



Natural Environment Report
Brechin Quarry
Township of Ramara

Prepared for:
LCP Quarry Limited

Prepared by:
Azimuth Environmental
Consulting, Inc.

December 2023

AEC 18-288b



Environmental Assessments & Approvals

December 20, 2023

AEC 18-288b

LCP Quarry Limited
145 Adelaide Street West, Suite 500
Toronto, Ontario M5H 4E5

Attention: Scott Kirby

Re: **Natural Environment Report for a Proposed Mineral Aggregate Quarry
(Part of Lots 11, 12 & 13, Concession 1), Township of Ramara**

Dear Mr. Kirby:

Azimuth Environmental Consulting, Inc. was retained to prepare a Natural Environment Report for a proposed mineral aggregate quarry at the location described above. This report documents the natural environmental features present within the proposed licenced area and adjacent lands, outlines potential impacts to local environmental features associated with the proposed works, and proposes mitigation measures to minimize potential for environmental impacts.

Ecological matters related to hydrological features within the study area including waterbodies, drainage features, fish and fish habitat are considered under the Fisheries Assessment prepared by RiverStone Environmental Solutions Inc, enclosed as an appendix within this report.

Should you have any questions or require additional information feel free to contact the undersigned.

Yours truly,
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Dan Stuart, M.Env.Sc.
Ecology Lead/Partner



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Executive Summary

Azimuth Environmental Consulting, Inc. (Azimuth) was retained by LCP Quarry Limited to complete a Natural Environment Report (NER) for a proposed mineral aggregate quarry on Part of Lots 11, 12 & 13, Concession 1 in the Township of Ramara, County of Simcoe. This purpose of the NER is to identify candidate significant Key Natural Heritage Features (KNHFs) present within the study area and address potential impacts to such KNHFs. Terrestrial environmental features described in the NER were documented by Azimuth, while aquatic environmental features and matters related to fish habitat were documented by RiverStone Environmental Solutions Inc. (RiverStone), included as an appendix within the NER. The proposed licenced area under the *Aggregate Resources Act* is 151.4 hectares, and the proposed extraction area is 91.5 hectares. Proposed mineral extraction activities will occur entirely east of the former rail line that bisects the property on a north-south axis, and monitoring and ecological enhancements will occur west of the rail line. This NER reviews relevant municipal, provincial, and federal planning documents, statutes, and guidelines related to KNHFs associated with the proposed licenced area and adjacent lands. Extensive consultation with the Ministry of Natural Resources and Forestry (MNR) and Ministry of the Environment, Conservation and Parks (MECP) occurred with regard for wetlands and other KNHFs, and Species at Risk (SAR) protected under Ontario's *Endangered Species Act, 2007*, respectively. A detailed background review of available natural heritage information sources also occurred as a component of the NER study.

The field program was carried out by Azimuth and RiverStone in 2019-2023 and included a detailed vegetation survey program according to provincial standards. Wildlife surveys comprised a detailed SAR screening, and targeted surveys for raptor wintering areas, bat roosting habitat, turtle overwintering habitat, turtle nesting habitat, waterfowl stopover/staging and waterfowl nesting habitat, amphibian breeding habitat, dawn breeding bird surveys, evening breeding bird surveys, and snake surveys. A fish habitat assessment including fish sampling was completed by RiverStone in 2019-2020.

The results of the site investigation were compiled to render an assessment regarding presence/absence of SAR, wetlands (including Significant Wetlands), Significant Woodland, Significant Valleyland, Areas of Natural and Scientific Interest, Significant Wildlife Habitat, and fish habitat within the study area limits. Three (3) OWES evaluations were completed for wetlands within the proposed extraction limit that meet minimum standards for eligibility for assessment under OWES (*i.e.* size, special features), all of which were determined to be non-significant wetlands.



The results of the assessment determined presence of the following KNHFs east of the rail line:

- Bobolink (Threatened) and Eastern Meadowlark (Threatened)
- Candidate Significant Wildlife Habitat: Amphibian Breeding Habitat (Woodland), Terrestrial Crayfish Habitat, Habitat for Special Concern and Rare Wildlife Species (Barn Swallow, Grasshopper Sparrow, Monarch, Chimney/Meadow Crayfish); and,
- Fish Habitat (Tributary A and Tributary G).

Additional KNHFs were identified and/or treated as present within lands west of the rail line and adjacent lands, however the impact assessment within the NER verified that KNHFs within these lands are not expected to be negatively impacted as a result of proposed mineral extraction works.

In consultation with MECP, it was determined that impacts to Bobolink and Eastern Meadowlark would be subject to a C-Permit Application Form and associated Overall Benefit program to offset impacts to the species. Similarly, it is recommended that Request for Reviews be submitted to Fisheries and Oceans Canada (DFO) regarding impacts to fish habitat within Tributary A and Tributary G. Impacts to Barn Swallow, Grasshopper Sparrow, and Monarch are anticipated to be avoidable through implementation of the mitigation approach detailed in the NER, which includes SAR worker training, timing windows for vegetation removal with regard for bird nesting and bat habitats, wildlife exclusion fencing, and erosion and sediment controls. Impacts to Amphibian Breeding Habitat (Woodlands)(5.99 hectares (ha)) and Terrestrial Crayfish Habitat (2.18ha) can be offset through implementation of a detailed Natural Restoration Plan presented in the NER. The Natural Restoration Plan includes creation and enhancement of 9.7ha of woodland and 10.52ha of wetland (9.92ha of wetland at quarry closure) primarily along the western perimeter areas east of the rail line (maintaining linkages/connectivity), and buffer lands west of the rail line.

Woodland/wetland creation and enhancements implemented through the Natural Restoration Plan is also anticipated to offset impacts to non-significant woodland and wetland features subject to removals within areas east of the rail line.

The NER concludes that with regard for avoidance, mitigation, and offsetting recommended in the report (including provincial and federal approvals with respect to Bobolink/Eastern Meadowlark and fish habitat, respectively), the proposed mineral extraction activity is not anticipated to negatively impact identified KNHFs.



1.0 INTRODUCTION

Azimuth Environmental Consulting, Inc. (Azimuth) was retained by LCP Quarry Limited to complete a Natural Environment Report (NER) for a proposed mineral aggregate quarry on Part of Lots 11, 12 & 13, Concession 1 (southwest of the settlement of Brechin) in the Township of Ramara (the “Township”), County of Simcoe (the “County”). A map illustrating the proposed mineral aggregate licence area and adjacent lands (which constitute the study area) is shown on Figure 1. The proposed licenced area under the *Aggregate Resources Act* (ARA) is 151.4 hectares, and the proposed extraction area is 91.5 hectares. The preparation of an NER is required in accordance with the ARA, noting that proposed licenced limits comprise (in part) mapped woodlands, wetlands, and drainage features. Environmental features described herein are identified in accordance with *Policy A.R. 2.01.07 Licence Applications: Natural Environment Report Standards* (“NER Standards”; OMNR, 2006) and *Aggregate Resources of Ontario: Technical Reports and Information Standards* (MNRF, 2020a).

Ecological matters related to hydrological features on the subject property including waterbodies/standing water, watercourses and other drainage features, fish and fish habitat are considered under the Fisheries Assessment prepared by RiverStone Environmental Solutions Inc. (RiverStone), available in Appendix A. Information provided in RiverStone’s study is synthesized throughout this report, however the aquatic features assessment in its full context (Appendix A) should be considered in parallel with summary information provided in this NER below.

This purpose of this NER is to identify candidate significant Key Natural Heritage Features (KNHFs) present within the study area and address potential impacts to confirmed and candidate significant KNHFs. The potential for negative impacts to natural heritage features resulting from the proposed activity is considered and recommendations for mitigation and avoidance, mitigation, and compensation are provided within this NER.

Azimuth has consulted with the Ministry of Natural Resources and Forestry (MNRF) and Ministry of the Environment, Conservation and Parks (MECP) for matters related to Species at Risk (SAR) protected under Ontario’s *Endangered Species Act, 2007* (ESA) and local environmental features including mapped woodland and wetland located on and adjacent to the subject property. Wetlands within the proposed mineral extraction area limits that are eligible for assessment have been evaluated in accordance with the Ontario Wetland Evaluation System (OWES; MNRF, 2022), all of which were determined to be non-significant wetlands. The results of the OWES evaluations have been submitted to the Township, County, and MNRF in accordance with provincial requirements.



The study area is located within the Lake Simcoe watershed within the jurisdiction of the Lake Simcoe Region Conservation Authority (LSRCA). Portions of the study area are within the LSRCA Regulation Limit, however a permit under Ontario Regulation (O.Reg.) 179/06 is not required for the proposed mineral aggregate extraction works under the ARA.

1.1 Study Area Definition

The study area comprises the proposed mineral aggregate licence boundaries shown on the attached figureset and adjacent lands within 120 metres (m)) of the proposed mineral aggregate licence boundaries. Natural features in the overall planning area beyond the defined study area limits are discussed where applicable throughout this report.

The proposed licenced area includes areas of the property within which mineral extraction works are proposed (areas east of the former rail line; Figure 1), and the majority of buffer lands to be dedicated for monitoring and natural restoration/enhancement west of the former rail line (Figure 1). Notably, the southwest portion of the property (west of the former rail line) adjacent to Concession Road 1 is located outside of the proposed licence boundary. Site operations are proposed exclusively within lands east of the former rail line.

1.2 Licence Applications: Natural Environment Report Standards

The purpose of this NER is to evaluate the presence of presumed and confirmed KNHFs within the study area limits, and provide an assessment of potential impacts to documented KNHFs as a result of the proposed works.

The ARA Provincial Standards require a NER be completed that identifies if any of the following natural heritage features exist on the site and within 120m of the site:

- a) Significant wetlands,
- b) Other coastal wetlands in Ecoregions 5E, 6E and 7E,
- c) Fish habitat,
- d) Significant woodlands and significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River),
- e) Habitat of endangered species and threatened species,
- f) Significant wildlife habitat,
- g) Significant areas of natural and scientific interest,
- h) Within the area of one or more provincial plan(s), any key natural heritage features not included in (a) through (g).



The Provincial Standards further direct that:

“Where any of the above features or areas have been identified, the report must identify and evaluate any negative impacts on the natural features or areas, including their ecological functions, and identify any proposed preventative, mitigative or remedial measures. The report must also identify if the site or any of the features, including in (a) through (g), are located within a natural heritage system that has been identified by a municipality in ecoregions 6E or 7E or by the province as part of a provincial plan.”

2.0 PLANNING CONTEXT

2.1 Provincial Planning Policy (2020)

The Provincial Policy Statement (PPS; MMAH, 2020) outlines policies related to natural heritage features (Section 2.1) and water resources (Section 2.2). Ontario's *Planning Act* (1990) requires that planning decisions shall be consistent with the PPS. The study area for this assessment is located entirely within **Ecoregion 6E**. According to the PPS development and site alteration shall not be permitted in:

- *Significant wetlands* in Ecoregions 5E, 6E and 7E; and,
- *Significant coastal wetlands*.

Similarly, Section 2.1.5 of the PPS states that, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration shall not be permitted within:

- a) *significant wetlands* in the Canadian Shield north of Ecoregions 5E, 6E; and 7E;
- b) *significant woodlands* in Ecoregions 6E; and 7E;
- c) *significant valleylands* in Ecoregions 6E; and 7E;
- d) *significant wildlife habitat*;
- e) *significant areas of natural and scientific interest*; and,
- f) *coastal wetlands* in Ecoregions 5E, 6E; and 7E that are not subject to policy 2.1.4(b)

Section 2.1.6 of the PPS states that development and site alteration is not permitted in fish habitat except in accordance with federal and provincial requirements.

Section 2.1.7 of the PPS states that development and site alteration shall not be permitted in habitat of Endangered and Threatened species, except in accordance with provincial and federal requirements.



Furthermore, under Section 2.1.8 of the PPS, no development and site alteration will be permitted on lands adjacent to natural heritage features and areas 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 there will be no negative impacts on the natural features and ecological functions.

2.2 Endangered Species Act, 2007

Ontario's ESA provides regulatory protection to Endangered and Threatened species 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 including reproduction, rearing of young, hibernation, migration or feeding.

The various schedules of the ESA included under O. Reg. 230/08 identify SAR in Ontario. These include species listed as Extirpated, Endangered, Threatened and Special Concern. As noted above, only species listed as Endangered and Threatened receive protection from harm and destruction to habitat on which they depend.

2.3 Lake Simcoe Protection Plan

The Lake Simcoe Protection Plan (LSPP; MOE, 2009) was developed to protect and restore the ecological health of the Lake Simcoe watershed. The subject property is located within the Lake Simcoe watershed and approximately 1.0 kilometre (km) east of the Lake Simcoe shoreline at its closest point, and are within the jurisdiction of the LSPP.

Policy 6.21-DP states: "Key natural heritage features are wetlands, significant woodlands, significant valleylands, and natural areas abutting Lake Simcoe."

Policy 6.22-DP states: "Key hydrologic features are wetlands, permanent and intermittent streams, and lakes other than Lake Simcoe."

During consultation with agencies it was confirmed that that the development proposal must conform with the natural heritage policies of the LSPP, specifically *Policy 6.41-6.44*, which states the following:

Policy 6.41-DP states: "Policies 6.41-6.44 apply to applications for new mineral aggregate operations and wayside pits and quarries that are outside of the Greenbelt Area and Oak Ridges Moraine area."



Policy 6.42-DP states: “No new mineral aggregate operations and no wayside pits and quarries, or any ancillary or accessory use thereto shall be permitted in the following key natural heritage features and key hydrologic features:

- a. significant wetlands;*
- b. significant habitat of endangered and threatened species; and*
- c. significant woodlands unless the woodland is occupied by young plantation or early successional habitat (as defined by MNR.)”*

Policy 6.43-DP states: “An application for a new mineral aggregate operation or new wayside pit or quarry may only be permitted in a key natural heritage feature, a key hydrologic feature or its related vegetated protection zone, other than a feature mentioned in policy 6.42, where the application demonstrates the following:

- a. the health, diversity and size of these key natural heritage features will be maintained or restored, and, to the extent possible, improved to promote a net gain of ecological health; and*
- b. any permitted extraction of mineral aggregates that occurs in a feature will be completed, and the area will be rehabilitated, as early as possible in the life of the operation.”*

Policy 6.44-DP states: “Every application for a new mineral aggregate operation must demonstrate:

- a. how connectivity between key natural heritage features and key hydrologic features will be maintained before, during and after the extraction of mineral aggregates; and*
- b. how the operator could immediately replace or restore any habitat that would be lost from the site with equivalent habitat on another part of the site or on adjacent lands.”*

Woodlands within the study area limits are considered in this report below with regard for the definition of Key Natural Heritage Features provided in *Policy 6.21-DP* of the LSPP and associated technical criteria. Wetlands within the study area meet the definition of Key Natural Heritage Features and Key Hydrologic Features according to the definitions provided in *Policy 6.21-DP* and *Policy 6.22-DP* of the LSPP respectively.

2.4 County of Simcoe

The northern half of the lands east of the rail line are designated as Agricultural and the southern half of lands east of the rail line is designated as Rural by Schedule 5.1 (Land Use Designations) of County’s Official Plan (Simcoe OP; County of Simcoe, 2023a)(Appendix B). Lands west of the rail line are primarily designated as Rural, with segments of woodland in the southwest portion of the property (outside of the proposed



licence boundary) designated as Greenlands according to Schedule 5.1 (Land Use Designations) of the County's OP. According to Section 3.8.1.2 of the Simcoe OP, *“Local municipal official plans shall contain policies and mapping that implement the County's Greenlands and natural heritage policies.”*

Schedule 5.2.2 (Streams and Evaluated Wetlands; Appendix B) shows two (2) mapped watercourses within the limits of the subject property, one originating in the central portion of the property and extending toward its northeast limit, and the other originating in the central portion of the property and extending toward its west limit.

The subject property and adjacent lands do not occur within the vicinity of a Provincially Significant Wetland (PSW), Locally Significant Wetland, ANSI – Provincial, or ANSI – Regional in accordance with Schedule 5.2.2 and Schedule 5.3.3 of the County's OP (Appendix B).

Simcoe County Mapping (2023b) illustrates a small unevaluated wetland unit in the northeast corner of the property along the southern boundary of Concession Road 2. Four (4) minor units labelled “Forested Area/Woodlands” and four (4) areas of isolated standing water are also illustrated within the limits of lands east of the rail line. Two (2) “Forested Area/Woodlands” units are illustrated within lands west of the rail line, one of which crosses the rail line (occurring on both sides).

2.5 Township of Ramara

The northern half of the subject property is designated as Agriculture and the southern half of the subject property is designated as Rural by Schedule A (Land Use Plan) of Township's Official Plan (Ramara OP; Township of Ramara, 2016)(Appendix B). The subject property is not designated as Core Areas and Corridors, or Supportive and Complimentary Areas and Corridors by Schedule C (Natural Area Framework) of the Ramara OP (Appendix B).

Section 5.2.2 (Natural Area Framework) of the Ramara OP clarifies that Core Areas and Corridors are natural areas of provincial, regional and local significance identified as:

- Provincially significant wetlands;
- Significant habitat of Endangered and Threatened species;
- Significant Woodland cores and corridors; and,
- Fish habitat.



Supportive and Complementary Areas and Corridors within the Ramara OP refer to natural areas of regional or local significance and other areas in County Greenlands identified as:

- Significant Valleylands;
- Environmentally sensitive areas;
- Significant Wetlands;
- Significant Woodlands;
- Significant Wildlife Habitat;
- Significant ANSIs; and,
- Regionally and locally significant natural heritage features.

2.6 Lake Simcoe Region Conservation Authority

The study area includes lands within the LSRCA Regulation Limit under O. Reg. 179/06 – “Regulation of Development Interference with Wetlands and Alterations to Shorelines and Watercourses” (Appendix C), however mineral aggregate operations under the ARA but within the LSRCA Regulation Limit are not subject to a permit under O. Reg. 179/06 to proceed with the proposed works.

The current LSRCA General Regulation mapping for the study area indicates the presence of two watercourse features originating in the center of the property, one flowing northeastward and the other flowing westward. Wetlands are also mapped on the subject property by current LSRCA General Regulation mapping (Appendix C).

3.0 STUDY APPROACH

3.1 Terms of Reference

A combination of a background information search and field investigations were undertaken to fulfill the objectives of this NER. Azimuth undertook the following activities for this study:

- Conducted field surveys to document existing terrestrial natural heritage features, functions, and species. Surveys included:
 - Evaluated/mapped vegetation community types based on Ecological Land Classification methods (ELC; Ecological Land Classification for Southern Ontario: First Approximation and its Applications. SCSS Field Guide FG-02; Lee *et al.*, 1998/2008) including a detailed vascular plant inventory (June 19, July 8, July 9, July 10, September 17, September 18, 2019, and October 1, 2021; supplementary ELC within lands west of the rail line on July 13, July 17, July 19, July 28, and August 17, 2023);



- Five (5) winter site reconnaissance and raptor wintering area surveys (February 4 and February 11, 2019, and January 20, February 17, and February 26, 2021);
- One (1) inventory of mature “snag” or cavity trees with potential to provide maternity roosting habitat for bat species within lands east of the rail line (April 25 and April 29, 2019);
- Fifteen (15) spring turtle basking surveys to determine whether water bodies on the property have potential to provide turtle overwintering habitat (April 25, May 7, May 8, May 29, June 6, 2019, and April 21, May 9, May 11, May 12, May 24, June 8, June 9, June 10, June 14, June 15, 2022);
- Six (6) waterfowl stopover/staging (terrestrial) and waterfowl nesting surveys (April 25, April 29, May 7, May 8, May 29, and June 6, 2019);
- Three (3) evening amphibian frog call surveys within lands east of the rail line and adjacent lands (April 25, May 29, and June 25, 2019) to determine the location and extent of amphibian breeding habitat;
- Three (3) dawn breeding bird screenings within lands east of the rail line and adjacent lands (June 6, June 19, and June 27, 2019);
- Three (3) evening turtle nesting surveys (May 29, June 12, and June 25, 2019) with supporting daytime nesting activity surveys (June 6, June 19, June 27, July 8, July 9, and July 10, 2019);
- Observations for reptile (snake and turtle) species within key habitat features within lands east of the rail line and adjacent lands (May 7, May 29, June 6, June 19, June 27, July 8, July 9, July 10, September 17, September 18, 2019, July 12 and October 1, 2021) and lands west of the rail line (July 17, July 19, July 28, and August 17, 2023);
- Three (3) evening breeding bird surveys (including Eastern Whip-poor-will; June 12, July 9, and July 10, 2019);
- One (1) wetland delineation exercise with LSRCA representatives on July 12, 2021, with follow-up delineation of minor wetland inclusions on October 1, 2021;
- Observations for other Significant Wildlife Habitat (SWH) categories during appropriate seasonal conditions (all site visits) ; and,
- A record of all incidental wildlife observations during site visits.
- Completed a SAR habitat assessment using field data collected by Azimuth during site visits and other data available and/or provided by agencies to confirm environmental constraints, and approval requirements under the ESA; and,
- Assessed the potential direct and indirect impacts of the proposed works on the natural heritage features and functions identified on or adjacent to the development parcel.



The following studies were undertaken by RiverStone with respect to fisheries/aquatic site investigations within the study area:

- Initial site review and watercourse delineation exercise (July 8, 2019);
- Locate monitoring stations, watercourse refinement, and watercourse monitoring (July 25, 2019);
- Additional watercourse monitoring (August 22, September, 25, October 23, 2019, and April 28, 2020); and,
- Watercourse electrofishing exercise (September 25, 2019).

A complete record of field studies undertaken in support of the completion of this NER report are presented in chronological order with associated dates, weather conditions, and survey effort in Table 1.

3.2 LSRCA Consultation

An initial site walk with LSRCA, Azimuth, and RiverStone took place on November 11, 2020 as a preliminary review of woodlands, wetlands, grasslands, and drainage features associated with the property. The above Terms of Reference (for 2019-2021 studies completed by Azimuth) were provided to LSRCA as a Natural Heritage Work Plan memorandum issued April 6, 2021 (Appendix C). A response was received from LSRCA on April 15, 2021 confirming that the study approach was acceptable (Appendix C). The LSRCA response stated that the development proposal must conform to the natural heritage policies of the LSPP, specifically *Policy 6.41-6.44*.

LSRCA also requested that a site walk occur to delineate woodland and wetland edges to their satisfaction, which took place in a follow-up staking exercise that occurred on July 12, 2021. During the staking exercise, wetland and woodland limits within lands east of the rail line were refined and/or accepted, however given timing constraints it was recommended that a follow-up survey be undertaken to refine two (2) additional minor wetland inclusions (MAM2-2e(inclusion) and MAM2-2f(inclusion)); Figure 2a), which were delineated by Azimuth on October 1, 2021.

3.3 MECP Consultation (Species at Risk)

A request for background information including SAR and fish habitat data was provided to the Ministry of Natural Resources and Forestry (MNRF), Midhurst District on January 30, 2019 (Appendix D). A response was received from MNRF on February 5, 2019 that included a list of known and suspected SAR in the Township that should be considered in



the study. Additional correspondence based on the results of Azimuth's survey program is detailed in this report below, a record of which is presented in Appendix D.

To assist with the transition of SAR matters from MNRD to the MECP, a virtual meeting was held on December 15, 2020 with an MECP representative (Management Biologist) to introduce the project and potential considerations regarding project approvals with respect to SAR.

Following additional consultation between client representatives and MECP, it was requested that an Information Gathering Form (IGF) and Avoidance Alternatives Form (AAF) be prepared for the property and proposed site alteration, both of which were submitted to MECP on January 28, 2022. A correspondence record and comment/response matrix for the IGF/AAF submission process is included in Appendix D. Based on MECP review of the third IGF/AAF submission, a response was received on June 15, 2023 (Appendix D) confirming the following:

Blanding's Turtle

- The level of survey effort to screen for Blanding's Turtles appears to demonstrate some confidence that the species is not utilizing wetland features on lands east of the rail line or adjacent lands, therefore it is unlikely that the proposed works will represent a contravention of the ESA and as such authorization is not required.
- Given presence in the greater landscape, suitable mitigation measures such as exclusion fencing, worker training, and operating protocols should be considered.

Little Brown Myotis (and other SAR bats)

- MECP is in agreement that removals of minor, immature woodland units within lands east of the rail line would not be expected to negatively impact SAR bat roosting habitat.
- It is advised restricting tree removals between **March 15-November 30** of any given year would suitably avoid impacts to individual SAR bats.

Butternut and Black Ash

- MECP notes that Butternut and Black Ash were not observed within lands east of the rail line or adjacent lands during Azimuth's site investigation. Azimuth notes such trees were observed in the western portion of lands west of the rail line.

Bobolink and Eastern Meadowlark

- MECP acknowledges that Bobolink and Eastern Meadowlark were confirmed breeding within lands east of the rail line, and grassland habitats will be impacted by the proposed works.



- The area to be impacted exceeds 30 hectares (ha) in size, therefore pursuant to section 17(2)(c) of the ESA, a permit will be required to proceed with the proposed development.
- MECP requests additional information regarding proposed mitigation and compensation, specifically in the context of providing an Overall Benefit to the species, and completion of a C-Permit Application Form.

3.4 MNRF Consultation

3.4.1 MNRF Information Request (2019)

As discussed in Section 3.3 above, a request for background information including SAR and fish habitat data was provided to the MNRF Midhurst District on January 30, 2019 (Appendix D). The submitted Information Request Form directs proponents to review available background resources including the Natural Heritage Information Centre (NHIC) Make-a-Map interface, Land Information Ontario (LIO), and SAR Ontario databases, which were considered in Azimuth and RiverStone's assessments (see Section 3.5 below).

A response was received from MNRF on February 5, 2019 that referred Azimuth to fisheries data available through LIO, and included a list of known and suspected SAR in the Township that should be considered in the study (Appendix D). In combination with subsequent discussions regarding wetland statuses (see Section 3.4.2 below), background consultation should be considered fulsome and in accordance with NER Standards under *Policy A.R. 2.01.07*.

3.4.2 Wetland Statuses

During background review, provincial background mapping available from the NHIC (MNRF, 2023; Appendix D) indicated presence of Unevaluated Wetland located in the northeast corner of the property adjacent to Concession Road 2. According to NER Standards under *Policy A.R. 2.01.07*, the Ministry of Natural Resources (now MNRF) is responsible for identifying Provincially Significant Wetlands (PSWs). Unevaluated Wetlands, such as that mapped in the northeast corner of the property, cannot be assumed as non-significant unless agreed to by the local MNRF office.

Azimuth submitted three (3) OWES evaluations for eligible wetland units within lands east of the rail line to the Township and County on March 10, 2023 (see Section 4.3 below). In accordance with OWES guidelines, wetland boundary geospatial files and confirmation of wetland statuses were also provided directly to MNRF on April 4, 2023 (Appendix D). A response was received on April 12, 2023 from MNRF Midhurst District, with a follow-up response from Wetlands (MNRF) on May 3, 2023 to confirm



receipt of the evaluation information in accordance with provincial requirements (Appendix D).

3.5 Background Data

A review of background documents provided information on site characteristics, habitat, wildlife, rare species and communities, and general cultural/historic aspects of the study area. This included a review of the following:

- Township of Ramara Official Plan (Township of Ramara, 2016);
- County of Simcoe Official Plan (County of Simcoe, 2023a);
- LSRCA Regulation Mapping (LSRCA, 2023);
- MNRF Ontario Base Map Index (OBM; Ontario GeoHub, 2023);
- Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Agricultural Information Atlas (AgMaps; OMAFRA, 2023);
- DFO's Aquatic Species at Risk Map (DFO, 2023);
- Ministry of Natural Resources and Forestry (MNRF) NHIC (MNRF, 2023);
- Atlas of the Breeding Birds of Ontario (OBBA; Cadman *et al.*, 2007);
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2020);
- MECP's Species at Risk Ontario list (MECP, 2023a);
- iNaturalist (NHIC) Rare Species of Ontario (iNaturalist, 2023);
- Ontario Butterfly Atlas (Toronto Entomologists' Association, 2023);
- Government of Canada's Species at Risk Public Registry (2023); and,
- Atlas of the Mammals of Ontario (Dobbyn, 1994).

