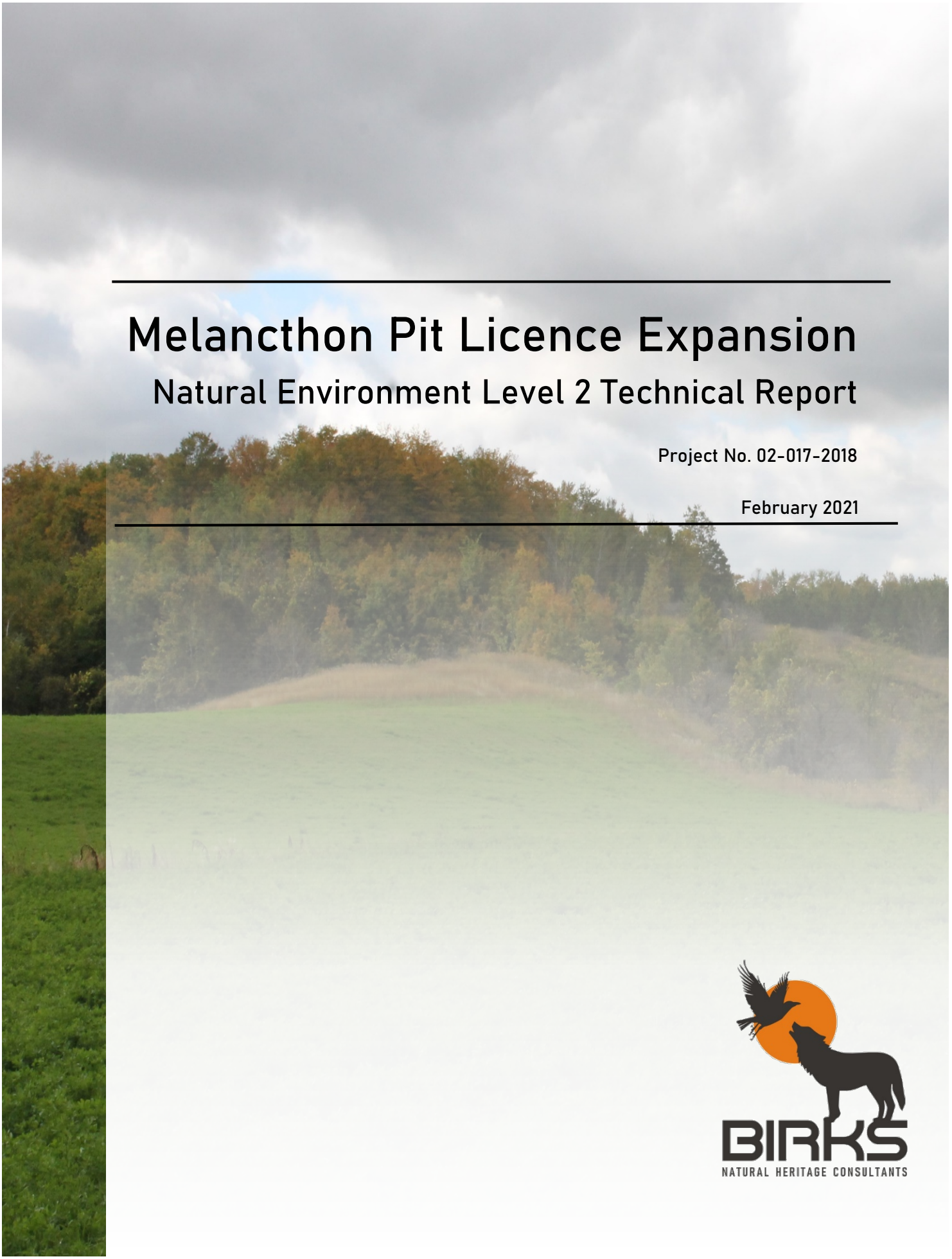

Melancthon Pit Licence Expansion

Natural Environment Level 2 Technical Report

Project No. 02-017-2018

February 2021

BIRKS
NATURAL HERITAGE CONSULTANTS

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Barrie, Ontario
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February 2021

Duivenvoorden Haulage Ltd.
3425 9th Line
Innisfil, ON
L9S 3Z6

Attention: John Duivenvoorden

RE: BIRKS NHC 02-017-2018
Natural Environment Level 2 Technical Report
Melancthon Pit License Expansion

Dear Mr. Duivenvoorden:

Thank you for retaining Birks Natural Heritage Consultants, Inc. to undertake the Natural Environmental Level 2 Assessment for the proposed Melancthon Pit License Expansion under the existing Class A license. The proposed expansion is located on Part Lot 14, Concession 4 OS E, in the Township of Melancthon, County of Dufferin. The proposed license expansion area is located on adjacent lands north of the existing Class A license pit.

A Natural Environment Level 1 Technical Report (Birks NHC 2019) was prepared which provided documentation of findings, including the characterization of significant natural heritage features. Those features include woodland, wetland, candidate significant wildlife habitat identified as seasonal concentration areas of animals and habitat for species of special concern, and potential habitat for species listed as Threatened or Endangered under Ontario's *Endangered Species Act,* 2007. The Natural Environment Level 1 Technical Report was used to identify opportunities and constraints for the proposed pit expansion and assist in the creation of the extraction plan. As part of the *Aggregate Resources Act*, a Natural Environment Level 2 Report is required when natural heritage features have been identified on or within 120 metres of a proposed extraction site.

The Natural Environment Level 2 Report provides an assessment of potential impacts to those features identified within the Natural Environmental Level 1 Technical Report, provides mitigation, compensation, and rehabilitation measures to reduce those potential impacts, and evaluates conformity with the applicable legislation and policies including the Aggregate Resources Act, Provincial Policy Statement, *Endangered Species Act*, County of Dufferin Official Plan, and Township of Melancthon Official Plan.

If you have any questions or concerns regarding this report, please do not hesitate to contact the undersigned.

Yours truly,

Birks Natural Heritage Consultants Inc.
Duivenvoorden

Brad Baker, H. B.Sc.
Ecologist

Stephanie Brady, HBES
Ecologist

cc: Tecia White, WhiteWater Hydrogeology Ltd.

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1 INTRODUCTION

Duivenvoorden Haulage Ltd (DHL) owns and operates the Melancthon Pit, which is licensed to extract aggregate from above the water table. Birks Natural Heritage Consultants, Inc. (Birks NHC) was retained by DHL to undertake the Natural Environmental Assessments for the proposed Melancthon Pit License Expansion. This Natural Environment Level 2 (NEL 2) Technical Report follows on the preparation of the Natural Environment Level 1 (NEL 1) Technical Report which was completed by Birks NHC (July 2019). Both documents are required for the proposed pit license expansion of the existing Class A license for the property identified as Part of Lot 14, Concession 4 OS E (the property) in the Township of Melancthon (the Township) and the County of Dufferin (the County). It is our understanding that the application is considered a Category 1 Class "A" Pit since extraction is proposed above the water table.

1.1 PURPOSE

A NEL 1 Technical Report was completed by Birks NHC (July 2019) which characterized the candidate Natural Heritage Features and Functions associated with the study area. Through the completion of the NEL 1, Birks NHC identified potential Natural Heritage Features and Functions associated with the proposed extraction plan. As part of the *Aggregate Resources Act*, 1990 (ARA) licence application process, a NEL 2 Impact Assessment is required when Natural Heritage Features and Functions have been identified on, or within, 120 metres of a proposed extraction site.

This report has been prepared to consider the natural heritage requirements of the following documents and policies:

a) Provincial Policy Statement (MMAH 2020) and Associated Training Manuals;
b) Township of Melancthon Official Plan (2014);
c) County of Dufferin Official Plan (2017);
d) *Conservation Authorities Act*, 1990;
e) Ontario *Endangered Species Act,* 2007;
f) Federal *Species at Risk Act*, 2002; and
g) Federal *Fisheries Act*, 1985.

The findings of the NEL 1 Technical Report were considered in the design of the proposed extraction plan. Details associated with the findings of the NEL 1 are provided throughout this report.

1.2 SITE DESCRIPTION

The property is largely dominated by agricultural lands (*i.e.,* active crops) and bounded by 4th line to the east. Remnant residential infrastructure is present in the eastern portion of the property with mature laneway trees and an access driveway from 4th line. The naturalized areas are confined to the southwest corner of the property which include woodland, wetland, open meadow, and hedgerows.

Seasonal overland drainage is present within the property limits and evidence of seasonal ponding within the agricultural fields is evident through review of past aerial imagery, topography, and observed conditions. Over the course of the field surveys the pond was observed forming with the spring runoff and quickly decreasing in size. The field conditions in the location of this temporal pond were dry in June such that agricultural use continues in the area.

1.3 Adjacent Land Use

The property is bounded to the south and east by lands licensed for aggregate extraction with agricultural lands occurring over much of the remaining adjacent properties. Dispersed rural residences and farm dwellings are located along 4th line and a naturalized woodland is present directly west of the property boundary.

1.4 Study Area

The study area for the NEL 2 Technical Report is defined in the Aggregate Resources of Ontario Provincial Standards, Sections 2.2.3 and 2.2.4 as the site and surrounding 120 metres. The study area is illustrated in Figure 1. For the purpose of classifying the significance of natural heritage features and functions, the study area is in Ecoregion 6E in Ontario.

2 ENVIRONMENTAL POLICY FRAMEWORK

The planning policies and regulations related to natural heritage which apply to the proposed expansion are summarized in the following sections. These sources provide information where natural heritage features or functions have been previously identified and guidance on what surveys will be required to ensure that all appropriate features and functions are considered in the NEL1 Technical Report.

2.1 Aggregate Resources Act, 1990

Under the ARA Provincial Standards, applicants are required to prepare a Natural Environmental Technical Reports to support the application. Where significant natural heritage features occur on, or in proximity to (*i.e.,* within 120 metres or within the maximum limit of groundwater influence) the proposed operation, applicants are required to prepare a NEL 2 Technical Report, identifying the following:

- The features and function of the identified natural environment feature(s)
- The nature of the potential negative impacts of the extraction operation on those features
- The proposed preventative, mitigative or remedial measures
- The nature and magnitude of any residual effects

Significant natural heritage features are defined in the *Provincial Policy Statement,* 2020 (PPS; MMAH, 2020) with guidance from supporting technical resource manuals prepared by the Ministry of Natural

Resources and Forestry (MNRF). Comprehensive field surveys and a review of background information and applicable policies were completed as part of the NEL 1 Technical Report which identified significant natural heritage features as defined under the PPS.

2.2 Provincial Policy Statement (2020)

Ontario's *Planning Act*, 1990 requires that planning decisions shall be consistent with the PPS. Section 2.1 of the PPS specifies policy related to protection of natural heritage features and functions. According Sections 2.1.4 of the PPS, development and site alteration shall not be permitted in the following features:

a) Significant wetlands in Ecoregions 5E, 6E; and 7E; and
b) Significant coastal wetlands.

Additional features are protected by Section 2.1.5 of the PPS which states that, development and site alteration shall not be permitted in the following natural features unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions:

a) Significant woodlands in Ecoregions 6E; and 7E;
b) Significant valleylands in Ecoregions 6E; and 7E;
c) Significant wildlife habitat (SWH);
d) Significant areas of natural and scientific interest; and
e) Coastal wetlands in Ecoregions 5E, 6E; and 7E that are not subject to policy 2.1.4(b)

While many of these features are mapped and direction is available to allow for candidate features and functions to be identified it remains the responsibility of the Province and/or the Municipality to designate areas identified within Section 2.1.4 and 2.1.5 of the PPS as significant. The Natural Heritage Reference Manual (OMNR 2010) and Ecoregion 6E Significant Wildlife Habitat Criterion Schedule (MNRF 2015) were used within this report to identify candidate features and functions.

Sections 2.1.6 and 2.1.7 state that development and site alteration is not permitted in fish habitat or habitat of Endangered and Threatened species except in accordance with federal and provincial requirements.

Section 2.1.8 extends protections of the PPS to adjacent lands, typically those within 120 metres of the potential impact. Section 2.1.8 states that development and site alteration shall not be permitted on adjacent lands to natural heritage features identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological function.

2.3 Endangered Species Act, 2007

Ontario's *Endangered Species Act*, 2007 (ESA) provides regulatory protection for Endangered and Threatened species, prohibiting harassment, harm and/or killing of individuals and destruction of their

habitats. Habitat is characterized within the ESA as the area prescribed by a regulation as the habitat of the species, or, an area on which the species depends, directly or indirectly, to carry on its life processes including reproduction, rearing of young, hibernation, migration or feeding.

The Ontario Regulation (O. Reg.) 230/08 of the ESA identifies Species at Risk in Ontario. These include species listed as Extirpated, Endangered, Threatened, and Special Concern. Ontario's ESA provides regulatory protection to extirpated, endangered and threatened species on the Species at Risk in Ontario List, prohibiting harassment, harm and/or killing of individuals and destruction of their habitats. Habitat is broadly characterized within the ESA as the area prescribed by a regulation as the habitat of the species, or, an area on which the species depends, directly or indirectly, to carry on its life processes. As noted above, only species listed as Endangered and Threatened receive species and habitat protection through the ESA. Species designated as Special Concern may receive protection under the Significant Wildlife Habitat provisions of the PPS.

2.4 Species at Risk Act, 2002

The federal *Species at Risk Act*, 2002 (SARA) provides regulatory protection to Extirpated, Endangered, and Threatened species through a prohibition on activities which could be considered detrimental (*i.e.* killing, harming or possession). Protection is extended to the "residence" and "critical habitat" of all species on federal lands. This habitat protection extends to cover all lands regardless of ownership where the habitat of a species listed in Schedule 1 is also protected by the *Migratory Breeding Birds Convention Act*, 1994 or the *Fisheries Act*, 1985 or through a special order issued by the Minister.

