake Erie. | -- | -- |
| Deer Yarding Areas | **No.** MNRF has not identified any deer yarding areas and the Subject Property lacks vegetation communities that could provide thermal cover and lower snow depths in winter (e.g., coniferous woodlands and plantations, etc.). | -- | -- |
| Deer Winter Congregation Areas | **No.** See above. | -- | -- |
| **Rare Vegetation Communities or Specialized Habitats for Wildlife** | | | |
| Cliffs and Talus Slopes | **No.** Cliffs and talus slope communities are absent. | -- | -- |
| Sand Barren | **No.** Sand barren communities are absent. | -- | -- |
| Alvar | **No.** Flora characteristic of alvars are absent. | -- | -- |
| Old Growth Forest | **Yes.** Based on a review of historical aerial photographs, the Deciduous Woodlot may represent a pre-settlement feature. | **No.** While the Deciduous Woodlot exhibits certain old-growth characteristics (e.g., old trees, snags, etc.), this feature appears to have been logged in the relatively recent past and contains limited coarse woody debris. | -- |
| Savannah | **No.** Flora characteristic of savannahs are absent. | -- | -- |
| Tallgrass Prairie | **No.** Flora characteristic of tallgrass prairies are absent. | -- | -- |
| Other Rare Vegetation Community | **No.** Provincially rare vegetation communities are absent. | -- | -- |
| Waterfowl Nesting Area | **No.** Wetland communities are absent. | -- | -- |
| Bald Eagle and Osprey Nesting, Foraging and Perching Habitat | **No.** Forest communities adjacent to large surface water features are absent. | -- | -- |
| Woodland Raptor Nesting Habitat | **Yes.** On-site forest communities may support nesting raptors. | **No.** While an active Red-tailed Hawk stick nest was documented in the Deciduous Woodlot, this species is not an indicator of this SWH type. No other active stick nests were documented. Tree cavities that may support Barred Owl are present; however, the Subject Property does not contain interior forest habitat (>100 m from an edge) and is therefore unlikely to support nesting Barred Owls, which are otherwise rare in Middlesex County. | -- |

| Ecoregion 6E | Do any Features, Habitats, or Areas within the Site meet relevant criteria (Ecoregion 6E Criteria Schedule) as Candidate SWH? | Do any Features, Habitats, or Areas within the Site meet relevant criteria (Ecoregion 6E Criteria Schedule) as Confirmed SWH? | Likelihood that Negative Effects to SWH (i.e., "degradation that threatens the health and integrity" as defined in the 2020 PPS) will occur based on the Proposed Development Plan and any related Site Alteration Activities. |
|---|---|---|---|
| Turtle Nesting Areas | **No.** Exposed mineral soils adjacent to surface water features (e.g., lakes, ponds, etc.) and/or wetlands that may support turtles are absent. | -- | -- |
| Seeps and Springs | **No.** Areas where groundwater emerges at the surface and may support specialized habitat for plants and wildlife are absent. | -- | -- |
| Amphibian Breeding Habitat (Woodland) | **No.** Forests with wetlands, ponds, and/or pools that may support significant congregations of breeding amphibians are absent. | -- | -- |
| Amphibian Breeding Habitat (Wetlands) | **No.** Wetlands and surface water features (e.g., ponds, lakes, etc.) that may support significant congregations of breeding amphibians are absent. | -- | -- |
| Woodland Area-Sensitive Bird Breeding Habitat | **No.** Interior forest interior conditions (i.e., >200 m from edge) are absent. | **No.** The results of the breeding bird surveys indicate that this SWH type is absent. | -- |
| **Habitat for Species of Conservation Concern** | | | |
| Marsh Bird Breeding Habitat | **No.** Wetland habitats of sufficient size with shallow water and emergent aquatic vegetation are absent. | -- | -- |
| Open Country Bird Breeding Habitat | **No.** Meadow habitats of sufficient size are absent. | -- | -- |
| Shrub/Early Successional Bird Breeding Habitat | **No.** Shrub/early-successional habitats of sufficient size are absent. | **No.** Field Sparrow was recorded as a probable breeder at BI-2; however, this species occupied lands north of the Subject Property and outside the Site. No other bird species indicative of shrub/early successional habitats were documented during the breeding bird surveys. | -- |
| Terrestrial Crayfish | **No.** Marsh and swamp communities and/or wet fields are absent. | **No.** Terrestrial crayfish chimneys were not documented incidentally. | -- |
| Special Concern and Rare Wildlife Species | **Yes.** See **Table 2** below. | **Yes.** See **Table 2** below. | **Possible.** See **Table 2** below. |
| **Animal Movement Corridors** | | | |
| Amphibian Movement Corridors | **No.** Significant amphibian breeding habitat is absent. Site is not expected to act as a significant movement corridor between breeding and summer habitat for amphibians. | -- | -- |
| Deer Movement Corridors | **No.** As MNRF has not identified any Deer Yarding Areas, significant Deer Movement Corridors are by extension also absent. | -- | -- |

**Table 2.** Results of the Special Concern and Provincially Rare Species Assessment.

| Species | Status per O. Reg. 230/08 under the ESA and/or NHIC | Rationale for Consideration in this Study | General Description of Habitats and Features which the Species is Known to Occupy or Use within the Ecoregion in which this Study is Located | Likelihood that the Species Occupies the Area within or adjacent to proposed Development or Site Alteration[1] | Likelihood that Negative Effects to the Species or its Habitat (i.e., "degradation that threatens the health and integrity" as defined in the 2014 PPS) will occur based on the Proposed Development Plan and any related Site Alteration Activities. |
|---|---|---|---|---|---|
| **Birds** | | | | | |
| **Eastern Wood-pewee (*Contopus virens*)** | SC | OBBA, documented on-site | • Breeds and forages in relatively open, deciduous and mixed forests of various sizes (including urban forest fragments) and along forest edges. | **Possible.** Species documented as a probable breeder in the Deciduous Woodlot. | **Negligible.** Deciduous Woodlot will be protected by a 15 m extraction setback. |
| **Red-headed Woodpecker (*Melanerpes erythrocephalus*)** | SC | OBBA | • Breeds and forages in open forests, savannahs, and forest edges that tend to contain large, mature trees. | **Negligible**. Species not documented during breeding bird surveys. | -- |
| **Wood Thrush (*Hylocichla mustelina*)** | SC | OBBA | • Breeds and forages in second-growth and mature deciduous and mixed forests with a well-developed understory. | **Negligible**. Species not documented during breeding bird surveys. | -- |
| **Insects** | | | | | |
| **Hackberry Emperor (*Asterocampa celtis*)** | S3 | Documented on-site | • Oviposits on Hackberry (*Celtis* spp.).<br>• Adults may be observed along forest edges, clearings, and trails (which provide thermoregulation opportunities) or nectaring on fermenting fruit or tree sap. | **Confirmed.** Species documented adjacent to the Deciduous Hedgerow (FODM11) where mature Common Hackberry is abundant. Additional Common Hackberry were documented along the southern boundary of the Deciduous Woodlot, which will be protected by a 15 m extraction setback. | **Negligible.** Provincial standards require that excavation be set back 15 m from the boundary of the Site. The dripline of the Deciduous Hedgerow is situated outside the extraction limit and any acoustic berm. |
| **Monarch (*Danaus plexippus*)** | SC | Ont. Butterfly Atlas | • Oviposits on Milkweeds (*Asclepias* spp.).<br>• Generalist forager that nectars in most areas with wildflowers. | **Possible.** Ovipositing sites (i.e., species in the genus *Asclepias*) are present, and species may forage on the Subject Property. | **Negligible.** Areas of proposed extraction lack large stands of Milkweed. The landscape surrounding the Site provides relatively abundant nectaring and ovipositing sites for this species. |
| **Tawny Emperor (*Asterocampa clyton*)** | S3 | Habitat and distribution | • Oviposits on Hackberry (*Celtis* spp.).<br>• Adults may be observed along forest edges, clearings, and trails (which provide thermoregulation opportunities) or nectaring on fermenting fruit or tree sap. | **Possible.** Ovipositing sites (i.e., Common Hackberry) are present. | **Negligible.** Provincial standards require that excavation be set back 15 m from the boundary of the Site. The dripline of the Deciduous Hedgerow is situated outside the extraction limit and any acoustic berm. |
| **Yellow Banded Bumble Bee (*Bombus terricola*)** | SC | Habitat and distribution | • Occupies a range of open areas with nectaring sites.<br>• Nests underground in abandoned rodent burrows or decomposing logs. | **Possible.** Species is a habitat generalist and occupies a wide range of areas. | **Negligible.** Areas of proposed extraction will not adversely affect nectaring opportunities for this species within the local landscape. Potential nesting and overwintering habitat within the Deciduous Woodlot will be protected. |
| **Plants** | | | | | |
| **False Rue-anemone (*Enemion biternatum*)** | S2 | iNaturalist | • Occupies rich deciduous forests, often on shaded banks of streams. | **Negligible**. Species not documented during vascular plant surveys. | -- |
| **Cream Violet (*Viola striata*)** | S3 | Documented on-site | • Occupies deciduous forests, thickets by streams, and occasionally swamps | **Possible.** Species documented in two (2) locations in the Deciduous Woodlot. | **Negligible.** Deciduous Woodlot will be protected by a 15 m extraction setback. |