3.6 Vegetation Community Mapping and Surveys

Prior to undertaking the field studies, an initial classification of habitats was undertaken using recent air photo imagery for an area encompassing the study area. Within lands east of the rail line and adjacent lands, vegetation boundaries were checked in the field on June 19, July 8, July 9, July 10, September 17, and September 18, 2019, with additional delineation/verification on July 12 and October 1, 2021. Supplemental vegetation surveys occurred within the remainder of lands west of the rail line and adjacent lands on July 13, July 17, July 19, July 28, and August 17, 2023.

All vegetation surveys occurred during the growing season when the ground cover vegetation layer was present and herbaceous plants were identifiable. Within lands east of the rail line, the character of the landscape is generally open with limited woodland cover capable of supporting spring ephemeral vegetation, therefore an early spring vegetation survey was excluded from the study. Woodlands within lands east of the rail



line were generally open in character supporting “open county” species, and highly degraded due to active pasturing by cattle throughout the subject property.

Vegetation community types were classified using ELC protocols. Wetland community delineations occurred according to the ELC system with a GPS unit using the >50% relative facultative and obligate wetland species cover standard that defines a wetland, as driven by OWES protocols.

The field program was undertaken by qualified terrestrial ecologists with existing knowledge related to rare, Threatened, and Endangered plant species with potential to occur in the area. The site assessment was focused during ELC work to ensure that appropriate effort was made to detect any species designated as SAR by the provincial ESA and/or federal Species at Risk Act (SARA).

A detailed screening for Butternut (*Juglans cinerea*) and Black Ash (*Fraxinus nigra*) was also conducted within the study area.

3.7 Wildlife Surveys

Wildlife species utilizing the study area were identified from direct observation, auditory signs, and through interpretation of other signs (tracks, scats, vocalizations, *etc.*) as a matter of course while conducting the site investigation. This information was used with background data related to wildlife use of the study area to determine the sensitive areas associated with wildlife.

3.7.1 Species at Risk

The SAR screening undertaken for this assignment compares the habitat requirements of species with potential to occur in this portion of Simcoe County (Township of Ramara), with potential habitat features identified within the study area. Habitat requirements and appropriate designations (Endangered, Threatened, or Special Concern) for all species with potential to occur based on the above are outlined in Table 2.

3.7.2 Raptor Wintering Area

According to the Significant Wildlife Habitat Technical Guide (SWHTG; OMNR, 2000) and its accompanying Criteria Schedules for Ecoregion 6E (MNRF, 2015a), raptor wintering area habitat consists of a combination of field and woodland with >15ha of meadow, with the overall habitat area >20ha in size. These habitats are typically lightly grazed and are windswept during the winter period such that snow cover is thin and small mammals can be easily preyed by raptors. The Ecoregion 6E criteria indicate that to be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by 10 or



more individuals of at least two “listed” species (or, at least one Short-eared Owl or Bald Eagle).

To date, no published provincial protocol exists for the evaluation of candidate raptor wintering areas. The SWHTG Criteria Schedules for Ecoregion 6E suggest referencing evaluation methods within *Birds and Bird Habitats: Guidelines for Windpower Projects* (MNRF, 2020b), which lists several methodologies for bird surveys, many of which target dawn or evening breeding birds and are not appropriate for raptor wintering area surveys.

In the absence of defined criteria, Azimuth conducted five (5) screenings for raptors within the study area on February 4 and February 11, 2019, and January 20, February 17 and 26, 2021 to determine whether conditions within the study area were feasible for raptor overwintering habitat function. Raptor surveys were conducted employing transect-based surveys within open portions of the property. Search effort within the study area was approximately 2-3 hours on all occasions and emphasized potentially suitable habitat types in the vicinity of woodlands in the southwest portion of lands east of the rail line and open areas of lands west of the rail line. On all occasions, surveys were conducted during daylight hours, avoiding windy conditions (Beaufort >3) and periods of moderate to heavy snow or fog.

3.7.3 Bats and Bat Habitat

Several bat species (including Endangered bats Little Brown Myotis, Northern Myotis, and Tri-colored Bat) may utilize large trees (preferably 25 centimetres (cm) diameter at breast height (DBH)) in the early stages of decay (“snag” trees) for the purposes of maternity colony roosting during the late spring season (MNRF, 2015b). It is acknowledged however, that trees of any size with suitable access features may be occupied by bats during the appropriate season (MECP, 2022). Azimuth conducted a detailed survey within lands east of the rail line on April 25 and April 29, 2019 (during the leaf-off season) for suitable snag trees that could potentially be used for bat maternity roosting purposes, surveying for trees featuring cracks, splits, holes, *etc.* that could feasibly provide access for bats. Lands east of the rail line were reviewed in detail to determine presence/absence of trees with potential snag features, noting that trees and treed areas east of the rail line were sparse and/or immature in character, and could be fully inventoried for suitable bat habitat trees. Bat snag surveys were not completed within lands west of the rail line, as mineral extraction works are not proposed in that portion of the property, therefore potential habitat features and functions would be retained.



No manmade structures that could provide access for bats are located on lands east of the rail line. An abandoned building foundation and abandoned silo without a roof are located in the southern portion of the property, however neither structure provides conditions conducive to roosting for Little Brown Myotis, Northern Myotis, or Tri-colored Bat. The abandoned building foundation was inspected for occurrences of Eastern Small-footed Bat commensurate with snake surveys detailed in Section 3.7.10 below. No other substantial rocky features (*e.g.* caves, karst, abandoned mines, suitable rock walls) conducive to Eastern Small-footed Bat activity were observed within the study area limits.

Vacant shed/airport maintenance facilities located on lands west of the rail line were observed to be unmaintained and in the early stages of disrepair, with potential to provide access as a bat maternity roosting feature, therefore providing potential habitat for Little Brown Myotis and Tri-colored Bat.

3.7.4 Turtle Overwintering Habitat

According to the SWHTG and the accompanying Criteria Schedules for Ecoregion 6E, turtle overwintering areas are permanent water bodies and wetlands where the water is deep enough to remain unfrozen at the bottom through the winter season. Potentially suitable turtle overwintering features were limited to three (3) ponds located on lands east of the rail line. A total of 15 visual encounter surveys of permanent water bodies with potential overwintering habitat on the subject property on April 25, May 7, May 8, May 29, and June 6, 2019, and April 21, May 9, May 11, May 12, May 24, June 8, June 9, June 10, June 14, June 15, 2022 in accordance with the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF, 2015c; "Survey Protocol"). As per this protocol surveys were conducted as follows:

- Fifteen (15) surveys were spread out over at least three (3) weeks, across multiple years in 2019 and 2022;
- Surveys were completed between ice-off (April) and June 15;
- Surveys were conducted between 8:00 a.m. and 5:00 p.m.;
- On sunny days, temperature was above 5°C;
- On partially cloudy or overcast days, temperature was above 15°C; and,
- Surveys were not carried out when temperatures were above 25°C.

Additional discussion regarding turtle overwintering/emergence screenings in the context of Blanding's Turtles is provided in Section 4.2.3.2 below.



3.7.5 Turtle Nesting Habitat

According to the SWHTG and its accompanying Criteria Schedules for Ecoregion 6E, turtle nesting areas typically comprise sand or gravel banks adjacent to open water. Azimuth conducted three (3) visual encounter surveys of all permanent water bodies within the study area (all located within lands east of the rail line), adjacent wetlands, and embankments on the subject property on May 29, June 12, and June 25, 2019 guided by the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario. As per this protocol surveys were conducted as follows:

- Surveys were completed between late May and early July; and,
- Surveys were conducted between 7:00 p.m. and 10:00 p.m.

Additional daytime surveys were also completed in the vicinity of permanent water bodies on June 6, June 19, June 27, July 8, July 9, and July 10, 2019 to search for evidence of nest predation, disturbed soils associated with turtle nesting, and other signs of turtle nesting.

3.7.6 Waterfowl Stopover/Staging (Terrestrial) and Waterfowl Nesting

Waterfowl stopover/staging areas (terrestrial) are characterized by open sheet water on flooded fields during the spring period. Waterfowl nesting areas can occur in upland terrestrial areas within 120 m of any wetland >0.5 ha in size. The SWHTG and its accompanying Criteria Schedules for Ecoregion 6E recommends surveys are conducted for waterfowl stopover/staging (terrestrial) during the mid-March to May period while standing water persists, and during the April-June breeding season for waterfowl nesting surveys. Azimuth conducted combined waterfowl stopover/staging and waterfowl nesting surveys within lands east of the rail line and adjacent lands on April 25, April 29, May 7, May 8, May 29, and June 6, 2019 around wetlands, open water bodies, and other low areas of temporary standing water and their adjacent lands.

3.7.7 Amphibian Breeding Habitat

Azimuth conducted three (3) evening calling amphibian surveys on April 25, May 29, and June 25, 2019 within lands east of the rail line and adjacent lands to document amphibian breeding on the property in accordance with the Great Lakes Marsh Monitoring Program (Bird Studies Canada, 2008) protocol. The locations of survey stations (11 total) sampled in 2019 are illustrated on Figure 2a-2b. Surveys were conducted at least 30 minutes after sunset under suitable weather conditions (*i.e.* no heavy rain and light winds (Beaufort wind scale ≤ 3)), with an observation period of 5 minutes carried out at the point count station. Temperatures met minimum thresholds defined as $>5^{\circ}\text{C}$ in April, $>10^{\circ}\text{C}$ in May, and $>17^{\circ}\text{C}$ in June.



3.7.8 Dawn Breeding Bird Surveys

Three (3) dawn breeding bird surveys were conducted within lands east of the rail line and adjacent lands on June 6 (time 06:14 to 08:40), June 19 (time 06:50 to 09:20), and June 27 (time 06:19 to 09:01) guided by point count methodology presented in Appendix D of the OBBA Guide for Participants (Ontario Breeding Bird Atlas, 2001). All surveys were to be conducted no earlier than one half hour before sunrise and were completed prior to 10:00 a.m. Surveys were completed under suitable weather conditions (*i.e.* no precipitation and light winds (Beaufort wind scale ≤ 3)), with an observation period of 5 minutes carried out at point count stations (26 total), illustrated on Figure 2a-2b.

3.7.9 Evening Breeding Bird Surveys

Evening breeding bird surveys were conducted based on a modified version of the Canadian Nightjar Survey Protocol (Bird Studies Canada *et al.*, 2019) and the DRAFT Survey Protocol for Eastern Whip-poor-will (*Caprimulgus vociferus*) in Ontario (MNR, 2014). Surveys were carried out in June and early July 2019 with the objective of sampling for Eastern Whip-poor-will and Common Nighthawk (SAR birds). Surveys in 2019 were focused to a period within 7 days of the full moons on June 17 and July 16. Surveys were shifted to within 7 days of the June and July full moons, as the May full moon (May 18, 2019) would be considered to occur within the migration period and therefore results may not be representative of potential breeding occurrences for the species.

Surveys began 30 minutes after sunset and the observer point counts were conducted for a length of 10 minutes. Surveys were undertaken within 90 minutes of sunset to account for crepuscular birds (*e.g.* Common Nighthawk) that are less active during the later evening period. Surveys were undertaken on calm clear nights with:

- At least 50% of the visible moon surface illuminated;
- Little or no cloud cover;
- Calm to light winds;
- No precipitation; and,
- Temperatures above 10°C.

Azimuth staff attended the study area for a total of three (3) evenings on June 12, July 9 and July 10, 2019 starting 30 minutes after sunset, all of which demonstrated suitable weather conditions. Surveys were undertaken at the survey stations (3 total) illustrated on Figure 2a-2b.

According to the DRAFT Survey Protocol for Eastern Whip-poor-will (MNR, 2014) calling Eastern Whip-poor-will can be heard up to 1km from a given location under ideal



conditions. As the surveys were completed under ideal conditions, Azimuth was able to determine presence/absence of the species to a suitable degree of confidence for the entire study area based on the survey stations illustrated on Figure 2a-2b. It is acknowledged that the protocol recommends that point counts have a fixed 300m radius so absolute numbers of birds can be counted, Azimuth conducted surveys using a wider radius given the first objective of the study is to establish simple presence/absence of the species.

3.7.10 Snake Surveys

Azimuth conducted snake surveys as a matter of course throughout the field program, including routine flipping of rocks/logs, and general observations for snake activity while conducting site surveys under suitable weather conditions. During site visits with suitable weather, the abandoned silo and building foundation in the southwest corner of lands east of the rail line were investigated for evidence of reptile activity. A total of 12 snake surveys occurred within lands east of the rail line on May 7, May 29, June 6, June 19, June 27, July 8, July 9, July 10, September 17, September 18, 2019, July 12 and October 1, 2021 in accordance with suitable weather conditions defined in the Survey Protocol for Ontario's Species at Risk Snakes (MNR, 2016). Surveys for snakes and suitable habitat were also investigated as a matter of course within lands west of the rail line and adjacent lands on July 17, July 19, July 28, and August 17, 2023. As per this protocol surveys met the following conditions:

- Surveys were completed between approx. mid-May and early-October;
- Surveys were conducted between 9:00 a.m. and 5:00 p.m. during spring (May-June) and early fall (September-October);
- Surveys were conducted between 8:00 a.m. and 12:00 p.m. or 5:00 p.m. and 8:00 p.m. during summer (July-August);
- On sunny days, temperature was between 10°C and 25°C;
- On overcast days, temperature was above 15°C and 30°C; and,
- Surveys were not carried out when wind speed exceeded Beaufort 3.

3.7.11 Drainage Features and Fish Habitat

The results of the background screening exercise informed the scope of targeted site investigations carried out by RiverStone in 2019 and 2020. Site investigations were focused on characterizing the general topography of the site and associated drainage patterns. Where appropriate, features were delineated with a survey-grade GPS receiver capable of 2m accuracy.



Watercourse Identification

The initial site investigation undertaken on July 8, 2019 focused on confirming the presence of the various drainage features identified through background review. The alignment of these features was formally delineated in all accessible locations within the study area by walking the approximate centerline of the feature and taking location points with a high-accuracy GPS receiver. Where flow was absent due to seasonally dry conditions, other physical characteristics were used to identify drainage alignments, such as topography, substrate, and presence of riparian vegetation communities.

Watercourse Monitoring and Characterization

Once identified, drainage features were assessed and monitored to inform a general characterization of the structure and function of each feature. Twelve (12) individual aquatic assessment/monitoring stations were established to evaluate conditions in consistent, representative locations during each monitoring visit. The locations of monitoring stations are illustrated within Appendix A (Figure 2; WQ1-12). Details on bank full width, wetted depth, standing water depth, velocity, bank stability, culvert dimensions, water temperature, dissolved oxygen, conductivity, pH, vegetation characteristics, and general observations were collected where applicable/feasible.

The assessed parameters were used to inform conclusions regarding feature permanency, fish community, fish habitat and fisheries values, and options for fish habitat improvements related to future rehabilitation (if/where applicable). The various watercourse monitoring dates are listed in Section 3.1 above, and a detailed data collection summary is provided in Appendix A.

Targeted Fish Sampling and Fish Habitat Assessment

RiverStone conducted a fisheries habitat assessment to characterize aquatic features and fish habitat in the study area. The habitat features that were documented included bank full and wetted width, max water depth, velocity, bank stability, substrate types, water temperature, dissolved oxygen (DO), conductivity, pH, and in feature and riparian vegetation. The presence or absence of fish habitat was ascertained through review of relevant background information sources (per Section 3.5) and the results of targeted and habitat-based assessments on-site. Formal assessment for fish presence was completed on September 25, 2019. Each watercourse that showed either intermitted or permanent flows was assessed for fish community structure using single pass electrofishing on the property within the identified tributaries. The sampling reaches were not blocked at either end during the assessment. A total of four (4) sampling stations were established, coinciding with water sampling stations WQ1, 2, 4, and 6 (Appendix A).



4.0 EXISTING CONDITIONS

4.1 Study Area

The subject property is located on the west side of Highway 12 approximately 2.8km south of the settlement of Brechin and approximately 1.0km east of the Lake Simcoe shoreline, depicted in its regional context in Figure 1.

Lands east of the rail line generally consist of pastureland characterized by open meadow and early successional shrub cover with evidence of sustained active grazing by cattle, observed in 2019 but not in 2020-2023. Pastureland on the subject property exists among a complex of successional thicket, early successional woodlands, and wetland thicket areas, particularly in the southwest portion of the subject property. Several minor (<0.5 hectare (ha)) wetland inclusions are interspersed throughout the pasturelands, and a small number of minor open water features comprising both manmade ponds and natural marsh areas are located within the property limits.

Two (2) mapped watercourses are located within lands east of the rail line, one originating in the central portion of the property and extending toward its northeast limit, and the other originating in the central portion of the property and extending toward its west limit (Appendix D), refined and described in greater detail in the Fisheries Assessment prepared by RiverStone (Appendix A).

Concession Road 1, Concession Road 2, and Highway 12 abut the south, north, and east edges of property respectively. Adjacent lands in the northwest quadrant of the concession (off-property) include successional thicket, active agricultural land, and a rural residential dwelling. Lands beyond the south, north, and east limits of the above boundary roads comprise similar rural land uses including row cropping, open pastureland and residential dwellings. Two (2) active quarries are located approximately 550m northeast of the subject property and 750m south of the subject property at their closest points. Three (3) residential parcels are located on the west side of Highway 12 and are enveloped by the subject property on their north, west, and south edges.

Lands west of the rail line comprise the western portion of the study area and are composed of a mosaic of land uses including coniferous plantation, mature mixed and coniferous woodland, upland meadow, wetland meadow marsh, and abandoned airstrip with vacant maintenance facility structures. The southern boundary of the property is defined by Concession Road 1, beyond which an extensive thicket occurs (west of the rail line), however these areas are visually obscured by presence of a large earthen berm. Lands beyond the southwest portion of the property represent a continuation of woodland/treed swamp communities located in the southwest portion of the property,



while the remainder of lands located north and west of the property comprise active agricultural land.

The east and west portions of the property are divided on a north-south axis by an earthen berm that was historically utilized as a railway line (Georgian Bay & Seaboard Railway; County of Simcoe, 2023b). The earthen railway berm does not feature a culvert (or similar infrastructure) and does not facilitate drainage between lands east and west of the berm, rendering both areas hydrologically isolated from each other.

A photographic record including representative images of vegetation communities and habitat features therein is presented in Appendix E, focusing on lands east of the rail line and the eastern approximately 120m of areas west of the rail line (*i.e.* lands in proximity to the proposed extraction footprint). A photographic record of aquatic features and functions prepared by RiverStone is presented in Appendix A.

4.2 Terrestrial Resources

4.2.1 Vegetation

The limits of all ELC communities identified within the study area are illustrated in Figure 2a-2c. A complete list of vascular plant species identified within the proposed quarry limits is presented in Table 3a (east of the rail line) and Tables 3b-3c (west of the rail line), and summary descriptions of vegetation communities within the subject property limits are presented in Table 4a (east of the rail line) and Table 4b (west of the rail line).

4.2.1.1 East of Rail Line

The portion of the property east of the rail line is located on the west side of Highway 12, approximately 1.6 km east of Lake Simcoe. The site is active pastureland comprising a complex of Dry-Moist Graminoid Meadow (MEGM3/MEGM4a) with large interspersed upland Buckthorn Deciduous Shrub Thickets (THDM2-6) that are generally thin in composition but surpass the >25% aerial cover standard to meet the definition of a thicket in accordance with the ELC system. In occasional low areas, several minor wetland inclusions (<0.5 ha) are interspersed within meadow and thicketed communities comprising small Reed Canary Grass Mineral Meadow Marsh (MAM2-2), Willow Mineral Swamp Thicket (SWT2-2), and manmade cattle ponds that have naturalized to become Cattail Mineral Shallow Marsh (MAS2-1) communities. Mineral soils are generally 20-30cm in depth before reaching gravel throughout the majority of the subject property, approaching 75cm in depth in wetter lowland areas in the northeast section of the property (MAM2-2a).



An upland section of dry meadow located in the southwest portion of the property (east of the rail line) is slightly elevated in topography compared with the remainder of the property and features slightly thinner soils (approximately 15cm in depth). Plant composition in this section is sparser in character than remaining open lands and includes a notable Common Juniper (*Juniperus communis*) element, however retains plant composition of recently grazed pastureland (within past 5 years). Although several species indicative of thinner soils (common in areas east of Lake Simcoe) occur including Hairy Beard-tongue (*Penstemon hirsutus*), Prairie Smoke (*Geum triflorum*), Upland White Aster (*Solidago ptarmicoides*), and Balsam Groundsel (*Packera paupercula* var. *paupercula*), no portion of the subject property is consistent with the definition of an alvar according to SWHTG or ELC standards. Further, no alvar indicator species listed in the SWHTG Ecoregion 6E Criteria Schedules identified during the vegetation inventory program.

The southwest portion of lands east of the rail line contain a Willow Mineral Swamp Thicket (SWT2-2) with a small section of semi-permanent standing water along its western edge (MAS2-1d (inclusion)). Additional SWT2-2 units with ephemeral standing water (dry by approximately June) are located along the southern boundary of the property adjacent to Concession Road 1, and in the northeast corner of the property adjacent to Concession Road 2.

Three (3) small wooded areas occur in the southwestern portion of lands east of the rail line, and include Dry-Fresh White Cedar Coniferous Forest (FOC2-2), White Birch-Poplar Mineral Deciduous Swamp (SWD4-3) and Mineral Cultural Woodland (CUW1) woodland types. All woodlands east of the rail line are immature in age (generally 30-40 years; County of Simcoe, 2023b), of poor floristic quality and diversity, and have highly degraded ground layers due to active grazing and use as refuge for shade by cattle.

4.2.1.2 West of Rail Line

Lands west of the rail line (Georgian Bay & Seaboard Railway) are located along the north side of Concession Road 1, approximately 1.0km east of Lake Simcoe. The area is characterized as a mosaic of vegetation types, likely originating from a variety of historical land use practices on the site.

The eastern portion of the area is characterized by large immature (approximately 20-40 years; County of Simcoe, 2023b) Coniferous Plantations (CUP3) comprising primarily White Spruce (*Picea glauca*) and Eastern White Pine (*Pinus strobus*), with additional representation from Scot's Pine (*Pinus sylvestris*). A moderately mature Dry-Fresh White Cedar Coniferous Forest (FOC2-2) is located in the southeast corner of the



property that extends partially eastward to the other side of the rail line, and represents the only vegetation community occurring continuous with both portions of the property.

The southern portion of the area west of the rail line includes sizeable upland Buckthorn Deciduous Shrub Thickets (THDM2-6) likely representing early successional units formerly designated as meadows. Similarly, early successional Dry-Fresh Native Coniferous Regeneration Thicket (THCM1-2) units are located in the eastern and northern portions of the area, primarily dominated by Eastern White Cedar (*Thuja occidentalis*). Western portions of the property are also characterized by relatively extensive Cultural Woodland (CUW1) units, representing a later successional stage than polygons dominated by shrub vegetation.

A mature woodland including upland Fresh-Moist White Cedar Coniferous Forest (FOC4-1) and White Cedar Hardwood Mineral Mixed Swamp (SWM1-1) are located in the southwest corner of the property, extending offsite onto adjacent lands west of the property. Fragmented Reed Canary Grass Meadow Marsh (MAM2-2) units are also located throughout the property, but more frequently identified in the western half of the property.

It is anticipated that due to the variety of land use histories on the property (*e.g.* rural airport runway and facilities), some areas have been historically maintained. Air photo interpretation (County of Simcoe, 2023b) shows that the northern approximately two thirds of lands west of the rail line comprised open country land uses until approximately 1995-2002. As such, a proportion of interstitial spacing between woodland and thicket units comprises a complex of Dry-Moist Graminoid Meadow (MEGM3/MEGM4b). The meadow is connected as a single unit, however the property generally lacks open country habitat types such as those documented east of the rail line due to the overall fragmented/interrupted conformation of the meadow polygon. No alvar indicator species (per SWHTG Ecoregion 6E Criteria Schedules) and minimal occurrences of species indicative of thinner soils were observed within the limits lands west of the rail line (*e.g.* one occurrence of Upland White Aster), therefore alvar communities should be considered absent on the property in accordance with ELC and/or SWHTG standards.

4.2.1.3 Vegetation Community Rarity

None of the vegetation communities documented are of federal or provincial conservation concern (MNRF, 2023). As described above, no portion of the study area contains vegetation communities or indicator species that could be considered as alvar in accordance with provincial guidance documents.



4.2.1.4 Rare and Uncommon Plants

There are no elements of occurrence (EO_ID) within the study area for provincially Endangered or Threatened, or provincially rare vegetation species according to the MNRF NHIC database (MNRF, 2023).

Two (2) species listed as Endangered under the ESA were identified within the study area, Butternut and Black Ash, both species occurring in the western portions of the property (Figure 2c).

No other plant species considered Endangered or Threatened were identified during the site investigation. Further, no other provincially rare (S1-S3) species were observed during the field program (noting Butternut is considered “S2?” in Ontario (MNRF, 2023)).

4.2.2 Wildlife

4.2.2.1 Mammals

Evidence of 12 mammalian species including a small mammal species (tracks), Meadow Vole (direct observation), Red Squirrel (direct observation), Muskrat (direct observation), Eastern Cottontail (tracks), Raccoon (direct observation), Snowshoe Hare (tracks), Porcupine (direct observation), Red Fox (tracks), Coyote (direct observation), White-tailed Deer (direct observation), and Black Bear (tracks) were recorded during the site investigations. Given the proximity of the study area to large natural areas in the greater landscape, it is expected the following other mammals could conceivably be encountered within the study area: other small mammal species (various mice, voles, and shrews), weasel species, Eastern Chipmunk, Eastern Gray Squirrel, and Striped Skunk.

4.2.2.2 Amphibians (Frogs, Toads, Salamanders)

A total of seven (7) calling amphibian species were identified during the evening amphibian breeding survey program, including Spring Peeper, Wood Frog, Western Chorus Frog, Gray Treefrog, Northern Leopard Frog, American Toad, and Green Frog. Full choruses of Spring Peeper, Western Chorus Frog, and Gray Treefrog were recorded in the largest wetland unit (SWT2-2a/MAM2-6/MAS2-1d (inclusion); Figure 2b) located in the southwest portion of the lands east of the rail line, particularly in areas of semi-permanent water. Amphibian breeding point counts are illustrated in Figure 2a-2b and detailed results of the amphibian breeding survey program are presented in Table 5.

No salamanders or newts were observed throughout the course of the field program. It is notable that woodland breeding pools were not observed within the study area and therefore salamanders/newts would not be anticipated to occur.



4.2.2.3 Reptiles (Turtles and Snakes)

As a result of the turtle overwintering/emergence survey program, turtles were observed within the property limits as follows:

- May 11, 2022
 - One (1) basking Midland Painted Turtle (MAS2-1a (inclusion))
- May 12, 2022
 - Two (2) basking Midland Painted Turtles (MAS2-1a (inclusion))
- May 24, 2022
 - One (1) basking Midland Painted Turtle (MAS2-1a (inclusion))
- June 8, 2022
 - Two (2) basking Midland Painted Turtles (MAS2-1a (inclusion))
 - One (1) basking Midland Painted Turtle (MAS2-1d (inclusion))
- June 11, 2022:
 - One (1) basking Midland Painted Turtle (MAS2-1a (inclusion))

One (1) Snapping Turtle was observed incidentally on June 12, 2022 on adjacent lands within the McNabb Drain, directly south of an isolated agricultural pond located approximately 30m north of Concession Road 2. The individual was observed swimming within the McNabb Drain in a westerly direction along the axis of the drain. No other Snapping Turtles were observed within or beyond the property limits during targeted surveys or throughout the course of the remainder of the field program. Given the intensive survey effort to identify turtles carried out within the study area limits, it is concluded that Snapping Turtles were not present within wetlands on the property.

No other turtle species, including Blanding's Turtle, were observed within the study area limits throughout the course of the field program. Additional discussion regarding turtle overwintering/emergence screenings in the context of Blanding's Turtles is provided in Section 4.2.3.2 below.

No evidence of turtle nesting, movement between wetlands (*i.e.* observations outside of wetland boundaries) or similar signs were identified on the subject property during the course of the field program.