2.5 Growth Plan for the Greater Golden Horseshoe

The study area is within the Growth Plan for the Greater Golden Horseshoe, 2019 (the Growth Plan) planning area. The property, however, does not encompass areas identified as being within the Natural Heritage System of the Growth Plan. Policies specific to the Growth Plan are applicable to proposed aggregate operations, as follows:

Section 4.2.8 applies to mineral aggregate resources:

> *2. Notwithstanding the policies in subsections 4.2.1, 4.2.2, 4.2.3 and 4.2.4, within the Natural Heritage System, mineral aggregate operations and wayside pits and quarries are subject to the following:*
>
> *a) no new mineral aggregate operation and no new wayside pits and quarries, or any ancillary or accessory use thereto, will be permitted in the following key natural heritage features and key hydrologic features:*
>
> *i. significant wetlands;*
>
> *ii. habitat of endangered species and threatened species; and*
>
> *iii. significant woodlands unless the woodland is occupied by young plantation or early successional habitat, as defined by the Province, in*

which case, the application must demonstrate that policies 4.2.8.4 b) and c) and 4.2.8.5 c) have been addressed and that they will be met by the operation;

b) any application for a new mineral aggregate operation will be required to demonstrate:

- *i. how the connectivity between key natural heritage features and key hydrologic features will be maintained before, during, and after the extraction of mineral aggregate resources;*
- *ii. how the operator could replace key natural heritage features and key hydrologic features that would be lost from the site with equivalent features on another part of the site or on adjacent lands;*
- *iii. how the water resource system will be protected or enhanced; and*
- *iv. how any key natural heritage features and key hydrologic features and their associated vegetation protection zones not identified in policy 4.2.2.3 a) will be addressed in accordance with policies 4.2.8.4 b) and c) and 4.2.8.5 c); and*

c) an application requiring a new approval under the Aggregate Resources Act to expand an existing mineral aggregate operation may be permitted in the Natural Heritage System, including in key natural heritage features, key hydrologic features and any associated vegetation protection zones, only if the related decision is consistent with the PPS and satisfies the rehabilitation requirements of the policies in this subsection.

4. For rehabilitation of new mineral aggregate operation sites, the following apply:

- *a) the disturbed area of a site will be rehabilitated to a state of equal or greater ecological value and, for the entire site, long-term ecological integrity will be maintained or enhanced;*
- *b) if there are key natural heritage features or key hydrologic features on the site, or if such features existed on the site at the time of the application:*
  - *i. the health, diversity, and size of these key natural heritage features and key hydrologic features will be maintained or enhanced; and*
  - *ii. any permitted extraction of mineral aggregate resources that occurs in a feature will be completed, and the area will be rehabilitated, as early as possible in the life of the operation;*
- *c) aquatic areas remaining after extraction are to be rehabilitated to aquatic enhancement, which will be representative of the natural ecosystem in that particular setting or ecodistrict, and the combined terrestrial and aquatic rehabilitation will meet the intent of policy 4.2.8.4 b); and*
- *d) outside the Natural Heritage System for the Growth Plan, and except as provided in policies 4.2.8.4 a), b) and c), final rehabilitation will appropriately reflect the long-term land use of the general area, taking into account applicable policies of this Plan and, to the extent permitted under this Plan, existing municipal and*

provincial policies. In prime agricultural areas, the site will be rehabilitated in accordance with policy 2.5.4 of the PPS, 2014.

5. Final rehabilitation for new mineral aggregate operations in the Natural Heritage System for the Growth Plan will meet these additional criteria:

a) where there is no extraction below the water table, an amount of land equal to that under natural vegetated cover prior to extraction, and no less than 35 per cent of the land subject to each license in the Natural Heritage System for the Growth Plan, is to be rehabilitated to forest cover, which will be representative of the natural ecosystem in that particular setting or ecodistrict. If the site is also in a prime agricultural area, the remainder of the land subject to the license is to be rehabilitated back to an agricultural condition;

b) where there is extraction below the water table, no less than 35 per cent of the non-aquatic portion of the land subject to each license in the Natural Heritage System for the Growth Plan is to be rehabilitated to forest cover, which will be representative of the natural ecosystem in that particular setting or ecodistrict. If the site is also in a prime agricultural area, the remainder of the land subject to the license is to be rehabilitated in accordance with policy 2.5.4 of the PPS, 2014; and

c) rehabilitation will be implemented so that the connectivity of the key natural heritage features and the key hydrologic features on the site and on adjacent lands will be maintained or enhanced.

2.6 County of Dufferin

Within the County of Dufferin Official Plan (2017), the property is categorized as Countryside Area according to Schedule B (Community Structure and Land Use), Agricultural Area in Schedule C (Agricultural Area and Rural Land), and Sand and Gravel Resources Area in Schedule D (Mineral Aggregate Resource Areas). Naturalized portions of the property are identified as Woodlands according to Schedule E (Natural Heritage Features) and County Preliminary Natural Heritage System within Schedule E1 (Natural Heritage System).

2.7 Township of Melancthon

The proposed expansion area is designated Extractive Industrial, Agricultural, and Environment Conservation, as per Schedule A-1 (Land Use and Road Plans) of the Township of Melancthon Official Plan (2014). Schedule D (Natural Heritage 1 Wetlands) and Schedule E (Natural Heritage 2 Woodlands, Wildlife Habitat and ANSI) further identify the naturalized portions of the proposed expansion property as Locally Significant and Unevaluated Wetlands, and Significant Woodlands (Primarily 20+ hectares), and Watercourses.

2.8 Nottawasaga Valley Conservation Authority

Portions of the property are regulated by the Nottawasaga Valley Conservation Authority (NVCA) in accordance with O. Reg. 172/06 – Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (Appendix A). Under this regulation, the NVCA requires that approvals be obtained for any proposed development within regulated areas. The terms of reference was reviewed by the NVCA and their response is included in Appendix A.

3 NATURAL HERITAGE FEATURES AND FUNCTIONS

The results of field surveys, review of background information and analysis of data completed as part of the NEL 1 Technical Report indicated the presence of Natural Heritage Features and Functions associated with the property and proposed extraction plan. A summary is included in Table 1 below which outlines what Natural Heritage Features and Functions will be further considered in this NEL 2 Technical Report. Figure 2 and Figure 3 provide additional context related to the Natural Heritage Features and Functions and General Site Photos are included in Appendix B.

Table 1. Summary of NEL 1 Natural Heritage Features and Functions

Natural Heritage Features and Functions	Within Property	Within 120 metres of Property	Actions Required (NEL 2)
Significant Wetland (Provincially, Regionally)	None Identified		No actions required
Other Wetlands	**Un-evaluated:** • SWDM2-1: Black Ash Mineral Deciduous Swamp • MAMM1-3: Reed-canary Grass Graminoid Mineral Meadow Marsh	None identified	NEL 2 evaluation for potential ecological impacts
Significant Woodlands	**Candidate:** • Considered potentially significant on the basis of proximity to other woodland or other habitats - Includes wetland habitat and an area of seasonal surface drainage. • Considered potentially significant on the basis of water protection - the study area is mapped as being within a Significant Recharge Area by the County and Township.		NEL 2 evaluation for potential ecological impacts
Significant Valleylands	None Identified		No actions required

Natural Heritage Features and Functions	Within Property	Within 120 metres of Property	Actions Required (NEL 2)
Significant Wildlife Habitat	**Potential:** • Bat Maternity Colonies for Silver-haired Bat and Big Brown Bat **Confirmed** • Special Concern and Rare Wildlife Species - Breeding Habitat for Eastern Wood-pewee	**Potential:** • Bat Maternity Colonies for Silver-haired Bat and Big Brown Bat. • Special Concern and Rare Wildlife Species - Breeding Habitat for Eastern Wood-pewee and Wood Thrush.	NEL 2 evaluation for potential ecological impacts
Provincial Areas of Natural and Scientific Interest	None Identified		No actions required
Fish Habitat	None Identified		No actions required
Habitat of Threatened or Endangered Species	**Potential:** • Abandoned Nest of Barn Swallow. No current use to demonstrate functioning habitat • Roosting Habitat for Endangered Bat Species	**Potential:** • Bank Swallow • Roosting Habitat for Endangered Bat Species **Confirmed** • Breeding Habitat for Eastern Meadowlark • Breeding Habitat for Bobolink	NEL 2 evaluation for potential ecological impacts

4 LEVEL 2 ASSESSMENT – POTENTIAL IMPACTS OF PROPOSED GRAVEL PIT EXPANSION

4.1 DESCRIPTION OF THE PROPOSED GRAVEL PIT EXPANSION DEVELOPMENT

An active extractive industrial pit to the south of the property within East Half of Lot 14, Concession 4, Township of Melancthon has been in operation since the early 1990s with the existing site plans dated 1992. The existing licence boundary is approximately 28.35 hectares. The proposed extraction plan, provided in Figure 4, will be an area of 34.5 hectares. The proposed extraction pit will be above the water table.

Figure 4 illustrates the limits of the proposed extraction plan.

The existing woodland and wetland portions within the property are measured at approximately 7.3 hectares. The proposed pit expansion would remove 2.3 hectares of woodland habitat with 5 hectares of woodland and wetland habitat remaining within the property (including the woodland portion within the setback area).

The proposed extraction plan for the gravel pit expansion is provided in the Site Plan (Appendix C; IPS 2020). The key conclusions regarding the extraction plan as they relate to the Natural Heritage Features and Functions, were drawn from the Site Plan and summarized as follows:

1. The limits of extraction are shown on Figure 4. A setback of 30 metres will be established along the existing woodland limit and along the edge of the woodland portions proposed for removal. Fencing or marker posts will be used as appropriate to delineate this boundary and the limits of operations. This may be temporary orange limit fencing or sediment erosion control fencing to protect against accidental encroachment.
2. The anticipated elevation of ground water ranges from ~507 m.a.s.l and ~497 m.a.s.l.
3. No buildings or structures will be on-site and none will remain on-site.
4. No internal haul routes will remain on-site.
5. There will be no off-site drainage as the entire site will be extracted to a level below the surrounding landscape. Drainage will occur through percolation into the ground water table. Should additional drainage be necessary, tile drains will be installed.
6. Each phase will be stripped of topsoil and subsoil in stages. Where there is a distinguishable layer, the topsoil will be stripped, handled and replaced as a separate layer. Wherever possible, topsoil will be moved directly to a rehabilitated location. All topsoil and subsoil will be used in rehabilitation of this site and if sufficient topsoil is available excess topsoil and overburden may be moved between this site and the adjacent Licence No. 3726 to provide appropriate timing and effective progressive rehabilitation on both sites.
7. Side slopes will range between grades of 2:1 and 8:1. Slopes will be established by cut/fill and/or backfill methods using on-site materials. The final landform shown represents the max. extent of extraction and may be reduced if marketable resources is not encountered.
8. Progressive rehabilitation will be ongoing as stripping and extraction progresses. Side slopes and pit floor areas not being utilized as part of active operations where extraction has been completed will be progressively rehabilitated.
9. Prior to vegetating the pit floor, compacted soils or substrates will be ripped to alleviate compaction without mixing soil layers. De-compaction will be completed to a min. depth of 15.0m (or more if sufficient quantities are available). The area will be seeded with a good hay mixture of timothy, alfalfa, and red clover. This crop will be ploughed under for two years, producing a healthy fibre content to the soil. After this, a good hay production farm should result.
10. After the aggregate resource has been extracted from within the proposed extraction limit, the site will be rehabilitated. We understand that Progressive and final rehabilitation will be used to accommodate subsequent land uses, to promote land use compatibility, to recognize the interim nature of extraction, and to mitigate negative impacts to the extent possible.

Rehabilitation will bring the lands back to a similar condition of the existing land uses, considering the interim nature of extraction and provided to mitigate any impacts associated with aggregate operations.

4.2 Potential Ecological Impacts

This section provides a discussion of the potential ecological impacts to the identified Natural Heritage Features and recommends mitigation measures where required.

4.2.1 Other Wetlands

No direct removals and/or infilling of wetland habitat will occur as part of the proposed extraction plan (Figure 4). The majority of the wetland feature is contained within woodland feature, therefore setbacks to the wetland limits proposed as part of the extraction plan average at approximately 65 metres, with the closest setback being 40 metres along the northern wetland limit and largest setback measured at 75 metres at the southern portion of the feature (Figure 4).

Therefore, potential direct impacts to the wetland feature are associated with (1) erosion and sedimentation during initial phases of the extraction plan (*i.e.,* stripping of the topsoil and overburden), and (2) changes to the hydrology and/or water quality of aquatic habitat due to changes of surface runoff and water quality entering the wetland feature.

Erosion and Sedimentation into Wetland Feature

Construction activity, especially operations involving the handling of earthen material, dramatically increases the availability of sediment for erosion and transport by surface drainage. In order to mitigate the adverse environmental impacts caused by the release of sediment-laden runoff into receiving wetland communities, measures for erosion and sediment control are required for extraction sites.

Any potential direct impacts to wetland habitat which could result from sedimentation can be mitigated through the diligent application of erosion and sediment control plans along the boundary of the wetland setback in the northern portion or edges of the proposed soil disturbances.

Mitigation measures are provided in Section 5.1 to further avoid potential impacts to the wetland feature.

Changes to the Hydrology and Water Quality of Aquatic Habitat

The Azimuth Environmental Consulting Inc., Combined Level 1 and Level 2 Hydrogeological Assessment report dated March 2019, identifies the wetland feature as predominantly surface water fed feature with some degree of seasonal groundwater contributions. Based on the known surface water flows and topography of the study area, surface water contributions originate within adjacent lands to the west, entering the wetland along the western property boundary and eventually existing the feature through the intermittent drainage features (Figure 2). Therefore, the proposed extraction plan is not expected

to alter the surface water flows entering the wetland feature. Existing conditions of the wetland are expected to be monitored and maintained throughout the operation phases and post-extraction.