[1] Likelihood categories should be interpreted as follows:

**Negligible:** so limited that the assessed species can be assumed absent.

**Unlikely:** while theoretically conceivable, species presence very improbable or temporary based on available information (e.g., habitat conditions, range, abundance in local landscape, etc.).
**Possible:** species presence plausible based on available information; no convincing evidence suggesting species could not occur on-site.
**Probable:** while not confirmed, available information suggests species has a high likelihood of being present.
**Confirmed:** species observed and/or evidence of occupation (e.g., tracks, etc.) documented.

# **Appendix 6.** Endangered and Threatened Species Assessment

| Species | Status per O. Reg. 230/08 of the ESA | Rationale for Consideration in this Study | General Description of Habitats and Features which the Species is Known to Occupy within the Ecoregion in which this Study is Located | Likelihood that the Species Occupies the Area within or adjacent to proposed Development or Site Alteration[1] | Likelihood that Negative Effects to the Species or its Habitat (i.e., "Damage" or "Destruction" as defined in the ESA) will occur based on the Proposed Development Plan and any related Site Alteration Activities |
|---|---|---|---|---|---|
| **Birds** | | | | | |
| **Bank Swallow (*Riparia riparia*)** | THR | OBBA | • Nests in natural or anthropogenically derived exposed, sandy substrates on vertical or steep surfaces.<br>• Forages in a variety of open areas including agricultural lands, meadows, prairies, woodland clearings, marshes, and above waterbodies. | **Negligible.** While this species may forage over open areas within the Site for brief periods during migration or forays from adjacent breeding sites, suitable breeding sites are absent from the Subject Property. Species not documented during breeding bird surveys. | -- |
| **Barn Swallow (*Hirundo rustica*)** | THR | OBBA | • Nests in barns, bridge/culvert undersides, awnings/overhangs on sides of buildings, and (historically) tree cavities.<br>• Forages in a variety of open areas including agricultural lands, meadows, prairies, woodland clearings, marshes, and above waterbodies. | **Negligible.** Species documented foraging over the Site during breeding bird surveys. Individuals appear to be nesting in a barn just northeast of the Site, though this area is ~150 m from the limit of extraction. | -- |
| **Bobolink (*Dolichonyx oryzivorus*)** | THR | OBBA | • Breeds and forages in hayfields, pastures, meadows, grasslands, and prairies which are often (but not always) greater 4 ha.<br>• May be found in more marginal habitats (e.g., shrubby fields, smaller fields, etc.) during migration or following disturbance to breeding habitats (e.g., hay cutting). | **Negligible.** Species not documented during breeding bird surveys.. | -- |
| **Eastern Meadowlark (*Sturnella magna*)** | THR | OBBA | • Breeds and forages in hayfields, savannahs, pastures, meadows, grasslands, prairies, and shrubby fields. | **Negligible.** While this species was documented as a possible breeder in a field on Adjacent Lands to the west, suitable breeding habitat is absent from the Site. | -- |
| **Mammals** | | | | | |
| **Eastern Small-footed Myotis (*Myotis leibii*)** | END | On-site habitats and distribution in southern Ontario. | • Maternal roosting sites include exposed rock outcrops, crevices, and cliffs.<br>• Overwinters in caves and mines that maintain temperatures above 0°C. | **Unlikely.** While this species may forage above open habitats on the Site or Adjacent Lands, potential maternal roosting habitat (e.g., rock outcrops, cliffs, etc.) is absent. | -- |
| **Little Brown Myotis (*Myotis lucifugus*)** | END | On-site habitats and distribution in southern Ontario. | • Maternity roosts sites most often include buildings and large diameter trees with cracks, crevices, and/or exfoliating bark.<br>• Overwinters in caves and mines that maintain temperatures above 0°C. | **Possible.** Species may roost and/or feed in the Deciduous Woodlot. | **Negligible.** The Deciduous Woodlot will be protected by a 15 m extraction setback. A timing window restriction will be applied to tree removal activities outside the Deciduous Woodlot to avoid impacting roosting bats (individuals or maternity colonies). |
| **Northern Myotis (*Myotis septentrionalis*)** | END | On-site habitats and distribution in southern Ontario. | • Maternity roosts most often include large diameter trees with cracks, crevices, and/or exfoliating bark (buildings rarely used).<br>• Overwinters in caves and mines that maintain temperatures above 0°C. | **Possible.** Species may roost and/or feed in the Deciduous Woodlot. | **Negligible.** The Deciduous Woodlot will be protected by a 15 m extraction setback. A timing window restriction will be applied to tree removal activities outside the Deciduous Woodlot to avoid impacting roosting bats (individuals or maternity colonies). |
| **Tri-colored Bat (*Perimyotis subflavus*)** | END | On-site habitats and distribution in southern Ontario. | • Maternal roosting sites include Maple (*Acer* spp.) and Oak (*Quercus* spp.) with dead/dying leaf clusters.<br>• Overwinters in caves and mines that maintain temperatures above 0°C. | **Possible.** Species may roost and/or feed in the Deciduous Woodlot. | **Negligible.** The Deciduous Woodlot will be protected by a 15 m extraction setback. A timing window restriction will be applied to tree removal activities outside the Deciduous Woodlot to avoid impacting roosting bats (individuals or maternity colonies). |
| **Plants** | | | | | |

| Species | Status per O. Reg. 230/08 of the ESA | Rationale for Consideration in this Study | General Description of Habitats and Features which the Species is Known to Occupy within the Ecoregion in which this Study is Located | Likelihood that the Species Occupies the Area within or adjacent to proposed Development or Site Alteration[1] | Likelihood that Negative Effects to the Species or its Habitat (i.e., "Damage" or "Destruction" as defined in the ESA) will occur based on the Proposed Development Plan and any related Site Alteration Activities |
|---|---|---|---|---|---|
| **American Ginseng (*Panax quinquefolius*)** | END | Known from Middlesex County. | • Occupies rich, relatively undisturbed deciduous forests. | **Negligible.** Species was not documented during vascular plant surveys. | -- |
| **Butternut (*Juglans cinerea*)** | END | Known from Middlesex County. | • Occupies a variety of treed habitats including mature forests, early-successional forests, and hedgerows. | **Negligible.** While two (2) individuals were documented within the Subject Property, this area is ~150 m from the limit of extraction. | -- |
| **Goldenseal (*Hydrastis canadensis*)** | THR | Known from Middlesex County. | • Occupies rich deciduous forests. | **Negligible.** Species was not documented during vascular plant surveys. | -- |
| **Wood-poppy (*Stylophorum diphyllum*)** | END | Known from Middlesex County. | • Occupies rich mixed and deciduous woodlands, forested ravines and slopes. | **Negligible.** Species was not documented during vascular plant surveys. | -- |

[1] Likelihood categories are to be interpreted as follows:

Negligible: so limited that the assessed species can be assumed absent.