One (1) snake was observed during the course of the field program, an Eastern Gartersnake observed on July 12, 2021. A total of 12 surveys within lands east of the rail line, and three (3) surveys within lands west of the rail line were completed during suitable conditions for snake activity throughout the field program, all of which included effort to overturn rocks/woody materials. Surveys within lands east of the rail line further included a targeted search around the abandoned structure located in the southern



portion of the property (Figure 2b) identified as having potential to provide habitat for snakes. The Eastern Gartersnake observation in July 2021 was incidental during the wetland staking exercise with LSRCA, and was observed along the southern edge of the SWT2-2a polygon (Figure 2b).

4.2.2.4 Birds

Evidence of 67 bird species was recorded within the study area during course of the field program. A total of 50 species were identified during the dawn breeding bird survey program, and 17 additional species were identified incidentally and/or during the course of other targeted surveys (*e.g.* waterfowl stopover/staging surveys) conducted throughout the remainder of the season. Detailed results of the dawn breeding bird survey program are presented in Table 6a-6c.

One (1) Great Egret (S2B; NHIC, 2023) was observed flying over the western portion of the property but did not land or otherwise interact with the lands and is therefore not anticipated to be breeding/nesting within the study area limits.

Evening breeding bird surveys did not detect the presence of crepuscular or nocturnal SAR such as Eastern Whip-poor-will or Common Nighthawk.

Raptor wintering surveys did not identify listed raptor species during any of the five (5) site walks and as such results do not suggest the study area provides Significant Wildlife Habitat as a Raptor Wintering Area.

4.2.2.5 Insects

Throughout the course of Azimuth's site investigation, the following insect species were documented incidentally throughout the subject property:

- Butterflies: Least Skipper, Summer Azure, Common Wood-nymph, Clouded Sulphur, Monarch, Dun Skipper, Northern Pearly-Eye, Viceroy, Black Swallowtail, Cabbage White, Peck's Skipper, Great Spangled Fritillary, European Skipper
- Dragonflies: Common Green Darner, Twelve-spotted Skimmer, Black Saddlebags

None of the species documented are of federal or provincial conservation concern (MNR, 2023), with the exception of Monarch which is listed as Special Concern under the provincial ESA.



4.2.3 Species at Risk

SAR with potential to occur in the planning area and their preferred habitats were screened to determine whether there is potentially suitable habitat within the study area (Table 2).

Based on this assessment in combination with vegetation communities, habitat features, and wildlife species observed during the site investigation, the following species are considered below in this NER based on presumed or confirmed occurrence within the study area:

East of Rail Line:

- **Threatened and Endangered:**
 - Bobolink (probable breeding/nesting)
 - Eastern Meadowlark (confirmed breeding/nesting)

- **Special Concern:**
 - Barn Swallow (aerial foraging)
 - Grasshopper Sparrow (probable breeding/nesting)
 - Monarch (breeding/nectaring)

West of Rail Line:

- **Threatened and Endangered:**
 - Little Brown Myotis, Northern Myotis, Tri-colored Bat (potential roosting within treed habitats, vacant structures)
 - Butternut
 - Black Ash

- **Special Concern:**
 - Barn Swallow (possible aerial foraging)
 - Wood Thrush (possible breeding/nesting)
 - Eastern Wood-pewee (potential breeding/nesting)
 - Golden-winged Warbler (potential breeding/nesting)
 - Monarch (breeding/nectaring)

Adjacent Lands (Off-Property):

- **Threatened and Endangered:**
 - Bobolink (potential habitat)
 - Eastern Meadowlark (potential habitat)



- **Special Concern:**
 - Barn Swallow (possible aerial foraging)
 - Grasshopper Sparrow (potential breeding/nesting)
 - Wood Thrush (potential breeding/nesting)
 - Eastern Wood-pewee (potential breeding/nesting)
 - Golden-winged Warbler (potential breeding/nesting)
 - Snapping Turtle (foraging/transit within McNabb Drain)
 - Monarch (breeding/nectaring)

Only species designated Threatened or Endangered receive individual and habitat protection under Section 9 and Section 10 of the ESA. Special Concern species are further discussed in the context of Significant Wildlife Habitat (Habitat for Special Concern and Rare Wildlife Species) in Section 4.7 below.

4.2.3.1 Bobolink and Eastern Meadowlark

Dawn breeding bird surveys conducted in June 2019 confirmed presence of Bobolink and Eastern Meadowlark exhibiting possible and probable indicators of breeding activity (singing males, territorial behaviour, pairing, flushing from likely nest sites). One (1) confirmed Eastern Meadowlark nest site containing eggs was observed within ground-level thatch in the southern portion of the property (Figure 3b).

Based on the results of the dawn breeding bird survey program, approximate locations of Bobolink and Eastern Meadowlark nesting sites and defended territories within the property are illustrated in Figure 3a-3b as outlined in the General Habitat Description for Bobolink (GHD; MECP, 2021a) and GHD for Eastern Meadowlark (MECP, 2021b). Category 1 (lowest tolerance to alteration), Category 2 (moderate tolerance to alteration) habitat buffers are illustrated for both species in accordance with MECP technical guidance, comprising the critical nesting zone and approximate area of defended territory (respectively) to support courtship, mating, feeding, and rearing of young (MECP, 2021a; MECP, 2021b).

It is acknowledged that grassland continuity is also a requirement to support the habitat needs of both species, and as such Category 3 habitat (highest tolerance to alteration) is also shown on Figure 3a-3b to comprise the majority of grasslands (MEGM3/MEGM4a) within lands east of the rail line. For both species, MECP technical guidance recommends Category 3 habitat applies from the outer edge of the Category 2 zone up to 300 m from the nest location within suitable grassland habitats.

Evidence of Bobolink and Eastern Meadowlark was also recorded within pastureland on adjacent lands, south of Concession Road 1 and in the adjacent meadow northwest of the



site. In accordance with the GHDs for both species, a roadway (*i.e.* Concession Road 1) acts as a barrier to habitat continuity, and as such no portion potential habitat on adjacent lands south of Concession Road 1 should be considered to extend onto the property.

4.2.3.2 Blanding's Turtle

MECP's response to the initial IGF/AAF submission received on March 4, 2022 (Appendix D) indicated an occurrence of Blanding's Turtle in the greater vicinity of the study area. The response further indicated "...a Blanding's Turtle occurrence has been recorded and protected habitat has been triggered...", a reference to the GHD for the Blanding's Turtle (*Emydoidea blandingii*)(MECP, 2021c) which designates Category 2 habitat as the wetland complex that extends up to 2km from an occurrence and 30m around suitable wetland/water bodies.

Three water bodies characterized as naturalized ponds likely manmade for cattle pasturing purposes are present in the northeast, southeast, and southwest corners of lands east of the rail line occupy 0.087ha (MAS2-1a (inclusion)), 0.058ha (MAS2-1c (inclusion)), and 0.108ha (MAS2-1d (inclusion)) respectively (see Figures 2a-2b; attached). All ponds meet the GHD's description of suitable habitat and have therefore been treated as such for the purposes of this assessment, however are limited in size and connectivity with other wetlands across the local landscape and therefore provide highly marginal habitat potential for Blanding's Turtle.

Based on detailed rationale provided to MECP (Appendix D), it is Azimuth's opinion that turtle emergence survey program undertaken in 2019 and 2022 meets and exceeds the "significant search effort" referred to in the Survey Protocol to demonstrate Blanding's Turtle absence at an "occupied" site. The surveys occurred across multiple (*i.e.* two) years, however given the intensive effort undertaken across 2019 and 2022, it is our opinion that the search effort was adequate to demonstrate complete absence of the species to a high level of confidence.

Conclusions Regarding Blanding's Turtle Presence/Absence

With consideration for the turtle emergence survey (visual encounter survey) program, supported by turtle nesting surveys, and incidental screenings described in the sections above, Azimuth concludes the following:

- Although a Blanding's Turtle record exists in the greater vicinity of the subject property, habitat conditions on the subject property are limited (0.253ha combined) and marginal for the species. Highway 12 is also anticipated to significantly limit the ability for Blanding's Turtle to cross from the east side (where the record occurred) to the west side of the road, although this may be



- possible in rare circumstances. It is our opinion that an “occupied” designation is not appropriate in the context of this assessment and the subject property should not be considered occupied.
- Intensive turtle emergence survey efforts were completed in 2019 and 2022 at multiples of 2.37x (revised from 2.57x appearing in Appendix D due to minor calculation error) and 5.76x the minimum search efforts (respectively) detailed in the Survey Protocol, demonstrating no evidence of Blanding’s Turtle on the subject property. Turtle emergence surveys therefore occurred at a “significant search effort” spanning “multiple years” referred to in the Survey Protocol as required when screening an occupied site for presence/absence.
 - Supporting turtle nesting surveys (3 total) and incidental screenings (10 total) occurred during suitable seasonality and weather conditions in 2019 and 2021, none of which demonstrated evidence of Blanding’s Turtle.

Based on the above, Azimuth concludes that the survey program undertaken for Blanding’s Turtle on the subject property has adequately demonstrated complete absence of the species to a high level of confidence.

As discussed in Section 3.3 above, the above rationale was provided to MECP in March 2023 to which a response was received in June 2023 (Appendix D) confirming the following:

- The level of survey effort to screen for Blanding’s Turtles appears to demonstrate some confidence that the species is not utilizing wetland features on lands east of the rail line or adjacent lands, therefore it is unlikely that the proposed works will represent a contravention of the ESA and as such authorization is not required.
- Given presence in the greater landscape, suitable mitigation measures such as exclusion fencing, worker training, and operating protocols should be considered.

As such, Blanding’s Turtle will be considered absent from the property for the purposes of this assessment. A mitigation program is outlined in detail in Section 8 below, in accordance with MECP recommendations.

4.3 Wetlands

Wetlands within the study area are not identified as provincially or locally Significant Wetland, or afforded a similar designation on Township, County (Appendix B), or Provincial mapping resources (MNRF, 2023).

In accordance with updated provincial protocols described in the OWES Southern Manual (4th Edition, December 2022; MNRF, 2022), a total of three (3) wetland units



were deemed eligible for evaluation and subject to separate evaluations as a component of this assessment and are included in Appendix F. Wetland evaluations were completed by a trained OWES Evaluator (Dan Stuart, Ecology Lead, Azimuth) and submitted to the Township and County on March 10, 2023. Geospatial files of evaluated wetland boundaries and confirmation of wetland status were issued to MNRF on April 4, 2023, within 30-days of submission of the evaluations, in accordance with OWES requirements.

As described in OWES methodology, Wetland Unit #1 (5.99ha) and Wetland Unit #2 (2.71ha)(Appendix F) were scored as individual wetlands as each exceeds 2ha in size. Wetland Unit #3 (1.36ha)(Appendix F) does not exceed 2ha in size, however was evaluated under OWES due to presence of NHIC-tracked wildlife species. Wetlands subject to evaluation were limited to those occurring on east of the rail line given proposed extraction activities are proposed exclusively within this portion of the property.

Other wetlands 0.5-2.0ha in size located east of the rail line were not subject to OWES evaluations due to absence of NHIC-tracked wildlife species or other special features or functions that would compel the undertaking of a full OWES evaluation. As such, remaining wetlands on east of the rail line 0.5-2ha in size are deemed not eligible for OWES evaluations in accordance with provincial criteria.

Wetlands <0.5ha in size were identified in several locations east of the rail line, however these have been identified as inclusions within upland communities, and are mapped as such (Figures 2a-2b) in accordance with ELC methodology. Wetlands <0.5ha in size do not meet the minimum unit size for mapping. No wetland <0.5ha in size east of the rail line comprises in part or in whole, a specialized wetland type eligible for an OWES evaluation in accordance with provincial criteria.

The results of the OWES Evaluation determined that the Wetland Unit #1, Wetland Unit #2, and Wetland unit #3 are **not significant** in accordance with provincial criteria defined in the OWES Manual. A complete record of the OWES evaluation for Wetland Unit #1, Wetland Unit #2, and Wetland unit #3 as submitted to the Township and County is available in Appendix F.

4.4 Significant Woodland

County Greenlands (Appendix B) are illustrated in the western portion of the property, partially overlapping with components of Woodland D (Figure 4c). Woodland D may therefore warrant consideration as Significant Woodland based on County mapping resources.



The Natural Heritage Reference Manual (NHRM; OMNR, 2010) and Technical Definitions and Criteria for Identifying Key Natural Heritage Feature and Key Hydrologic Features for the Lake Simcoe Protection Plan (“LSPP Technical Definitions”; MNRF, 2015d) provide guidelines of defining woodlands and their boundaries. Pursuant to NHRM and LSPP Technical Definitions standards, six (6) separate woodland units are located on the subject property, identified as Woodland A, Woodland B, Woodland C, Woodland D, Woodland E, and Woodland F on Figure 4a-4c.

An assessment of potential significance for Woodlands A-F has been prepared based on criteria detailed in the LSPP Technical Definitions and supported by the NHRM, presented in Table 7.

With regard for woodland connectivity, the NHRM states that “*woodland areas are considered to be generally continuous even if intersected by narrow gaps 20 m or less in width between crown edges*”. The LSPP Technical Definitions further states “*An opening more than 20 metres wide that bisects a woodland would be considered to create two separate woodlands.*” In the case of Woodland A and Woodland D, there exists an opening measuring approximately 21m between crown edges. Several scattered trees are located within this gap, however these individual trees occur in a location comprising a meadow ground layer, and are not characteristic of woodland structure or floristic composition to be considered part of either woodland feature. As such, the gap between Woodland A and Woodland D in this location renders the features as two separate woodland units.

The assessment presented in Table 7 is prepared with regard for LSPP Technical Definitions, as thresholds for significance are more restrictive than those presented in the NHRM. Based on this assessment, the following woodland units on the do not meet standards that compel consideration as significant natural heritage features:

- Woodland A
- Woodland B
- Woodland C
- Woodland F

The following woodland units meet one or more standards for potential significance based upon LSPP Technical Definitions, presented in Table 7:

- Woodland D (Size, Natural Composition, Age or Tree Size, Proximity criteria)
- Woodland E (Natural Composition, Proximity criteria)



As such, Woodland D and Woodland E are treated as Candidate Significant Woodland for the purposes of this assessment.

4.5 Significant Valleyland

No portion of the study area is identified as Significant Valleyland, nor assigned a similar designation on Township, County (Appendix B), or Provincial mapping resources (Appendix D).

There are no valleyland features located within the study area according standards presented in the NHRM or LSPP Technical Definitions, principally due to the lack of valleyland topography associated with permanent or intermittent watercourses. The property is relatively flat in character with only minor topographic variation. Areas where standing water occurs for a portion of the season (*i.e.* wetlands) are characterized as occurring on a broad plain in a headwater area and not typical of the landform and ecological criteria attributed to valleyland systems. No portion of the study area fulfills the valley morphology and landform prominence required to be considered Candidate Significant Valleyland.

4.6 Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest are not mapped within the study area according to Township, County (Appendix B), or Provincial mapping resources (Appendix D).

4.7 Significant Wildlife Habitat

An assessment of the potential for Significant Wildlife Habitat (SWH) within study area was conducted, using the criteria outlined within MNRF's SWHTG and the accompanying Ecoregion 6E Criteria Schedules. An assessment of Candidate Significant Wildlife Habitat categories relative to documented vegetation communities and habitats within the development parcel is presented in Table 8. The following Candidate SWH types were identified or treated as present within the study area based on the results of the field program:

East of Rail Line:

- Amphibian Breeding Habitat (Woodland)
- Terrestrial Crayfish Habitat
- Special Concern and Rare Wildlife Species
 - Barn Swallow
 - Grasshopper Sparrow
 - Monarch



- Chimney/Meadow Crayfish

West of Rail Line:

- Bat Maternity Colonies
- Waterfowl Nesting Habitat
- Amphibian Breeding Habitat (Woodland)
- Terrestrial Crayfish Habitat
- Special Concern and Rare Wildlife Species
 - Barn Swallow
 - Wood Thrush
 - Eastern Wood-pewee
 - Golden-winged Warbler
 - Monarch

Adjacent Lands (Off-property):

- Bat Maternity Colonies
- Amphibian Breeding Habitat (Woodland)
- Open Country Bird Breeding Habitat
- Shrub/Early Successional Bird Breeding Habitat
- Special Concern and Rare Wildlife Species
 - Barn Swallow
 - Wood Thrush
 - Eastern Wood-pewee
 - Golden-winged Warbler
 - Monarch

4.7.1 Bat Maternity Colonies

One (1) deciduous swamp (SWD4-3; Figure 2c) community meeting ELC criteria in the Ecoregion 6E Criteria Schedules is located within the south-central portion of the property, east of the rail line. The SWD4-3 polygon is immature and bat snag surveys conducted in April 2019 did not identify suitable habitat trees within the SWD4-3 unit or elsewhere within lands east of the rail line. Wooded areas within lands east of the rail line are immature/early successional (generally 30-40 years old; County of Simcoe, 2023b), mostly comprising coniferous species such as Eastern White Cedar, and not characteristic of typical habitat utilized by bats for maternity roosting purposes.

Mixed swamp in the southwest portion of the property (SWM1-1; Figure 2c) contains a mix of second growth mid-aged to mature trees that is anticipated to provide the appropriate snag density (>10 snags/ha) conducive to Bat Maternity Colonies. The extent



of Candidate Bat Maternity Colonies within lands west of the rail line is illustrated on Figure 5c.

Note that as detailed in the Ecoregion 6E Criteria Schedules, coniferous woodland features (*i.e.* FOC, WOC, SWC) are not considered candidate ELC types for Bat Maternity Colonies.

4.7.2 Amphibian Breeding Habitat (Woodland)

Amphibian breeding surveys documented >20 breeding individuals (full choruses) of two (2) listed frog species within potential Amphibian Breeding Habitat (Woodland) within the study area as follows and illustrated in Figure 5a-5c:

- SWT2-2a/MAS2-6/MAS2-1d (inclusion): Spring Peeper, Gray Treefrog
- MAM2-2h: Spring Peeper, Gray Treefrog

In lieu of completed detailed amphibian breeding studies in lands >120m west of the rail line, the following communities are also treated as providing Candidate Amphibian Breeding Habitat (Woodland) function and are illustrated on Figure 5c:

- SWM1-1
- MAM2-2i (inclusion)
- MAM2-2j (inclusion)
- MAM2-2k
- MAM2-2l (inclusion)
- MAM2-2m (inclusion)
- MAM2-2n (inclusion)
- MAM2-2p
- MAM2-2q (inclusion)

As detailed in the Ecoregion 6E Criteria Schedules, woodlands within a 230m radius of the above wetland ecotypes would also be considered to provide candidate Amphibian Breeding Habitat (Woodland) function where habitat criteria have been identified.

Remaining wetlands (and surrounding woodlands) east of the rail line and 120m adjacent lands did not provide habitat for >20 breeding individuals of two (2) listed species, and therefore do not meet minimum criteria for Candidate SWH.



4.7.3 Waterfowl Nesting Habitat

Waterfowl nesting habitat meeting criteria for Candidate SWH was not identified east of the rail line or adjacent lands, however detailed surveys for waterfowl nesting activity were not carried out within the remainder of the property, west of the rail line.

Potentially suitable wetlands within western portions of the property include meadow marshes (MAM units) exceeding 0.5ha in size, and wetland inclusions (<0.5ha) present in clusters of three (3) or more plus 120m adjacent lands, listed as follows:

- MAM2-2k
- MAM2-2l (inclusion)
- MAM2-2m (inclusion)
- MAM2-2n (inclusion)
- MAM2-2p
- MAM2-2q (inclusion)

The above vegetation communities plus 120m adjacent lands are treated as Candidate SWH for Waterfowl Nesting Habitat for the purposes of this assessment.

4.7.4 Open Country Bird Breeding Habitat

Open meadow (MEGM3/MEGM4a; Figures 2a-2b) that comprises the majority of lands east of the rail line was recently subject to active pasturing by cattle up to 2019. Intensive livestock pasturing has occurred within the past 5 years, and therefore the subject property does not qualify as candidate Open Country Bird Breeding Habitat.

Meadow units west of the rail line do not exceed 30ha and are therefore not considered suitable habitat.

Hayfields and/or old-field meadows on adjacent lands (north of Concession Road 2 and east of Highway 12) may provide suitable conditions to support Open County Bird Breeding Habitat (Figures 5a-5b). There is potential that species listed under the Ecoregion 6E Criteria Schedules occur >120m from the property limit within adjacent lands that would render the entire polygon as Candidate SWH, and therefore is treated as such for the purposes of this assessment.

4.7.5 Early Successional Bird Breeding Habitat

One (1) upland shrub thicket or early successional woodland community >10ha in size is located within the subject property, THDM2-6b located east of the rail line. Intensive livestock pasturing has occurred within this vegetation community in the past 5 years,



and therefore the subject property does not qualify as candidate Shrub/Early Successional Bird Breeding Habitat.

A large thicket is located south of the boundary of Concession Road 1 on adjacent lands (Figure 5c). The unit exceeds 10ha in size and therefore may provide Shrub/Early Successional Bird Breeding Habitat, and is treated as such for the purposes of this assessment.

4.7.6 Terrestrial Crayfish Habitat

Two (2) terrestrial crayfish burrows were observed east of the rail line, in the northeast portion of the property (SWT2-2b) and the southeast portion of the property (adjacent to a dug pond; MAS2-1c (inclusion)), illustrated on Figures 5a-5b. Terrestrial crayfish burrows were also observed in the western portion of the property within a meadow marsh feature (MAM2-2k; Figure 5c). As noted in the Ecoregion 6E Criteria Schedules, collection and identification of individual terrestrial crayfish is very difficult, therefore terrestrial crayfish burrows are to be considered an indicator of presence.

Two species of crayfish including Chimney Crayfish (*Fallicambarus fodiens*) and Meadow Crayfish (*Cambarus diogenes*) occupy terrestrial environs and construct crayfish “chimneys”, both of which are listed as provincially-rare (S-Rank 3) by the NHIC (MNRF, 2023). As such, habitats for both species also receive consideration as Candidate SWH under Special Concern and Rare Wildlife Species.

4.7.7 Special Concern and Rare Wildlife Species

4.7.7.1 Barn Swallow

One (1) occurrence of Barn Swallow was observed near the northeast corner of the subject property over an upland meadow (MEGM3/MEGM4a) on June 6, 2019 (Figure 5a). The individual was observed flying over the site and potentially conducting aerial foraging activities.

In lieu of completed detailed breeding bird studies for lands >120m west of the rail line, Barn Swallow aerial foraging activities are treated as present within the area west of the rail line and adjacent lands.

No evidence of Barn Swallow nesting was observed on the subject property (including any vacant structure), nor was Barn Swallow activity observed within structures located on adjacent lands.



4.7.7.2 Wood Thrush

One (1) Wood Thrush was heard singing within a coniferous plantation (CUP3-2) unit on June 27, 2019 within 120m of the rail line. OBBA guidelines indicate that a single occurrence of a singing male is classified as “possible breeding”. The approximate location of the recorded individual is illustrated on Figure 5c. The single observation does not confirm breeding, but may indicate a nearby breeding territory, suggesting that portions of the woodland (*i.e.* Woodland D; Figure 4c) >120m from the rail line may provide suitable breeding and nesting habitat for the species.

4.7.7.3 Eastern Wood-pewee

Eastern Wood-pewee was not detected during the dawn breeding bird survey program east of the rail berm and lands within 120m of its boundaries, or incidentally throughout the remainder of the field program.

Potential breeding and nesting habitat for the species may occur within portions of Woodland A and Woodlands D-F (Figure 4c) where located >120m from the rail berm. Breeding and nesting activity for the species is treated as present in this location in lieu of completed detailed breeding bird studies for lands >120m west of the rail berm.

4.7.7.4 Grasshopper Sparrow

One (1) Grasshopper Sparrow was heard singing on the property on three (3) occasions during the course of the dawn breeding bird survey program, an indication of “probable breeding” activity in accordance with OBBA guidelines. An estimated nest centroid is illustrated within the upland meadow as illustrated in Figure 5a.

One (1) occurrence of a singing Grasshopper Sparrow was recorded on June 6, 2019 within upland meadow (MEGM3/MEGM4a) in the southern portion of the property, however OBBA guidelines indicate that a single occurrence of a singing male is classified as “possible breeding” and may have represented a transient/late migratory occurrence rather than evidence of breeding/nesting activity. Given only a single occurrence of the species was recorded in this location, potential breeding territory in the southern portion of the property is not afforded further consideration in this assessment.

4.7.7.5 Golden-winged Warbler

Golden-winged Warbler was not detected during the dawn breeding bird survey program east of the rail line and lands within 120m of its boundaries, or incidentally throughout the remainder of the field program.

Thicket and early successional woodland west of the rail berm and adjacent lands may provide potential breeding and nesting habitat function of the species. A large thicket is located south of Concession Road 1 on adjacent lands, portions which may also provide



potential breeding and nesting habitat for the species. Breeding and nesting activity for the species is treated as present in this location in lieu of completed detailed breeding bird studies for lands >120m west of the rail berm.

4.7.7.6 Monarch

Monarch was observed incidentally within open upland meadows on the property on several occasions, nectaring on various wildflower species. The species' host plant, Common Milkweed (*Asclepias syriaca*) was widespread on the property at a low density. No areas with a high density of Common Milkweed or otherwise preferred habitat were observed within the study area. Although Monarch eggs, larvae, or pupae were not observed on Common Milkweed plants, it can be assumed that breeding activities are also occurring on the property and adjacent lands. The large upland meadow features (MEGM3/MEGM4) are anticipated to provide the principle habitat function for the species on the property. Comparable open country habitats with a low density of Common Milkweed are ubiquitous within the local area and greater landscape, that may also provide breeding and/or nectaring habitat for Monarch.

4.7.7.7 Snapping Turtle

One (1) Snapping Turtle was observed incidentally on June 12, 2022 on adjacent lands within the McNabb Drain, directly south of an isolated agricultural pond located approximately 30m north of Concession Road 2. The individual was observed swimming within the McNabb Drain in a westerly direction along the axis of the drain. No other Snapping Turtles were observed within or beyond the property limits during targeted surveys or throughout the course of the remainder of the field program.

4.7.7.8 Chimney/Meadow Crayfish

Refer to Section 4.7.6 above with regard for Chimney/Meadow Crayfish, in the context of Terrestrial Crayfish Habitat.

4.8 Fish Habitat

The following sections outline the characteristics of the various watercourses/drainage features documented throughout the study area. The location and field-verified alignment of all identified features within the defined study area and the greater landscape are depicted on Figure 2 within Appendix A. Additional surface water descriptions and details are provided in the Level 1 and Level 2 Hydrogeological Assessment, Proposed Brechin Quarry (Azimuth, 2023).

4.8.1 Tributary A

Existing OBM mapping depicts Tributary A as originating in the northeastern portion of the subject property, flowing north to the northern property limit along Concession Road 2. The southern headwaters of the OBM-mapped watercourse could not be located in the



field; it is assumed that the mapping is inaccurate and/or the southern upstream extent of the feature has been altered through historic agricultural practices.

Tributary A has a catchment area of 43.7ha (Azimuth, 2023). There is an online dug pond (Pond 1/MAS2-1a (inclusion); Figure 2a) that occurs along the mapped alignment of Tributary A, proximate to Concession Road 2 (WQ1 Station). The pond collects overland surface water from the southern area of the catchment before overtopping into a field in braided channels and flowing under Concession Road 2 via a culvert into the McNabb Drain.

The southern portion of the Tributary A catchment is active pastureland with no evidence of a channel, but occasional pockets of moist soil were observed. Evidence of historic ditching/channelization was observed along the alignment moving north towards Concession Road 2. The channel was observed to be more defined and wider ~75cm for about 150m, coinciding with the southern limit of a vegetation community generally described as thicket swamp (SWT2-2b; Figure 2a). The channel profile ranged from ~30-75 cm wide, ~15-20 cm deep, with muck substrates. During the spring 2020 site investigation, staff observed a standing water depth of ~4 cm and wetted width of ~42 cm in this northern portion of the channel (see WQ1 on Figure 2 within Appendix A).