4.2.2 Candidate Significant Woodland

Development and site alteration is not permitted within Significant Woodland and adjacent lands unless the ecological function of the feature has been evaluated and it has been demonstrated that there will be no negative impact to the natural feature or its ecological function. No negative impact is defined as "degradation that threatens the health and integrity of the natural features or ecological functions for which the area is identified due to single, multiple or successive development or site alteration activities". The Natural Heritage Reference Manual (MNR 2010) defines ecological integrity as "the condition of an ecosystem in which (a) the structure, composition and function are unimpaired by stresses from human activity, (b) natural ecological processes are intact and self-sustaining, and (c) ecosystem evolution is occurring naturally and that ecological integrity includes hydrological integrity.

For the purposes of this assessment, the woodland located within the property is considered to be candidate Significant Woodland on the basis that it met 2 out of 8 potential functions used for consideration for significance.

Based on a review of the proposed extraction plan, approximately 2.3 hectares of the Candidate Significant Woodland feature (Figure 4), would be removed within the FODM5-1 community. This area represents 8.5% of the contiguous woodland feature, measured at 27 hectares (Figure 3) and was modified to exclude and protect the wetland contained within the woodland feature. Thus, there is no expectation that the loss of the area proposed for extraction would impact the contiguous feature including the associated functions that qualify the woodland as a candidate significant feature. Proximity to Other Woodlands or Other Habitats and Water Protection functions will not be directly impacted by the proposed minor woodland removals. The wetland feature will continue to receive ecological benefits from the retained woodland feature.

A 30-metre setback area will be established prior to any site preparation activities. A portion of the setback will be maintained as woodland and should be maintained as such during the life of extraction within the pit. Based on the assessment of the size criteria, and the retention of the woodland functions the proposed woodland removals are not expected to result in an ecological impact to the overall Natural Heritage Feature which extends beyond the property limits.

Appropriate protection measures including rehabilitation and compensation measures should be implemented along the length of the feature setback and are provided in Section 5.

4.2.3 Significant Wildlife Habitat

Habitat for Species of Conservation Concern - Breeding Habitat for Eastern Wood-pewee

As outlined in Section 4.4.2 of the NEL 1 Technical Report (Birks NHC 2019) one Wood Thrush and two Eastern Wood-pewee males were documented within the FODM5-1 (*i.e.,* recorded at survey points 2, 3, and 4; Figure 2). One Eastern Wood-pewee male was observed in the FODM5-1 community during both surveys calling within the same locale. This is indicative of territorial behaviour and the vegetation community is probable breeding habitat. The other incidence for Eastern Wood-pewee and the identification of Wood Thrush are only indicative of possible breeding as there was no strong evidence of successful nesting.

The proposed extraction plan would result in a loss of 2.3 hectares of the FODM5-1 vegetation community that is expected to provide breeding habitat for one Eastern Wood-pewee pair. Approximately 2.5 hectares of that community will be retained within the property from any extraction activities, which includes the portions that are within the 30-metre feature setback (Figure 4).

Eastern Wood-pewee lives in the mid-canopy layer of deciduous or mixed forests with little understory vegetation, forest clearings, or the edges of deciduous and mixed forests. The average territory size of a breeding pair in Ontario is estimated to be 1.76 ± 0.24 ha (COSEWIC 2012). The remaining 2.25 hectares within the property will continue to support a breeding pair. Furthermore, portions of the contiguous woodland feature are expected to provide suitable breeding habitat for the species.

Therefore, the loss of 2.3 hectare of suitable habitat is not expected to result in a negative ecological impact to the species. Mitigation measures are provided in Section 5.1 below.

Seasonal Concentration Areas of Animals

Bat Maternity Colonies for Silver-haired Bat and Big Brown Bat are identified as candidate Significant Wildlife Habitat because known locations of forested bat maternity colonies are extremely rare in Ontario. As discussed within Section 4.4.5 of the NEL 1 Technical Report (July 2019, Birks NHC), both Big Brown Bat and Silver-haired Bat were recorded during the course of the acoustic surveys. For the purpose of these acoustic surveys, each time a bat approaches the recording device and calls it triggers a recording which is then called a bat pass. Within the study area a total of 279 passes were identified for Big Brown Bat and Silver-haired Bat with 190 passes at SM5717, 70 passes at SM5700, a single pass at SM5696, three passes at SM3697, and nine passes at SM3672. SM5716 did not record any passes of the two species.

The largest concentration of recordings for these two species was at recorder SM5717 which was located at the maintained area, also the location of the old barn and residence on the property. SM5700 which recorded the second highest numbers of passes was located at the wetland in the southwest corner of the property which was used as a control site due to the open conditions and surface water in June. Recorders SM3697, SM3672, SM5696, and SM5716 recorded a combined 13

passes of EPFU/LANO complex which includes recordings of Big Brown Bat (*Eptesicus fuscus* - EPFU) and Silver-haired Bat (*Lasionycteris noctivagans* - LANO).

Over a recording period of ten days, 13 passes accounts for approximately one pass per evening which is an extremely low occurrence rate. Most locations where there are a large number of bats indicative of a maternity colony would be expected to have more than 40 passes per evening on a subaverage night. There is no indication from the recordings that the FODM5-1 community should be confirmed as candidate Significant Wildlife Habitat Bat Maternity Colony for Silver-haired Bat and Big Brown Bat. Acoustic recording details is provided in Appendix D.

While the FOD5-1 community is considered as potential habitat, there is no indication from the recordings that the vegetation community should be confirmed as candidate Significant Wildlife Habitat, specifically, Bat Maternity Colony for Silver-haired Bat and Big Brown Bat. Therefore, the loss of 2.3 hectares of the FODM5-1 community is not expected to result in a negative ecological impact to Bat Maternity Colonies. The remaining 2.5 hectares within the property will continue to provide day roosting habitat for various bat species include Big Brown Bat and Silver-haired Bat. Mitigation measures are provided in Section 5.1 to further reduce any potential impacts to this function and species.

4.2.4 Habitat of Threatened and Endangered Species

Eastern Meadowlark and Bobolink

Eastern Meadowlark and Bobolink males were documented during the 2018 field investigations. Bobolink and Eastern Meadowlark are obligate grassland species. In Ontario, the two species still breed in a variety of natural grassland habitat types, including remnant prairies, savannahs and alvar grasslands. Both species were observed on the property early in the year, prior to the breeding season and are considered transient males. All breeding activity documented in the study area for these species was on agricultural lands off the property opposite 4th line. The road right-of-way is approximately 30 metres wide and therefore none of the mapped territories would extend onto the property.

There is no expectation that the proposed extraction plan would result in contraventions to the ESA as it relates to Eastern Meadowlark and Bobolink and their habitats. Based on the site conditions present at the time of the field surveys, no portions of the property represent key habitat for the two species. Mitigation measures are provided in Section 5.1 to further reduce any potential impacts to this function and species.

Endangered Bat Species - Little Brown Myotis, Northern Myotis, and Tri-colored Bat

As outlined within the NEL 1 Technical Report (Birks NHC 2019), acoustic field data collection was conducted for portions of the property through the deployment of six Wildlife Acoustic Song Meter SM3Bat Bioacoustic Recorders (Figure 3) with a weather resistant SMM-U1 ultrasonic microphone for a

period of ten days to record ultrasonic calls that would be produced by a bat using the area. The recorders were deployed from June 12 to June 22, 2018.

Important habitat functions for Little Brown Myotis, Northern Myotis, and Tri-colored Bat could include hibernacula, maternity roosts, day roosts, and foraging habitat. Of these habitat types, no features with potential to function as hibernacula exist on the property, nor are hibernacula suspected to occur in the study area. Potential foraging habitat would be associated with areas of the property providing water or an abundance of flying insects. Foraging habitat is widely available within the matrix of open field and wooded areas common to throughout the County of Dufferin. Unless the foraging habitat was in proximity to a maternity roost, the loss of potential foraging habitat is unlikely to result in a contravention of the ESA. Day roosts are those that are used by males and non-reproductive females as they move across the landscape and can take the form of any tree with appropriate snag features such as loose bark, cracks or crevices. There is no indication that there is any fidelity to specific day roost sites. The loss of potential day roost habitat is unlikely to result in a contravention of the ESA. Thus, maternity roost habitat is the only habitat function considered in detail on the property.

Acoustic surveys were employed due to the presence of potential high-quality maternity roost habitat on the property. Bioacoustic recorders were deployed on the property to provide additional information for use in determining what bat species were present in the area and how those species are using potential maternity roost habitat on the property. The recorders were situated on the property for that purpose as illustrated in Figure 3 with the following rationale and results:

- SM3672 – Monitor SM3672 was placed in the site which was expected to be the most likely roost location in the FODM5-1 vegetation community. A combination of relatively open canopy and mature maple trees with features including holes and loose bark which could promote bat use were present in this location. The understory in the location was also very open. **A total of 40 bat passes recorded in this location were determined to be Little Brown Myotis or Northern Myotis;**
- SM3697 – Monitor SM3697 was placed along an old trail which was expected to facilitate bat movement through the forest. As with the other locations within the FODM5-1 vegetation community, this monitor was situated in a cluster of snag trees which could be expected to provide roosting opportunity. The canopy was closed which detracts from the potential value of the site. **A total of 7 bat passes recorded in this location were determined to be Little Brown Myotis or Northern Myotis;**
- SM5696 – Monitor SM5696 was focused on a grouping of large trees in an area of open understory close to the forest edge. This location contained enough snag trees to be considered a cluster and was one of four areas within the FODM5-1 vegetation community which was expected to provide roosting opportunity. The appropriate microhabitat in the trees was sheltered from sunlight by the canopy which would reduce the likelihood of use. **A total of 3 bat passes recorded in this location were determined to be Little Brown Myotis or Northern Myotis;**

- SM5700 – Monitor SM5700 was placed as a control to provide a better understanding of the species present in the area. The presence of standing water and abundance of insects associated with the wetland were expected to draw bats to this location. By June, there were no other sources of water present on the property. Notwithstanding, it is expected that woodland pools, farm ponds, and water present in the adjacent land would also function for the same purposes. **A total of 53 bat passes recorded in this location were determined to be Little Brown Myotis or Northern Myotis;**
- SM5716 – Monitor SM5716 was focused on a grouping of large decrepit trees close to the forest edge. This location contained enough snag trees to be considered a cluster and was one of four areas within the FODM5-1 vegetation community which could provide roosting opportunity. Again, the appropriate microhabitat within the trees was sheltered from sunlight by the canopy which was expected to reduce the likelihood of use. **Only a single bat pass was recorded in this location which was determined to be Little Brown Myotis or Northern Myotis**; and,
- SM5717 – Monitor SM5717 was placed as a both a control to provide an overview of species present in the area and a monitor to determine if large numbers of bats were present in this area of the property. The presence of a large number of calls could be indicative that the abandoned barn was being used as a roost. **A total of 11 bat passes recorded in this location were determined to be Little Brown Myotis or Northern Myotis.**

As expected, the results of the acoustic field data collection indicate the presence of Myotis sp. at all acoustic monitoring locations. Tri-colored Bat was not recorded at any of the acoustic monitoring locations. The results of the acoustic surveys are included in Appendix D.

Overall, the bat activity recorded on the property was low and there is no indication from the recordings that a large maternity colony for Endangered bat species was present within the FODM5-1 vegetation community or elsewhere in the study area. A large number of recordings in the first half hour after sunset with constant returns through the evening would be indicative of likely maternity roost function provide. Instead, the recordings indicate a low level of use by Species at Risk bats with an average of 4 recordings per evening at the highest recorder in the FODM5-1 vegetation community and only 5 recordings per evening at the control. This level of activity would be more likely to suggest day roost activity in the woodlot or single roosting females.

Male bats and non-reproductive females roost individually or in small groups as they move across the landscape. This function is regularly inconsistent, and individuals do not regularly return to the same roost or location on consecutive nights. Thus, based on the lack of evidence supporting the potential for important maternity roosts and based on our understanding of day roosting activity there is no expectation that the loss of 2.3 hectares of the FODM5-1 community would result in contravention of the ESA as it relates to Endangered Bat Species. Mitigation measures are provided in Section 5.1 to avoid accidental impacts to day roosting individuals.

Bank Swallow

Suitable habitat for Bank Swallow was noted within the existing extraction site south of the property limits. Surveys conducted in 2018 did not document this species nesting in the study area. Notwithstanding, it remains a possibility that the species could become established within portions of the study area that contain suitable features in the future.

During the breeding season (*i.e.*, May through August), nesting Bank Swallows require a vertical or near-vertical bank of a suitable substrate, typically consisting of fine sand or silt (Falconer, M. *et al*. 2016). In Ontario, natural banks and aggregate pits are the most commonly used nesting locations, with a greater percentage of colonies occurring in manmade locations (MNRF 2017). Avoidance of habitat as part of the extraction plan is not expected to be possible. Therefore, pre-planning and implementing measures to prevent Bank Swallows from establishing colonies in areas requiring disturbance during the breeding season can help prevent harm or harassment to swallows. Mitigation and prevention measures are provided in Section 5.1 below.

At this time, the proposed extraction plan would not result in a contravention of the ESA as it relates to Bank Swallow. Appropriate measures will be required throughout the course of the extraction phases to ensure no accidental harm to Bank Swallow colonies.

Barn Swallow

As discussed in Section 4.7.2 of the NEL 1 Technical Report (Birks NHC 2019), one inactive Barn Swallow nest was observed within the existing structure on the property. Barn Swallow is listed as a Threatened Species and is protected under the provincial ESA.