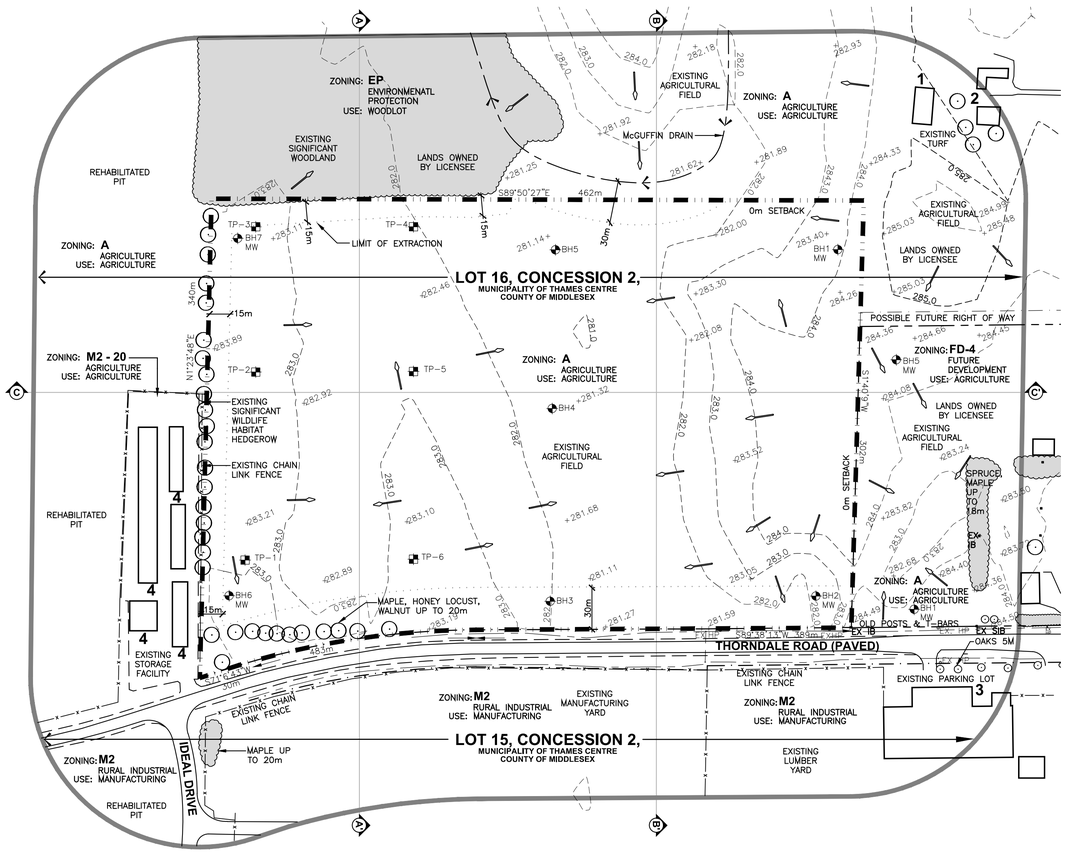
Low/Unlikely: while theoretically conceivable, species presence very improbable or temporary based on available information (e.g., habitat conditions, range, abundance in local landscape, etc.).

Possible: species presence plausible based on available information; no convincing evidence suggesting species could not occur on-site.

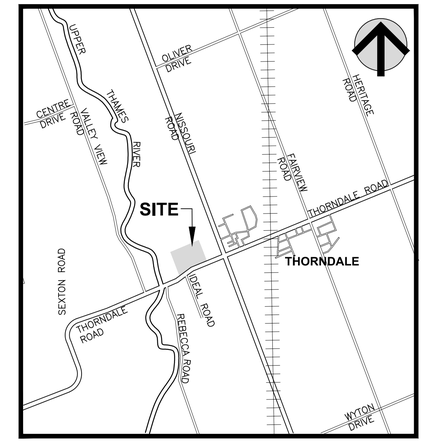
Probable: while not confirmed, available information suggests species has a high likelihood of being present.

Confirmed: species observed and/or evidence of occupation (e.g., tracks, etc.) documented.

# **Appendix 7.** Site Plans




## KEY MAP




## LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- 120m INFORMATION BOUNDARY
- POSSIBLE FUTURE RIGHT-OF-WAY LINE
- PROPERTY LINES
- REGULATORY SETBACK AND LIMIT OF EXTRACTION LINE
- WATERCOURSE
- EXISTING FENCE
- EXISTING 5m CONTOUR LINE
- EXISTING 1m CONTOUR LINE
- EXISTING SPOT ELEVATION
- EXISTING VEGETATION
- LOCATION OF SECTION
- EXISTING BUILDING AND NUMBER
- EXISTING HYDRO POLE
- DIRECTION OF SURFACE WATER DRAINAGE
- BOREHOLE LOCATION AND NUMBER DRILLED AND MONITORING WELL INSTALLED BY EXP JUNE 15, 16, AND 29, 2020

## BUILDING LIST

| No. | |
|---|---|
| 1. | BARN |
| 2. | HOUSE |
| 3. | INDUSTRIAL BUILDING |
| 4. | STORAGE FACILITY BUILDINGS |

| NO. | DATE | REVISIONS | OWNER | HM | MNR |
|---|---|---|---|---|---|

Pre Licence Review

| NO. | DATE | REVISIONS | OWNER | HM | MNR |
|---|---|---|---|---|---|

Site Plan Amendments

## EXISTING FEATURES NOTES

### GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSIST OF 5 DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.
3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE MINISTRY OF NATURAL RESOURCES AND FORESTRY UNDER THE AGGREGATE RESOURCES ACT FOR A CATEGORY 3 - CLASS 'A' LICENCE, PIT ABOVE THE WATER TABLE.

### LICENCE INFORMATION

4. APPLICANT:
   5026367 ONTARIO LTD.
   21964 FAIRVIEW ROAD
   THORNDALE, ON N0M 2P0
5. TOTAL AREA TO BE LICENCED: 14.2 ha
   TOTAL AREA TO BE EXTRACTED: 12.0 ha
   TOTAL AREA TO REHABILITATED: 12.0 ha

### BASE INFORMATION

6. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM FROM SURVEY, PROJECT # DEL19-103 BA BY DEVELOPEMNT ENGINEERING. ALL ELEVATIONS ARE GEODETIC AND ABOVE SEA LEVEL (ASL).

   THE SITE WAS FIELD CHECKED BY HARRINGTON MCAVAN LTD., SEPTEMBER 1, 2020.
7. ZONING INFORMATION OBTAINED FROM MUNICIPALITY OF THAMES CENTRE ZONING BY-LAW ZBL-75-2006, MAPS 13 AND 17, OFFICE CONSOLIDATION MARCH 2019. MAJORITY OF PROPOSED LICENCE IS PRESENTLY ZONED A (AGRICULTURE). A ZBA WILL BE APPLIED FOR TO CHANGE FD4 TO M3 (EXTRACTIVE INDUSTRIAL).

### HYDROGEOLOGICAL INFORMATION

8. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY EXP DATED DECEMBER 2020.
9. THE WATER TABLE ELEVATION WITHIN THESE PROPERTIES IS ESTIMATED TO BE BETWEEN 275.5 TO 279.5m ABOVE SEA LEVEL (A.S.L.) BASED ON ABOVE REPORT.

### TECHNICAL REPORTS

10. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY EXP DATED DECEMBER 2020 (REFER TO SHEET 3 OF 4 FOR TECHNICAL RECOMMENDATIONS).
11. NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY TERRASTORY ENVIRONMENTAL CONSULTING INC. DATED DECEMBER 2020 (REFER TO SHEET 3 OF 4 FOR TECHNICAL RECOMMENDATIONS).
12. ARCHAEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY LINCOLN ENVIRONMENTAL CONSULTING CORP. DATED OCTOBER 2020 (REFER TO SHEET 3 OF 4 FOR TECHNICAL RECOMMENDATIONS).
13. ACOUSTICAL INFORMATION WAS OBTAINED FROM NOISE REPORT BY HGC ENGINEERING DATED DECEMBER 2020 (REFER TO SHEET 3 OF 4 FOR TECHNICAL RECOMMENDATIONS).