Within the thicket swamp community, Tributary A becomes braided and diffuse with no defined channel. Between Pond 1 and 190m to the south the low-lying area and shrub thicket swamp showed heavy soil disturbance caused by cattle.

4.8.2 Tributary B

Tributary B was identified on OBM as originating in a shrub thicket community in the north portion of the south pasture area (Figure 2 within Appendix A) and has a catchment area of 26.5ha (Azimuth, 2023). There was no defined channel at the mapped origin of this feature; however, the area is situated in a subtle depression where areas of standing water (~15cm) were noted during the spring 2020 site visit. A defined channel was first observed ~80 m west of the mapped origin of the feature, consisting of a ditch ~ 1.13m wide and 28cm deep, within an area of open pasture. This area is densely vegetated (primarily grasses) with pockets of standing water up to 12cm deep; however, there was no observable flow during any of the monitoring visits. Tributary B directs overland flow in a westerly direction towards an online pond feature (Pond 2/MAS2-1d (inclusion); Figure 2b) to the east of the rail line (WQ9). Pond 2 had water present throughout the monitoring period and the Hydrogeological Assessment (Azimuth, 2023) suggests that the pond may be supported by shallow perched ground water. The online pond showed heavy disturbance by cattle. The OBM mapping shows the tributary moving west from Pond 2, however, no outlet was observed along the OBM mapped flow



path. Based on field observations and mapping completed by both RiverStone and Azimuth, Tributary B outlets from Pond 2 and flows north connecting with Tributary G. Tributary B would be considered intermittent based on the data collected.

4.8.3 Tributary C

Tributary C occurs on adjacent lands, with about 35,000m² (3.5ha) of its catchment on the subject property. The tributary appears to be part of the tile drain system for the agricultural fields. Based on general observations from the edge of the property, the tributary consists of a dug drainage ditch on adjacent lands that runs along a portion of the west property boundary. At the time of assessment, the adjacent property was in a ploughed condition. Based on general observations the watercourse is ~1.2-1.5m wide with occasional standing water, including a wetted width of ~70 cm and a depth of ~3cm to 7cm. The start of the ditch is ~150m north of the property line with no direct connection to the subject property. No direct connection to Tributary H was observed.

4.8.4 Tributary D, E, F

Tributary D/E/F all appear to originate within or beyond the western portion of the defined study area and are located outside the area proposed for extraction. A combination of surface water pockets, ditching, and culverts move surface water to the northeastern property limit at which point the flows then appear to become part of two tile drains that form the downstream extent of Tributaries E and F on adjacent lands (Figure 2 within Appendix A). The network of channels and surface water pockets in this area of the subject property are poorly defined and ultimately flow via tile drains and outlet to the west at County Road 47. The field observations and mapping are somewhat different than what is mapped on OBM. During field verification of the tributary alignments, there was no evidence of a channel or connection between Tributary D and Tributary B, or Pond 2 located to the east side of the old rail alignment. A berm has been constructed at the east end of the airfield runway that appears to limit surface water flow between Tributary B/G/Pond 2 and the eastern tributaries (D, E, and F). There was no evidence of a defined channel proximate to the western edge of the rail line and constructed berm; differing from the OBM mapped location. Both the Azimuth field map and the OBM mapped depict Tributary D and E watercourses intersecting at the access road into the airfield. In this area a more defined channel is observable in some locations. A 1-1.5m deep dug channel about 1.15m wide with varying depths of water 0.5m to 1.0m flows in a northerly direction toward a small dug pond at the edge of the existing airstrip. Standing water was noted in the pond during the spring 2020 site visit, with a 4.0cm depth and wetted width of 35.0-60.0 cm. No standing water or flow was observed throughout the 2019 monitoring period; however, pockets of saturated soils were evident. The pond feature where Tributary D terminates was monitored (WQ10; Figure 2 within Appendix A) over the summer of 2019 and observed to be dry by September.



There was no observable connection between any channels observed on the western most portion of the subject property and the adjacent lands. It is anticipated that Tributary E follows the general direction indicated on the OBM mapping moving in a northwest direction via tile drains across agricultural field and bisects County Road 47 just south of the County Road 47 and Concession Road 2 intersection. Assessment of this portion of watercourse was attempted from the County Road 47 Right-of-Way; however, no channel was found. A tile drain outlet was located at WQ12 (Figure 2 within Appendix A) and was monitored during the summer of 2019. The drain outlet was dry for most of the year with flow only observed in late October 2019. Based on OMAFRA online mapping, the agricultural field has had random tile drainages installed. With a lack of water and no connection to tributaries providing fish habitat, it was concluded that Tributary E has been highly altered and does not support any fisheries functions.

Tributary F is located to the west of the study area. OBM shows a watercourse across an agricultural field that had been ploughed for crops during the summer of 2019. The assessment of the watercourse was conducted from the Right-of-Way of County Road 47, and no defined channel or indication of watercourse was observed. Within the Right-of-Way a tile drain (WQ11; Figure 2 within Appendix A) was monitored through the summer of 2019, with no flow observed at any time. Based on OMAFRA online mapping, the agricultural field has had random tile drainage installed. During the spring 2020 site visit, the portion of watercourse between the end of drain and roadside ditch had been cleaned out. This area supported a wetted width of 57.0cm, water depth of 4.0cm and a velocity of 0.4 m/s. With a lack of a defined watercourse, limited flow, and no direct connection to tributaries providing fish habitat, it was concluded that Tributary F does not contribute to fish habitat.

All these tributaries would be considered ephemeral or intermittent.

4.8.5 Tributary G

Tributary G is a continuation of Tributary B and online with Pond 2. Tributary G has a catchment area of 76.0ha (Azimuth, 2023), that includes the catchment area for Tributary B described above. The south portion of this tributary, closest to the pond, consists of a dug drainage ditch that runs along a hedgerow between the pasture lands (east portion of study area) and former airfield (west portion of study area). The ditch is ~ 1.6-1.9m wide and ~0.75cm deep and directs overland flow from the pond at WQ9 (Figure 2 within Appendix A) in a northerly direction until it flows on to adjacent private lands to the north. The northern reach could only be assessed from the Right-of-Way of Concession Road 2 and aerial imagery. It appears that the channel consists of a dug drainage ditch along an access road between two (2) agricultural fields. Fields on either side of the ditch



are mapped by OMAFRA as having both systematic and random tile drainage installed. Flows from this tributary are directed under Concession Road 2 via culvert to the McNabb Drain.

Data was collected for Tributary G at WQ4, WQ8 and WQ9 stations. WQ4 is located on the south side of Concession Road 2 (Figure 2 within Appendix A), WQ8 is at the upstream limit of Tributary G on the subject property, and WQ9 is associated with Pond 2 (Figure 2 within Appendix A). During high water levels it is speculated that this tributary directs flows from the pond at WQ9 (termination of Tributary B) towards the north. Standing water was observed at WQ4 throughout the summer with water temperatures of between 6.0 and 19.2°C. Based on data collected at WQ4 during the spring 2020 site visit, the south portion of Tributary G (adjacent to the north property boundary) had a standing depth of 6.0 cm, a wetted width of 45-70cm, with flow of 0.1m/s. Tributary G converges with the McNabb Drain (Tributary H) via a culvert under Concession Road 2.

At WQ8 the channel was dry except during the April 2020 site visit. Baseflow in this feature becomes limited in the upper reaches, following spring freshet when Pond 2 becomes equilibrated (Azimuth, 2023). Additional contributions to baseflow were observed in the lower reaches closest to Concession Road 2, from the tile drain outlets from the eastern agricultural fields.

A single Northern Pike was identified in the tributary proximate to the culvert (WQ4) on September 25, 2019. During periods of high flow there would be direct connection between the McNabb Drain and Tributary G, making this reach of the watercourse direct fish habitat during at least some portion of the year.

4.8.6 Tributary H (McNabb Drain)

Tributary H (otherwise referred to as the McNabb Drain) is located to the north of Concession Road 2 and receives most of the surface water contributions from the extraction area of the proposed licence. The catchment area of the McNabb Drain upstream of Tributary A is 125ha and consists of wetlands east of Highway 12, industrial areas, and portions of the Lafarge Canada Inc. Brechin Quarry (Azimuth, 2023). The tributary consists of the roadside ditch running parallel to Concession Road 2 before turning north between agricultural fields and then west toward County Road 47. Mapping by OMAFRA identifies the tributary as a constructed open or unknown drain (McNabb Drain) with a DFO classification of “F”. This classification is assigned to streams having intermittent flows and no species sensitivities, restricting in-stream activities to periods without flow, and only requiring authorization if maintenance cannot be completed while the channel is dry, frozen or without flow.



Tributary H was monitored at three stations (WQ2, 3 and 6) in the summer of 2019. Stations 2 and 3 had standing water present throughout the summer months but no measurable flow. Flow was recorded on three (3) occasions at 0.4m/s, 0.6m/s and 0.6m/s at downstream station WQ6 (Figure 2 within Appendix A). Water temperature ranged from 7.3°C to 20.0°C. Fish were caught at the monitoring station adjacent to County Road 47 (WQ6), in addition to the Northern Pike observed in Tributary G (WQ4) that is directly linked to Tributary H via culvert. With the presence of fish in the lower reaches and at a connected culvert, along with the presence of water and flow throughout the year, it is concluded that Tributary H would be considered direct fish habitat.

Drain maintenance was undertaken in the McNabb Drain/Tributary H sometime between the last sampling in 2019 and spring sampling in 2020. During the 2019 monitoring season, the majority of Tributary H was very dense with Cattail and muck substrates. Prior to the April 28, 2020 site visit, the ditch had been cleaned out with vegetation removed. Within downstream reaches (south of Highway 47) the channel takes a more natural form as it flows west to Lake Simcoe.

4.8.7 Pond in Southeast Corner of Study Area

A pond is located in the southeast corner of the property (MAS2-1c (inclusion); Figure 2b). This pond was initially visited during the July 25, 2019 site visit, with observations of fish, but no inlet or outlet. Based on the pond being an isolated feature, further monitoring was not conducted.

4.8.8 Fish Habitat Assessment

Fish Sampling Results

Water features that may contain fish habitat include lakes, ponds (other than human-made offline ponds), permanent and intermittent watercourses, headwater drainage features, and wetlands. As discussed above, potentially suitable locations for fish sampling were selected based on the presence of water. Three (3) sampling points (Figure 2 within Appendix A) were identified and sampled by RiverStone on September 25, 2019 with results outline in Table A below.

Table A: Fish Collected by RiverStone on September 25, 2019

Fish Species		Station Number*		
Common Name	Scientific Name	1 (WQ6)	2 (WQ4)	3 (WQ1)
Central Mudminnow	<i>Umbra limi</i>	2	--	2
Creek Chub	<i>Semotilus atromaculatus</i>	7	--	--
Northern Pike	<i>Esox lucius</i>	--	1	--

*Sampling event used backpack electrofishing unit



Habitat of Aquatic Endangered and Threatened Species

Based on a review of background information, including biodiversity databases and federal habitat mapping for aquatic SAR, there is no expectation that drainage features within the study area support habitat for any aquatic species listed as Endangered or Threatened under the provincial ESA or federal SARA.

Fish Habitat Summary

Fish were caught at three of the sampling stations, including at the furthest downstream point of Tributary H (WQ6), at the culvert under Concession Road 2 (WQ4), and within Tributary A at the pond feature (WQ1). Based on fish presence RiverStone concludes that Tributary H represents direct fish habitat. Based on fish captured and habitat connectivity, it is also assumed that Tributary G would represent direct fish habitat on a seasonal basis. Tributary A, downstream of Pond 1 is also fish habitat, although fish passage is only seasonal between Pond 1 and the McNabb Drain (Tributary H).

In addition, RiverStone incidentally observed forage fish (species unknown) within the pond located in the southeast corner of the subject property (MAS2-1c (inclusion); Figure 2b), however offline ponds are not considered fish habitat in accordance with DFO criteria. Figure 3 within Appendix A provides a visual summary of areas identified as fish habitat within the study area and permanency of flows.

5.0 NATURAL HERITAGE FEATURES AND FUNCTIONS

The results of the field program combined with review of background information indicate the potential for the following candidate KNHFs within the study area:

- Habitat for Threatened or Endangered Species
 - Bobolink and Eastern Meadowlark (Threatened)
 - Little Brown Myotis, Northern Myotis, Tri-colored Bat (Endangered)
 - Butternut (Endangered)
 - Black Ash (Endangered)
- Candidate Significant Woodland
 - Woodland D
 - Woodland E
- Candidate Significant Wildlife Habitat
 - Bat Maternity Colonies
 - Waterfowl Nesting Habitat
 - Amphibian Breeding Habitat (Woodland)
 - Open Country Bird Breeding Habitat
 - Shrub/Early Successional Bird Breeding Habitat
 - Terrestrial Crayfish Habitat



- Special Concern and Rare Wildlife Species
 - Barn Swallow
 - Wood Thrush
 - Eastern Wood-pewee
 - Grasshopper Sparrow
 - Monarch
 - Golden-winged Warbler
 - Snapping Turtle
 - Chimney/Meadow Crayfish
- Fish Habitat
 - Tributary A & Pond 1 (permanent direct/seasonal indirect fish habitat)
 - Tributary G & Pond 2 (seasonal direct fish habitat)
 - Tributary H (permanent direct fish habitat)

Additional natural heritage features are listed as follows:

- Wetland (Non-Significant; Wetland Unit #1, Wetland Unit #2, Wetland Unit #3)
- Woodland (Non-Significant; Woodland A, Woodland B, Woodland C, Woodland F)

Although wetlands within the study area do not meet criteria for significance under the OWES system, all wetlands are considered KNHFs in accordance with LSPP requirements. Non-significant Wetlands are acknowledged to meet the LSPP definitions (*Policy 6.21-DP* and *Policy 6.22-DP*) for consideration as KNHFs and Key Hydrologic Features, respectively.

Regarding drainage features within the study area, according to the LSPP:

“Intermittent streams” means stream-related watercourses that contain water or are dry at times of the year that are more or less predictable, generally flowing during wet seasons of the year but not the entire year, and where the water table is above the stream bottom during parts of the year.

In accordance with the assessment provided by RiverStone above and the Hydrogeological Assessment (Azimuth, 2023), the water table with the study area is never above stream base elevations. Therefore, although drainage features may include “intermittent” flow for periods of the year, none are considered “intermittent streams” in accordance with the definition in the LSPP for consideration as Key Hydrologic Features.



6.0 PROPOSED DEVELOPMENT

The site is proposed to be developed as a mineral aggregate quarry. The area proposed to be licenced under the ARA is 151.4ha and the proposed extraction area is 91.5ha. Extraction of the site will occur in three lifts and two phases. The final quarry floor for the proposed quarry will slope from approximately 207.6 metres above sea level (ASL) in the northeast to approximately 202.6 metres ASL in the southwest. Following the extraction of material, the property will be rehabilitated by allowing the quarry excavation to flood forming a quarry lake. An operational schematic is shown on Figure 6. The proposed Brechin Quarry Site Plans are submitted under a separate cover. A simplified operation schematic for the Brechin Quarry is included in Appendix G.

7.0 IMPACT ASSESSMENT

7.1 Habitat for Threatened or Endangered Species

Impacts with regards to the ESA and Habitat of Threatened or Endangered species are covered under Section 9 and 10 of the ESA. Section 9 deals directly with killing, harming, or harassing living members of a species while Section 10 covers destruction or damage to habitat of Threatened or Endangered species. The following Threatened or Endangered species are presumed or confirmed to occur within the study area limits:

- Bobolink and Eastern Meadowlark (Threatened)
- Little Brown Myotis, Northern Myotis, Tri-colored Bat (Endangered)
- Butternut (Endangered)
- Black Ash (Endangered)

7.1.1 Bobolink and Eastern Meadowlark

Bobolink and Eastern Meadowlark habitats observed during the dawn breeding bird survey program are illustrated on Figure 3a-3b relative to the proposed quarry extraction footprint. One (1) Eastern Meadowlark nest site was confirmed during the course of the survey program, however the remainder of nest centroids are estimated based on repeated observations of Bobolink or Eastern Meadowlark in locations shown, in accordance with OBBA guidelines. Using confirmed and estimated nest centroids, habitat categories were assigned and illustrated on Figure 3a-3b based on guidelines described in the GHD for Bobolink and GHD for Eastern Meadowlark.

Mineral extraction works will retain a setback along property edges, however these buffers are not expected to be of sufficient width to support Bobolink or Eastern Meadowlark breeding/nesting activities (Category 1 & Category 2) when extraction is at its greatest extent, with the exception of preserved meadow directly west of the existing residences along Highway 12 (Figure 3b). This preserved meadow parcel provides



consolidated habitat for both Bobolink and Eastern Meadowlark and will persist at the greatest extent of extraction activities.

Category 3 Habitat function is anticipated to be retained outside of the extraction limits at the greatest extent of the proposed activity. Category 3 Habitat may support habitat for feeding, rearing of young, resting, dispersal and concealment from predators, but is able to withstand a high tolerance to alteration. Category 3 Habitat located outside of the extraction limits will persist as a meadow community with feeding/resting/dispersal/concealment opportunities in the long term. As Category 3 Habitat demonstrates a high tolerance to alteration, the adjacent quarry operations (*e.g.* blasting, noise, dust) are not anticipated to result in adverse habitat impacts.

Proposed works are not anticipated to negatively impact potential habitat for Bobolink and Eastern Meadowlark south of Concession Road 1, as this area is located off the subject property, is divided from the property by a roadway, and is anticipated to persist in whole at the greatest extent of the proposed activity.

As discussed in Section 3.3 above, correspondence has occurred with MECP regarding ESA permitting associated with anticipated impacts to Bobolink and Eastern Meadowlark as a result of the proposed development (Appendix D), including the submission of an IGF/AAF package. A response was received from MECP on June 15, 2023 indicating the following direction with regard for Bobolink and Eastern Meadowlark:

- MECP acknowledges that Bobolink and Eastern Meadowlark were confirmed breeding east of the rail line, and grassland habitats will be impacted by the proposed works.
- The area to be impacted exceeds 30ha in size, therefore pursuant to section 17(2)(c) of the ESA, a permit will be required to proceed with the proposed development.
- MECP requests additional information regarding proposed mitigation and compensation, specifically in the context of providing an Overall Benefit to the species, and completion of a C-Permit Application Form.

It is anticipated that an acceptable mitigation and compensation strategy can be achieved through the ESA permitting process in accordance with ESA requirements. As previously confirmed with the approval agencies, this approach addresses the requirements of the LSPP (specifically *Policy 6.42-DP*) as it relates to impacts to habitat of Endangered and Threatened species.



7.1.2 Little Brown Myotis, Northern Myotis, Tri-colored Bat

During the site investigation, potentially suitable snags were observed within woodlands west of the rail line, some of which were determined to exhibit features such as cracks, splits, peeled bark, and cavities that may provide access for bats during the maternity roosting period in approximately June, and the day roosting period throughout the active period (approx. April to September). Vacant structures west of the rail line associated with the former airport on the property were in fair to poor condition, and may also provide suitable roosting habitat for Little Brown Myotis and Tri-colored Bat (noting, Northern Myotis is typically not associated with anthropogenic structures).

In response to the IGF/AAF submission, the following was received from MECP on June 15, 2023 indicating the following direction with regard for SAR bats:

- MECP is in agreement that removals of minor, immature woodland units east of the rail line would not be expected to negatively impact SAR bat roosting habitat.
- It is advised restricting tree removals between **March 15-November 30** of any given year would suitably avoid impacts to individual SAR bats.

No tree cover with potential to provide significant maternity or day roosting habitat function of Little Brown Myotis, Northern Myotis, or Tri-colored Bat will be subject to removals as a result of the proposed activity as extraction works will be confined to lands east of the rail line, thereby avoiding any direct impacts to the species or their habitats.

Further, a minimum habitat setback of 15m will be maintained between the full extent of the proposed mineral extraction works and the limit of potentially occupied habitat for the species, which is anticipated to avoid indirect impacts to the species providing conformance is demonstrated for environmental considerations and mitigation described below (Section 8). As such, there is no expectation the proposed works will negatively impact Little Brown Myotis, Northern Myotis, Tri-colored Bat, or the habitat upon which they depend.

7.1.3 Butternut

Two (2) individual Butternut trees were identified within the central portion of lands west of the rail line, both of which were sapling-stage trees ranging approximately 0.5-1.5m tall and appearing in good health.

Under O. Reg. 830/21 root harm prevention zones are outlined for the protection of Butternut trees, however it is understood that in some circumstances a surrounding radius of up to 50m from an individual tree (outermost seed dispersal zone) qualifies as the critical habitat setback for a healthy Butternut stem. Proposed mineral extraction works



will occur entirely within lands east of the rail line, located a minimum of approximately 413m from Butternut #1 and 417m from Butternut #2 (Figure 2c). The limit of proposed extraction is substantially more distant than the maximum 50m critical habitat setback outlined above, and as such there is no expectation that the proposed works will negatively impact either individual Butternut stems or their associated critical habitat buffers.

Proposed woodland and wetland restoration works illustrated in the Natural Restoration Plan within lands west of the rail line (Areas C and E; Figure 7) and described in Section 8.5 below would not occur where Butternut have been identified or their associated maximum 50m critical habitat setback zones. Inadvertent disturbance to Butternut trees is therefore not anticipated during proposed restoration activities.

7.1.4 Black Ash

Black Ash trees were identified within the western portion of the property (west of the rail line), associated with mixed swamp (SWM1-1; Figure 2c) and meadow marsh (MAM2-2k; Figure 2c).

Although Black Ash is listed as Endangered under the ESA, protections for the species do not take effect until January 27, 2024. The proposed provincial Recovery Strategy for Black Ash (Catling *et al.*, 2022) recommends that wetland communities within which Black Ash is identified and a surrounding buffer measuring 28m from the wetland edge be subject to provincial regulation under the ESA. The proposed Recovery Strategy also recommends that individual Black Ash trees located outside of a wetland unit (*i.e.* within upland areas) are subject to a 28m critical habitat buffer on an individual basis. Adoption of the regulation had not been confirmed at the time of writing, therefore proposed protections and associated habitat setbacks are considered interim provincial guidance.

Other recent provincial guidance (MECP, 2023b) suggests that habitat protection under Section 10 of the ESA will apply to areas within 30m of healthy Black Ash stems with a DBH >8cm.

Proposed mineral extraction works will occur entirely within lands east of the rail line, located a minimum of 435m from the closest identified Black Ash stem or associated wetland polygon (Figure 2c). The limit of proposed extraction is substantially more distant than the maximum 28m-30m critical habitat setback outlined above, and as such there is no expectation that the proposed works will negatively impact either individual Black Ash stems or their associated critical habitat buffers.



Proposed woodland and wetland restoration works illustrated in the Natural Restoration Plan within lands west of the rail line (Area C and E; Figure 7) and described in Section 8.5 below would not occur where Black Ash or their associated 28m-30m setback have been identified. Inadvertent disturbance to Black Ash trees is therefore not anticipated during proposed restoration activities.

7.2 Candidate Significant Woodland

Woodlands located west of the rail line (Figure 4c) meet one or more standards for potential significance based upon LSPP Technical Definitions and supported by the NHRM, presented in Table 7:

- Woodland D (Size, Natural Composition, Age or Tree Size, Proximity criteria)
- Woodland E (Natural Composition, Proximity criteria)

No portion of Woodland D or Woodland E will be subject to removals as a result of proposed mineral extraction works. Setbacks of approx. 16m and 34m will be maintained between the full extent of the proposed works and the limit of Woodland D and Woodland E respectively. The existing abandoned rail corridor and associated berm currently provides a permanent physical and hydrological barrier which is further anticipated to limit potential impacts to the Candidate Significant Woodland, including influence from light, noise, dust, erosion and sediment, and other potential indirect impacts associated with the proposed works. As such, with consideration for environmental mitigation measures described in Section 8 below, there is no expectation the proposed works will negatively impact Candidate Significant Woodlands located west of the rail line or adjacent lands.

The above strategy is anticipated to satisfy municipal and provincial requirements related to avoiding negative impacts to Significant Woodlands, including (but not limited to) LSPP *Policy 6.42-DP to Policy 6.44-DP*, through maintenance of the health, diversity, size, and connectivity of KNHFs via appropriate mitigation and restoration activities. Existing Significant Woodlands on the property will be enhanced as a result of implementation of the Natural Restoration Plan detailed in Section 8.5 below.

7.3 Candidate Significant Wildlife Habitat

According to the PPS, development and site alteration are not permitted within SWH located in Ecoregion 6E, unless it can be demonstrated there will be no negative impacts upon the feature and its ecological functions. The following Candidate SWH types were documented or treated as present as a result of the field program:

- Bat Maternity Colonies



- Waterfowl Nesting Habitat
- Amphibian Breeding Habitat (Woodland)
- Open Country Bird Breeding Habitat
- Shrub/Early Successional Bird Breeding Habitat
- Terrestrial Crayfish Habitat
- Special Concern and Rare Wildlife Species
 - Barn Swallow
 - Wood Thrush
 - Eastern Wood-pewee
 - Grasshopper Sparrow
 - Monarch
 - Golden-winged Warbler
 - Snapping Turtle
 - Chimney/Meadow Crayfish

7.3.1 Bat Maternity Colonies

Candidate Bat Maternity Colonies associated with the study area are limited to mid-aged to mature mixed woodland located in the western portion of the property (west of the rail line) and adjacent lands (Figure 5c). The proposed works will be confined to lands east of the rail line and will not require direct woodland removals west of the rail line. Proposed mineral extraction works will occur entirely within lands east of the rail line, located a minimum of approximately 436m from the limit of the Candidate SWH feature.

The limit of proposed works is distant from Candidate Bat Maternity Colonies within the study area, such that there is no expectation that the proposed works will negatively impact the ecological form and function of the feature.

7.3.2 Waterfowl Nesting Habitat

Wetlands located in the western portion of lands west of the rail line may provide Candidate SWH for Waterfowl Nesting Habitat, and are treated as such for the purposes of this assessment. Potential SWH includes meadow marshes (MAM units) in the western sections of the property (Figure 2c) and upland areas within 120m of its boundaries, as follows:

- MAM2-2k
- MAM2-2l (inclusion)
- MAM2-2m (inclusion)
- MAM2-2n (inclusion)
- MAM2-2p



- MAM2-2q (inclusion)

The limit of proposed works is sufficiently distant from Candidate Waterfowl Nesting Habitat within the study area, such that there is no expectation that the proposed works will negatively impact the ecological form and function of the features.

7.3.3 Amphibian Breeding Habitat (Woodland)

Wetlands in the southern portion of lands east of the rail line (as illustrated on Figure 5a-5b) and adjacent wetland west of the rail line were documented to meet SWH criteria for Amphibian Breeding Habitat (Woodland). Other wetlands west of the rail line located >120m from the boundary of rail berm may also provide SWH function for Amphibian Breeding Habitat (Woodland) and are treated as such for the purposes of this assessment.

Wetlands associated with Candidate SWH for Amphibian Breeding Habitat (Woodland) occupy a total of 5.99ha on lands east of the rail line, all of which will be subject to removal or be otherwise impacted as a result of proposed mineral extraction activities. No removal of Candidate SWH for Amphibian Breeding Habitat (Woodland) will occur with any portion of lands west of the rail line or adjacent lands.

A component of the proposed development concept includes the dedication of wetland restoration blocks through implementation of a Natural Restoration Plan, as illustrated in the Figure 7 series as described in further detail in Section 8.5 below. Wetland restoration units including Areas D1, D2, E, F, G, and H (Figure 7) will represent newly-created wetlands or wetland enhancements that will function to support onsite compensation for breeding amphibians. Areas D1 (4.2ha), D2 (0.6ha), F (0.22ha), G (0.17ha), and H (0.13ha) will be established along the western and northern limits of proposed mineral extraction activities and represent an expansion/enhancement opportunity for minor sections of retained wetland located in the proximity to the northeast property boundary. Areas D1/D2 will be established as seasonally flooded “wetland edge” ecotypes similar to existing meadow marsh communities throughout the property, with internal permanently flooded ponds (Areas F, G, and H) to provide habitat complexity conducive to amphibian life processes. A “wetland edge” restoration block will also be established within Area E (5.2ha) that will provide additional amphibian habitat compensation west of the rail line.