A Notice of Activity as prescribed in Section 23.5 of O. Reg. 242/08 made under the ESA was submitted on September 27, 2019 (Confirmation ID M-102-6328667601; Appendix E) for the removal of the structure. The structure was subsequently demolished on in the winter of 2020 prior to the spring migratory return.

Mitigation for the loss of the structure as per Section 23.5 or O. Reg. 242/08 is required and further discussed in Section 5.1.

5 MITIGATION, REHABILITATION, AND COMPENSATION PLAN

5.1 MITIGATION PLAN

Mitigation refers to the avoidance or reduction of impacts associated with the proposed works through best construction practices. Potential ecological impacts to the identified natural heritage features and functions were assessed. Where applied correctly, mitigation is intended to reduce the potential for impacts to ensure that the natural heritage features and functions will continue uninhibited by the

proposed extraction. Thus, mitigation would be required to ensure that there is no negative impact and the development can proceed in conformity with the relevant planning documents and in compliance with environmental law.

The following mitigation measures are recommended to minimize the above listed potential impacts.

5.1.1 Species at Risk

Given the dynamic character of the natural environment, as well as changes to policy (*i.e.,* new species listing), consideration is recommended in the interpretation of potential presence of Threatened or Endangered species as protected under the ESA.

This report was produced based on the most up-to-date policy information however, it is not intended to act as a long-term assessment of potential Species at Risk. The ESA is recognized as being a 'proponent-driven' piece of legislation and therefore it is the responsibility of the landowner/developer to ensure compliance with the regulations made under this act. Should a considerable length of time and/or sudden change in policy occur prior to construction, it is recommended that a review of the assessment provided within this report be undertaken by a qualified Ecologist to ensure compliance with the ESA at that time.

All current Threatened or Endangered species listed under O. Reg. 230/08 made under the *Endangered Species Act*, 2007 with a currency date of August 1, 2018 have been considered within this report.

<u>Bank Swallow Prevention Measures</u>
As discussed above, no portions of the property currently contain suitable habitat for Bank Swallow. The following section provides recommendations to prevent the establishment of Bank Swallow colonies during the course of the extraction phases.

The Best Management Practices (BMP) for the Protection, Creation and Maintenance of Bank Swallow Habitat in Ontario (MNRF 2017) was produced to assist aggregate pit operators in ensuring compliance with relevant provincial and federal regulations. The following is taken directly from the BMP document:

Slope Management
Bank Swallows prefer vertical slopes for nesting. If access to stockpiles or extraction faces that provide suitable nesting habitat for Bank Swallows is required during the breeding season, they should be made unsuitable for nesting by eliminating vertical faces.

If undertaking a slope reduction plan, consider the following recommendations:

- Reduce slopes to 70 degrees or less. This can be achieved by:
    - Sloping off stockpiles (bulldozing etc.);

  - Using an excavator to create the desired slopes; or
  - Contouring faces or piling material on the face.
- Vertical faces high up on a slope may have to be altered from above. If this is not possible, extraction in these areas may need to be scheduled for after nesting Bank Swallows have left the colony as described in Section 4.1.
- Maintain slope reduction until at least July 15; cease prevention measures between July 15 and August 20 only with the approval of local MNRF officials.
  - For work sites that are operational daily, the slope should be left at 70 degrees or less at the end of each day.

Slope management is the preferred approach.

Deterrent and Exclusion Measures

Deterrent and exclusion measures may be less reliable than slope management however can be used when slop management is not a feasible option. In Ontario, plastic Great Horned Owls and kites shaped as hawks have been used at select sites to deter Bank Swallows from colonizing with evidence of success at some locations (MNRF 2017). Acoustic deterrents such as noise-makers are not recommended deterrents as there is no evidence this approach to be a successful one for Bank Swallow in Ontario.

5.1.2 General Mitigation Plan

General mitigation of potential impacts to identified natural heritage features and functions during construction include:

- Fencing should be used appropriately as directed so that wildlife movements are only blocked when desired (*i.e.,* as exclusion fencing during construction).
- Increase habitat wherever possible, native plantings within the setback area could expand habitat available in the area.
- Erosion and sediment control plan should be implemented to protect the retained habitats (wetland, woodland). Control measures should be maintained in place until site works have been completed and the risk of sedimentation is no longer a concern.
- Tree cutting should be timed to occur during the calendar months of November 1 to March 31 and no cutting activity in forested areas should occur outside that period. This will ensure that no bats actively roosting in trees will be killed or harmed as a result of clearing activities and is outside of the breeding bird season.
- Where possible, maximize the distance of heavy equipment used from the woodland and edge to avoid disturbing wildlife.
- Refueling of all equipment should occur at least 30 metres from retained natural features, including woodland and wetland habitat.
- The use of artificial lighting should be limited within the study area to the extent possible.
- Should an animal be injured or found injured during the construction phase, they should be transported to an appropriate wildlife rehabilitation centre.

- Existing vegetation should be maintained within the prescribed setbacks of the proposed pit license expansion.

5.1.3 Wetland Habitat

In advance of any vegetation clearing or earth works (*i.e.*, clearing or grubbing) the extraction limits approved in the proposed Site Plan should be established in proximity to natural heritage features to be protected. A temporary fence (*i.e.*, sediment fence) should be erected along the surveyed limits to prevent inadvertent encroachment into areas intended to be protected. Fencing should be monitored and kept intact until site works have been completed and the risk of sedimentation is no longer a concern.

5.1.4 Woodland Habitat

Tree protection measures should be implemented prior to commencement of extraction activity to ensure tree resources designated for retention are not impacted. Retainable trees should be protected through the installation of fencing or a comparable barrier along the drip line of the retainable trees. No development activities (material and equipment storage, grading, equipment activity, *etc.*) should be permitted outside of the identified extraction area. Fencing should be monitored and kept intact until site works have been completed and the risk of sedimentation or accidental encroachment during clearing or excavation is no longer a concern.

5.1.5 Agency Approvals

Portions of the study area associated with wetland habitat are regulated under O. Reg. 172/06. Therefore, a permit from the NVCA will be required prior to any site works within regulated areas.

5.2 Rehabilitation and Compensation Plan

As provided above in Section 4.1, progressive rehabilitation will be ongoing as stripping and extraction progresses.

5.2.1 Woodland Habitat

The extraction plan will result in a net loss of woodland habitat, including associated wildlife habitat functions. Although the area in question is minimal when considering the contiguous feature, compensation for the loss should be considered in future stages of the application, in conformity with the Growth Plan. Opportunities exist within the property to re-establish woodland conditions post extraction to offset any potential ecological impacts. Progressive rehabilitation is a recommended approach as it provides opportunities to utilize stockpiled soil and initiates the process of forest regeneration.

General woodland rehabilitation recommendations are provided as follows:

1. Prior to removal of the woodland, soil from the forest floor (containing seedbank) should be salvaged and moved into the selected woodland compensation areas
2. A topsoil layer of at least 20 cm deep will need to be placed prior to planting
3. Additional topsoil should be placed around the roots of all planted trees and shrubs
4. Plants should be native species that are appropriate for the site conditions
5. Tree species should be randomly mixed in a variable arrangement and not in rows to mimic a natural forest
6. Seedlings should be planted in spring or fall
7. Plant material should be watered immediately after planting and bi-weekly for the first two months, then monthly for the rest of the growing season
8. Tree guards should be placed on seedling stems to reduce impacts from mammal browsing
9. Plant material should be inspected annually for survival for the first three years. Plants should be replaced if there is less than 80% survival

A compensation planting plan should be incorporated into the Site Plan for the proposed pit license expansion.

5.2.2 Barn Swallow Habitat Compensation Measures

Part of the ESA requirements when submitting a Notice of Activity under Section 23.5 of O. Reg. 242/08 is to create replacement habitat before the next active season. The barn structure was subsequently demolished on in the winter of 2020 prior to the spring migratory return and a replacement structure, meeting criteria outlined within O. Reg. 242/08, was created in the southwest corner of the property prior to May 2020 adjacent to the retained wetland and neighboring fields. The created habitat must be maintained for a period of three years after the habitat is created.

A Barn Swallow mitigation and restoration record will be prepared which shall include the following information:

1. The name and contact information of the person who is proposing to carry out the activity
2. A description of the activity the person proposes to carry out, including the proposed start and completion dates
3. A description of the building or structure that is the object of the activity
4. The number, location, and description of barn swallow nests located on the building or structure, and the amount of area suitable for nesting that the building or structure provides

6 CONCLUSIONS

As required within the policies of the ARA, this NEL 2 Technical Report provides discussion related to the natural heritage features and functions associated with the study area for the proposed Melancthon Pit License Expansion. A NEL 1 Technical Report was prepared for the study area (Birks NHC 2019) which details the criteria and processes used to determine what natural heritage features and functions are associated with the area and their respective significance. As outlined in Table 1 of this report, natural heritage features and functions were identified within the study area. This NEL 2 Technical Report investigated the potential for negative impacts to those identified naturel heritage features and functions. Assuming the recommendations outlined in Section 5 of this NEL 2 Technical Report are implemented there is no expectation that the proposed pit license expansion would result in negative impacts to the identified natural heritage features and functions. Thus, from a natural heritage perspective the application would be considered to conform to environmental policies and complying with environmental legislation examined within this report.

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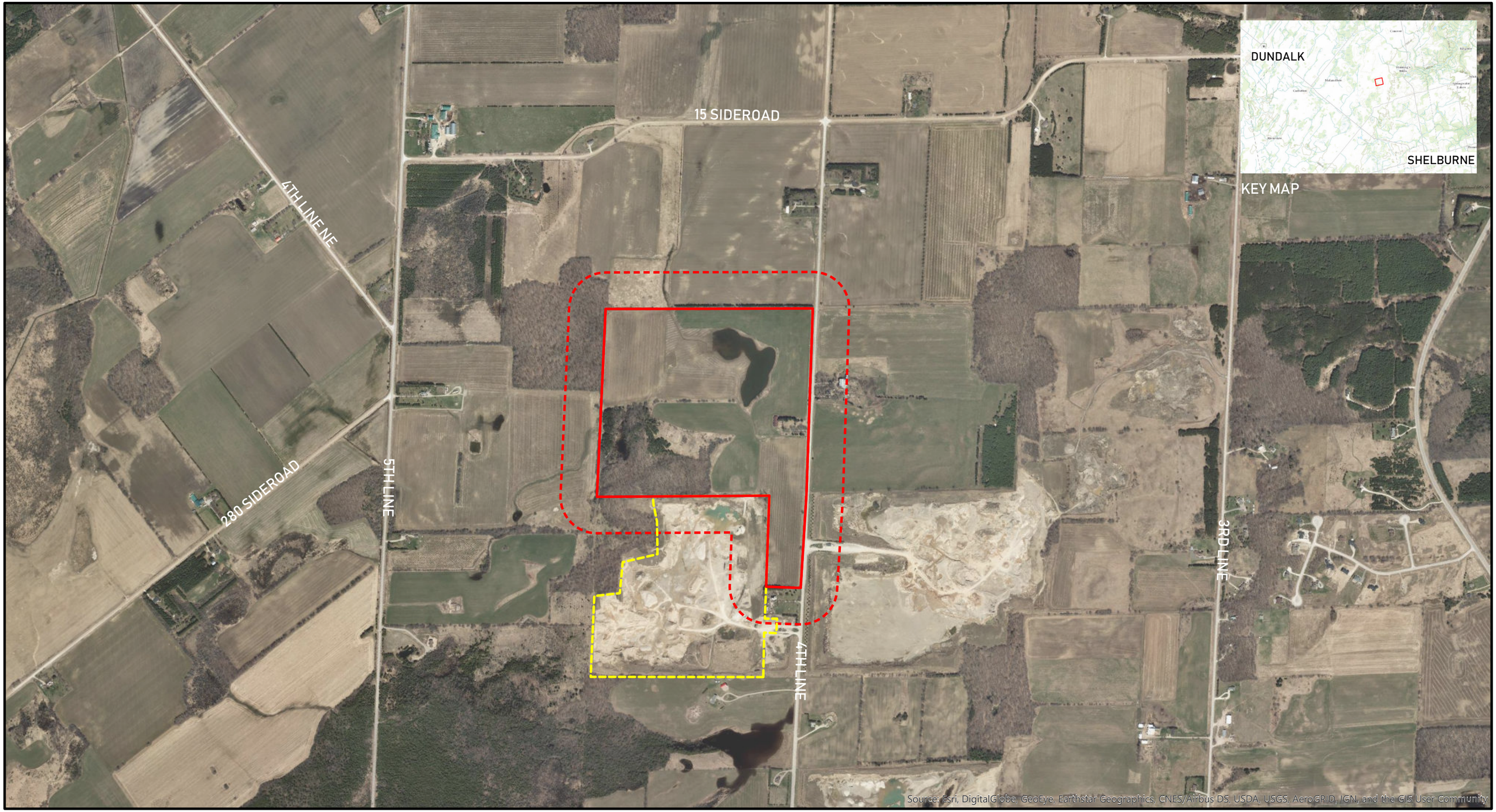