Harrington McAvan Ltd
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www.harringtonmcavan.com

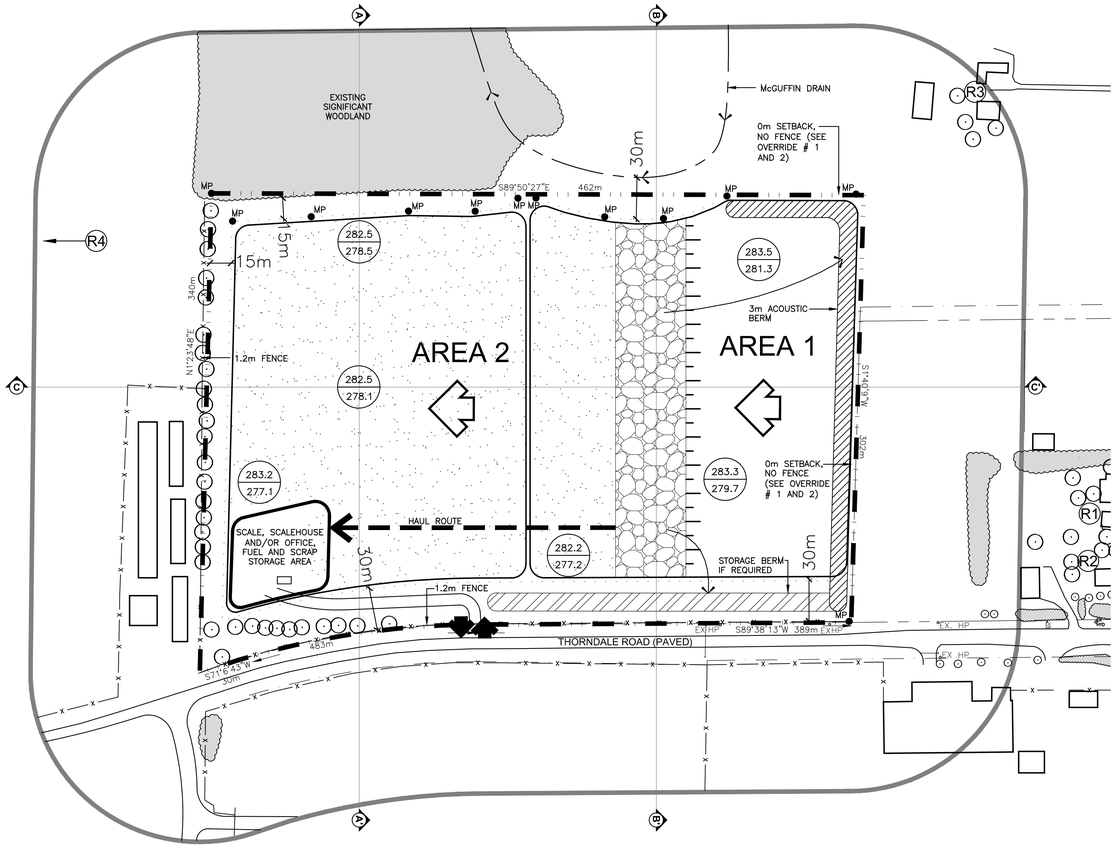

Project Name

# 5026367 Ontario Ltd.
## ELLIOT PIT

LICENSEE SIGNATURE _____
LICENCE No.
PART LOT 16, CONCESSION 2
MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF WEST NISSOURI), COUNTY OF MIDDLESEX

| | | |
|---|---|---|
| Scale 1:2000 (0 10 50 80m) | North | Stamp: ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS, RICHARD McAVAN, MEMBER |
| Drawing Status: PRELIMINARY FOR DISCUSSION | | |
| Drawn SB | Checked MH | Issue Date JAN 2021 |
| Drawing Title: EXISTING FEATURES PLAN | | Project Number 20-22 |
| | | Drawing Number 1 OF 4 |

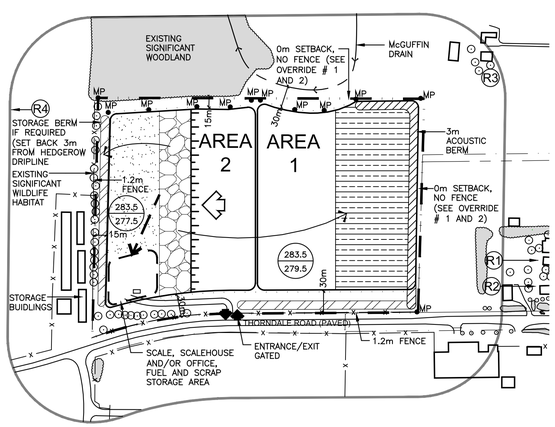
FILE NAME: 20-22/COMP/2022-1.DWG
PLOT DATE: JANUARY 4, 2021




# PHASE A

## PHASE A NOTES

1. **ESTABLISH THE ENTRANCE/EXIT AND HAUL ROAD INTO THE SITE AT THORNDALE ROAD, ACCORDING TO THE APPROPRIATE MUNICIPAL STANDARDS. CONSTRUCT THE PROPOSED SCALE, SCALEHOUSE AND/OR OFFICE AND FUEL STORAGE IN THE AREA SHOWN.**
2. **PRIOR TO ANY ON SITE OPERATIONS, CONSTRUCT OR UPGRADE THE FENCING ON THE LICENCED BOUNDARIES TO THE STANDARDS OF THE AGGREGATE RESOURCES ACT (1.2m HIGH POST AND WIRE FENCE), EXCEPT WHERE SITE PLAN OVERRIDES ARE NOTED). ALL FENCING SHALL BE MAINTAINED.**
3. **CONSTRUCT THE HAUL ROAD THROUGH SOUTH PART OF AREA 1 AND 2 AND USE STRIPPED SOIL TO BEGINE CONSTRUCTION OF ACOUSTIC BERM.**
4. **PRIOR TO EXTRACTION STRIP TOPSOIL AND OVERBURDEN SEPARATELY USE THE MATERIALS TO CONTINUE CONSTRUCTION OF ACOUSTIC BERM TO RECOMMENDEDED SPECIFICATIONS.**
5. **ANY REMAINING STRIPPED MATERIAL MAY NE STORED IN STORAGE BERM AS SHOWN.**
6. **BEGIN EXTRACTION OF AREA 1 IN A WESTERLY DIRECTION. PORTABLE PROCESSING PLANT AND STOCKPILING AREA MAY BE TEMPORARILY LOCATED NEAR THE PIT FACE .**
7. **UNDISTURBED PORTIONS OF AREAS 1 AND 2 SHALL REMAIN IN AGRICULTURAL USE .**




# PHASE B

1:4000 0 50 100 150m

## PHASE A NOTES

1. **COMPLETE EXTRACTION OF AREA 1.**
2. **BEGIN STRIPPING TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 2 AND USE TO BEGIN REHABILITATION OF AREA 1. EXCESS MATERIAL MAY BE STORED IN STORAGE BERMS AS SHOWN.**
3. **BEGIN EXTRACTION OF AREA 2 IN A WESTERLY DIRECTION.**
4. **COMPLETE REHABILITATION OF AREA 1 TO AGRICULTURAL AFTER-USE.**

# PHASE C (NOT SHOWN)

## PHASE A NOTES

1. **COMPLETE EXTRACTION OF AREA 2. AND BEGIN REHABILITATION OF AREA 2.**
2. **REMOVE SCALE AND SCALE HOUSE AND ALL SCRAP AND EQUIPMENT AND COMPLETE REHABILITATION OF AREA 2.**
3. **COMPLETE REHABILITATION OF ALL REMAINING AREAS (INCLUDING ALL INTERNAL HAUL ROADS) USING TOPSOIL AND OVERBURDEN STOCKPILED IN BERMS.**
4. **RETURN SITE TO AGRICULTURE.**

# OPERATIONS NOTES

## GENERAL INFORMATION

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND MAY SLIGHTLY VARY WITH MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY SPECIFIC OR EQUAL TIME PERIOD.

   EXTRACTION SHALL GENERALLY FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT, NOT WITHSTANDING THE EXTRACTION AND REHABILITATION PROCESS ABOVE. DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS MAY REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING. ANY MAJOR DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRE APPROVAL FROM MNRF.