A total of 10.52ha of wetland creation or enhancement habitat will be established during the life of the operation to offset losses of 5.99ha of Candidate SWH for Amphibian Breeding Habitat (Woodland) function located within the study area limits. Project activities are scheduled to occur in a two phased manner as illustrated on the schematic presented in Figure 6, with works initially proceeding in the northern portion of the



property only and progressing to the south portion of the property as a part of Phase 2. Implementation of the Natural Restoration Plan is proposed to occur at the outset of project activities, therefore compensation wetlands would be fully established by the time project works impact documented Amphibian Breeding Habitat (Woodland) in the southwest portion of the property. As such, there would be no point throughout the course of the project works when a net positive quantity of high quality Candidate SWH does not occur on the subject property.

Following ultimate closure of the proposed operation, a saddle berm outlet will be established in proximity to Area G (Figure 7), removing hydrological input from the quarry and potentially drying out wetland and associated amphibian breeding function from Area D2 (0.6ha). Area F (0.22ha) is anticipated to persist as a dug pond in the long term, with associated wildlife habitat function. As such, although 10.52ha of compensatory wetland restoration and enhancements are proposed, a total of 9.92ha of suitable amphibian breeding habitat will persist in the long term.

Regardless of the above, losses of 5.99ha of wetlands meeting Candidate SWH criteria for Amphibian Breeding Habitat (Woodland) will be permanently offset with 9.92ha of wetlands anticipated to provide amphibian breeding habitat function. Further, given that extraction is expected to progress across the site over decades, removals of all the Candidate SWH will not occur at one time. Any removals are expected to occur gradually over a long period of time while creation of Natural Restoration Areas will commence prior to any extraction occurring onsite, thereby ensuring the quantity of Candidate SWH within the study area is never less than the amount currently represented onsite.

With regard for Candidate SWH for Amphibian Breeding Habitat (Woodland) located west of the rail line and adjacent lands, no portion of such habitats will require direct removals to accommodate the proposed works. Within lands west of the rail line, setbacks of approximately 36m will be maintained between the full extent of the proposed works and the limit of the Candidate SWH (MAM2-2h; Figure 5c). The existing abandoned rail corridor and associated berm currently provides a permanent physical and hydrological barrier which is further anticipated to limit potential impacts to the Candidate SWH, including influence from light, noise, dust, erosion and sediment, and other potential indirect impacts associated with the proposed works.

Although woodland removals are proposed within lands east of the rail line, extensive woodlands west of the rail line will continue to provide habitat function for breeding amphibians at the greatest extent of the proposed activity. It is anticipated that ultimately woodland habitat function will be replaced on the landscape, through planting of 9.5ha of



woodland (Areas A-C) as part of the Natural Restoration Plan detailed further in Section 8.5 below.

With consideration for the above rationale, it is expected that impacts to the quantity and quality of Candidate SWH for Amphibian Breeding Habitat (Woodland) will be avoided west of the rail line and fully offset east of the rail line to avoid negative impacts, through implementation of a detailed Natural Restoration Plan, as illustrated in the Figure 7 series and detailed in Section 8.5 below.

7.3.4 Open Country Bird Breeding Habitat

Candidate SWH for Open Country Bird Breeding Habitat may be associated with grassland (hayfield or old-field meadows) located on adjacent lands east of the property (east of Highway 12) and north of the property (north of Concession Road 2)(Figures 5a-5b).

Proposed mineral extraction works will occur entirely within the confines of lands east of the rail line and will not result in the direct removal of offsite open country habitats. In all cases, such meadows/grasslands are separated by existing roadway infrastructure which are anticipated to constitute functional barriers between land use practices on the property and potential offsite habitat functions. It is anticipated that with consideration for environmental mitigation measures described in Section 8 below, there is no expectation that the proposed works would negatively impact Candidate SWH for Open Country Bird Breeding Habitat.

7.3.5 Shrub/Early Successional Bird Breeding Habitat

Candidate SWH for Shrub/Early Successional Bird Breeding Habitat may be associated with the large thicket/shrubland located south of the property (south of Concession Road 1; Figure 5c).

Proposed mineral extraction works will occur entirely within the confines of lands east of the rail line and will not result in the direct removal of offsite shrub thicket habitats. The qualifying shrub thicket is separated by existing roadway infrastructure which is anticipated to constitute a functional barrier between land use practices on the property and potential offsite habitat functions. It is anticipated that with consideration for environmental mitigation measures described in Section 8 below, there is no expectation that the proposed works would negatively impact Candidate SWH for Shrub/Early Successional Bird Breeding Habitat.



7.3.6 Terrestrial Crayfish Habitat

Three (3) ELC polygons containing terrestrial crayfish burrows were observed within the study area limits. According to the Criteria Schedules for Ecoregion 6E, the ELC ecosite providing habitat is considered the SWH unit, therefore polygons SWT2-2b (1.89ha within northeast wetland; Figure 5a), MAM2-2b (1.31ha within southeast wetland; Figure 5b), and MAM2-2k (1.13ha; Figure 5c) are considered Candidate SWH for the purposes of this assessment.

Candidate SWH for Terrestrial Crayfish Habitat occupies a total of 4.31ha within the study area limits. A total of 0.87ha within SWT2-2b will be removed and 1.31ha (entire polygon) of MAM2-2b will be removed as a result of the proposed works. No portion of MAM2-2k within lands west of the rail line or surrounding lands will be removed as a result of the proposed works.

As detailed in Section 7.3.3 above, a component of the proposed development concept includes the dedication of a parcel measuring 5.32ha beyond the northwestern boundary (Area D1, D2, F, G, H) of the extraction area for water management and natural ecosystem restoration purposes, and an additional wetland restoration block (5.2ha) west of the rail berm within Area E (Figure 7). A total of 10.52ha of wetland restoration and enhancements will be implemented to support the proposed development, however ultimate closure of the quarry will render 0.60ha (Area D2) as providing limited wetland function. Area F (0.22ha) is anticipated to persist as a dug pond in the long term, with associated wildlife habitat function. A total of 9.92ha of wetland restoration and enhancements are therefore expected to persist in the long term.

Given that 9.92ha of wetland habitat restoration lands are available in the long term, relative to 2.18ha of anticipated Candidate SWH loss associated with Terrestrial Crayfish Habitat, it is anticipated that wetland compensation substantially exceed the quantity of habitat proposed to be removed. It is notable that portions of Area D1 are currently functioning as wetland and will be subject to enhancements as part of the Natural Restoration Plan. As such, expansion of the wetland to the west (*i.e.* remainder of Area D1 and D2) will provide a direct linkage for new habitat opportunities for terrestrial crayfish.

With consideration for the above rationale, it is expected that Candidate SWH for Terrestrial Crayfish habitat will be avoided west of the rail line, and the quantity and quality of habitat will be fully offset where losses are proposed to avoid negative impacts through implementation of a detailed Natural Restoration Plan, as illustrated in the Figure 7 series and detailed in Section 8.5 below. The above conclusions would also apply to



Chimney Crayfish and Meadow Crayfish in the context Candidate SWH under Special Concern and Rare Wildlife Species (assigned S-Rank 3 by NHIC).

7.3.7 Special Concern and Rare Wildlife Species

7.3.7.1 Barn Swallow

One (1) Barn Swallow was observed flying over the northeast portion of the subject property on June 6, 2019 (Figure 5a), however the individual was observed undertaking probable aerial foraging and did not land in the vicinity of the subject property.

Provincial guidance states that the area of up to 5m from a Barn Swallow nest should be considered to have a moderate tolerance to alteration, and the area up to 200m from a Barn Swallow nest should be considered to have a high tolerance to alteration (MECP, 2021d).

As no Barn Swallow nesting was observed within the subject property or adjacent lands, it is not anticipated that proposed works would impact the ability for the species' foraging activities. Adjacent lands and the greater landscape largely comprise open agricultural fields, meadows, wetlands, and other features conducive to Barn Swallow foraging, and as such there is no expectation the proposed undertaking would negatively impact the species.

7.3.7.2 Wood Thrush

One (1) Wood Thrush was heard singing within a coniferous plantation (CUP3-2) within 120m of the rail line, however it is anticipated that possible breeding and nesting habitat for the species occurs further west within the limit of Woodland D (Figure 4).

The proposed works will occur entirely within the limits of lands east of the rail line, and no portion of Woodland D is proposed to be removed as a result of the proposed works thereby avoiding direct impacts to the species. Potential breeding/nesting habitat for the species may occur >120m from the rail line, a sufficient distance such that there is no expectation the proposed works will negatively impact potential habitat form and function for the species.

7.3.7.3 Eastern Wood-pewee

Eastern Wood-pewee was not detected during the dawn breeding bird survey program east of the rail line or lands within 120m of its boundaries, however the species is treated as present within woodlands west of the rail line (Woodland A, Woodland D, Woodland E, Woodland F; Figure 4c) where located >120m from the rail berm, in lieu of completed detailed breeding bird studies.



The proposed works will occur entirely within lands east of the rail line, and no portion of Woodlands D-F or the western portion of Woodland A (*i.e.* >120m from the rail berm) are proposed to be removed as a result of the proposed works thereby avoiding direct impacts to the species. Potential breeding/nesting habitat for the species may occur >120m from the rail berm, a sufficient distance such that there is no expectation the proposed works will negatively impact potential habitat form and function for the species. According to COSEWIC (2012), the average breeding territory for Eastern Wood-pewee is 1.70 +/- 0.33ha, therefore abundant woodland cover within lands of the rail line (*e.g.* >20ha woodland cover within Woodland D; Figure 4c) would allow potential habitat for the species to persist on the property.

7.3.7.4 Grasshopper Sparrow

One (1) probable breeding territory for Grasshopper Sparrow was observed in the northern portion of the subject property (Figure 5a) during the dawn breeding bird survey program. The presumed nest centroid was observed approximately 70m south of Concession Road 2.

According to COSEWIC (2013), relevant data suggest the average minimum habitat patch size for the species is 6ha. Individual Grasshopper Sparrow breeding territories range between 0.3-1.4ha in size, and the species tend to nest in open areas away from forest edges. The surrounding landscape provides an abundance of potential habitat opportunities for Grasshopper Sparrow, which requires open-country conditions to facilitate its life processes. Hayfields and pastureland located north, east, and south of the property across from Concession Road 2, Highway 12, and Concession Road 1 respectively would continue to provide extensive potential habitat function for the species in the post-development setting.

Although it is unlikely that all active hayfield/pastureland on adjacent lands would be converted to an unsuitable land use (*e.g.* row crop), an open meadow unit surrounding the existing residences along Highway 12 will be retained on the property in an area measuring approximately 8.22ha in size, located outside of the proposed limits of mineral extraction activities. The retained grassland unit exceeds 6ha in size and would therefore retain a potential breeding territory meeting the minimum patch size requirement for the species.

Based on the above, there is no expectation that the proposed development would represent a net loss of available breeding territories for Grasshopper Sparrow on the property, and further the overall availability of suitable habitat on the landscape for Grasshopper Sparrow is anticipated to persist.



7.3.7.5 Golden-winged Warbler

Golden-winged Warbler was not detected during the dawn breeding bird survey program on lands east of the rail line within 120m of its boundaries, however the species is treated as present within thickets and early successional habitats west of the rail line and adjacent lands where located >120m from the rail berm, in lieu of completed detailed breeding bird studies.

The proposed works will occur entirely within lands east of the rail line, and no vegetation removals are proposed west of the rail line as a result of the proposed works thereby avoiding direct impacts to the species. Potential breeding/nesting habitat for the species may occur >120m from the rail line, a sufficient distance such that there is no expectation the proposed works will negatively impact potential habitat form and function for the species. Potentially occupied thicket south of Concession Road 1 is separated by existing roadway infrastructure which is anticipated to constitute a functional barrier between land use practices on the property and potential offsite habitat functions.

7.3.7.6 Monarch

Habitat for Monarch is widespread and abundant in Southern Ontario, and can be identified primarily on open lands with an abundance of wildflowers, particularly where the species' host plant Common Milkweed occurs. The proposed activity will result in the removal of suitable meadow habitat within the property, presumed to be utilized at a low density for Monarch breeding and nectaring purposes during the summer period.

Notably, the study area is not located within 5km of Lake Ontario and therefore does not qualify as a potential Migratory Butterfly Stopover Area as defined in the Criteria Schedules for Ecoregion 6E.

Adjacent lands and the greater landscape largely comprise open agricultural fields, meadows, wetlands, and other features conducive to Monarch life processes, providing abundant habitat opportunities that are expected to retain suitable habitat function for Monarch in the post-development setting. Removal of meadow within the proposed mineral extraction area will not impact the overall form or function of Monarch habitat, as opportunities for the species life processes comprise a large component of the local landscape and will be retained at the greatest limit of extraction works. No areas with a high density of Common Milkweed or otherwise preferred habitat for the species will be impacted by the proposed works. As such, there is no expectation the proposed development would negatively impact the species given the ubiquity of local habitat opportunities.



7.3.7.7 Snapping Turtle

One (1) Snapping Turtle was observed incidentally on June 12, 2022 on adjacent lands within the McNabb Drain, directly south of an isolated agricultural pond located approximately 30m north of Concession Road 2. The individual was observed swimming within the McNabb Drain in a westerly direction along the axis of the drain.

Snapping Turtle was not observed within the property boundaries, including the wetland on the property located directly south of Concession Road 2. Given the intensive survey effort to identify turtles within the wetland south of Concession Road 2, it is concluded that Snapping Turtles were not present within wetlands on the property.

Proposed mineral extraction works will occur entirely within the confines of lands east of the rail line, and will not result in direct impacts within McNabb Drain, located on the north side of Concession Road 2. Snapping Turtle are capable of tolerating a wide variety of conditions related to water depth and quality within wetlands, drainage features, and open water units; inhabiting “almost any kind of freshwater habitat” (COSEWIC, 2008). The Level 1 and Level 2 Hydrogeological Assessment for the proposed works prepared by Azimuth (2023) predicts that total volume released to McNabb Drain increases by 32% and at the end of Phase 2, the volume is increased by 143%. Given the habitat generalist tendencies of Snapping Turtle, there is no expectation that increased fluvial output from quarry operations will negatively impact potential habitat function for the species within the McNabb Drain.

It is therefore anticipated that with consideration for environmental mitigation measures described in Section 8 below, there is no expectation that the proposed works would negatively impact potential habitat form and function for Snapping Turtle associated with the McNabb Drain.

7.3.7.8 Chimney/Meadow Crayfish

Refer to Section 7.3.5 above with regard for Terrestrial Crayfish Habitat.

7.3.8 Conclusions

With regard for Candidate SWH identified within the study area limits, providing that conformance is demonstrated for environmental considerations and mitigation described below (Section 8), there is no expectation that negative ecological impacts to the above Candidate SWH would result from the proposed development.

The above strategy is anticipated to satisfy municipal and provincial requirements related to avoiding negative impacts to SWH.



7.4 Fish Habitat

7.4.1 Impact Assessment Approach

To carry out an ecological assessment of potential impacts associated with the proposed licence within the subject property, RiverStone has employed the following approach:

1. Predict impacts to fish and fish habitat based on the proposed extraction plan, including both direct and indirect impacts overall project life stages (*i.e.*, operation to post-rehabilitation).
2. Evaluate the significance of the predicted impacts to fish and fish habitat based on their spatial extent, magnitude, timing, frequency (how often), and duration (how long).
3. Assess the probability or likelihood that the predicted impacts will occur at the level of significance expected (*e.g.*, high, medium, low probability).
4. Where the potential for negative impacts exists, regulatory recommendations and ecologically meaningful mitigation measures are offered to avoid such impacts first, and where impacts cannot be fully avoided to minimize and/or compensate such impacts as appropriate.

Direct impacts are those in which there is a direct cause-effect relationship between a proposed activity within the quarry extraction area on fish and fish habitat. In the context of the ARA application considered herein, direct impacts largely pertain to the necessary removal of vegetation and drainage features within the extraction area. Indirect impacts may include disturbance effects or alteration of local water balance to onsite and off-site features. The major project phases for which impacts must be assessed include the operational phase and a post-rehabilitation phase. The operational phase has active extraction operations as well as maintenance of dewatered conditions with excess water being pumped out of the quarry in accordance with MECP permit to take water (PTTW) and environmental compliance approval conditions. The flood back phase is the period after cessation of extraction, during which the water table is allowed to return to natural (unmanaged) conditions and final rehabilitation commitments are fulfilled. The post-rehabilitation phase occurs when all rehabilitation activities are complete.

The following assessment evaluates the potential for negative impacts resulting from the activities proposed as part of the ARA application, as well as mitigation measures to address the potential for negative impacts.

7.4.2 Water Quality and Quantity and Fish Habitat

The potential for negative impacts to fish and fish habitat comes primarily from land use change or construction practices that modify water quantity (baseflow and/or groundwater contributions), quality (chemical and thermal properties), or alters the



physical structure within the watercourse or associated buffers. Additionally, blasting, and operational practices (dust, fuel storage, spills, *etc.*) can also impact fish and fish habitat.

Azimuth (2023) completed a comprehensive Hydrogeological Assessment and determined that the relative contribution of groundwater to the surface water features assessed in the study area was insignificant and thus there would be no impact to the assessed tributaries over the lifespan of the quarry (Azimuth, 2023) with respect to groundwater. In developing the design of the quarry, the surface water catchments located within the property and the proposed extraction areas were considered in detail. The potential for surface water quality/quantity impacts was considered through the various phases of the proposed application. This corresponds to Phase 1 and Phase 2 in the accompanying Azimuth Level 1 and Level 2 Hydrogeological Assessment (2023). In terms of fish and fish habitat the surface water features considered herein are Tributaries A, G, and H (McNabb Drain) with Tributaries G and H (McNabb Drain) occurring on lands adjacent to the properties.

In general, the results of Azimuth (2023) surface water assessment determined that the water balance to Tributary A in the reach that provides fish habitat (Pond 1 and downstream) would be maintained either through installation of a sump and pumping to a Central Discharge Structure that would outlet to Pond 1. Tributary G water balance would not be impacted during Phase 1; however, a significant portion of its upstream catchment would be removed during Phase 2, including Pond 2 and Tributary B, ultimately becoming part of the quarry lake. Removal of the catchment area would result in a significant loss of base flow, thus decreasing the availability of fish habitat in Tributary G.

Azimuth (2023) provides a detailed description on water management for Tributary A as per below:

Water management will include establishment of a Quarry floor sump and pumping to a Central Discharge Structure (COS) located at or near the property boundary at the south limit of Tributary C. The COS will be a man-made discharge pond that releases water towards the Tributary A-Pond 1 subwatershed by a passive weir. Within the property setback on the west side of Phase 1, a flow channel and wetland will be constructed to offset a wetland area that will be removed during Phase 2. The constructed channel will direct water from the COS along the west side of Phase 1 and then east along the Concession 2 berm to discharge to Pond 1 and Tributary A, reaching the McNabb Drain. During Phase 1, the Quarry footprint only includes areas within the Tributary A catchment.



As such, changes to existing conditions are considered to be minimal, as the discharge point from the site will remain from Pond 1 to the McNabb Drain. During Phase 2, water from the Quarry footprint that was originally in the areas of Tributary G, the Tributary C roadside ditch and the Southeast Corner catchments will also be discharged via the COS and to the McNabb Drain.

With respect to Tributary H (McNabb Drain), Azimuth predicts that total volume released to McNabb Drain increases by 32% and at the end of Phase 2, the volume is increased by 143%. The Tributary G sub-watershed upstream of the McNabb Drain has an area of 60.85ha, of which 25.4ha is on-site. Runoff from 22.2ha of this sub-watershed will be re-directed into Tributary A, which will decrease runoff to Tributary G, from the on-site catchment by 87%, with a corresponding increase for Tributary A. This does not change the overall runoff to Tributary H, but moves the outlet point upstream by approximately 1000m.

Water quality and quantity must be maintained to ensure the protection of fish and fish habitat. Baseflow contributions to fish bearing water must be at a minimum maintained on a seasonal basis to ensure the protection of fish and fish habitat. The quality (thermal and water chemistry parameters) should be consistent with the existing condition and able to support aquatic life. The findings in the Hydrogeological Assessment (Azimuth, 2023) indicate that seasonal changes in baseflow in Tributary H because of the application, remain within the natural variation that is currently experienced in the feature. All water discharged either directly or indirectly to Tributary H will need to maintain the appropriate water quality as per MECP requirement. As a result the discharge water will be of appropriate quality to ensure no negative impacts of aquatic life as approved by MECP.

7.4.3 Tributary A

Results of the onsite assessments concluded that the downstream reach of Tributary A and Pond 1 is direct fish habitat, supporting a small population of tolerant warmwater fish species within the online pond. Removal of part of this features catchment area during extraction will impact the direct fish habitat and connectivity with the McNabb Drain, if loss of baseflow is not mitigated. Based on the data provided by Azimuth (2023), the catchment area of Pond 1 is 45.8ha with 43.7ha inside the licence boundary. Full extraction will capture 34ha of this. But all the runoff from this area, plus an additional area of 61ha from Tributaries C, G, and the southeast corner will be released into the Tributary A/Pond 1 sub-watershed so Pond 1 will receive more water, up to the end of Phase 2. While the quarry fills to become a lake, flow from the site through Pond 1 will be reduced by 87% if all the surplus is retained to fill the quarry. Once the lake has been



filled, flow from the site through Pond 1 will be reduced by 13% compared to the pre-extraction amounts. To ensure that removal of the portion of the tributary within the extraction area does not result in impacts to fish or fish habitat downstream, RiverStone recommends:

- Baseflow to Pond 1 and connectivity between the pond and the McNabb Drain Tributary must be maintained.
- Blast designs should be in accordance with DFO Guidelines for the use of explosives in or near Canadian fisheries waters provided in Appendix 9.
- A qualified professional should be retained to prepare a blasting plan that is compliant with DFO regulations.
- Removal of the portions of the tributary that are located within the extraction area should be part of a Request for Review by DFO and DFO requirements shall be complied with.

It is anticipated that securing of DFO approvals for the proposed activity would suitably address the requirements of applicable municipal, provincial, and federal requirements related to fish and fish habitat.

7.4.4 Tributary G

Results of the onsite assessments concluded that Tributary G provides direct fish habitat during some months of the year. Removal of the upstream reaches (Tributary B and Pond 2) of this feature as part of the proposed new licence will result in direct impacts to fish or fish habitat on adjacent lands. Removal of portions of the catchment area will result in a decrease in baseflow contributed to Tributary G resulting in extended dry periods and potential loss of any seasonal connection to the upstream reaches. The loss of portions of this feature may result in a HADD and requires at minimum a review by DFO. A Natural Restoration Plan detailed in Section 8.5 below has incorporated rehabilitation efforts related to fish and fish habitat including a new channel and wetlands that will work to mitigate the impact of this loss of natural feature and function.

It is recommended a Request for Review be submitted to DFO for the loss of portions of Tributary G and DFO requirements shall be complied with. It is anticipated that securing of DFO approvals for the proposed activity would suitably address the requirements of applicable municipal, provincial, and federal requirements related to fish and fish habitat.

7.4.5 Tributary H/McNabb Drain

Results of the onsite assessments concluded that Tributary H/McNabb Drain was direct fish habitat. The Natural Restoration Plan detailed in Section 8.5 below indicates that all discharge from the quarry will be directed through the COS and into Tributary H via



Pond 1 and Tributary A. The discharge location proposed, at the upstream limit of Tributary H in the study area will mitigate the potential loss baseflow from Tributary G.

The Hydrogeological Assessment (Azimuth, 2023) indicates additional baseflow contribution will be released to the McNabb Drain during the operational life of the quarry. The estimated increase of about 20% was considered minimal in light of the large surface flow contributions from upstream of the property and would be within the tributary's natural variation. After Phase 1, flow in McNabb Drain will increase by 4%. After Phase 2, flow in McNabb Drain will increase by 20%. During lake filling, flow in McNabb Drain will decrease by 11%. Once the quarry lake is full, flow in McNabb Drain will be 4% higher. There are no anticipated impacts to fish and fish habitat in the Tributary H provided the recommendations for the tributaries are implemented.

It is noted that Tributary H is a Municipal Drain Class F, according to the DFO classification system (OMAFRA, 2023).

7.5 Other Natural Heritage Features

Natural features deemed to be non-significant and/or (in the case of wetlands) not considered candidates for evaluation will be subject to removals as a result of proposed mineral extraction works as follows:

- Wetlands: 9.87ha
- Woodlands: 3.72ha

As detailed above, a component of the proposed development concept includes the dedication of a parcel measuring 5.32ha along the northwestern limit of extraction (Area D1, D2, F, G, H) for water management and natural ecosystem restoration purposes, and an additional wetland restoration block (5.2ha) with Area E (Figure 7). A total of 10.52ha of wetland restoration and enhancements will be implemented to support the proposed development, however ultimate closure of the quarry will render 0.6ha (Area D2) as providing limited wetland function. Area F (0.22ha) is anticipated to persist as a dug pond in the long term. As 9.87ha of non-significant wetland removals are proposed as a part of the proposed activity, the restoration strategy providing 9.92ha of wetland restoration and enhancements in the long term, is expected to exceed the quantity of wetland to be removed on the property as a result of site works.

Woodland restoration within upland areas is proposed on earthen berms to be established around the northern (Area A; 4.6ha) and southeast (Area B; 0.8ha) limits of lands east of the rail line (5.4ha total) abutting the outer edges of the proposed extraction limit, as illustrated on Figure 7. Additionally, a woodland restoration and enhancement area will



be established west of the rail line (Area C; 4.1ha), providing additional natural complexity in the western portion of the study area. The total quantity of woodland restoration and enhancements proposed as part of the Natural Restoration Plan will comprise a total of 9.5ha of compensatory upland vegetation communities and associated habitats. As 3.72ha of non-significant woodland removals are proposed as a part of the development plan, the restoration strategy providing 9.5ha of restoration will meet and exceed the quantity of woodland removals, thereby offsetting impacts to non-significant woodlands in the long term.

The combined total of woodland and wetland compensation and enhancement lands to persist beyond quarry closure is 19.42ha, relative to combined losses of 13.59ha of woodland and wetland habitats. Notably, an additional 0.60ha of wetland restoration (Area D2) will persist until quarry closure for a total of 20.02ha of combined restoration lands. The above approach therefore demonstrates that implementation of the proposed Natural Restoration Plan will result in a net gain of natural systems on the within the study area limits.

The above strategy satisfies municipal and provincial requirements related to maintaining the health, diversity and size of natural features, providing rehabilitation of natural features in a timely manner, and maintaining habitat connectivity on the landscape described in LSP Policy 6.43-DP and Policy 6.44-DP, via replacement and restoration of habitat loss through implementation of the above-described Natural Restoration Plan.

7.6 Linkages

The property is located in a headwater area, and as demonstrated through Azimuth and RiverStone's assessments (Appendix A) natural features are generally oriented toward northward drainage in the northeast quadrant of the property, and westward drainage in the southwest areas of the property. It is therefore anticipated that natural features (*e.g.* woodlands, wetlands, thicket cover) on the property generally promote wildlife passage along a northeast-southwest axis within the property limits. Natural features occurring in the southeast corner of the property (*e.g.* MAM2-2b; Figure 2b) are isolated in character and visually similar to surrounding upland meadow conditions, such that wildlife passage function is expected to be limited in this portion of the property.

It is anticipated that wildlife could access the northern portion of the property via the McNabb Drain and/or natural lands east of Highway 12. Although Highway 12 likely represents a substantial barrier to wildlife passage, it remains plausible that some degree of wildlife movement still occurs, particularly for mammals and birds which are less at risk of wildlife-vehicle conflicts than herpetofauna. Extensive natural cover associated with lands west of the property and adjacent lands to the south of Concession Road 1



provide ample opportunity for wildlife to access natural cover within the southwest portion of the property.