MELANCHTON PIT EXPANSION
NATURAL ENVIRONMENT
LEVEL 2

BIRKS NHC 02-017-2018

FIGURE 1. STUDY AREA

LEGEND

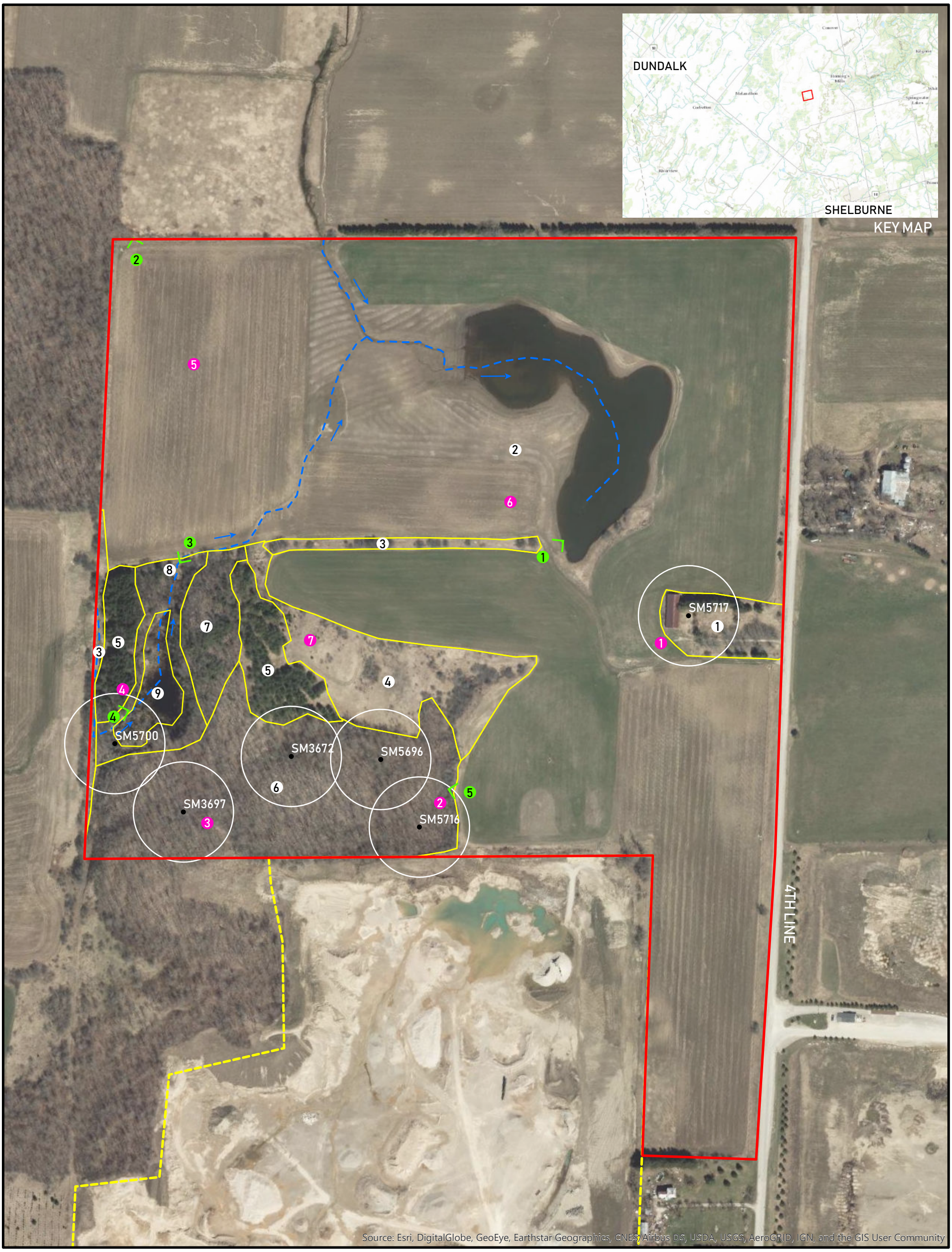
- Boundary Area to be Licenced
- Existing Licence Boundary
- 120 metre Study Area

N
W E
S

240 120 0 240 480 720 960 Meters

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI CANADA
MAP CREATED BY: SB
MAP CHECKED BY: BB
MAP PROJECTION: NAD 1983 UTM ZONE 17N
STATUS: DRAFT
DATE: 9/1/2020

BIRKS



MELANCHTON PIT EXPANSION
NATURAL ENVIRONMENT LEVEL 2

BIRKS NHC 02-017-2018

FIGURE 2. EXISTING CONDITIONS & SURVEY LOCATIONS

LEGEND

- Boundary Area to be Licenced
- Existing Licence Boundary
- Intermittent Drainage Features

Survey Locations

- Amphibian Calling Survey
- Bat Acoustic Recorder
- Dawn Breeding Bird Survey

Vegetation Communities

- 1) Maintained Area
- 2) Agriculture
- 3) Hedgerow
- 4) MEMM3 - Dry to Fresh Mixed Meadow
- 5) WOCM1 - Dry to Fresh Coniferous Woodland
- 6) FODM5-1 - Dry to Fresh Sugar Maple Deciduous Forest
- 7) FOMM7-1 - Fresh to Moist White Cedar-Sugar Maple Mixed Forest
- 8) SWDM2-1 - Black Ash Mineral Deciduous Swamp
- 9) MAMM1-3 - Reed-canary Grass Graminoid Mineral Meadow Marsh

70 35 0 70 140 210 280 Meters

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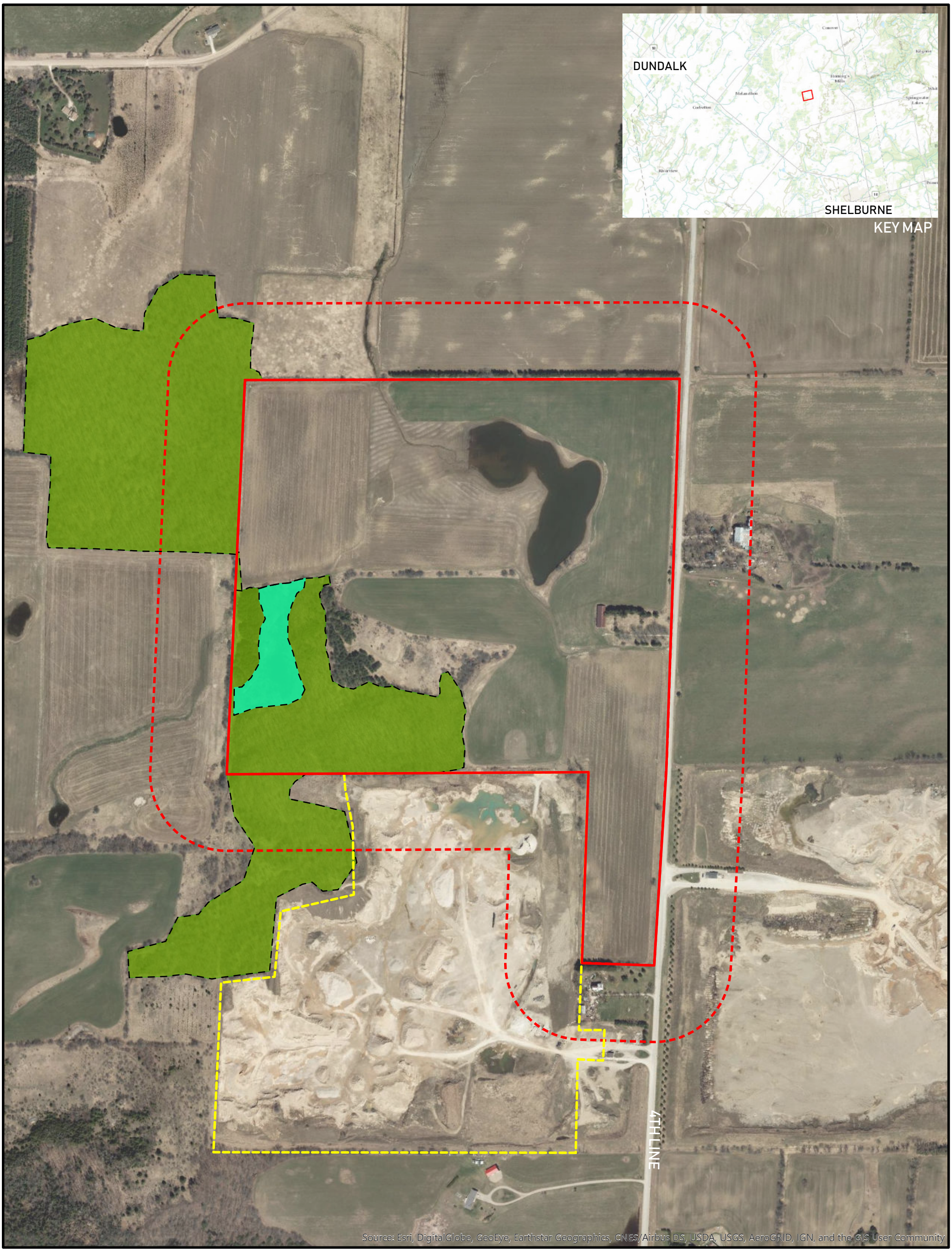
DATE: 9/1/2020

N W E S

BIRKS NATURAL HERITAGE CONSULTANTS



MELANCHTON PIT EXPANSION
NATURAL ENVIRONMENT LEVEL 2

BIRKS NHC 02-017-2018

FIGURE 3. NATURAL HERITAGE FEATURES

LEGEND

- Boundary Area to be Licenced
- Existing Licence Boundary
- 120 metre Study Area
- Wetland Area (1.3 hectares)
- Candidate Significant Woodland (27 hectares)
- Natural Heritage Feature Limit

MAP DRAWING INFORMATION:
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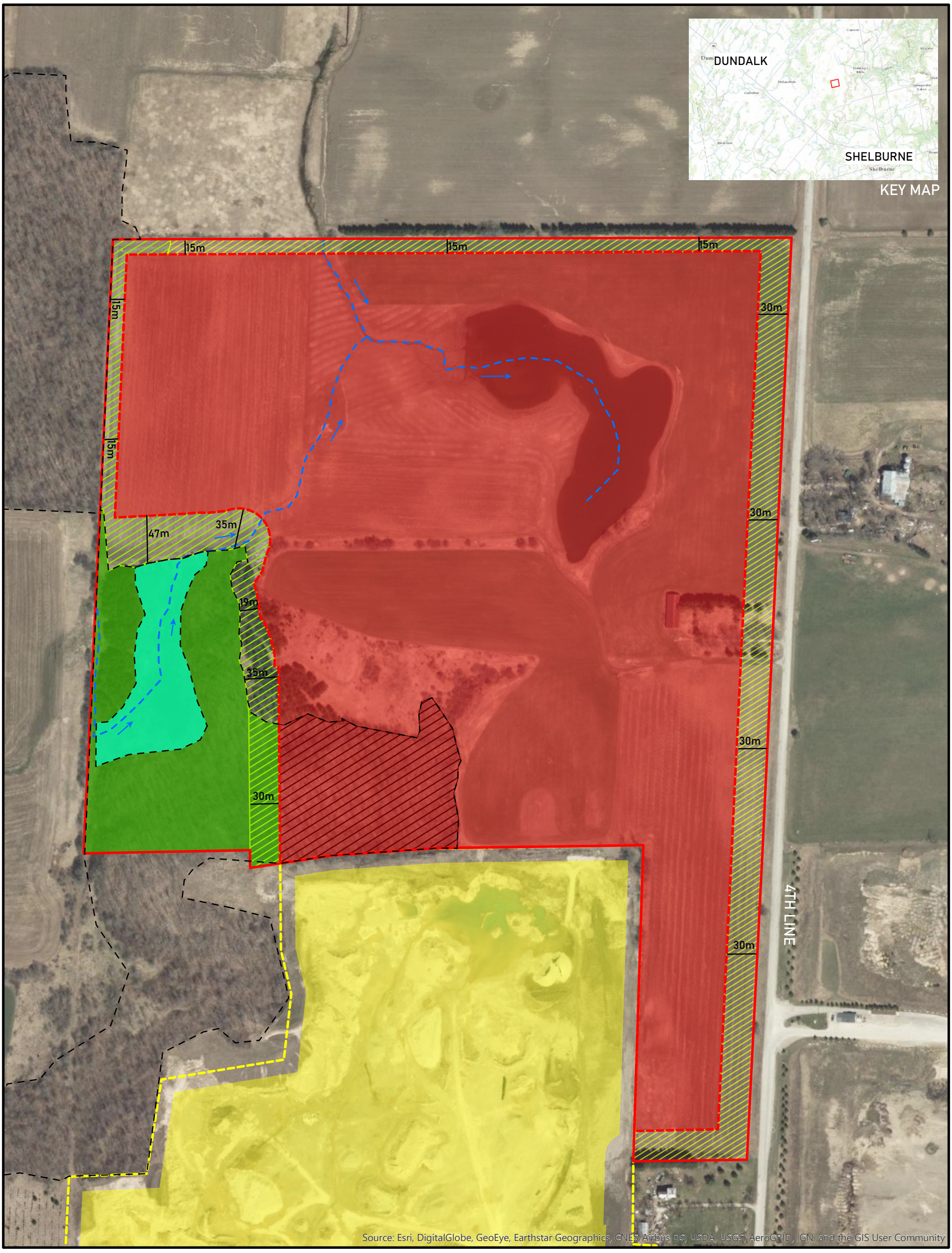
DATE: 9/1/2020

N W E S

110 55 0 110 220 330 440 Meters

BIRKS NATURAL HERITAGE CONSULTANTS



MELANCHTON PIT EXPANSION
NATURAL ENVIRONMENT LEVEL 2

BIRKS NHC 02-017-2018

FIGURE 4. PROPOSED EXTRACTION PLAN

LEGEND

- Boundary Area to be Licenced
- Existing Licence Boundary
- Intermittent Drainage Features
- Wetland Area (1.3 hectares)
- Natural Heritage Feature Limit
- Retained Natural Heritage Features (5 hectares)
- Property Setbacks
- Natural Heritage Feature Setback
- Proposed Extraction Limit (IPS)
- Proposed Extraction (IPS)
- Existing Extraction Area (IPS)
- Woodland Loss (2.3 hectares)