2. REFER TO DRAWING 1 OF 4, EXISTING FEATURES. FOR A DESCRIPTION OF EXISTING VEGETATION AND BUILDINGS WITHIN THE 120 METRE BOUNDARY AND ON SITE,
3. SITE PLAN OVERRIDES ARE LISTED IN THE SITE PLAN OVERRIDE TABLE SHOWN ON THIS PAGE.

## EXTRACTION/PROCESSING/HAULING INFORMATION

4. TOTAL AREA TO BE EXTRACTED IS 12.0 HECTARES.
5. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS 300,000 TONNES.

   EXTRACTION OF SAND AND GRAVEL ABOVE WATER TABLE WILL TAKE PLACE IN ONE OR TWO BENCHES, WITH A MAXIMUM HEIGHT OF ±6 METRES. THE GROUNDWATER TABLE IS ESTIMATED TO BE BETWEEN ± 275.5 AND 279.5m ASL (SEE HYDROGEOLOGICAL REPORT BY EXP). FRONT END LOADERS WILL BE USED TO EXTRACT MATERIAL AND HAUL TRUCKS OR CONVEYORS WILL CARRY MATERIAL TO THE PORTABLE PLANT FOR FURTHER PROCESSING. REFER TO SECTIONS A-A', B-B', AND C-C' ON DRAWING 4 OF 4 FOR FURTHER DETAILS.

   PORTABLE PROCESSING EQUIPMENT, FOR CRUSHING AND SCREENING WILL BE USED ON SITE AND WILL BE LOCATED CLOSE TO THE PIT FACE AT START UP, IN ADDITION TO PROCESSING, SITE ACTIVITIES WILL INCLUDE STRIPPING AND REHABILITATION. OPERATIONAL EQUIPMENT MAY INCLUDE TRUCKS, LOADERS, EXCAVATOR, BACKHOES, BULLDOZERS, SCRAPERS, CONVEYORS AND OTHER RELATED EQUIPMENT, PROCESSING EQUIPMENT, STACKERS AND PRODUCT STOCKPILES WILL NOT EXCEED ±15 METRES IN HEIGHT AND WILL BE LOCATED CLOSE TO PIT FACES.

6. OFFICE/STORAGE BUILDING AND/OR SCALE/SCALEHOUSE MAY BE CONSTRUCTED WHERE SHOWN.
7. EQUIPMENT, SCRAP AND MACHINERY ASSOCIATED WITH THE EXTRACTION OPERATIONS WILL BE REMOVED UPON COMPLETION OF EXTRACTION.

## HYDROGEOLOGICAL INFORMATION

8. THE WATER TABLE ELEVATION VARIES ACROSS THIS LICENCE FROM APPROXIMATELY ± 275.5 TO ± 279.5m ABOVE SEA LEVEL (A.S.L.), BASED ON THE DECEMBER 2020 HYDROGEOLOGICAL REPORT (SEE ABOVE). REFER TO SECTIONS ON SHEET 3 OF 4.
9. SURFACE DRAINAGE WILL BE DIRECTED TO LOW AREAS FOR WATER TO INFILTRATE INTO THE GRANULAR MATERIALS ON THE PIT FLOOR. THERE WILL BE NO OFF-SITE DITCHING/ DISCHARGE.

## NOISE MITIGATION INFORMATION

10. HOURS OF OPERATION:

| | |
|---|---|
| SITE PREPARATION AND REHABILITATION: | 07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS |
| EXCAVATION AND PROCESSING | 07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS |
| SHIPPING: | 07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS |

## AIR QUALITY INFORMATION

11. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

## SITE MANAGEMENT INFORMATION

**MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION**

12. EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

**FENCING INFORMATION**

13. BOUNDARIES OF THE AREA TO BE LICENCED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 4 EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING ON THE LICENCED BOUNDARIES WILL BE UPGRADED TO 1.2m HIGH POST AND WIRE TO COMPLY WITH THE AGGREGATE RESOURCES ACT WHERE REQUIRED.

    1.2m HIGH, HIGHLY VISIBLE MARKER POSTS SHALL BE USED TO DEMARCATE LICENCE CORNERS WHEN AGRICULTURAL ACTIVITY PERMITS.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

14. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS WHERE SHOWN AND STOCKPILES ON PIT FLOOR CLOSE TO EXTRACTION FACE.

BERM INFORMATION

15. BERMS SHALL BE A MINIMUM OF ±2.5 METRES ABOVE THE EXISTING GRADE, OR AS SPECIFIED IN HGC ENGINEERING NOISE ASSESSMENT REPORT DATED DECEMBER 2020 AND SHOWN ON OPS PLAN, BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 3 OF 4 DETAILS AND SECTIONS, ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN, NOTE #7) IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION.
16. ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND REHABILITATE THE SITE. TOPSOIL CAN BE TEMPORARILY STOCKPILED ON THE PIT FLOOR.

SCRAP STORAGE INFORMATION

17. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED IN THE SCALE AREA, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND NOT WITHIN 30m OF ANY BODY OF WATER AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. STUMPS/ WOODY MATERIAL MAY BE CHIPPED AND USED FOR SOIL ENHANCEMENT DURING PROGRESSIVE REHABILITATION. TREES WILL BE HARVESTED AND SOLD AS LUMBER OR UTILIZED FOR FIREWOOD AND/ OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

18. FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE AGGREGATE PROCESSING EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD. ALL SPILLS TO THE ENVIRONMENT MUST BE REPORTED TO THE SPILLS ACTION CENTRE OF MECP, ANY SPILL SHALL BE REMOVED AND DISPOSED OF AT AN APPROPRIATE MECP APPROVED FACILITY.

# LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- 120m INFORMATION BOUNDARY
- PROPERTY LINE
- REGULATORY SETBACK AND LIMIT OF EXTRACTION LINE
- EXISTING FENCE
- EXISTING 5m CONTOUR LINE (285)
- EXISTING 1m CONTOUR LINE (284)
- EXISTING SPOT ELEVATION (283.85)
- EXISTING VEGETATION
- EXISTING WETLAND
- LOCATION OF SECTION (A)
- EXTRACTION FACE
- BERM (MIN. HEIGHT AS SHOWN)
- UNDISTURBED AREA
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- AREA UNDER REHABILITATION
- EXISTING BUILDING AND NUMBER (1)
- EXISTING HYDRO POLE (HP)
- DIRECTION OF SURFACE WATER DRAINAGE
- BOREHOLE LOCATION AND NUMBER DRILLED AND MONITORING WELL INSTALLED BY EXP JUNE 15, 16, AND 29, 2020 (BH/MW)
- ENTRANCE/ EXIT
- DIRECTION OF EXTRACTION
- DIRECTION OF TOPSOIL AND OVERBURDEN MOVEMENT
- PRODUCT TRANSPORTATION VIA HAUL ROAD
- LOCATION OF NOISE RECEPTOR (R3)
- EXISTING ELEVATION / PROPOSED ELEVATION (296.00 / 286.00)
- PROPOSED MARKER POST (MP)

# SITE PLAN OVERRIDE (VARIANCE)

THE FOLLOWING CONDITIONS ILLUSTRATED ON THESE PLANS VARY FROM THE OF THE PROVINCIAL STANDARDS MADE UNDER THE AGGREGATE RESOURCES ACT

| ITEM | SECTION |
|---|---|
| SETBACK REDUCTION TO 0m ON EAST AND NORTH BOUNDARIES, PROPERTY IS OWNED BY LICENSEE. | 5.10 |
| NO FENCING ALONG NORTH BOUNDARY, DENSE WOODLOT PROHIBITS ACCESS AND TO PERMIT CONTINUED AGRICULTURAL USE AND ALONG EAST BOUNDARY TO PERMIT CONTINUED AGRICULTURAL USE. | 5.1 |

| NO. | DATE | REVISIONS | OWNER | HM | MNR |
|---|---|---|---|---|---|

**Pre Licence Review**

| NO. | DATE | REVISIONS | OWNER | HM | MNR |
|---|---|---|---|---|---|

**Site Plan Amendments**


Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com


**Project Name**

# 5026367 Ontario Ltd.
# ELLIOT PIT

LICENSEE SIGNATURE _____

LICENCE No.