As illustrated in Natural Restoration Plan mapping (Figure 7) and detailed in Section 8.5 below, a permanent natural corridor will be established along the northwestern edge of the proposed extraction limit (Areas A, D1-D2, F, G, H). The corridor will include extensive ecosystem enhancements including woody plantings and seed mix applications, and will provide improved cover and habitat complexity compared with current conditions in that portion of the property. Natural corridor lands within the southern portion of the property (*i.e.* western section of Area A) will be supported by retained naturalized lands located north of the property limit (MEGM3/MEGM4a; Figure 2b), maintaining opportunities for wildlife passage along and beyond the proposed noise berm. As such, at ultimate build-out of the quarry footprint, wildlife passage and associated habitat linkages are anticipated to be maintained in a similar manner to the existing condition on the property.

It is recommended that implementation of the Natural Restoration Plan occur at the outset of project works, such that natural restoration areas are fully established as early as feasible into quarry operations. It is anticipated that by prioritizing natural restoration at an early stage, wildlife will become accustomed to utilizing the restored setbacks surrounding the extraction area in advance of vegetation removals and subsequent mineral extraction works. Phase 1 of the proposed mineral extraction works will begin in the north end of the property with extraction generally progressing south across the site (Figure 6), therefore the majority of existing wildlife cover and habitat will be retained until later stages of quarry operations in Phase 2.

The above strategy satisfies municipal and provincial requirements related to maintaining connectivity between KNHFs and key hydrologic features, including (but not limited to) LSPP *Policy 6.44-DP*, via maintenance of wildlife conveyance opportunities through implementation of the above-described Natural Restoration Plan.

8.0 OPERATIONS, MITIGATION AND COMPENSATION

The sections below outline a mitigation strategy to avoid negative impacts to natural heritage features, and provide a natural ecosystem compensation strategy to offset woodland and wetland losses throughout the project area.

8.1 Species at Risk

It should be noted that the absence of a protected species within the study area does not indicate that they will never occur within the area. Given the dynamic character of the natural environment, there is a constant variation in habitat use. Care should be taken in



the interpretation of presence of species of concern including those listed under the ESA. Based on the presence of SAR within the study area the following mitigation measures are proposed.

8.1.1 Bobolink and Eastern Meadowlark

The proposed Brechin Quarry will result in the removal of habitat for Bobolink and Eastern Meadowlark, as described in Section 7.1.1 above. It is recommended that the ARA Site Plans include the following requirement:

- Prior to any site alteration within the area identified as habitat for Bobolink and Eastern Meadowlark, the requirements of Part IV of O.Reg. 830/21 of the ESA shall be met.

8.1.2 Worker Training

Worker training would assist the on-site workers in the identification of the SAR with potential to occur in the area. Workers should be instructed to stop work immediately if any SAR are encountered within the work area. Individuals working on site should ensure that SAR are not harmed during construction or killed by heavy machinery, vehicles or other equipment.

It is recommended that the ARA Site Plans include the following requirement:

The licensee shall seek to ensure that onsite personnel are educated to ensure that, if identified, SAR are not wantonly injured or killed, and to ensure that damage to features which could constitute habitat is avoided. Information shall be conveyed through a SAR expert and include:

- Species habitat and identification;
- Requirements under the ESA including avoidance of harm to the species and damage to relevant habitat;
- Appropriate action to take if the species is encountered;
- How to record sightings and encounters; and,
- That care should be taken when undertaking construction activities in order to avoid harming the species or damaging/destroying habitat.

8.2 Migratory Breeding Birds and Bats

Activities involving the removal of vegetation should be restricted from occurring during the breeding season. Migratory birds, nests, and eggs are protected by the *Migratory Birds Convention Act*, 1994 including Migratory Birds Regulations (2022), and the *Fish*



and *Wildlife Conservation Act*, 1997. Environment Canada outlines dates when activities in any region have potential to impact nests at the Environment Canada Website (<https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html>). In Zones C1 and C2 vegetation clearing should be avoided between **April 1 and August 31** of any given year.

Although maternity or day roosting habitat for bat species is not anticipated to be impacted by the proposed works, it is recommended that tree removals are conducted outside of the active window for the species to avoid potential conflicts with errant/unexpected individual bats between **March 15 and November 30** of any given year.

It is recommended that the ARA Site Plans include the following requirement:

- Tree removal should be avoided between **March 15 and November 30** of any given year.

8.3 Wildlife Exclusion Fencing

In accordance with MECP advice received through the consultation process, it was recommended that reptile exclusion fencing be considered to prevent access of turtles into work zones (Appendix D). MECP acknowledged that the proposed works are unlikely to damage or destroy habitat for Blanding's Turtle, but advised that due to documented populations within larger wetland complexes in the landscape to the north and southwest of the property, a suitable mitigation program including wildlife exclusion fencing would prevent errant or unexpected movement of Blanding's Turtles through the work area. Given the scarcity of suitable habitat features beyond where the extraction area abuts Highway 12 and Concession Road 1, wildlife exclusion fencing is not recommended along the eastern and southern boundaries of the proposed extraction footprint.

Although recommendations presented below are prepared in the context of MECP recommendations regarding Blanding's Turtles in the landscape, it is anticipated that wildlife exclusion fencing will also limit conveyance of snakes, amphibians, and most mammal species within the work area.

It is recommended that the ARA Site Plans include the following requirements:

- Along the north and west licence boundary, wildlife fencing shall be installed according to provincial Reptile and Amphibian Exclusion Fencing (MECP, 2021e) guidelines.



- Wildlife exclusion fences shall be inspected after spring thaw and throughout the active season for tears or other damage.

8.4 Sediment and Erosion Controls and Best Management Practices

Erosion and Sediment Controls (ESCs) are recommended for future project activities to minimize the extent of accidental or unavoidable impacts to adjacent vegetation communities, wildlife habitat and fish habitat.

It is recommended the ARA Site Plans include the following requirements:

- Prior to the commencement of site works, silt fencing shall be applied along the length of directly adjacent natural or naturalized features, and routine inspection/maintenance of the silt fencing shall occur.
- Silt fencing shall be maintained until lands abutting the work area (*e.g.* noise berms) are considered stabilized with self-sustaining vegetation such that potential runoff of sediment into adjacent natural areas is effectively controlled.

8.5 Natural Restoration Plan

8.5.1 Natural Restoration Plan Overview

A component of the proposed development concept includes the implementation of a Natural Restoration Plan to provide permanent compensation and enhancement for woodland and wetland habitat losses as a result of proposed quarry activities.

Nine (9) natural restoration areas are identified within the properties, as illustrated on the Natural Restoration Plan key map presented in Figure 7. A block of natural restoration areas will be retained within the setback between the northern and western boundaries of the proposed limit of extraction, identified as Areas A, D1-D2, F, G, and H (Figure 7). A natural restoration area will also be established in the southeast corner of the property between the proposed extraction limits and the property boundary, identified as Area B (Figure 7).

Areas A and B will comprise an Upland Planting Zone where woodland restoration is proposed, creating a naturalized treed buffer between extraction limits and retained adjacent lands, measuring a combined total of 5.4ha.

Areas D1-D2, F, G and H will represent a Wetland Edge Planting Zone where wetland creation and enhancement is proposed, forming a naturalized buffer between mineral extraction activities and retained adjacent lands. Areas D1-D2 will represent a wetland edge ecotype subject to seasonal flooding but featuring mesic/hydric soils characteristic



of swamp thicket/meadow marsh systems. Areas F, G, and H will represent Permanently Flooded Zones (ponds) where water is expected to persist year-round. The combined total of Areas D1-D2, F, G and H will occupy 5.32ha of natural wetland creation and enhancement.

It is acknowledged that the eastern portion of Area D1 currently functions as wetland, however given the high incidence of invasive species (*e.g.* Reed Canary Grass) and intensive proposed wetland shrub plantings within this unit, it is expected that wetland function will be enhanced as a result of the natural restoration program. Western portions of the restoration block will be converted from dry-moist meadow to wetland through installation of a pump/outlet into Area F throughout quarry operations, with conveyance of flow northward through a swale/low-lying zone toward Concession Road 2. At quarry closure, the outlet location into Area F will be decommissioned; however a saddle berm outlet will convey outflows into Area G in the long term. Area F is anticipated to persist as a dug pond in the long term. As such, Area D2 will ultimately convert back to dry-moist upland following quarry closure, representing 0.60ha of the overall natural wetland creation and enhancement zone lost from the initial 5.32ha restoration area, leaving 4.72ha of wetland restoration (Areas D2, F, G, and H) persisting in the long term.

Lands west of the rail line will also function as natural restoration zones, and include an upland (woodland) creation and enhancement unit (Area C) measuring 4.1ha in size, and a wetland creation area (Area E) measuring 5.2ha in size, both of which will persist in the long term. Lands within Area E are currently moist-mesic in character, however an existing culvert currently conveys drainage beneath the decommissioned air strip that bisects the property. As a part of site preparation works, it is anticipated that wetland conditions will be created within Area E by removing and/or blocking the culvert in this location.

It is recommended that the ARA Site Plans include the following requirements:

- Areas A and B shall comprise an Upland Planting Zones and shall be planted after construction of the berm.
- Areas D1 and D2 shall comprise Wetland Edge Planting Zones and shall be completed when the water mitigation system is installed.
- Areas F, G, and H shall comprise Permanently Flooded Zones and shall be completed when the water mitigation system is installed.
- Areas C and E shall comprise an Upland Planting Zone and Wetland Edge Planting Zone respectively, and shall be planted prior to extraction commencing in Phase 2.



8.5.2 Vegetation Restoration

Natural restoration zones shall be planted with suitable woody materials and seeded with appropriate native seed mixes and nurse crops suited to the moisture regime of each zone.

It is recommended that the ARA Site Plans include the following requirements:

- In all restoration areas, any necessary earth movement shall be completed in advance of the commencement of local restoration works, to avoid damaging plant and seed materials.
- Woody and herbaceous invasive species (*i.e.* trees, shrubs and vines) shall be treated and removed prior to the initiation of planting and seed mix application.
- Invasive species control methods may include (if required) mowing, soil tillage, spot burning using a drip torch, and flooding. Herbicide application shall be undertaken on a species-specific basis and shall only be applied judiciously and as a last measure. Spot sprayers and/or wicking devices shall be used to minimize the inadvertent spread of herbicide to native vegetation.
- In Area D2, the driveway and associated culvert shall be installed in advance of the commencement of local restoration works, to avoid damaging plant and seed materials.
- In Area E, the existing culvert crossing under the former airport runway shall be removed or blocked prior to the commencement of restoration works, to facilitate an appropriate moisture regime conducive to the establishment of a wetland vegetation community.
- Upland Planting Zones (Areas A-C) shall include the following trees species (or approved equivalents):
 - Trembling Aspen (*Populus tremuloides*)
 - Largetooth Aspen (*Populus grandidentata*)
 - Balsam Poplar (*Populus balsamifera*)
 - Paper Birch (*Betula papyrifera*)
 - Freeman's Maple (*Acer x freemanii*)
 - Eastern White Pine (*Pinus strobus*)
 - Eastern White Cedar (*Thuja occidentalis*)
 - Eastern Redcedar (*Juniperus virginiana*)
 - Bitternut Hickory (*Carya cordiformis*)
 - Black Cherry (*Prunus serotina*)
 - Northern Red Oak (*Quercus rubra*)
- Upland Planting Zones (Areas A-C) shall include the following shrub species (or approved equivalents):
 - Chokecherry (*Prunus virginiana*)
 - Common Juniper (*Juniperus communis*)



- Staghorn Sumac (*Rhus typhina*)
- Grey Dogwood (*Cornus racemosa*)
- Alternate-leaved Dogwood (*Cornus alternifolia*)
- Wild Black Currant (*Ribes americanum*)
- Upland Planting Zones (Areas A-C) and berms identified on Figure 7 shall include a suitable upland native seed mix such as TRCA_SD-6 Ontario Butterfly Meadow Mix or TRCA-SD-5 Farm Field Edge Pollinator Mix (or approved equivalent), installed at a minimum density of 25 kilograms/hectare.
- Wetland Edge Planting Zones (Areas D1-D2 and E) shall include the following shrub species (or approved equivalents):
 - Nannyberry (*Viburnum lentago*)
 - Red-osier Dogwood (*Cornus sericea*)
 - Bebb's Willow (*Salix bebbiana*)
 - Pussy-willow (*Salix discolor*)
 - Heart-leaved Willow (*Salix eriocephala*)
 - Meadow Willow (*Salix petiolaris*)
- Wetland Edge Planting Zones (Areas D1-D2 and E) shall include a suitable native mesic/wetland edge mix such as TRCA-SW-2 Wet Slope Mix (or approved equivalent), installed at a minimum density of 25 kilograms/hectare.
- Restoration areas and berms shall include initial application of a nurse crop of Annual Oats (*Avena sativa*) for spring/summer seed mix application(s) and/or winter wheat (*Triticum aestivum*) for fall seed mix application(s), installed at a minimum density of 30 kilograms/hectare.
- Tree and shrub materials shall be planted as bare root stock or potted stock (minimum 1-gallon) at a minimum density of 2.5m on-centre.
- In Upland Planting Zones, shrubs shall not represent more than 10% of woody materials planted.

8.5.3 Restoration Monitoring

Natural restoration zones shall be subject to post-restoration monitoring to review establishment of woody stem and seed mix material installations.

It is recommended that the ARA Site Plans include the following requirements:

- Natural restoration zones shall be monitored at least once annually for at least the first two (2) years after woody plant and seed mix materials are installed.
- A survival rate of 80% of the original number of planted stems is the recommended target after two years for each planting Area.



- If after two (2) years, dead tree/shrub material exceeds 20% in any planting Area, woody materials shall be replaced during the spring planting season of the following year to meet or exceed the 80% survival threshold.

9.0 CONCLUSIONS

Based upon our analysis, it is concluded that subject to the incorporation of the environmental protection, remediation and compensation measures and criteria described throughout this report, the proposed development will not result in a negative impact upon KNHFs or their ecological functions.



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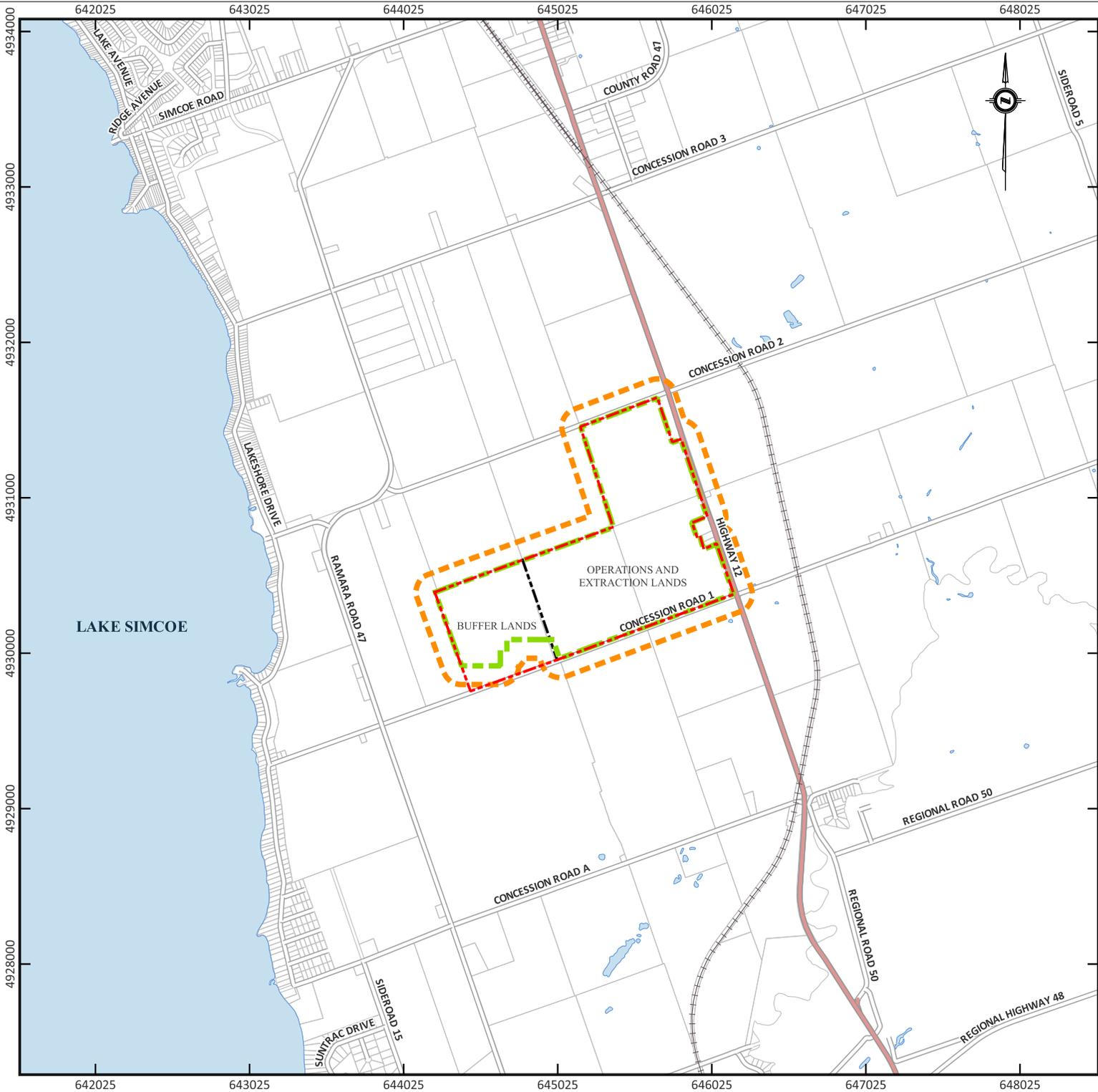
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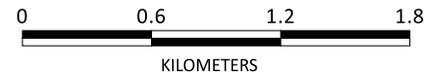
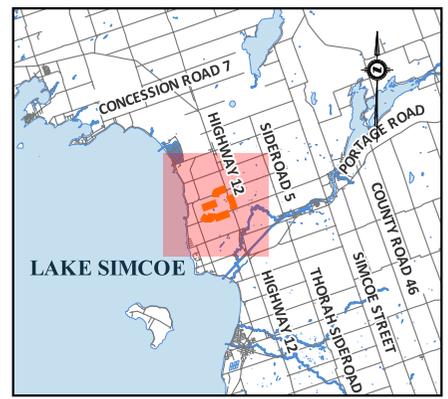


LEGEND

- Approx. Property Boundary
- License Boundary
- Former Rail Line
- Study Area Limit
- Waterbody
- Rail
- Road
- Highway

REGIONAL MAP

SCALE 1:50000

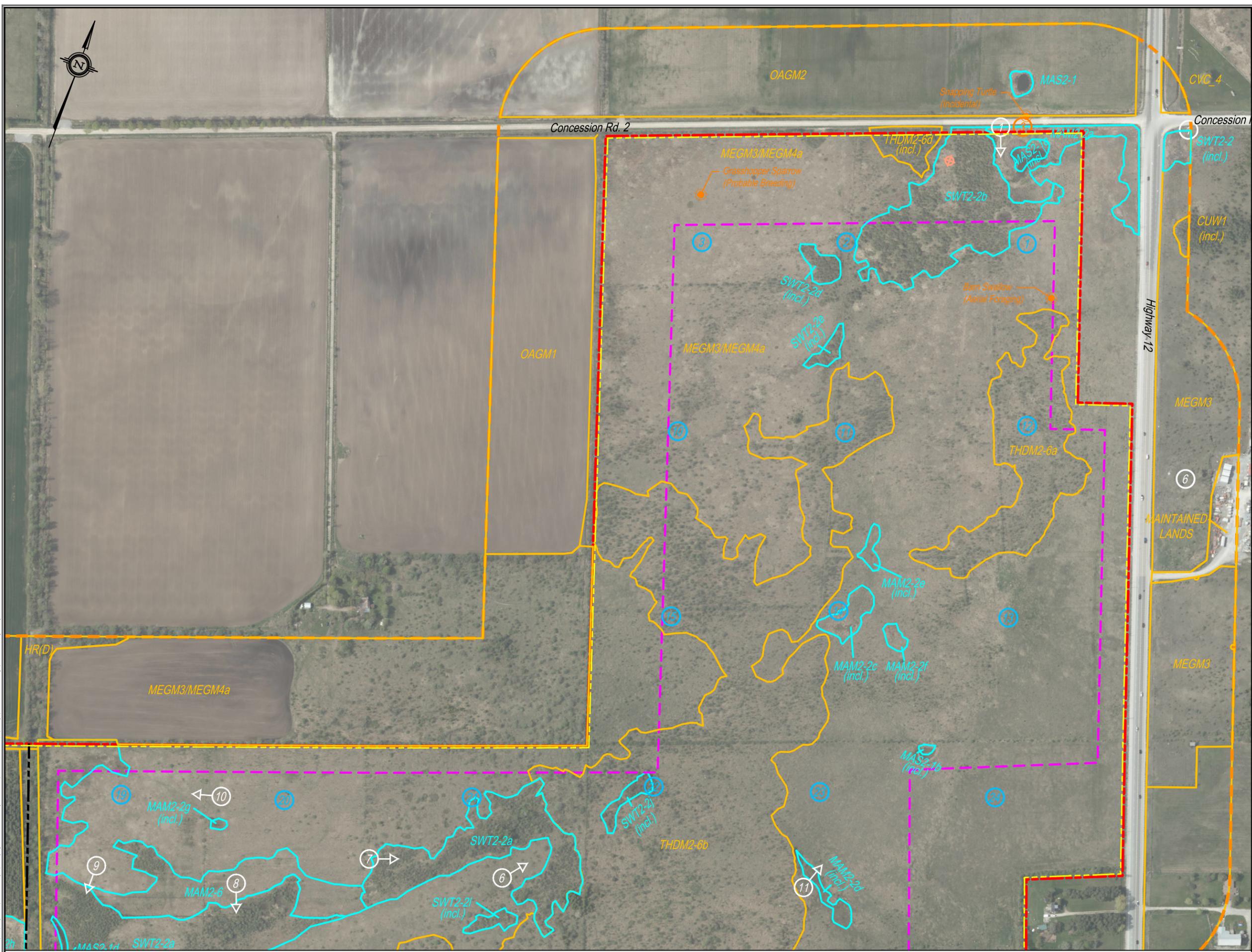


SITE LOCATION

**BRECHIN QUARRY
BRECHIN, ON**

DATE ISSUED:	DECEMBER 2023	Figure No. 1
CREATED BY:	A.L.	
PROJECT NO.:	18-288	
BASE MAP:	MNRF	

Plotted by: ALJ on December 12, 2023 at 1:39pm
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LEGEND:

- Approx. Property Boundary
- License Boundary
- Former Rail Line
- Study Area Limit
- Limit of Extraction (MHBC, 2023)
- ⊙ Structures
- ⊕ Dawn Breeding Bird Point Count Station
- ⊕ Evening Breeding Bird Point Count Station
- ← ⊕ Amphibian Stations and Direction (white)
- Species Observation
- ⊕ Terrestrial Crayfish Burrow
- Vegetation Communities

CUP3 Coniferous Plantation
 CUP3-2 White Pine Coniferous Plantation
 CUW1 Mineral Cultural Woodland
 CVC_4 Extraction (Pits and Quarries)
 FOC2-2 Dry-Fresh White Cedar Coniferous Forest
 FOC4-1 Fresh-Moist White Cedar Coniferous Forest
 FOC4-2 Fresh-Moist White Cedar-Hemlock Coniferous Forest
 FODM4-12 Dry-Fresh Exotic Deciduous Forest
 MEGM3 Dry-Fresh Graminoid Meadow
 MEGM4 Fresh-Moist Graminoid Meadow
 MEMM4 Fresh-Moist Mixed Meadow
 OAGM1 Annual Row Crops
 OAGM2 Perennial Cover Crop
 OAGM4 Open Pasture
 THCM1-2 Dry-Fresh Native Coniferous Regeneration Thicket
 THDM2-6 Buckthorn Deciduous Shrub Thicket
 SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
 SWM1-1 White Cedar-Hardwood Mineral Mixed Swamp
 SWT2-2 Willow Mineral Thicket Swamp
 MAM2-2 Reed Canary Grass Mineral Meadow Marsh
 MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh
 MAS2-1 Cattail Mineral Shallow Marsh
 HR(D) Deciduous Hedgerow

NOTES:
 1. Refer to Appendix A for drainage feature mapping prepared by RiverStone.

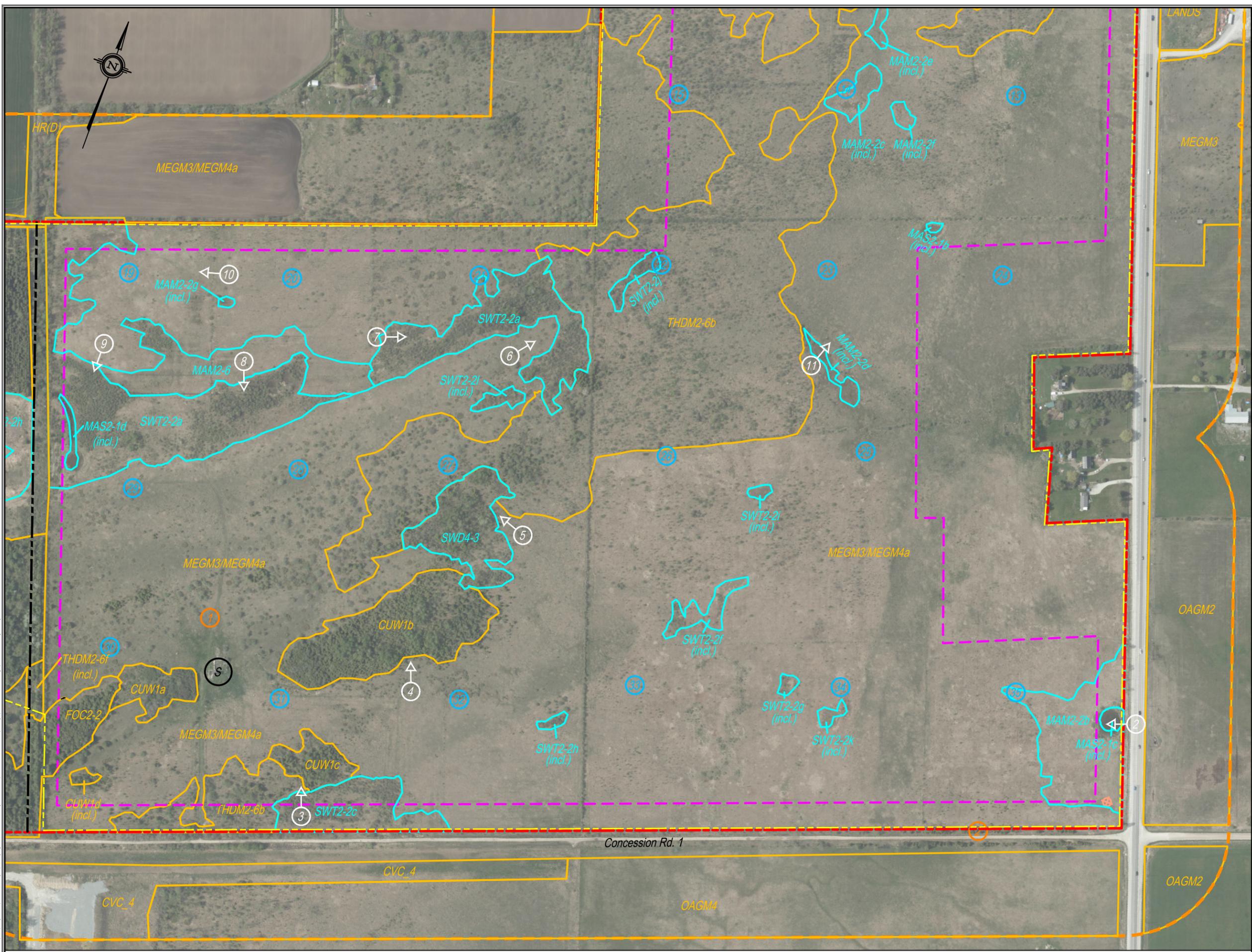
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AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Environmental Features

**Brechin Quarry
 Brechin, ON**

DATE ISSUED:	December 2023	Figure No.
CREATED BY:	JLM	2a
PROJECT NO.:	18-288b	
REFERENCE:	Simcoe County Maps	



- LEGEND:**
- Approx. Property Boundary
 - License Boundary
 - Former Rail Line
 - Study Area Limit
 - Limit of Extraction (MHBC, 2023)
 - S Structures
 - # Dawn Breeding Bird Point Count Station
 - # Evening Breeding Bird Point Count Station
 - # Amphibian Stations and Direction (white)
 - Species Observation
 - ⊕ Terrestrial Crayfish Burrow
 - Vegetation Communities
- CUP3 Coniferous Plantation
 - CUP3-2 White Pine Coniferous Plantation
 - CUW1 Mineral Cultural Woodland
 - CVC_4 Extraction (Pits and Quarries)
 - FOC2-2 Dry-Fresh White Cedar Coniferous Forest
 - FOC4-1 Fresh-Moist White Cedar Coniferous Forest
 - FOC4-2 Fresh-Moist White Cedar-Hemlock Coniferous Forest
 - FODM4-12 Dry-Fresh Exotic Deciduous Forest
 - MEGM3 Dry-Fresh Graminoid Meadow
 - MEGM4 Fresh-Moist Graminoid Meadow
 - MEMM4 Fresh-Moist Mixed Meadow
 - OAGM1 Annual Row Crops
 - OAGM2 Perennial Cover Crop
 - OAGM4 Open Pasture
 - THCM1-2 Dry-Fresh Native Coniferous Regeneration Thicket
 - THDM2-6 Buckthorn Deciduous Shrub Thicket
 - SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
 - SWM1-1 White Cedar-Hardwood Mineral Mixed Swamp
 - SWT2-2 Willow Mineral Thicket Swamp
 - MAM2-2 Reed Canary Grass Mineral Meadow Marsh
 - MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh
 - MAS2-1 Cattail Mineral Shallow Marsh
 - HR(D) Deciduous Hedgerow

NOTES:
 1. Refer to Appendix A for drainage feature mapping prepared by RiverStone.