MAP DRAWING INFORMATION:
DATA PROVIDED BY ESRI CANADA
MAP CREATED BY: SB
MAP CHECKED BY: BB
MAP PROJECTION: NAD 1983 UTM ZONE 17N
STATUS: DRAFT
DATE: 31/03/2020

N W E S

70 35 0 70 140 210 280 Meters

BIRKS NATURAL HERITAGE CONSULTANTS

APPENDIX A

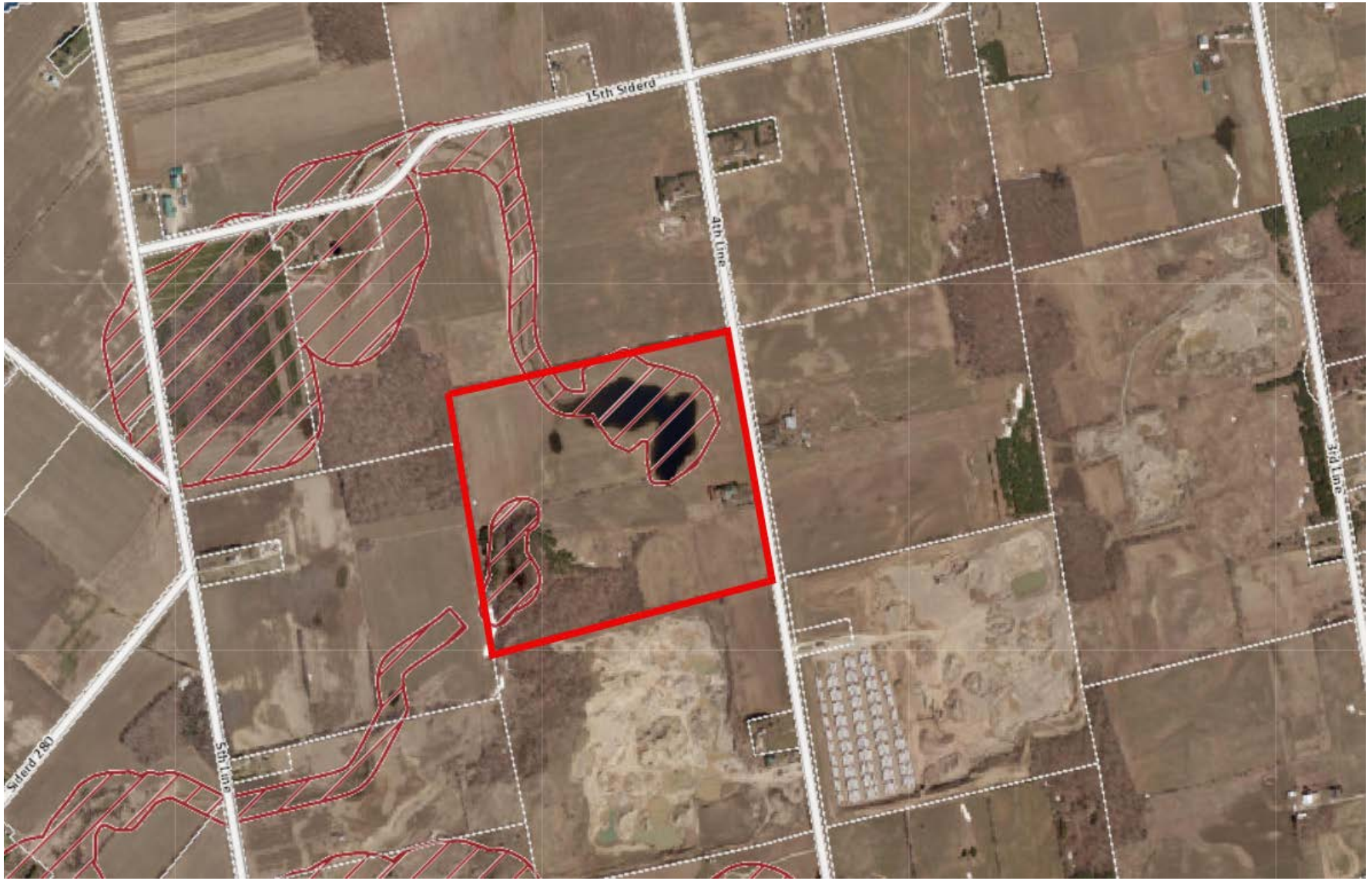
Nottawasaga Valley Conservation Authority

Regulation Mapping

BIRKS

NATURAL HERITAGE CONSULTANTS

Appendix A: Nottawasaga Valley Conservation Authority Regulation Mapping.



Brad Baker

From: Lee Bull <lbull@nvca.on.ca>
Sent: Tuesday, March 9, 2021 7:13 AM
To: Brad Baker
Subject: NVCA Terms of Reference Melancthon Pit - ID # 42204

Good morning Brad

In general, the proposed/completed field program (email below) appears mostly comprehensive and appropriate based on a high-level review of site conditions and characteristics. Staff have one question: did on-site conditions not warrant survey effort to identify potential SAR nightjar activity, i.e. Whip-poor-whil?

NVCA staff request that the report submission clearly address the framework for all relevant planning policies and provincial regulations (including O. Reg. 172/06) which govern the proposal. Report submissions should clearly outline proposed pathways to policy conformity and regulatory compliance relevant to identified natural heritage constraints.

Finally, in the absence of a clear understanding of potential impacts at this time, staff reserve the right to recommend additional post-submission refinements to the scope of work, including but not limited to potential mitigation-related works.

We trust the foregoing is of assistance to you.

Sincerely,

Lee J. Bull, MCIP, RPP | Manager, Planning Services

Nottawasaga Valley Conservation Authority
8195 8th Line, Utopia, ON L0M 1T0
T 705-424-1479 ext. 231 | **F** 705-424-2115
lbull@nvca.on.ca | **nvca.on.ca**

I am currently working remotely as the Nottawasaga Valley Conservation Authority is taking preventative measures to limit the spread of COVID-19. You may experience some delays or disruptions as we follow recommendations of health professionals to slow the virus from spreading.

From: Brad Baker <bbaker@birksnhc.ca>
Sent: Wednesday, March 3, 2021 8:57 AM
To: Lee Bull <lbull@nvca.on.ca>
Cc: Mike Francis <mfrancis@nvca.on.ca>
Subject: NVCA Terms of Reference Melancthon Pit

Good Morning Lee and Mike,

Birks Natural Heritage Consultants, Inc. (Birks NHC) has been retained to undertake an Natural Environmental Level 1 and 2 Reports for the Melancthon Pit License Expansion being proposed by Duivenvoorden Haulage Ltd ad the property identified as Part of Lot 14, Concession 4 OS E in the Township of Melancthon and the County of Dufferin. The purpose of the Natural Environmental Level 1 and 2 Technical Reports will be to address the

requirements set out by the province of Ontario specifically within the Aggregate Resources of Ontario Provincial Standards.

A summary of the surveys completed including the dates for the completion of the surveys are outlined in the following Table.

Table 1. Summary of Field Surveys Conducted

Dates	Start/End Time	Type of Survey	Biologists
June 10 & 29, 2018	5:50-9:15	Dawn breeding bird surveys	Brad Baker (Azimuth)
May 2, May 17, & June 19, 2018	20:50-22:15	Amphibian Calling surveys	Brad Baker, Alexa Pompilio (Azimuth)
March 26, 2018 April 7, 2018 April 23, 2018 May 2, 2018 May 10, 2018 May 17, 2018	9:00-15:30 20:50-22:15 10:00-16:00 20:50-22:15 12:30-14:45 20:50-22:15	Shorebird surveys	Brad Baker, Alexa Pompilio (Azimuth)
April 23, 2018	10:00-16:00	Headwater Drainage Feature Review	Brad Baker, Mike Gillespie (Azimuth)
November 2017 April 23, 2018 June 10, 2018 August 3, 2018 October 9, 2018	10:30-16:00 10:00-16:00 9:15-12:00 11:00-14:00 11:00-13:00	Ecological Land Classification and Vegetation surveys	Brad Baker, Melissa Fuller (Azimuth, Birks NHC)
March 26, 2018	9:00-15:30	Bat Snag Density survey (Step 2)	Brad Baker, Stephanie Brady (Azimuth)
June 12 - June 22, 2018	N/A	Bat Acoustic survey (Steps 3&4)	Brad Baker, Stephanie Brady (Azimuth, Birks NHC)

Site assessment considered the following information:

Site Assessment

- Review available background information for the property and surrounding lands (*i.e.*, within 120 metres);
- Review policies related to the natural heritage components of the proposed development, including municipal and provincial policies;
- Map any key natural heritage feature within the property including characterization of vegetation communities utilizing the Ecological Land Classification system;
- Conduct a multiple site visits to collect vegetation and wildlife data; and,
- Conduct a Species at Risk habitat screening for the property to determine if appropriate habitat is present to allow Species at Risk to potentially be present.

During all surveys incidental wildlife, plant, and habitat observations were considered. The relevant sections of the NEL1 report will outline the specific methods used for each of the surveys, including specific provincial protocols utilized.

Our Reports follow the Standards set out within the Aggregate Resources of Ontario Provincial Standards documents.

Notwithstanding, a summary of the process follows:

1. Report Preparation and Submission
    - Prepare a NEL 1 report which will include the following:
        a. An outline of any significant natural heritage features or functions on the property or adjacent lands within 120 meters, as defined by the Natural Heritage Reference Manual (2010);

b. Mapping outlining:
    i. The approximate boundary of the property and study area
    ii. Ecological Land Classification communities with associated field data in table format
    iii. The locations of any identified natural heritage features or functions within the study area
c. Conclusion and recommendations for appropriate consideration within the NEL 2 Report

- Review the Site Plan which included proposed extraction area and operational details
- Consultation with the project team to modify site plan characteristics to consider Natural Features identified within the NEL1 Report (Constraints).
- Prepare a NEL 2 report which will include the following:

d. The scope of the site plan amendment;
e. A review of any significant natural heritage features or functions on the property or adjacent lands within 120 meters, as defined by the Natural Heritage Reference Manual (2010);
f. Mapping outlining:
    i. The approximate boundary of the property and study area
    ii. Ecological Land Classification communities with associated field data in table format
    iii. The locations of any identified natural heritage features or functions within the study area
    iv. Proposed development and limit of disturbance
g. An outline of any potential impacts to those features or functions associated with the proposed development
h. Proposed mitigation to reduce the potential for any impacts to those features or functions
i. Conclusion, recommendations and mitigation that aligns with he overarching policy framework of the study area

At this time, Birks NHC requests that NVCA review the above proposed Terms of Reference and provide any feedback where deemed required. This correspondence will be included within the NEL2 Report.
Based on the current schedule, we expect submission of the NEL1 and NEL2 Report should follow in short order through the Aggregate Resources Act process.
If you have any questions or concerns, please do not hesitate to contact me directly at anytime. Thank you for your assistance in this matter.

Regards,

Brad Baker, H.B.Sc/Ecologist
Birks Natural Heritage Consultants, Inc.
p. (705)790-1285
w. www.birksnhc.ca
a. 23 Herrell Avenue, Barrie L4N 6T5

APPENDIX B

Photo Appendix

BIRKS

NATURAL HERITAGE CONSULTANTS

Photograph 1. General south facing view of natural area in southwest corner. Vegetation Communities WOCM1 and FODM5-1 evident with Small shrub hedgerows. (May 2018)

Photograph 2. General south facing view of natural area in southwest corner. Vegetation Communities WOCM1, SWDM2-1 and FOMM7-1 evident with FODM5-1 in background. (May 2018)

Photograph 3. General south facing view of natural area in southwest corner. Vegetation Communities WOCM1, SWDM2-1and FOMM7-1 evident. (May 2018)

Photograph 4. General View of retained MAMM1-3 meadow marsh community. (June 2018)

Photograph 5. General view of mature forested portion of the property to be retained. (March 2020)

Photograph 6. View of Drain north of the property facing south from Side Road 15 (October 2020)

Photograph 7. View facing north of water flow from drain north of property during spring run-off. (May 2019)

Photograph 8. View facing north of the same location where water enters property from drain north during the growing season with no evidence of flow. (October 2020)

Photograph 9. Central Pool near height of melt facing northwest. (May 2018)

Photograph 10. Central Pool one month later facing northeast. (June 2019)

Photograph 11. Existing Barn Structure present on property facing northwest.
(October 2019)

Photograph 12. Barn Structure post-demolition facing northeast.
(October 2020)

Photograph 13. Barn Swallow replacement habitat as Constructed illustrating nesting cups (October 2020)