PART LOT 16, CONCESSION 2

MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF WEST NISSOURI), COUNTY OF MIDDLESEX

**Scale** 1:2000 (0 10 50 80m)

**North**

**Stamp** ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RICHARD McAVAN — MEMBER

**Drawing Status**: PRELIMINARY FOR DISCUSSION

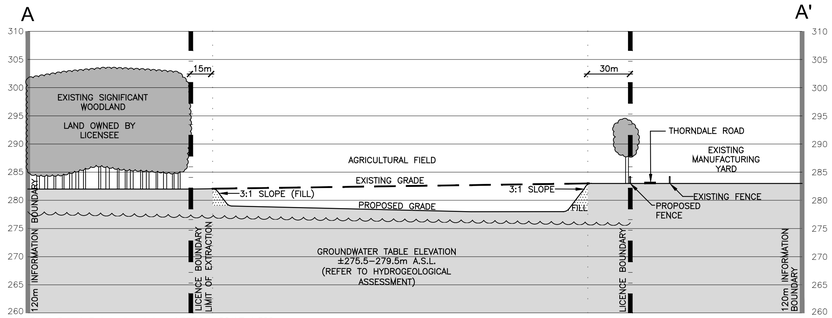
**Drawn** SB | **Checked** MH | **Issue Date** JAN 2021

**Drawing Title**: OPERATIONS PLAN

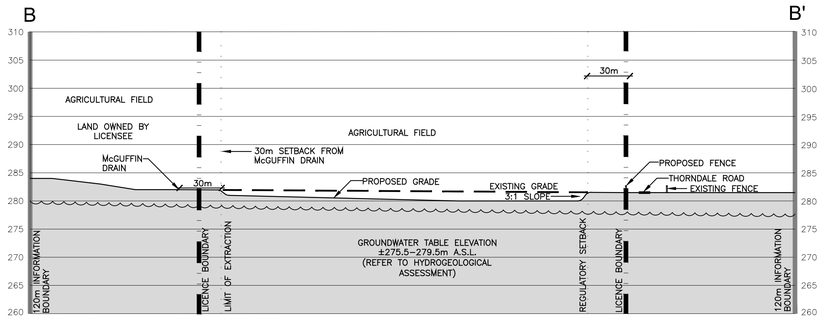
**Project Number**: 20-22

**Drawing Number**: 2 OF 4

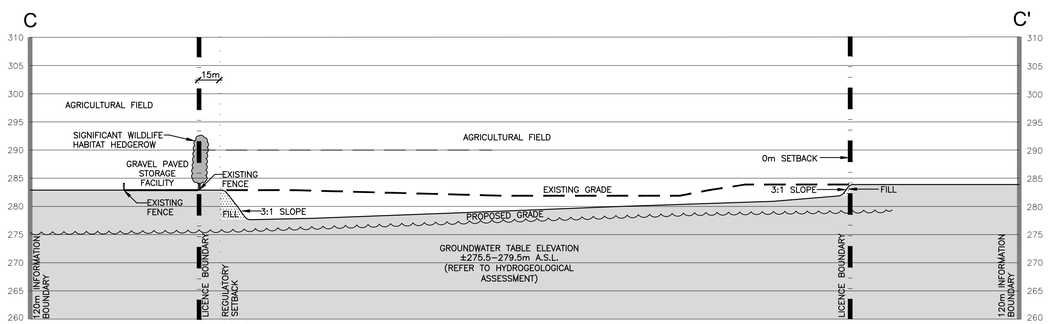
FILE NAME: 20-22/COMP/2022-2.DWG
PLOT DATE: JANUARY 4, 2021




SECTION A-A' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000




SECTION B-B' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000




SECTION C-C' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000

# TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS AS OF DECEMBER 2020. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

NOISE ASSESSMENT - HGC ENGINEERING, DATED DECEMBER 2020

1. THE FOLLOWING TABLE PRESENTS THE REFERENCE SOUND LEVELS USED FOR THE ACOUSTIC MODELING PRESENTED HEREIN. THESE SOUND LEVELS WERE BASED ON SITE MEASUREMENTS OF SIMILAR PROCESSING EQUIPMENT TO BE USED IN THIS PIT.

   REFERENCE SOUND POWER LEVELS OF PROCESSING EQUIPMENT

| EQUIPMENT | SOUND POWER LEVEL dBA re: $10^{-12}$ W |
|---|---|
| A CRUSHING AND SCREENING PLANT WITH AN ASSOCIATED LOADER | 115 |
| EXCAVATOR | 108 |
| TRUCKS | 103 |

   IF OTHER EQUIPMENT IS PROPOSED FOR OPERATION IN THE GRAVEL PIT, IT SHALL BE CONFIRMED THROUGH MEASUREMENT TO PRODUCE SOUND LEVELS CONSISTENT WITH THE ABOVE REFERENCED SOUND LEVELS OR ADDITIONAL MITIGATION MEASURES MAY BE REQUIRED.

2. A MINIMUM 3.0 M HIGH PERIMETER BERM (ABOVE EXISTING GRADE) SHALL BE CONSTRUCTED ALONG THE EASTERN BOUNDARY AND NORTHEAST CORNER OF THE PIT PRIOR TO THE COMMENCEMENT OF EXTRACTION OR PROCESSING ACTIVITIES IN AREA 1. THE 3.0 M HIGH PERIMETER BERM SHALL REMAIN AFTER ALL ACTIVITIES ARE MOVED INTO AREA 3.

3. A MINIMUM 7.0 M HIGH ACOUSTICAL BARRIER SHALL BE CONSTRUCTED AND MAINTAINED ON THE PIT FLOOR BESIDE THE CRUSHING AND SCREENING PLANT IN THE DIRECTION OF R1 TO R3 (TO THE EAST OF THE PLANT).

4. A MINIMUM 6.0 M HIGH ACOUSTICAL BARRIER SHALL BE CONSTRUCTED AND MAINTAINED ON THE PIT FLOOR BESIDE THE CRUSHING AND SCREENING PLANT IN THE DIRECTION OF R4 (TO THE WEST OF THE PLANT).

5. THE ACOUSTICAL BARRIERS MENTIONED ABOVE COULD BE COMPRISED OF THE PIT FACE, AN EARTH BERM, A NOISE WALL, AGGREGATE STOCKPILES OR ANY OTHER CONSTRUCTION WITH A MINIMUM SURFACE DENSITY OF 20 KG/M2.

6. ACTIVITIES USED TO PREPARE THE SITE FOR EXCAVATION, SUCH AS THE STRIPPING OF TOPSOIL, CONSTRUCTION OF BERMS, OR ACTIVITIES RELATED TO THE REMEDIATION OF THE SITE ARE CONSIDERED TO BE CONSTRUCTION ACTIVITIES. THEY ARE REGULATED UNDER MUNICIPAL BYLAWS AND NPC-115 "SOUND LEVEL LIMITS FOR MOTORIZED CONSTRUCTION EQUIPMENT".

ARCHAEOLOGICAL ASSESSMENT - LINCOLN ENVIRONMENTAL CONSULTING CORP. DATED OCTOBER 2020

SHOULD PREVIOUSLY UNDOCUMENTED ARCHAEOLOGICAL RESOURCES BE DISCOVERED, THEY MAY BE A NEW ARCHAEOLOGICAL SITE AND THEREFORE SUBJECT TO SECTION 48(1) OF THE ONTARIO HERITAGE ACT. THE PROPONENT OR PERSON DISCOVERING THE ARCHAEOLOGICAL RESOURCES MUST CEASE ALTERATION OF THE SITE IMMEDIATELY AND ENGAGE A LICENSED CONSULTANT ARCHAEOLOGIST TO CARRY OUT ARCHAEOLOGICAL FIELDWORK, IN COMPLIANCE WITH SECTION 48(1) OF THE ONTARIO HERITAGE ACT.