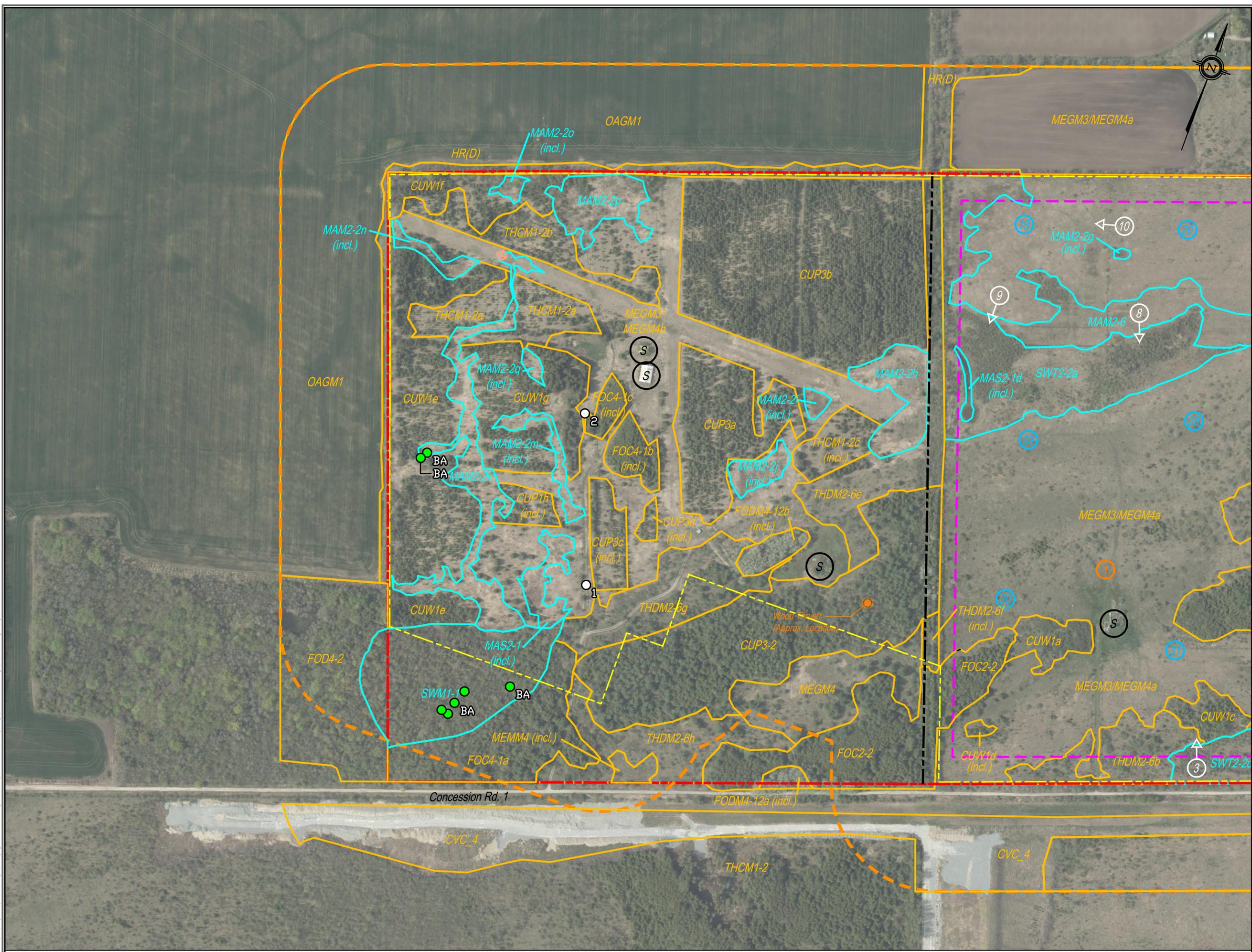
60m 0 120m
 HORIZONTAL SCALE 1: 4,000



Environmental Features	
Brechin Quarry Brechin, ON	
DATE ISSUED: December 2023	Figure No.
CREATED BY: JLM	2b
PROJECT NO.: 18-288b	
REFERENCE: Simcoe County Maps	

Plotted by: ALJ on December 12, 2023 at 1:39pm
 File: P:\18_projects\18-288_symphony_golf - feasibility studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg Layout: E152b PlotScale: 1

Plotted by: ALJ on December 12, 2023 at 1:40pm
 File: P:\18_projects\18-288_symphony_golf - feasibility studies\01.2 - carden quarry\04.0 - drafting\18-288.dwg - layout: EIS2c - PlotScale: 1



LEGEND:

- Approx. Property Boundary
- License Boundary
- Former Rail Line
- Study Area Limit
- Limit of Extraction (MHBC, 2023)
- S Structures
- # Dawn Breeding Bird Point Count Station
- # Evening Breeding Bird Point Count Station
- # Amphibian Stations and Direction (white)
- Species Observation
- ⊕ Terrestrial Crayfish Burrow
- Vegetation Communities

CUP3	Coniferous Plantation
CUP3-2	White Pine Coniferous Plantation
CUW1	Mineral Cultural Woodland
CVC_4	Extraction (Pits and Quarries)
FOC2-2	Dry-Fresh White Cedar Coniferous Forest
FOC4-1	Fresh-Moist White Cedar Coniferous Forest
FOC4-2	Fresh-Moist White Cedar-Hemlock Coniferous Forest
FODM4-12	Dry-Fresh Exotic Deciduous Forest
MEGM3	Dry-Fresh Graminoid Meadow
MEGM4	Fresh-Moist Graminoid Meadow
MEMM4	Fresh-Moist Mixed Meadow
OAGM1	Annual Row Crops
OAGM2	Perennial Cover Crop
OAGM4	Open Pasture
THCM1-2	Dry-Fresh Native Coniferous Regeneration Thicket
THDM2-6	Buckthorn Deciduous Shrub Thicket
SWD4-3	White Birch-Poplar Mineral Deciduous Swamp
SWM1-1	White Cedar-Hardwood Mineral Mixed Swamp
SWT2-2	Willow Mineral Thicket Swamp
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAM2-6	Broad-leaved Sedge Mineral Meadow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
HR(D)	Deciduous Hedgerow

○ Butternut Tree - Unevaluated
 ●_{BA} Black Ash Tree

NOTES:
 1. Refer to Appendix A for drainage feature mapping prepared by RiverStone.

60m 0 120m
 HORIZONTAL SCALE 1:4,000

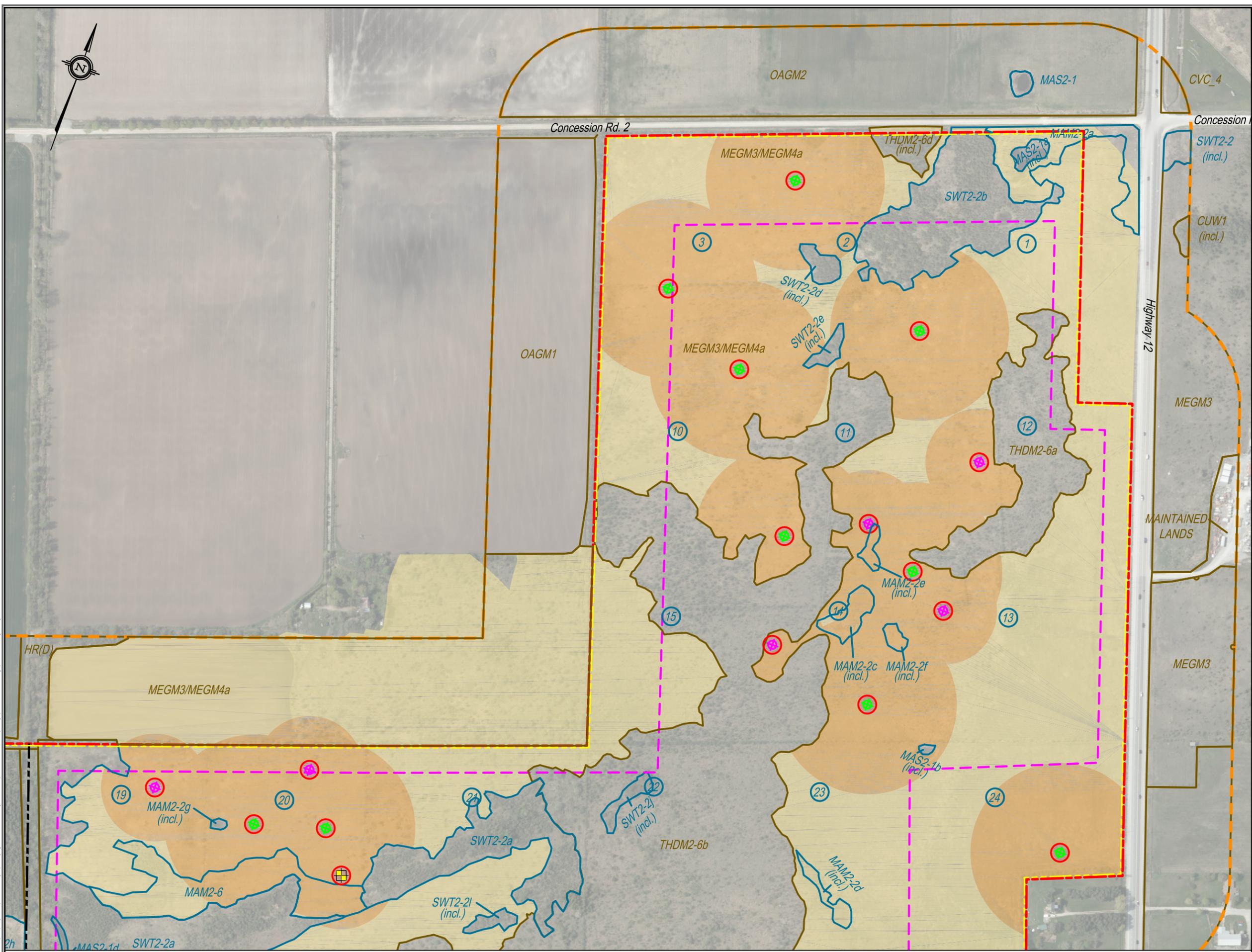
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Environmental Features

**Brechin Quarry
Brechin, ON**

DATE ISSUED: December 2023	Figure No.
CREATED BY: JLM	2c
PROJECT NO.: 18-288b	
REFERENCE: Simcoe County Maps	

Plotted by: ALJ on December 19, 2023 at 6:22pm
 File: P:\16 projects\18-288 symphony golf - feasibility studies\01.2 - carden quarry\04.0 - drafting\18-288.dwg Layout: EIS3a PlotScale: 1



LEGEND:

- Approx. Property Boundary
- License Boundary
- Former Rail Line
- Study Area Limit
- Limit of Extraction (MHBC, 2023)
- ⊙ Structures
- ⊕ Dawn Breeding Bird Point Count Station
- ⊕ Bobolink Estimated Nest Location
- ⊕ Eastern Meadowlark Estimated Nest Location
- ⊕ Eastern Meadowlark Confirmed Nest Location
- Category 1 Habitat
- Category 2 Habitat
- Category 3 Habitat
- Potential Bobolink and Eastern Meadowlark Habitat

Vegetation Communities

- CUP3 Coniferous Plantation
- CUP3-2 White Pine Coniferous Plantation
- CUW1 Mineral Cultural Woodland
- CVC_4 Extraction (Pits and Quarries)
- FOC2-2 Dry-Fresh White Cedar Coniferous Forest
- FOC4-1 Fresh-Moist White Cedar Coniferous Forest
- FOC4-2 Fresh-Moist White Cedar-Hemlock Coniferous Forest
- FODM4-12 Dry-Fresh Exotic Deciduous Forest
- MEGM3 Dry-Fresh Graminoid Meadow
- MEGM4 Fresh-Moist Graminoid Meadow
- MEMM4 Fresh-Moist Mixed Meadow
- OAGM1 Annual Row Crops
- OAGM2 Perennial Cover Crop
- OAGM4 Open Pasture
- THCM1-2 Dry-Fresh Native Coniferous Regeneration Thicket
- THDM2-6 Buckthorn Deciduous Shrub Thicket
- SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
- SWM1-1 White Cedar-Hardwood Mineral Mixed Swamp
- SWT2-2 Willow Mineral Thicket Swamp
- MAM2-2 Reed Canary Grass Mineral Meadow Marsh
- MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh
- MAS2-1 Cattail Mineral Shallow Marsh
- HR(D) Deciduous Hedgerow

60m 0 120m

HORIZONTAL SCALE 1:4,000

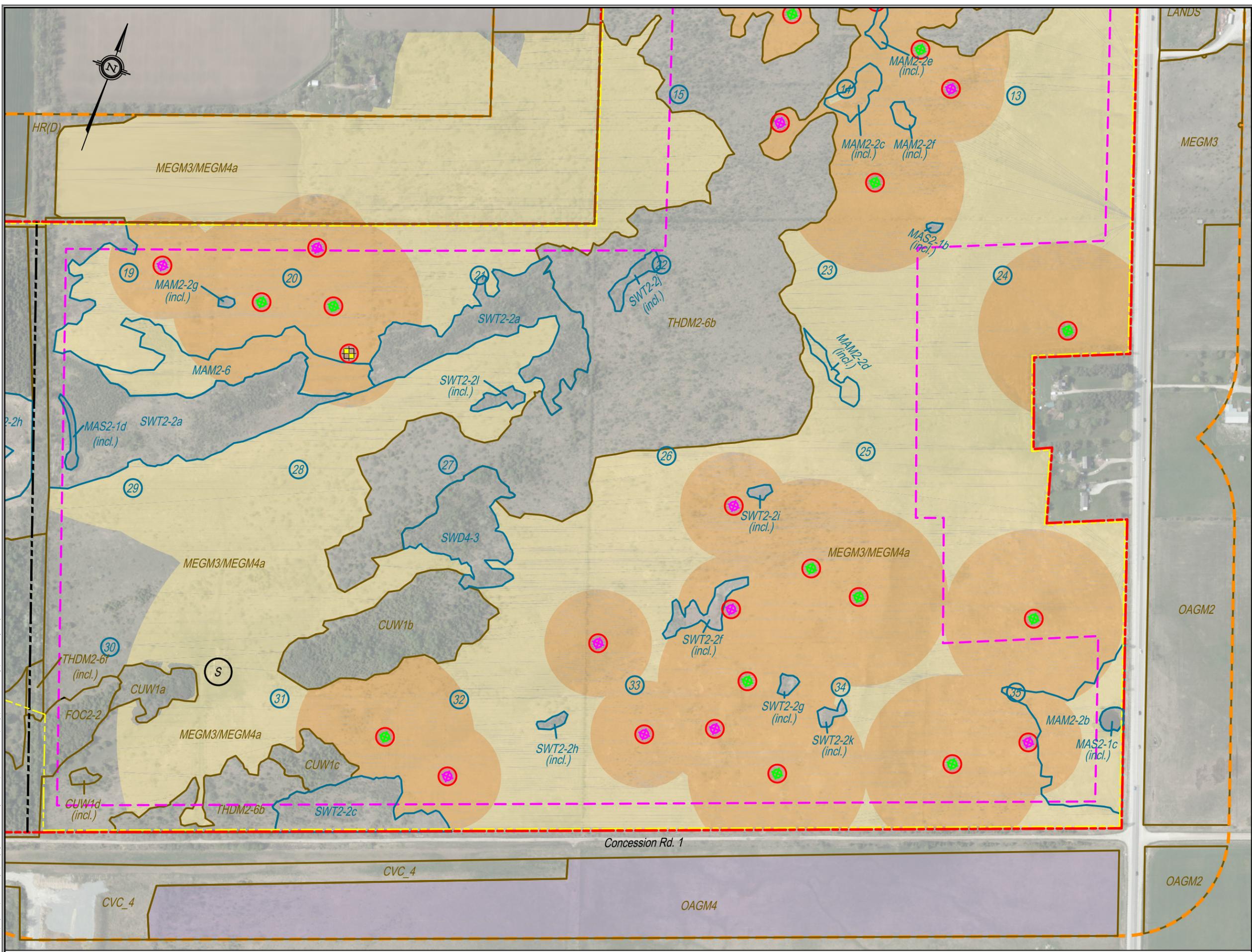
Bobolink/E. Meadowlark Nesting

**Brechin Quarry
Brechin, ON**

DATE ISSUED: August 2023	Figure No.
CREATED BY: JLM	3a
PROJECT NO.: 18-288b	
REFERENCE: Simcoe County Maps	

DAYSTAMP: December 2023

Plotted by: ALJ on December 19, 2023 at 6:22pm
 File: P:\18_projects\18-288_symphony_golf - feasibility studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg Layout: EIS3b PlotScale: 1



LEGEND:

- Approx. Property Boundary
- License Boundary
- Former Rail Line
- Study Area Limit
- Limit of Extraction (MHBC, 2023)
- ⊙ Structures
- ⊕ Dawn Breeding Bird Point Count Station
- ⊕ Bobolink Estimated Nest Location
- ⊕ Eastern Meadowlark Estimated Nest Location
- ⊕ Eastern Meadowlark Confirmed Nest Location
- Category 1 Habitat
- Category 2 Habitat
- Category 3 Habitat
- Potential Bobolink and Eastern Meadowlark Habitat

Vegetation Communities

CUP3	Coniferous Plantation
CUP3-2	White Pine Coniferous Plantation
CUW1	Mineral Cultural Woodland
CVC_4	Extraction (Pits and Quarries)
FOC2-2	Dry-Fresh White Cedar Coniferous Forest
FOC4-1	Fresh-Moist White Cedar Coniferous Forest
FOC4-2	Fresh-Moist White Cedar-Hemlock Coniferous Forest
FODM4-12	Dry-Fresh Exotic Deciduous Forest
MEGM3	Dry-Fresh Graminoid Meadow
MEGM4	Fresh-Moist Graminoid Meadow
MEMM4	Fresh-Moist Mixed Meadow
OAGM1	Annual Row Crops
OAGM2	Perennial Cover Crop
OAGM4	Open Pasture
THCM1-2	Dry-Fresh Native Coniferous Regeneration Thicket
THDM2-6	Buckthorn Deciduous Shrub Thicket
SWD4-3	White Birch-Poplar Mineral Deciduous Swamp
SWM1-1	White Cedar-Hardwood Mineral Mixed Swamp
SWT2-2	Willow Mineral Thicket Swamp
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAM2-6	Broad-leaved Sedge Mineral Meadow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
HR(D)	Deciduous Hedgerow

60m 0 120m
HORIZONTAL SCALE 1:4,000

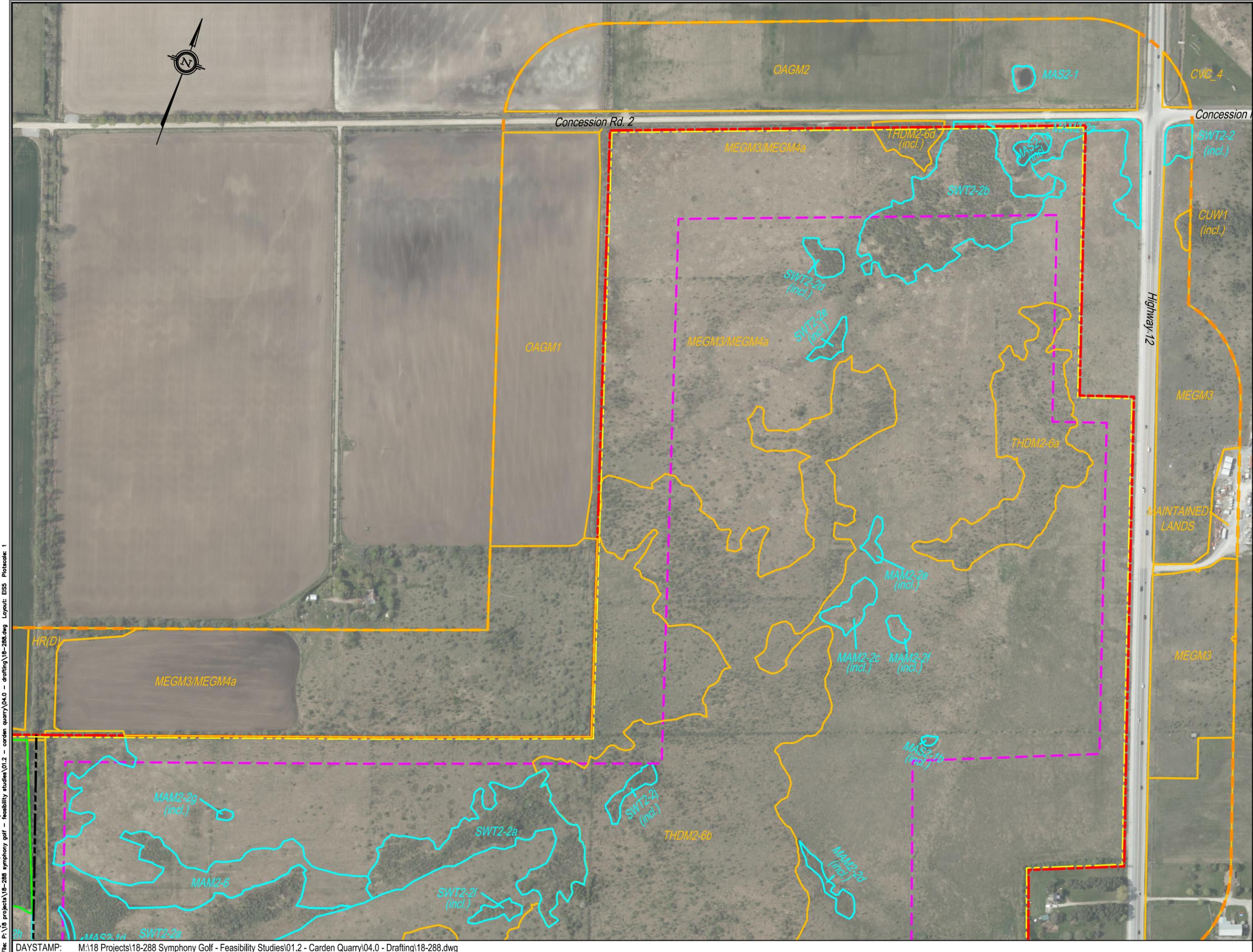
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Bobolink/E. Meadowlark Nesting

**Brechin Quarry
Brechin, ON**

DATE ISSUED: December 2023	Figure No.
CREATED BY: JLM	3b
PROJECT NO.: 18-288b	
REFERENCE: Simcoe County Maps	

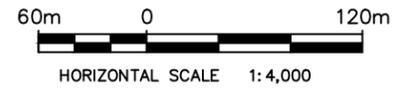
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LEGEND:

- Approx. Property Boundary
- License Boundary
- Former Rail Line
- Study Area Limit
- Limit of Extraction (MHBC, 2023)
- Woodland Boundary
- Vegetation Communities

CUP3	Coniferous Plantation
CUP3-2	White Pine Coniferous Plantation
CUW1	Mineral Cultural Woodland
CVC_4	Extraction (Pits and Quarries)
FOC2-2	Dry-Fresh White Cedar Coniferous Forest
FOC4-1	Fresh-Moist White Cedar Coniferous Forest
FOC4-2	Fresh-Moist White Cedar-Hemlock Coniferous Forest
FODM4-12	Dry-Fresh Exotic Deciduous Forest
MEGM3	Dry-Fresh Graminoid Meadow
MEGM4	Fresh-Moist Graminoid Meadow
MEMM4	Fresh-Moist Mixed Meadow
OAGM1	Annual Row Crops
OAGM2	Perennial Cover Crop
OAGM4	Open Pasture
THCM1-2	Dry-Fresh Native Coniferous Regeneration Thicket
THDM2-6	Buckthorn Deciduous Shrub Thicket
SWD4-3	White Birch-Poplar Mineral Deciduous Swamp
SWM1-1	White Cedar-Hardwood Mineral Mixed Swamp
SWT2-2	Willow Mineral Thicket Swamp
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAM2-6	Broad-leaved Sedge Mineral Meadow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
HR(D)	Deciduous Hedgerow

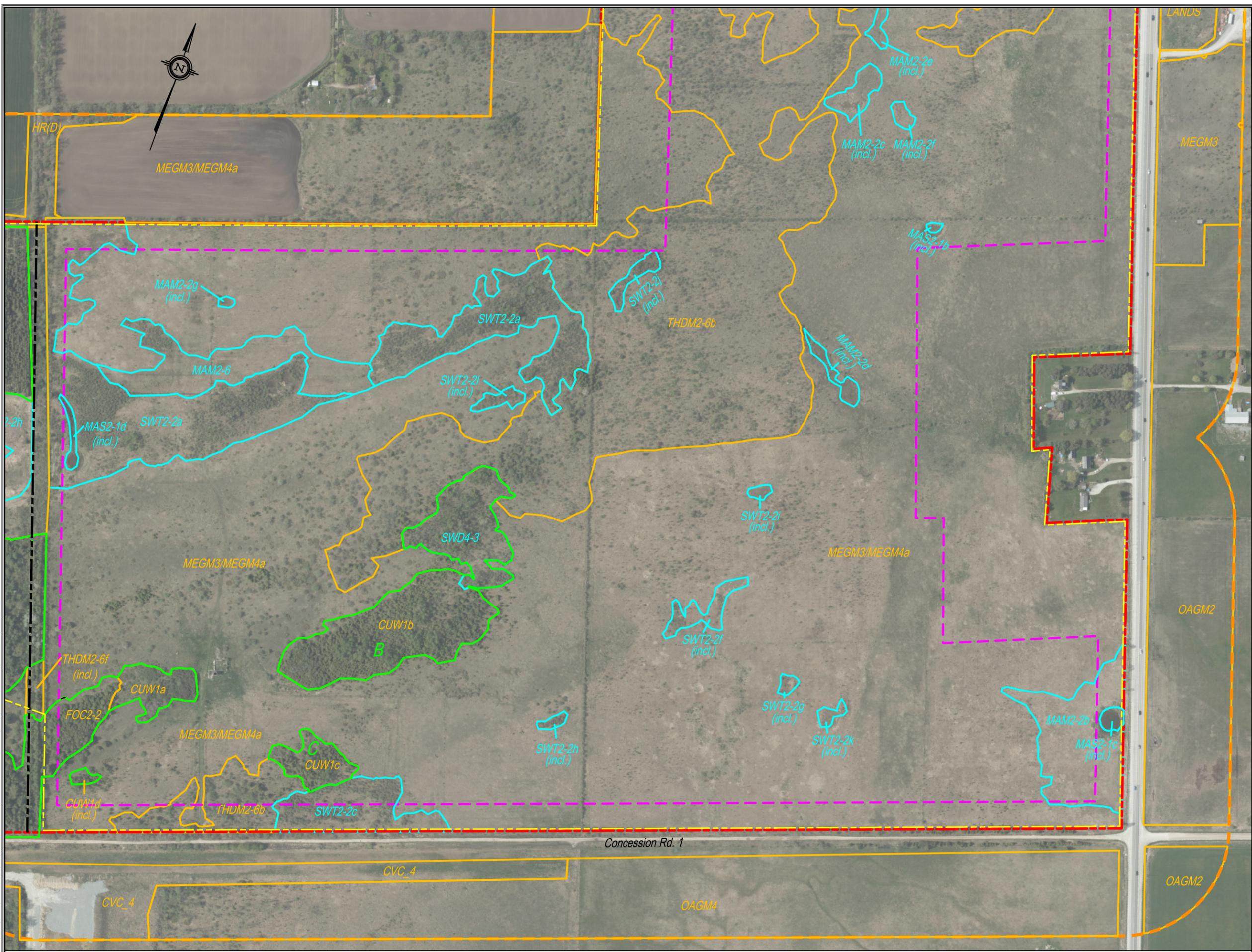


Woodland Assessment

**Brechin Quarry
 Brechin, ON**

DATE ISSUED:	December 2023	Figure No.
CREATED BY:	JLM	4a
PROJECT NO.:	18-288b	
REFERENCE:	Simcoe County Maps	