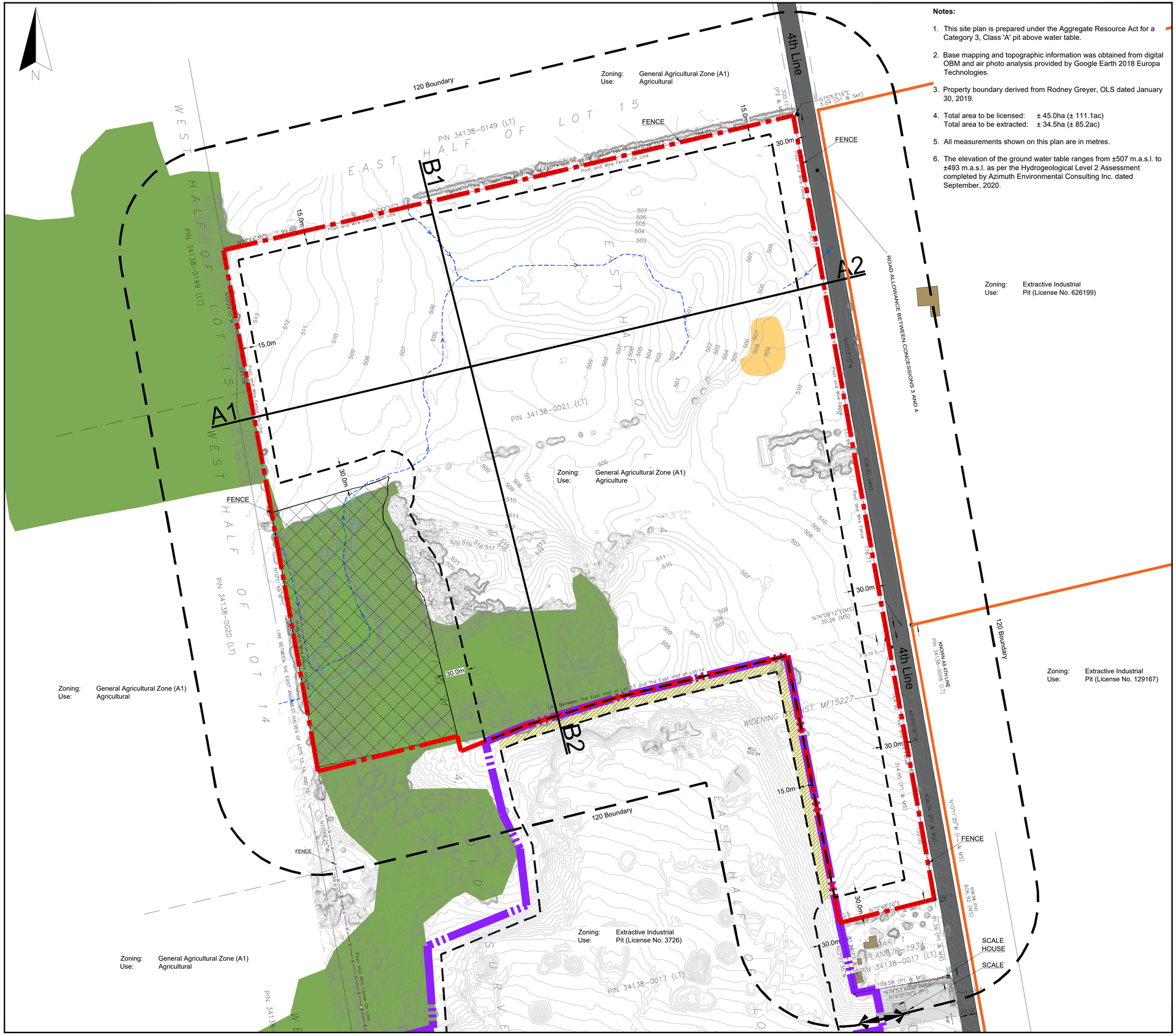
Photograph 14. Barn Swallow Nesting Structure Placement in Southwest corner facing east with agricultural fields behind photographer. (October 2020)

APPENDIX C

Site Plans

BIRKS

NATURAL HERITAGE CONSULTANTS



Notes:

1. This site plan is prepared under the Aggregate Resource Act for a Category 3, Class 'A' pit above water table.
2. Base mapping and topographic information was obtained from digital OBM and air photo analysis provided by Google Earth 2018 Europa Technologies.
3. Property boundary derived from Rodney Greyer, OLS dated January 30, 2019.
4. Total area to be licensed: ± 45.0ha (± 111.1ac)
   Total area to be extracted: ± 34.5ha (± 85.2ac)
5. All measurements shown on this plan are in metres.
6. The elevation of the ground water table ranges from ±507 m.a.s.l. to ±493 m.a.s.l. as per the Hydrogeological Level 2 Assessment completed by Azimuth Environmental Consulting Inc. dated September, 2020.

KEY MAP - 1:50,000

Legend

- Boundary of Area to be Licensed
- Limit of Extraction
- Existing Licensed Boundary (LICENSE NO. 3726)
- Existing Licensed Pits
- Surface Water Drainage Direction
- Existing Building / Structure
- Scale / Scale House
- Archeological Site (Subject to Stage 3/4 Assessment)
- Area Subject to Site Plan Amendment for Pit Expansion
- Public Road
- Elevation, Contour
- Woodlands
- Wetlands
- High Constraint Woodland Area
- Existing Fence
- Operational Entrance
- Cross-Sections

Site Plan Amendments:

No.	Date	Description	By
1	March 4, 2021	Application	A.S.

MNRF Approval Stamp:

Stamp:

Applicant:

DUIVENVOORDEN HAULAGE LTD.

3425 9th Line,
Innisfill, Ontario
L9S 3Z6

Project:

MELANCTHON PIT EXPANSION

Part of East half of Lots 13 and 14,
Con. 4 Twp of Melancthon on RR#2,
Shelburne, Ontario

EXISTING FEATURES

1 of 4

MNRF License Ref. No.:

Pre-approval Review:

Scale: 1:2,000 (0 50 100 150 200 250m)

IPS INNOVATIVE PLANNING SOLUTIONS
PLANNERS • PROJECT MANAGERS • LAND DEVELOPERS
647 WELHAM RD., UNIT 9A, BARRIE, ONTARIO, L4N 0B7
tel: 705 • 812 • 3281 fax: 705 • 812 • 3438 e: info@ipsconsultinginc.com www.ipsconsultinginc.com

Drawn By:	A.S.	Checked By:	D.V. / J.H
File No.:	18-802	Date:	February 2, 2021

APPENDIX D

Bat Acoustic Survey Results

Melanchton Pit NEL 1
SM3672
06/12/2018 - 06/22/2018
Sunset Time: 21:03
Sunrise Time: 5:50

TIMES	21:00-21:30	21:30-22:00	22:00-22:30	22:30-23:00	23:00-23:30	23:30-12:00	12:00-12:30	12:30-1:00	1:00-1:30	1:30-2:00	2:00-2:30	2:30-3:00	3:00-3:30	3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	TOTAL
SPECIES																			
MYLU																			0
MYSE																			0
MYOTIS			1				4	6	5	7	2	4	6	3	2				40
PESU																			0
EPFULANO			1	1	1									1	5				9
LACI																			0
LABO																			0
LowF																			0
HighF																			0
TOTAL	0	0	2	1	1	0	4	6	5	7	2	4	6	4	7	0	0	0	49

		w/o HI-F	**TOTAL SAR**	**40**
		w/ HI-F	TOTAL SAR	**40**

Melanchton Pit NEL 1
SM3697
06/12/2018 - 06/22/2018
Sunset Time: 21:03
Sunrise Time: 5:50

TIMES	21:00-21:30	21:30-22:00	22:00-22:30	22:30-23:00	23:00-23:30	23:30-12:00	12:00-12:30	12:30-1:00	1:00-1:30	1:30-2:00	2:00-2:30	2:30-3:00	3:00-3:30	3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	TOTAL
SPECIES																			
MYLU																			0
MYSE																			0
MYOTIS							1			1	4	1							7
PESU																			0
EPFULANO		1	1	1															3
LACI		1																	1
LABO																			0
LowF																			0
HighF																			0
TOTAL	0	2	1	1	0	0	1	0	0	1	4	1	0	0	0	0	0	0	11

		w/o HI-F	**TOTAL SAR**	**7**
		w/ HI-F	TOTAL SAR	7

Melanchton Pit NEL 1
SM5696
06/12/2018 - 06/22/2018
Sunset Time: 21:03
Sunrise Time: 5:50

TIMES	21:00-21:30	21:30-22:00	22:00-22:30	22:30-23:00	23:00-23:30	23:30-12:00	12:00-12:30	12:30-1:00	1:00-1:30	1:30-2:00	2:00-2:30	2:30-3:00	3:00-3:30	3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	TOTAL
SPECIES																			
MYLU																			0
MYSE																			0
MYOTIS							1							2					3
PESU																			0
EPFULANO		1																	1
LACI			1																1
LABO																			0
LowF																			0
HighF																			0
TOTAL	0	1	1	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	5
																		w/o HI-F	TOTAL SAR 3
																		w/ HI-F	TOTAL SAR 3

Melanchton Pit NEL 1
SM5700
06/12/2018 - 06/22/2018
Sunset Time: 21:03
Sunrise Time: 5:50

TIMES	21:00-21:30	21:30-22:00	22:00-22:30	22:30-23:00	23:00-23:30	23:30-12:00	12:00-12:30	12:30-1:00	1:00-1:30	1:30-2:00	2:00-2:30	2:30-3:00	3:00-3:30	3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	TOTAL
SPECIES																			
MYLU																			0
MYSE																			0
MYOTIS		4	4	5	2	4	4	7	9		4	3	1	2	2	2			53
PESU																			0
EPFULANO		15	18	12	5	8	5	1	2	1		5		1	1	2			76
LACI		22	2	6				2				1			1				34
LABO																			0
LowF																			0
HighF																			0
TOTAL	0	41	24	23	7	12	9	10	11	1	4	9	1	3	4	4	0	0	163
																		w/o HI-F	TOTAL SAR 53
																		w/ HI-F	TOTAL SAR 53

Melanchton Pit NEL 1
SM5716
06/12/2018 - 06/22/2018
Sunset Time: 21:03
Sunrise Time: 5:50

TIMES	21:00-21:30	21:30-22:00	22:00-22:30	22:30-23:00	23:00-23:30	23:30-12:00	12:00-12:30	12:30-1:00	1:00-1:30	1:30-2:00	2:00-2:30	2:30-3:00	3:00-3:30	3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	TOTAL
SPECIES																			
MYLU																			0
MYSE																			0
MYOTIS									1										1
PESU																			0
EPFULANO																			0
LACI				1															1
LABO																			0
LowF																			0
HighF																			0
TOTAL	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2

w/o HI-F **TOTAL SAR** 1
w/ HI-F TOTAL SAR 1

Melanchton Pit NEL 1
SM5717
06/12/2018 - 06/22/2018
Sunset Time: 21:03
Sunrise Time: 5:50

TIMES	21:00-21:30	21:30-22:00	22:00-22:30	22:30-23:00	23:00-23:30	23:30-12:00	12:00-12:30	12:30-1:00	1:00-1:30	1:30-2:00	2:00-2:30	2:30-3:00	3:00-3:30	3:30-4:00	4:00-4:30	4:30-5:00	5:00-5:30	5:30-6:00	TOTAL
SPECIES																			
MYLU																			0
MYSE																			0
MYOTIS				1		1	1	1		3	1	2	1						11
PESU																			0
EPFULANO		16	42	60	47	7	1									17			190
LACI		7	96	27	2	3					1	1		1	2	6			146
LABO																			0
LowF																			0
HighF								1					2						3
TOTAL	0	23	138	88	49	11	2	2	0	3	2	3	3	1	2	23	0	0	350

w/o HI-F **TOTAL SAR** 11
w/ HI-F TOTAL SAR 14

Species ID

MYLU	Myotis lucifugus
MYSE	Myotis septentrionalis
PESU	Perimyotis subflavus
EPFU	Eptesicus fuscus
LANO	Lasionycteris noctivagans
LACI	Lasiurus cinereus
LABO	Lasiurus borealis
MYLE	Myotis leibii

Groupings

MYOTIS	Myotis sp.
EPFULANO	Eptesicus fuscus/Lasionycteris noctivagans
LowF	Low Frequency Bat (<35kHz Fmin)
HighF	High Frequency Bat (>35kHz Fmin) PESU, LABO, or MYLU

Minimum Frequency Range of Species

MYLU	40 - 45kHz
MYSE	40 - 45kHz
PESU	35 - 40kHz
EPFU	25 - 30kHz
LANO	25 - 30kHz
LACI	<25kHz
LABO	30 - 35kHz
MYLE	40 - 45kHz

APPENDIX E

Barn Swallow Registration Confirmation

BIRKS

NATURAL HERITAGE CONSULTANTS

CONFIRMATION OF REGISTRATION

Form Name:	Barn Swallow - Activities in built structures that are habitat (s.23.5)
Date Registration Filed:	09/27/2019
Confirmation ID:	M-102-6328667601
Version Number:	001
Update Date:	

Dear Sir/Madam,

It is your responsibility to understand all the applicable requirements of registration and to be aware of which species are eligible or excluded in relation to your activity. Some requirements apply to all activities being initiated on the landscape, such as the minimization of adverse effects on the species. Other requirements vary by activity such as record keeping, monitoring, and creation of mitigation plans and reports. **Please go to https://www.ontario.ca/page/alter-structure-habitat-barn-swallow for specific requirements, information and resources.**

It is also your responsibility to monitor changes to the SARO List (O. Reg. 230/08) as well as eligibility and requirements in the General Regulation O. Reg. 242/08.

When documents are requested by the Ministry of Natural Resources and Forestry (MNRF) they are due within 14 days.

Duivenvoorden Haulage Ltd

3425 9th LINE
INNISFIL, ON L9S3Z6

You have completed the registration portion of Ontario Regulation Reg. 242/08 of the *Endangered Species Act, 2007* and your Notice form has been received by the Ministry of Natural Resources and Forestry for activities eligible under the following regulatory provision:

Barn Swallow - Activities in built structures that are habitat (s.23.5)

located at:

437202 4th LINE

For the species listed in Appendix A.

Species observations must be reported directly to the Natural Heritage Information Centre, within three months, by completing a Rare Species Reporting Form available at http://www.ontario.ca/page/report-rare-species-animals-and-plants.

In addition to the General Regulation, information is available at http://www.ontario.ca/page/natural-resources-approvals.

You are required to show this Confirmation of Registration upon request of the Ministry. Please refer to Ontario Regulation 242/08 for requirements that apply to your activity.