THE CEMETERIES ACT, R.S.O. 1990 C. C.4 AND THE FUNERAL, BURIAL AND CREMATION SERVICES ACT, 2002, S.O. 2002, C.33 (WHEN PROCLAIMED IN FORCE) REQUIRE THAT ANY PERSON DISCOVERING HUMAN REMAINS MUST NOTIFY THE POLICE OR CORONER AND THE REGISTRAR OF CEMETERIES AT THE MINISTRY OF CONSUMER SERVICES.

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS AS OF DECEMBER 2020. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

HYDROGEOLOGICAL ASSESSMENT - EXP DATED DECEMBER 2020

1. SPILL ACTION RESPONSE PLAN
   FUEL HANDLING ACTIVITIES SHOULD BE DIRECTED TOWARDS THE NORTHEAST PORTION OF THE SITE WHERE LESS PERMEABLE SOIL IS FOUND AND LIMITED GRAVEL-TAKING ACTIVITIES ARE PLANNED. SPILL CONTAINMENT EQUIPMENT SHOULD BE UTILIZED WHERE FUEL HANDLING OCCURS, AND THE OPERATORS SHOULD BE AWARE OF THE SPILL ACTION RESPONSE PLAN. THE LOCATION OF APPROPRIATE SPILL RESPONSE EQUIPMENT/MATERIALS SHOULD BE CLEARLY IDENTIFIED ONSITE, SO THAT ANY PETROLEUM SPILLS FROM TRUCKS AND HEAVY EQUIPMENT (EG. FUEL, HYDRAULIC OIL) CAN BE QUICKLY ADDRESSED.

2. GROUNDWATER MONITORING
   SEASONAL GROUNDWATER MEASUREMENTS ARE CURRENTLY UNDERWAY AT THE SITE, AND SHOULD CONTINUE UNTIL THE SPRING OF 2021, TO ENSURE THAT A FULL RANGE OF SEASONAL GROUNDWATER LEVELS ARE RECORDED FOR THE SITE. WHEN GRAVEL EXTRACTION OPERATIONS COMMENCE, MONITORING OF THE GROUNDWATER DEPTHS AT THE SITE SHOULD CONTINUE ON A QUARTERLY BASIS TO DOCUMENT THE GROUNDWATER TABLE ELEVATIONS.

3. WELL DECOMMISSIONING
   WHEN THE WELLS ARE DETERMINED TO BE NO LONGER REQUIRED, THEY SHOULD BE PROPERLY DECOMMISSIONED IN ACCORDANCE WITH ONTARIO REGULATION 903.

4. SITE RESTORATION WITH OVERBURDEN SOILS
   THE NEAR SURFACE OVERBURDEN SOILS AT THE SITE GENERALLY COMPRISE SANDY SILT FILL AND SANDY SILT MATERIAL, WHICH OVERLIES THE GRANULAR DEPOSITS WHICH ARE TO BE EXTRACTED FROM THE SITE. THIS MATERIAL IS EXPECTED TO BE STOCKPILED ONSITE AND/OR USED TO CONSTRUCT BERMS AT THE SITE DURING THE AGGREGATE EXTRACTION OPERATION AND THEN LATER RE-USED TO RESTORE GRADES WITHIN THE EXTRACTED AREA, AS PART OF THE SITE REHABILITATION WORK.

NATURAL ENVIRONMENT ASSESSMENT - TERRASTORY ENVIRONMENTAL CONSULTING INC. DATED DECEMBER 2020

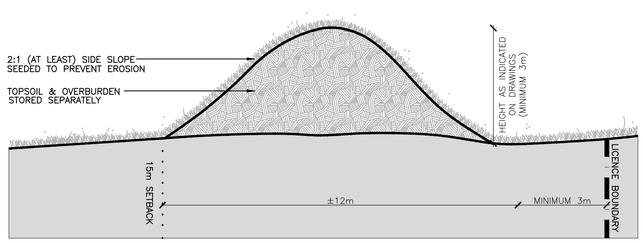
1. THE 15M SETBACK FROM THE DRIPLINE OF THE DECIDUOUS WOODLOT WILL BE WELL-MARKED UNDER THE DIRECTION OF A QUALIFIED ECOLOGIST PRIOR TO THE COMMENCEMENT OF ADJACENT PIT OPERATIONS.

2. THE 15M SETBACK FROM THE DRIPLINE OF THE DECIDUOUS WOODLOT WILL BECOME NATURAL, SELF-SUSTAINING VEGETATION.

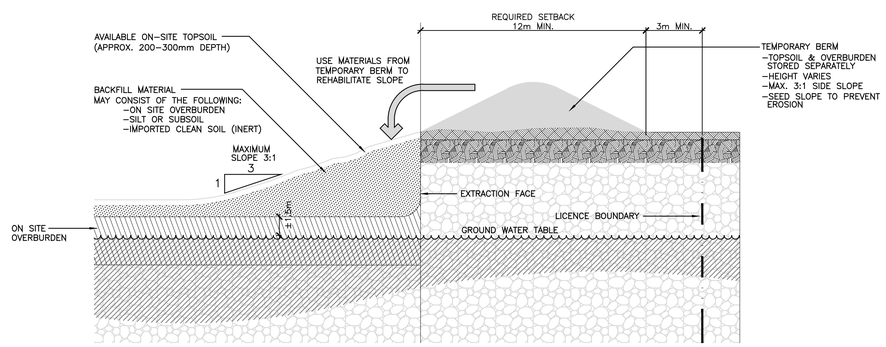
3. THE DRIPLINE OF THE DECIDUOUS HEDGEROW WILL BE WELL-MARKED UNDER THE DIRECTION OF A QUALIFIED ECOLOGIST PRIOR TO THE COMMENCEMENT OF ADJACENT PIT OPERATIONS.

4. ALL NECESSARY REMOVAL OF VEGETATION TO SUPPORT PIT OPERATIONS WILL BE COMPLETED OUTSIDE THE PRIMARY BIRD NESTING AND BAT ACTIVITY PERIODS (I.E., TO BE COMPLETED BETWEEN OCTOBER 1 AND MARCH 31).

5. ANY NECESSARY LIGHTING TO SUPPORT PIT OPERATIONS WILL BE DIRECTED AWAY FROM THE DECIDUOUS WOODLOT TO THE EXTENT PRACTICABLE.



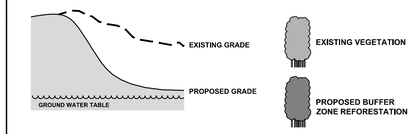

TYPICAL BERM SECTION
N.T.S.




TYPICAL SIDESLOPE REHABILITATION BY BACKFILLING
N.T.S.

## LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- 120m INFORMATION BOUNDARY
- REGULATORY SETBACK LINE
- PARCEL LINE




## SECTION NOTES

### GENERAL INFORMATION

1. SECTION LINES ARE INDICATED ON DRAWINGS 1, 2 AND 5.

| NO. | DATE | REVISIONS | OWNER | HM | MNR |
|---|---|---|---|---|---|

Pre Licence Review

| NO. | DATE | REVISIONS | OWNER | HM | MNR |
|---|---|---|---|---|---|

Site Plan Amendments


Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com


Project Name

# 5026367 Ontario Ltd.
## ELLIOT PIT

LICENSEE SIGNATURE _____
LICENCE No.
PART LOT 16, CONCESSION 2
MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF WEST NISSOURI), COUNTY OF MIDDLESEX

Scale 1:1000 (0 10 20 30 40m)

North

Stamp: ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RICHARD McAVAN — MEMBER