Any questions related to this registration and/or the Natural Resources and Forestry Registry should be directed to:

Registry and Approval Services Centre
Ministry of Natural Resources and Forestry
300 Water Street
Peterborough, ON, K9J8M5
Toll-free: 1-855-613-4256
E-mail: mnr.rasc@ontario.ca

Appendix A:

Species impacted by the registered activity:

Barn Swallow (Hirundo rustica)

APPENDIX F

Qualifications

BIRKS

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BRAD BAKER

H. B.Sc., Biological Sciences
Ecologist

PROFILE

2018 - Present	Ecologist, Birks Natural Heritage Consultants Inc.
2009 - 2018	Ecologist/Species at Risk Specialist, Azimuth Environmental Consulting, Inc.
2008 - 2009	Project Scientist, S2S Environmental Inc.
2007 - 2008	Post-Grad Certificate, Environmental Engineering Applications, Conestoga College
2005 - 2006	Research Associate, Terrestrial Biology Research Project, Brock University
2004 - 2005	Field Biologist, Behavioural Ecology Research Project, Brock University
2004	H. B.Sc., Biological Sciences, Brock University
2003	Research Associate, Community Ecology Research Project, Brock University
2002	Field Biologist, Terrestrial Biology Research Project, Brock University

EXPERIENCE

2018 - Present Ecologist, Birks Natural Heritage Consultants

Brad has worked on a wide range of ecology projects since 2002 with an emphasis terrestrial ecology and Species at Risk. He has an Honours Degree in Biology from Brock University (2004), and a Post Graduate Certificate in Environmental Engineering Applications from Conestoga College (2008). He is one of the founding members of Birks Natural Heritage Consultants, who works to provide forward thinking and creative solutions where natural heritage and human plans converge. He provides project management for natural heritage projects, regularly working with environmental planners and proponents who look to undertake works in and around important natural features. In consulting he has project experience ranging from provincial and municipal environmental assessments for large mining, infrastructure projects, and landfills through to Environmental Impacts Studies and Natural Heritage Evaluations for small home improvements in the Growth Plan Areas of Ontario. He has also been a key project member for projects focused on inventory of Natural Heritage Features and functions and the recreation, improvement, or post-construction monitoring of those systems.

Some of the certifications he holds include: Butternut Health Assessor Certification, Ontario Ecological Land Classification for the Great Lakes Region, Wetland Evaluation System Certification and Joint Health and Safety Committee Certification. He has been on the Ecology Committee for the Ontario Stone Sand & Gravel Association (OSSGA) since 2010.

2009 - 2018 Ecologist, Azimuth Environmental Consulting, Inc.

- Terrestrial Ecology Team Lead: managed the terrestrial ecology group providing mentorship to junior staff and oversight or assistance with the projects for each individual project manager.
- Biological Inventory: undertook evaluation of ecological systems using the Ecological Land

Classification system including plant community classification, in addition to floral and wildlife inventories (birds, reptiles, amphibians, and mammals) to define Natural Heritage Features and Functions and assess potential for developmental impacts upon those important components of the natural environment.

- Species at Risk Surveys: worked to undertake, and where necessary design, focussed species surveys to determine if Species at Risk protected under Ontario's *Endangered Species Act*, 2007 (ESA) (*e.g.* Endangered Bats [Little Brown Myotis], Turtles [Blanding's Turtle], Birds [Eastern Whip-poor-will]) are present within potential habitat identified during evaluation of Ecological Land Classification screenings.
- Environmental Reporting: produced Constraints Screening Reports for applications followed by appropriate reporting based on the applicable policies associated with the application.
- Permitting: coordinated permits made under the ESA and alternatives available under Ontario Regulation 242/08 of the ESA.
- Training: provided SAR training in both classroom and onsite settings for construction projects including residential development, aggregate sites, highway, culvert, road, and bridge construction projects to comply with regulatory agency approvals. Ministry of Transportation Registry, Appraisal and Qualification System qualified 'Natural Sciences' specialist, and MTO 'Species at Risk Specialist.
- Environmental inspections and compliance monitoring: carried out environmental compliance monitoring for Species at Risk (SAR) and Bird Nesting for highway, culvert, road, and bridge construction projects to comply with regulatory agency approvals.
- Biological Monitoring: managed environmental monitoring programs under pre and post-development scenarios to ascertain changes terrestrial, and wetland habitats.

2005 - 2006 Research Associate/Field Biologist, Brock University

- West Nile Surveillance: identified mosquitoes to species, for the Ontario West Nile surveillance program.
- Field Work: sampled adult and larval invertebrates at various sites in Southern Ontario, also managed research team during an extended sampling program in Northern Ontario.

2004 - 2005 Primary Researcher/Field Biologist, Behavioural Ecology Research Project, Brock University

- Experimental Design: designed and conducted a scientifically defensible research project to determine the effects of white light on the calling behaviour of Green Frogs (*Rana clamitans*).
- Reporting and Publication: analysed behavioural data collected during the field studies to determine the effects of light on breeding behaviour of frogs, and subsequently published the findings in the Canadian Journal of Zoology.

2003 Research Associate, Community Ecology Research Project, Brock University

- Community Sampling Program: assisted with a sampling program to determine the community structure, and ecology of Hymenopterans (specifically bee species), monitoring

change in the ecology during the year, and comparing populations within disturbed habitats, to populations within old field habitats to test the intermediate disturbance hypothesis.

- Plant Identification Program: identified and inventoried flowering plants within the different communities.
- Identification of Species: assisted in the identification of the bee species captured throughout the sampling program.

2002 Field Biologist, Terrestrial Biology Research Project, Brock University

- Breeding Bird Surveys: conducted daily bird census along set census route within a permanent plot on a large industrial facility in the Niagara Region with varied habitat area. Counted and mapped location of individuals and nests and noted behaviour over time. Monitored the condition and fate of broods.
- Breeding Bird Surveys: monitored other significant woodlands in the Niagara Region for the Ontario Breeding Bird Atlas.

PROFESSIONAL AFFILIATIONS, CERTIFICATION & TRAINING

- Butternut Health Assessor, MNRF — August 2009
- Standard First Aid – Level A CPR, Action First Aid — May 2010
- Training in Ontario ELC for Great Lakes Region, MNRF — September 2010
- Ontario Wetland Evaluation System Certification, MNRF — June 2011
- Ontario Species at Risk Handling Training for *Endangered Species Act* Authorization Holders, MNRF — November 2011
- MTO RAQS Certified for "Natural Sciences"
- Sedge Identification Workshop, Toronto Region Conservation Authority — June 2012
- NHIC Data Sensitivity WebEx Training, MNRF — March 2013
- Wildlife Acoustics Bat Detector & Analysis Course, Wildlife Conservation Society Canada — June 2015
- Joint Health and Safety Committee Certification Training Part One &Two Industrial Safety Trainers Inc. — Winter 2016
- Emergency First Aid with AED/CPR — March 2017
- Bat Acoustics Training Analysis Course, Wildlife Conservation Society Canada — June 2017

PUBLICATIONS

Baker, B.J and Richardson, J.M.L. 2006. **The effect of artificial light on male breeding-season behaviour in green frogs, *Rana clamitans melanota.* Canadian Journal of Zoology. 84:** 1528-1532

STEPHANIE BRADY

H.B.E.S. Environmental Studies
Ecologist

PROFILE

2018 - Present	Ecologist, Birks Natural Heritage Consultants Inc.
2016 - 2018	Ecologist, Azimuth Environmental Consulting, Inc.
2015 - 2016	Biologist, Dillon Consulting Limited
2013 - 2015	Shrike Recovery Program Biologist, Wildlife Preservation Canada
2012 - 2013	Biologist, Dillon Consulting Limited
2012	Field Ornithologist, Thunder Cape Bird Observatory
2011 -2012	Wildlife Biologist Intern, Ministry of Natural Resources and Forestry
2009 - 2012	H.B.E.S. Environmental Studies, Lakehead University
2006 - 2008	Forestry Diploma, La Cité Collegiale

EXPERIENCE

2018 - Present Ecologist, Birks Natural Heritage Consultants

Stephanie has been involved in numerous terrestrial projects, including the implementation of Environmental Impact Studies, Natural Heritage Evaluations, and Ecological Offsetting Plans for the acquisition of Municipal, Provincial, and Federal environmental approvals including submissions and acquisition of permits made under Section 17 of Ontario's *Endangered Species Act,* 2007 and alternatives available under the act for various Species at Risk. She has an Honours Degree in Environmental Studies from Lakehead University (2012) and a College Diploma in Forestry from La Cité Collegiale (2008). One of the founding members of Birks Natural Heritage Consultants, Inc., Stephanie possesses in-depth knowledge and industry approved training of Ontario's Species at Risk including Endangered bat species, reptiles, and birds.

2016 - 2018 Ecologist, Azimuth Environmental Consulting, Inc.

Components of projects located within terrestrial and wetland environs primarily for the implementation of Class Environmental Assessments, Environmental Impact Studies, Natural Heritage Evaluations, and Natural Heritage Impact Assessments for the acquisition of Municipal, Provincial, and Federal environmental approvals. Activities include:

- Terrestrial biological inventory and evaluation of ecological systems using the Ecological Land Classification system including plant community classification, floral and wildlife (birds, reptiles, amphibians, and mammals) inventories to assess post-development impacts upon vulnerable/threatened/endangered species;
- Proposal and budget development, records review, agency and client consultation, development of comprehensive field programs, data collection and processing, and synthesis of technical reports;
- Completion of Species at Risk assessments in compliance with Ontario's *Endangered Species Act*, 2007;

- Submission and acquisition of permits made under Section 17 of Ontario's *Endangered Species Act,* 2007 and alternatives available under Ontario Regulation 242/08 for various Species at Risk including Blanding's Turtle (*Emydoidea blandingii*), Eastern Meadowlark (*Strunella magna*), and Bobolink (*Dolichonyx oryzivorus*);
- Completion of ecology Peer Reviews for small- and large-scale developments including proposed mining developments in Northern Ontario (Federal Environmental Assessment) as part of a multi-disciplinary team on behalf of First Nation communities; and
- Collection and analysis of bat acoustic recordings including the deployment of Wildlife Acoustic SM3Bat Recorders, data download and management, and species identification for the assessment of bat roosting habitat for Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), Tri-colored Bat (*Perimyotis subflavus*), and Eastern Small-footed Myotis (*Myotis lebeii*).

2015 - 2016 Biologist, Dillon Consulting Limited

Collected post-construction data at the Erieau Wind Farm (GDF Suez) in Chatham-Kent, including bird and bat mortality data and Species at Risk assessments as per Ontario Regulation 521/10 Renewable Energy Approvals made under the *Environmental Protection Act*, 1990.

Conducted field site studies for the completion of Environmental Impact Studies and Class Environmental Assessment projects including:

- Dawn breeding bird surveys;
- Amphibian calling surveys;
- Bat exit surveys; and
- Species at Risk surveys.

2013 - 2015 Shrike Recovery Program Biologist, Wildlife Preservation Canada

Carried out and managed all activities related to the recovery for the wild population of the Endangered Eastern Loggerhead Shrike (*Lanius ludovicianus*), Eastern subpopulation in Carden, Ontario including:

- Wild population surveying and monitoring on private and public lands;
- Trapping and banding wild birds with a 4-colour band combination;
- Designed habitat stewardship project on private lands for the enhancement of grassland bird habitat;
- Coordinated and Adopt-a-Site program for the Carden core, secured and managed volunteer efforts throughout the breeding season;
- Liaised with Conservation Authorities, Ontario Parks, and other permitting agencies;
- Compiled breeding and population data into Access database;
- Wrote monthly, year-end, and permit reports to various agencies including the Canadian Wildlife Services and Ministry of Natural Resources and Forestry; and
- Contributed to public outreach material such as yearly newsletters, monthly blogs, leading public tours of the field site, and presenting field results to various groups of stakeholders.

Carried out and supervised all activities related to the captive breeding program for Eastern Loggerhead

Shrike including:

- Designed and carried out daily husbandry duties for captive breeding pairs;
- Performed daily behavioural observations to document breeding activity;
- Maintained feed supply;
- Trapped and banded first year birds to be released with a 4-colour band combination;
- Fitted Geolocators and VHF tags to first year birds;
- Coordinated captive bird transfers with partner facilities including the Toronto Zoo and African Lion Safari; and
- Coordinated the release of captive-reared young, including post-release behavioural monitoring.

2012 - 2013 Biologist, Dillon Consulting Limited

Collected post-construction data at the Greenwich Wind Farm (Enbridge) in Dorion, Northwestern Ontario including bird and bat mortality data and Species at Risk Assessments.

2012 Field Ornithologist, Thunder Cape Bird Observatory

Carried out all aspects relating to the Canadian Migration Monitoring Network, including:

- Conducted daily census of migrating birds;
- Extracted birds from mist nets, ground and Heligoland traps;
- Banded >100 birds of various species ranging from raptors to warbler species; and
- Assisted Bander-in-Charge with various tasks including scribing.

2011 - 2012 Wildlife Biologist Intern, Ministry of Natural Resources and Forestry

Carried out all the field data collection portion of the Guide Effectiveness Monitoring Program in Algonquin Provincial Park, including:

- Monitored forest song birds using automated recording devices;
- Classified vegetation communities following the protocols of the Ecological Land Classification; and
- Assisted the Aquatic and Wetland research department during fish sampling surveys in Northwestern Ontario.

PROFESSIONAL AFFILIATIONS, CERTIFICATION & TRAINING

- Bat Acoustic Training - Hardware, Techniques, & Analysis Course - Wildlife Conservation Society Canada June 2017
- Crew Leader II Backpack Electrofishing - Cambium Aboriginal August 2019
- Emergency First Aid CPR/AED Level C June 2015
- Pleasure Craft Operator Card 2011
- Ontario Reptile & Amphibian Training Course - MNRF June 2016

LANGUAGE PROFICIENCY

English, Spoken and Written

Stephanie Brady
H.B.E.S. Environmental Studies
Ecologist

French, Spoken and Written