Drawing Status: PRELIMINARY FOR DISCUSSION

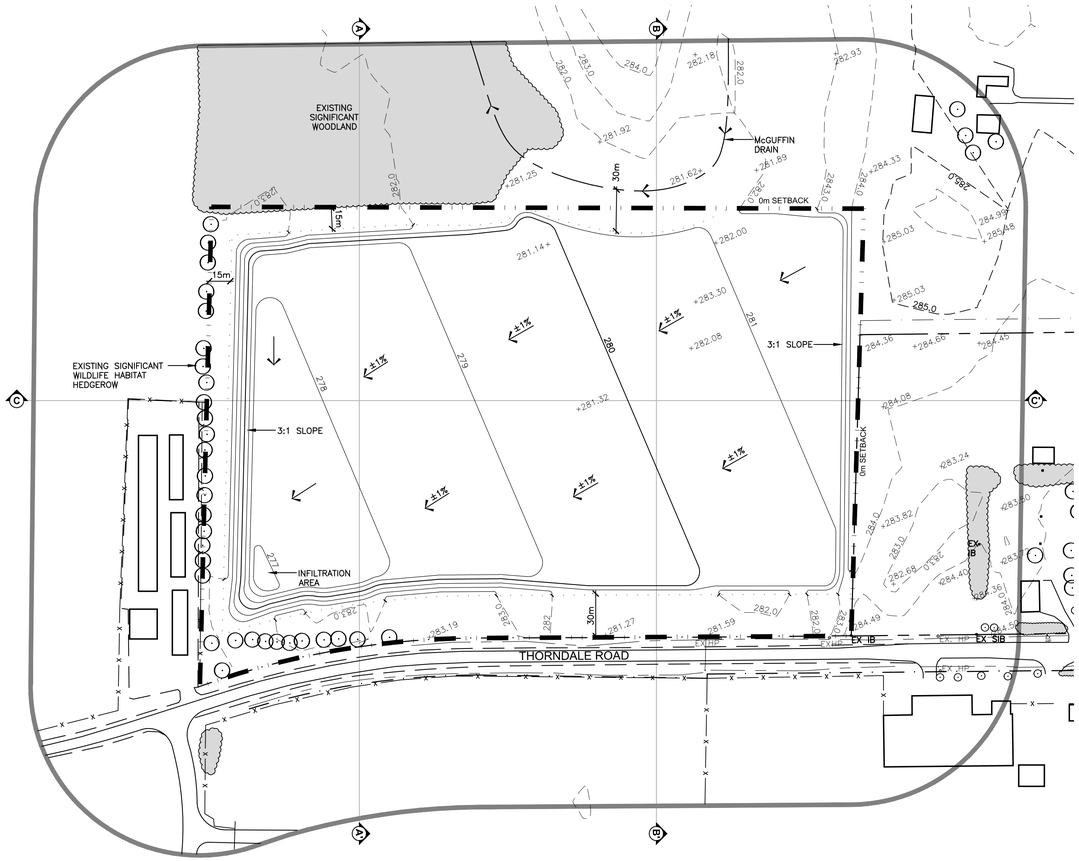
Drawn SB | Checked MH | Issue Date JAN 2021

Drawing Title: SECTIONS AND DETAILS

Project Number: 20-22

Drawing Number: 3 OF 4

FILE NAME: 20-22/COMP/2022-3.DWG
PLOT DATE: JANUARY 4, 2021




# REHABILITATION NOTES

## GENERAL INFORMATION

1. REFER TO SHEET 3 OF 4 FOR SECTIONS, SHEET 2 OF 4 FOR OPERATIONS AND PHASING DIAGRAMS AND NOTES AND SHEET 4 OF 4 FOR FINAL REHABILITATION AND NOTES.
2. PROPERTY SHALL BE REHABILITATED TO:
   AGRICULTURE 12.0 HA
   FOR A TOTAL OF 12.0 HECTARES.

## HYDROGEOLOGICAL INFORMATION

3. IT IS ANTICIPATED THAT THE GROUNDWATER ELEVATION ACROSS THE SITE WILL REMAIN RELATIVELY UNCHANGED AT ± 275.5 - 279.5 A.S.L. (SEE EXP HYDROGEOLOGICAL ASSESSMENT.).
4. ALL SURFACE DRAINAGE WILL BE DIRECTED TO THE LOW AREAS REMAINING ON THE PIT FLOOR ON SITE SO THAT THE WATER CAN INFILTRATE INTO THE GRANULAR MATERIALS. THERE WILL BE NO SURFACE DISCHARGE OFF SITE.

## SIDESLOPE/MEADOW REHABILITATION INFORMATION

GRADING INFORMATION

5. REHABILITATED SLOPES WITHIN THE LICENCED AREA WILL BE CONSTRUCTED AS SHOWN ON THE CROSS SECTIONS. REHABILITATION OF ABOVE WATER SLOPES SHALL BE BY BACKFILLING (MINIMUM 3:1) AND/OR CUT AND FILL METHOD USING AVAILABLE ON-SITE OVERBURDEN AND TOPSOIL.

   AVAILABLE OVERBURDEN REPLACED WILL BE APPROXIMATELY 100mm THICK.

   REFER TO DRAWING 3 OF 4, SECTIONS, FOR MORE INFORMATION ON BACKFILLING AND CREATION OF REHABILITATED SIDESLOPES.

TOPSOILING INFORMATION

6. ALL AVAILABLE TOPSOIL ON THE SITE WILL REMAIN TO BE USED FOR REHABILITATION OF THIS SITE.

VEGETATION STABILIZATION INFORMATION

7. TOPSOIL SHALL BE SEEDED WITH A MIXTURE OF GRASSES AND LEGUMES THAT MAY INCLUDE THE FOLLOWING AT A RATE OF APPROXIMATELY 125KG/HA:
   BUCKWHEAT RED CLOVER WHITE CLOVER
   TALL FESCUE ANNUAL RYE

## REHABILITATING TO AGRICULTURAL FIELDS INFORMATION

8. DEEP RIPPING OF FIELDS SHALL BE PERFORMED TO ELIMINATE COMPACTION (WHERE REQUIRED).
9. SPREADING OF AVAILABLE SUBSOIL/ OVERBURDEN AND ROUGH GRADING.
10. SPREADING OF AVAILABLE TOPSOIL AND FINE GRADING.
11. REMOVAL OF STONES LARGER THAN 100mm.
12. SEED AREAS WITH SEED MIXTURE NOTED ABOVE. ALL VEGETATION PLANTED DURING THIS LICENCE WILL BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.
13. MATERIAL FROM OTHER PROPERTIES (EG. MANURE AND/ OR TOPSOIL) MAY BE IMPORTED INTO THE SITE FOR SOIL ENHANCEMENT USING STANDARD AGRICULTURAL PRACTICES.

## SETBACK REHABILITATION INFORMATION

14. AFTER SIDESLOPES ARE CREATED AND REQUIRED BERMS ARE REMOVED FROM SETBACKS THESE AREAS WILL BE IMMEDIATELY STABILIZED WITH A SUITABLE GROUNDCOVER AND THEN REFORESTED THE FOLLOWING SPRING. SETBACK AREAS PROPOSED FOR REFORESTATION AND DEVOID OF BERMS WILL BE PLANTED WITHIN TWO YEARS OF LICENCE ISSUANCE.

## LEGEND

- BOUNDARY OF AREA TO BE LICENCED
- 120m INFORMATION BOUNDARY
- PROPERTY LINE
- REGULATORY SETBACK LINE
- EXISTING FENCE
- EXISTING BUILDING
- 285 EXISTING 5m CONTOUR LINE
- 284 EXISTING 1m CONTOUR LINE
- HP EXISTING HYDRO POLE
- X 283.85 EXISTING SPOT ELEVATION
- 285.00 PROPOSED 5m CONTOUR LINE
- 284.00 PROPOSED 1m CONTOUR LINE
- DIRECTION OF SURFACE WATER DRAINAGE
- EXISTING VEGETATION
- A LOCATION OF SECTION

| NO. | DATE | REVISIONS | OWNER | HM | MNR |
|---|---|---|---|---|---|

Pre Licence Review

| NO. | DATE | REVISIONS | OWNER | HM | MNR |
|---|---|---|---|---|---|

Site Plan Amendments

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

# 5026367 Ontario Ltd.
## ELLIOT PIT

LICENSEE SIGNATURE _____
LICENCE No.
PART LOT 16, CONCESSION 2
MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF WEST NISSOURI), COUNTY OF MIDDLESEX

Scale 1:2000
0 10 50 80m

North

Stamp
ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
RICHARD McAVAN
MEMBER

Drawing Status
PRELIMINARY FOR DISCUSSION

Drawn SB
Checked MH
Issue Date JAN 2021

Drawing Title
REHABILITATION PLAN

Project Number
20-22

Drawing Number
4 OF 4

FILE NAME: 20-22/COMP/2022-4.DWG
PLOT DATE: JANUARY 4, 2021