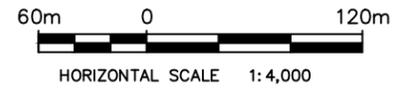
Plotted by: ALJ on December 12, 2023 at 1:41pm
 File: P:\18_projects\18-288_symphony_golf - feasibility studies\01.2 - Carden Quarry\04.0 - drafting\18-288.dwg - Layout: EIS5b - PlotScale: 1



LEGEND:

- Approx. Property Boundary
- License Boundary
- Former Rail Line
- Study Area Limit
- Limit of Extraction (MHBC, 2023)
- Woodland Boundary
- Vegetation Communities

CUP3	Coniferous Plantation
CUP3-2	White Pine Coniferous Plantation
CUW1	Mineral Cultural Woodland
CVC_4	Extraction (Pits and Quarries)
FOC2-2	Dry-Fresh White Cedar Coniferous Forest
FOC4-1	Fresh-Moist White Cedar Coniferous Forest
FOC4-2	Fresh-Moist White Cedar-Hemlock Coniferous Forest
FODM4-12	Dry-Fresh Exotic Deciduous Forest
MEGM3	Dry-Fresh Graminoid Meadow
MEGM4	Fresh-Moist Graminoid Meadow
MEMM4	Fresh-Moist Mixed Meadow
OAGM1	Annual Row Crops
OAGM2	Perennial Cover Crop
OAGM4	Open Pasture
THCM1-2	Dry-Fresh Native Coniferous Regeneration Thicket
THDM2-6	Buckthorn Deciduous Shrub Thicket
SWD4-3	White Birch-Poplar Mineral Deciduous Swamp
SWM1-1	White Cedar-Hardwood Mineral Mixed Swamp
SWT2-2	Willow Mineral Thicket Swamp
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAM2-6	Broad-leaved Sedge Mineral Meadow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
HR(D)	Deciduous Hedgerow



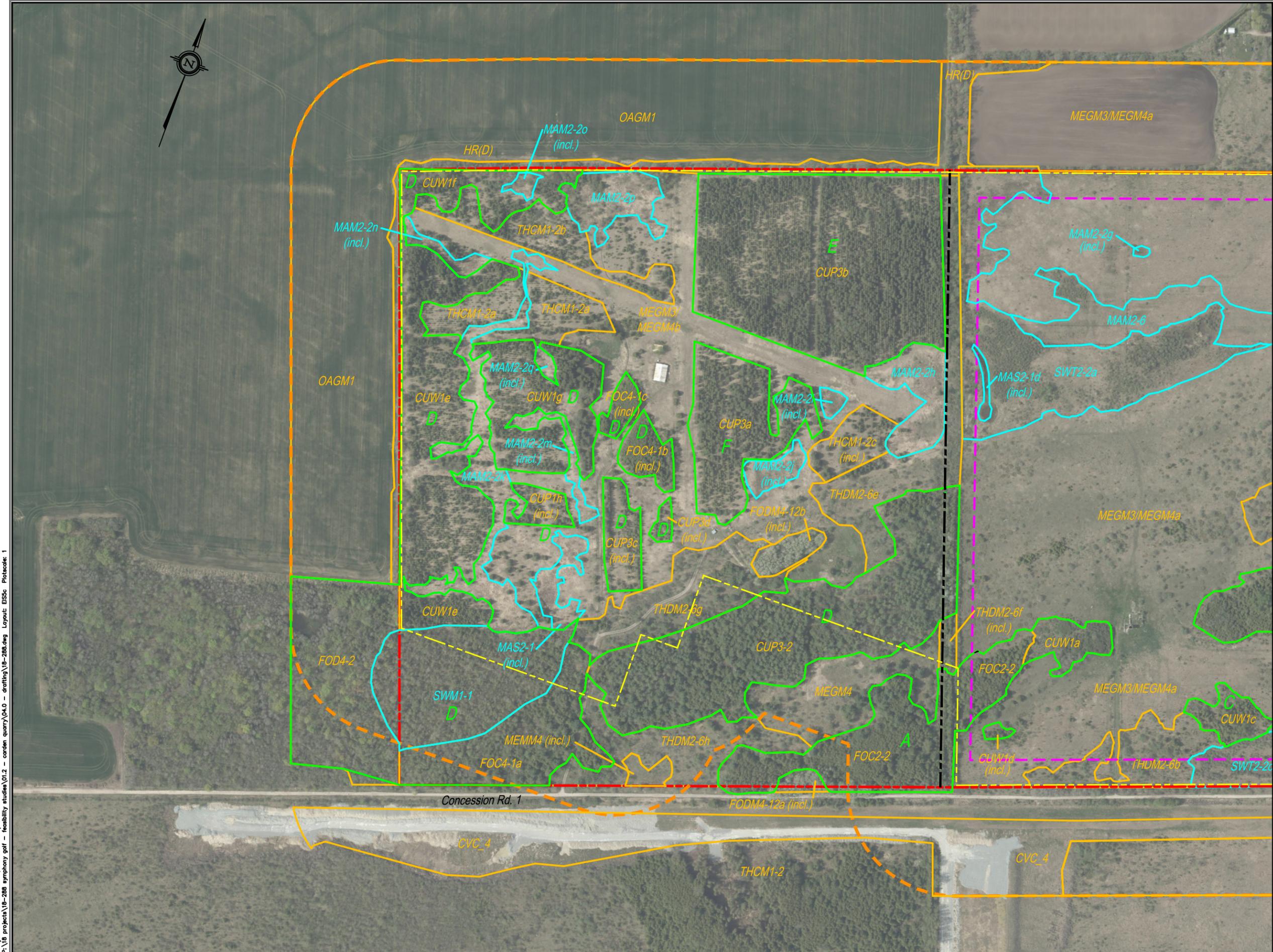
Woodland Assessment

**Brechin Quarry
Brechin, ON**

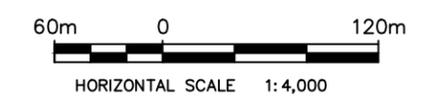
DATE ISSUED:	December 2023	Figure No.
CREATED BY:	JLM	4b
PROJECT NO.:	18-288b	
REFERENCE:	Simcoe County Maps	

Plotted by: ALJ on December 12, 2023 at 1:42pm
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DAYSTAMP: December 2023



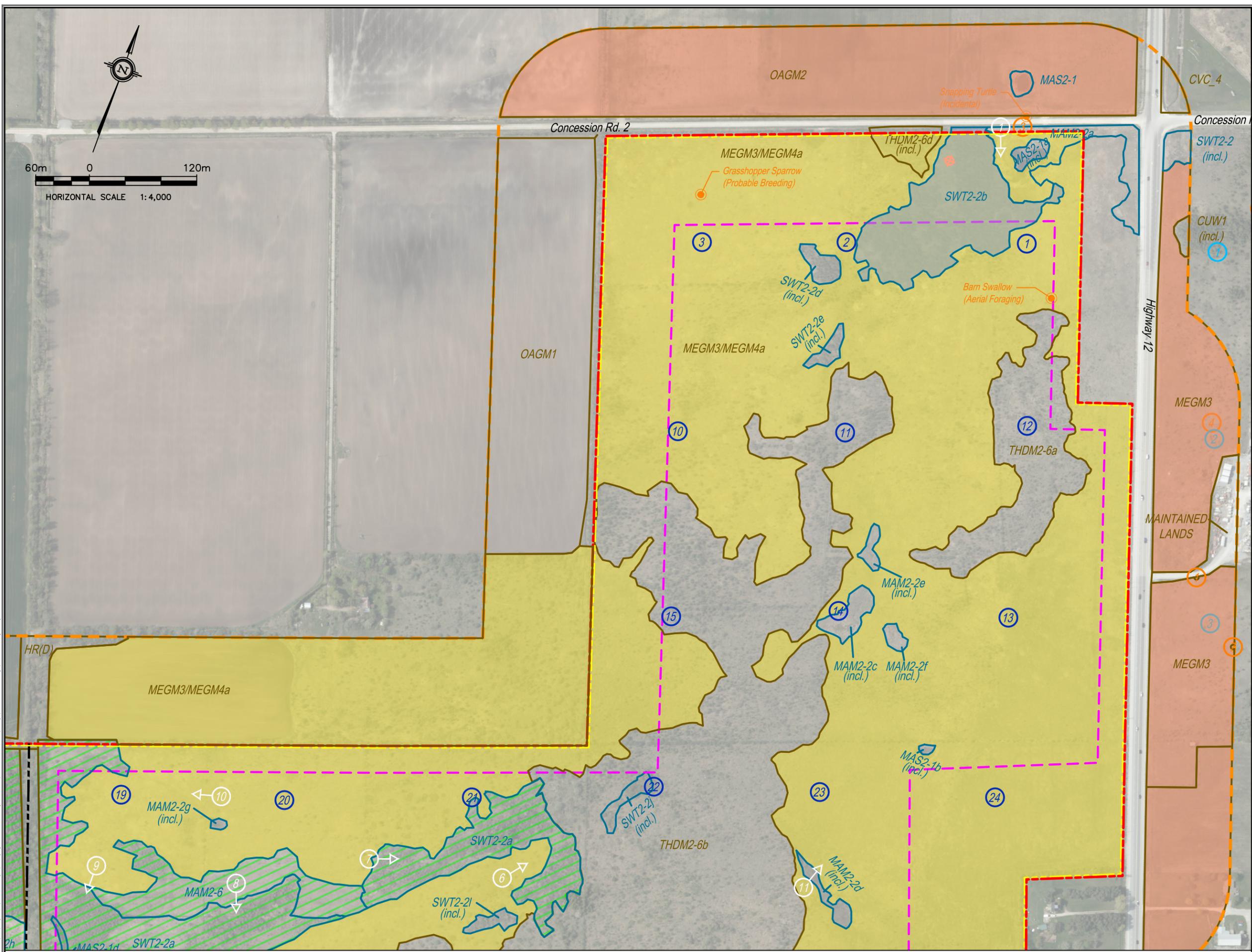
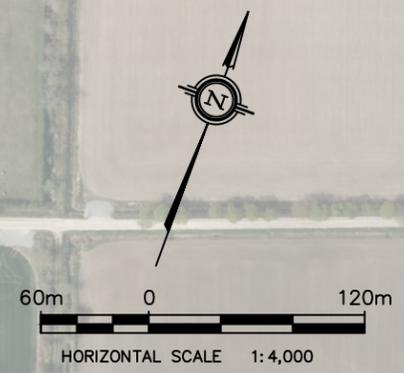
- LEGEND:**
- - - Approx. Property Boundary
 - - - License Boundary
 - - - Former Rail Line
 - Study Area Limit
 - - - Limit of Extraction (MHBC, 2023)
 - Woodland Boundary
 - Vegetation Communities
- | | |
|----------|---|
| CUP3 | Coniferous Plantation |
| CUP3-2 | White Pine Coniferous Plantation |
| CUW1 | Mineral Cultural Woodland |
| CVC_4 | Extraction (Pits and Quarries) |
| FOC2-2 | Dry-Fresh White Cedar Coniferous Forest |
| FOC4-1 | Fresh-Moist White Cedar Coniferous Forest |
| FOC4-2 | Fresh-Moist White Cedar-Hemlock Coniferous Forest |
| FODM4-12 | Dry-Fresh Exotic Deciduous Forest |
| MEGM3 | Dry-Fresh Graminoid Meadow |
| MEGM4 | Fresh-Moist Graminoid Meadow |
| MEMM4 | Fresh-Moist Mixed Meadow |
| OAGM1 | Annual Row Crops |
| OAGM2 | Perennial Cover Crop |
| OAGM4 | Open Pasture |
| THCM1-2 | Dry-Fresh Native Coniferous Regeneration Thicket |
| THDM2-6 | Buckthorn Deciduous Shrub Thicket |
| SWD4-3 | White Birch-Poplar Mineral Deciduous Swamp |
| SWM1-1 | White Cedar-Hardwood Mineral Mixed Swamp |
| SWT2-2 | Willow Mineral Thicket Swamp |
| MAM2-2 | Reed Canary Grass Mineral Meadow Marsh |
| MAM2-6 | Broad-leaved Sedge Mineral Meadow Marsh |
| MAS2-1 | Cattail Mineral Shallow Marsh |
| HR(D) | Deciduous Hedgerow |



Woodland Assessment

**Brechin Quarry
Brechin, ON**

DATE ISSUED: August 2023	Figure No.
CREATED BY: JLM	4c
PROJECT NO.: 18-288b	
REFERENCE: Simcoe County Maps	



LEGEND:

- Approx. Property Boundary
- License Boundary
- Former Rail Line
- Study Area Limit
- Limit of Extraction (MHBC, 2023)
- S Structures
- # Dawn Breeding Bird Point Count Station
- # Evening Breeding Bird Point Count Station
- ←# Amphibian Stations and Direction (white)
- Amphibian Breeding Habitat (Woodland)
- Terrestrial Crayfish Burrow
- Terrestrial Crayfish Habitat
- Bat Maternity Colonies
- Open Country Bird Breeding Habitat
- Monarch Habitat
- Shrub/Early Successional Bird Breeding Habitat
- Waterfowl Nesting Habitat (+120m adjacent lands)
- Species Observation
- **Vegetation Communities**

CUP3 Coniferous Plantation
CUP3-2 White Pine Coniferous Plantation
CUW1 Mineral Cultural Woodland
CVC_4 Extraction (Pits and Quarries)
FOC2-2 Dry-Fresh White Cedar Coniferous Forest
FOC4-1 Fresh-Moist White Cedar Coniferous Forest
FOC4-2 Fresh-Moist White Cedar-Hemlock Coniferous Forest
FODM4-12 Dry-Fresh Exotic Deciduous Forest
MEGM3 Dry-Fresh Graminoid Meadow
MEGM4 Fresh-Moist Graminoid Meadow
MEMM4 Fresh-Moist Mixed Meadow
OAGM1 Annual Row Crops
OAGM2 Perennial Cover Crop
OAGM4 Open Pasture
THCM1-2 Dry-Fresh Native Coniferous Regeneration Thicket
THDM2-6 Buckthorn Deciduous Shrub Thicket
SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
SWM1-1 White Cedar-Hardwood Mineral Mixed Swamp
SWT2-2 Willow Mineral Thicket Swamp
MAM2-2 Reed Canary Grass Mineral Meadow Marsh
MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh
MAS2-1 Cattail Mineral Shallow Marsh
HR(D) Deciduous Hedgerow

Notes:

- In addition to Bat Maternity Colonies within SWM1-1, treed areas and structures west of rail line may provide habitat for SAR bats
- Golden-winged Warbler: All lands >120m west of rail line, and THD/THCM1-2 south of Concession Road 1
- Eastern Wood-pewee and Wood Thrush: All woodlands >120m west of rail line.

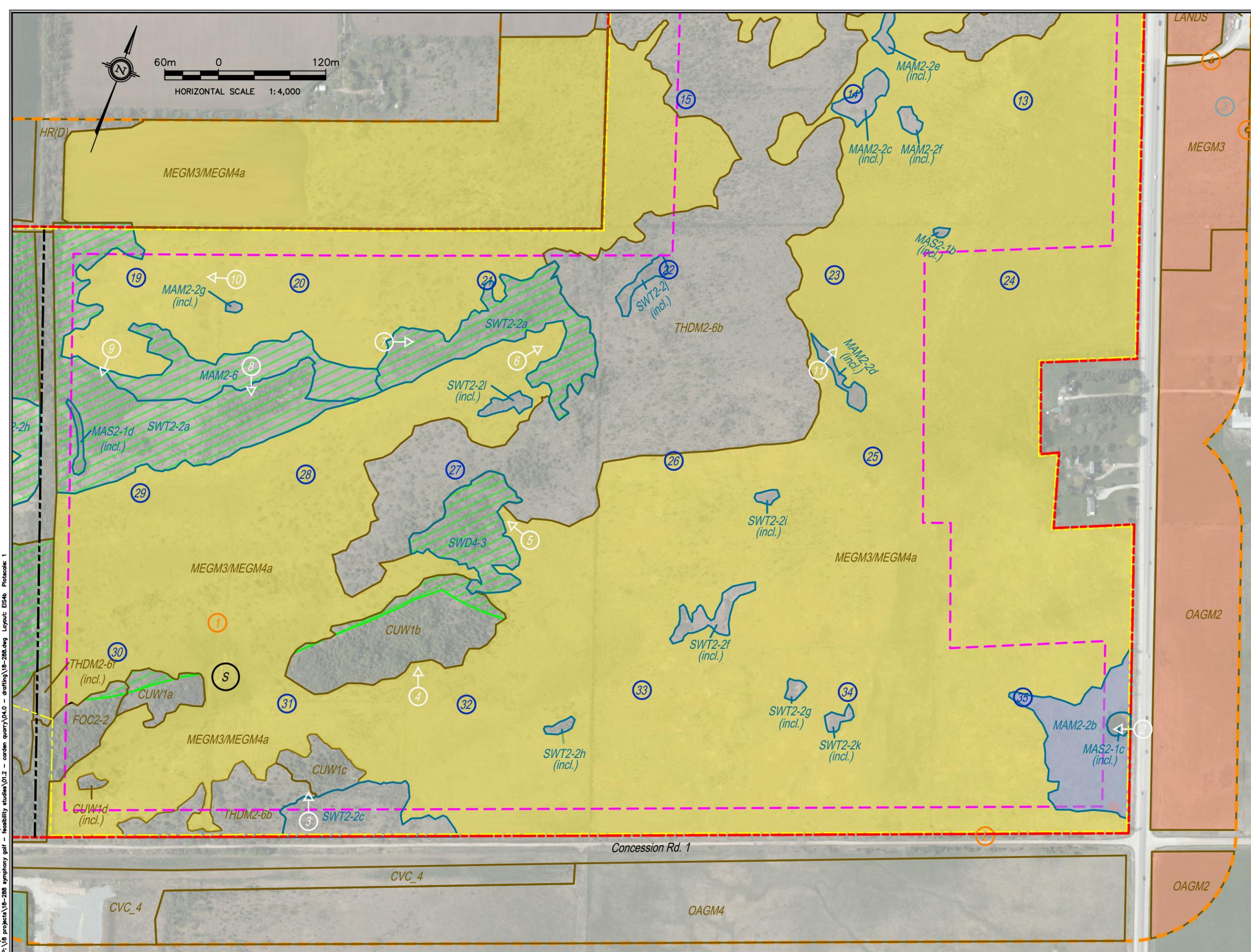


Significant Wildlife Habitat

**Brechin Quarry
Brechin, ON**

DATE ISSUED:	December 2023	Figure No.
CREATED BY:	JLM	5a
PROJECT NO.:	18-288b	
REFERENCE:	Simcoe County Maps	

Plotted by: ALJU on December 12, 2023 at 1:42pm
 File: P:\18_projects\18-288_symphony_golf - feasibility studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg
 Layout: EIS4a - Pictscale: 1
 DAYSTAMP: M:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg



- LEGEND:**
- Approx. Property Boundary
 - License Boundary
 - Former Rail Line
 - Study Area Limit
 - Limit of Extraction (MHBC, 2023)
 - S Structures
 - # Dawn Breeding Bird Point Count Station
 - # Evening Breeding Bird Point Count Station
 - # Amphibian Stations and Direction (white)
 - Amphibian Breeding Habitat (Woodland)
 - Terrestrial Crayfish Burrow
 - Terrestrial Crayfish Habitat
 - Bat Maternity Colonies
 - Open Country Bird Breeding Habitat
 - Monarch Habitat
 - Shrub/Early Successional Bird Breeding Habitat
 - Waterfowl Nesting Habitat (+120m adjacent lands)
 - Species Observation
- Vegetation Communities**

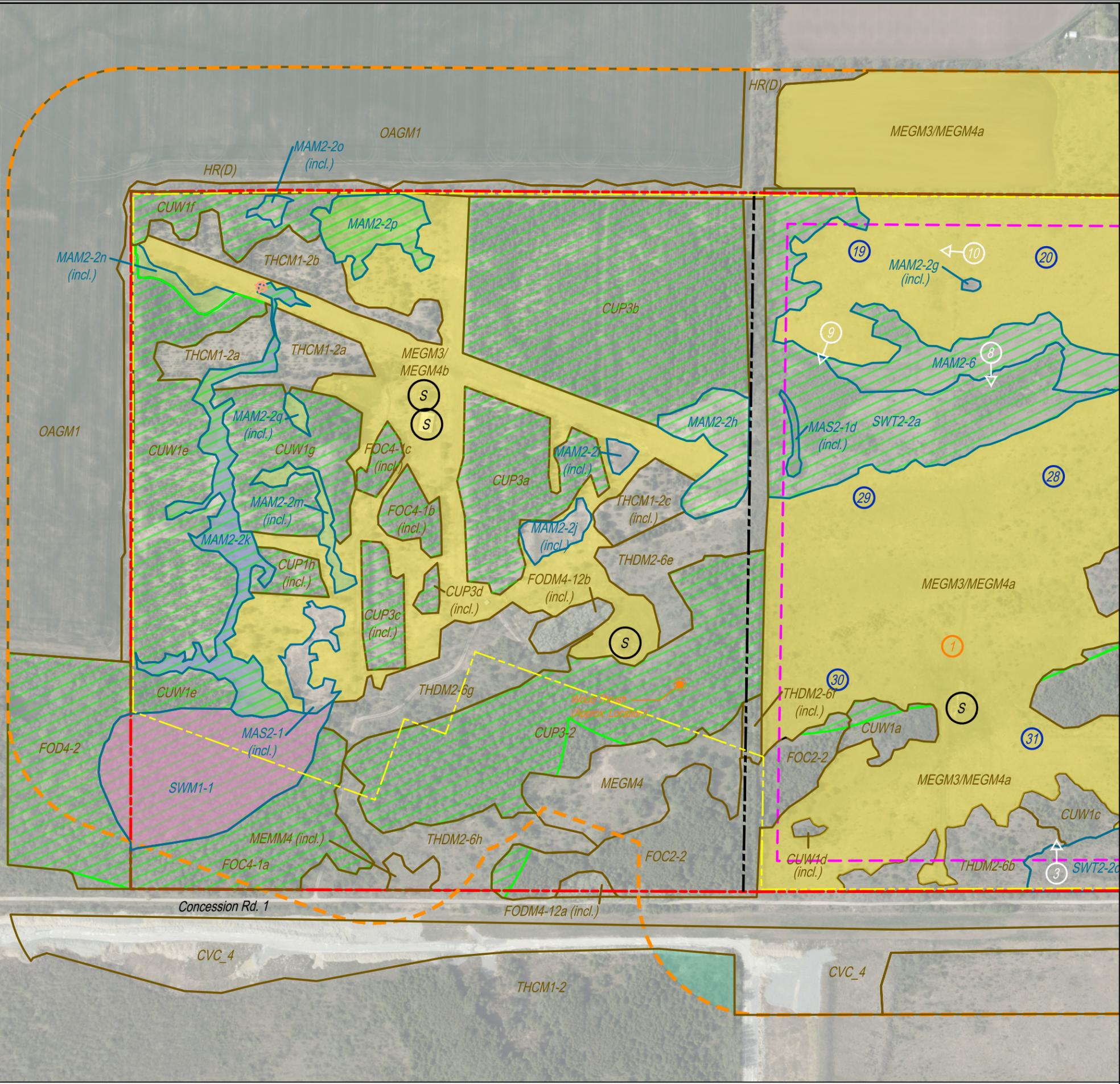
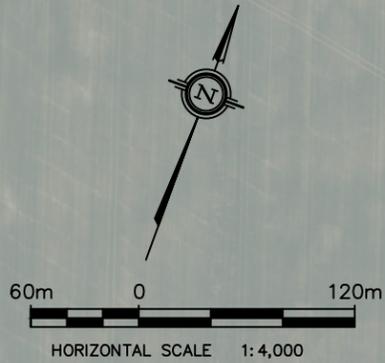
- CUP3 Coniferous Plantation
- CUP3-2 White Pine Coniferous Plantation
- CUW1 Mineral Cultural Woodland
- CVC_4 Extraction (Pits and Quarries)
- FOC2-2 Dry-Fresh White Cedar Coniferous Forest
- FOC4-1 Fresh-Moist White Cedar Coniferous Forest
- FOC4-2 Fresh-Moist White Cedar-Hemlock Coniferous Forest
- FODM4-12 Dry-Fresh Exotic Deciduous Forest
- MEGM3 Dry-Fresh Graminoid Meadow
- MEGM4 Fresh-Moist Graminoid Meadow
- MEMM4 Fresh-Moist Mixed Meadow
- OAGM1 Annual Row Crops
- OAGM2 Perennial Cover Crop
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- SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
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- MAM2-2 Reed Canary Grass Mineral Meadow Marsh
- MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh
- MAS2-1 Cattail Mineral Shallow Marsh
- HR(D) Deciduous Hedgerow

- Notes:**
- In addition to Bat Maternity Colonies within SWM1-1, treed areas and structures west of rail line may provide habitat for SAR bats
 - Golden-winged Warbler: All lands >120m west of rail line, and THD/THCM1-2 south of Concession Road 1
 - Eastern Wood-pewee and Wood Thrush: All woodlands >120m west of rail line.



Significant Wildlife Habitat	
Brechin Quarry Brechin, ON	
DATE ISSUED: December 2023	Figure No.
CREATED BY: JLM	5b
PROJECT NO.: 18-288b	
REFERENCE: Simcoe County Maps	

Plotted by: ALJ on December 12, 2023 at 1:42pm
 File: P:\18_projects\18-288_symphony_golf - feasibility studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg
 Layout: EIS4b PlotScale: 1



- LEGEND:**
- Approx. Property Boundary
 - License Boundary
 - Former Rail Line
 - Study Area Limit
 - Limit of Extraction (MHBC, 2023)
 - S Structures
 - # Dawn Breeding Bird Point Count Station
 - # Evening Breeding Bird Point Count Station
 - ← # Amphibian Stations and Direction (white)
 - Amphibian Breeding Habitat (Woodland)
 - Terrestrial Crayfish Burrow
 - Terrestrial Crayfish Habitat
 - Bat Maternity Colonies
 - Open Country Bird Breeding Habitat
 - Monarch Habitat
 - Shrub/Early Successional Bird Breeding Habitat
 - Waterfowl Nesting Habitat (+120m adjacent lands)
 - Species Observation
 - **Vegetation Communities**

- CUP3 Coniferous Plantation
- CUP3-2 White Pine Coniferous Plantation
- CUW1 Mineral Cultural Woodland
- CVC_4 Extraction (Pits and Quarries)
- FOC2-2 Dry-Fresh White Cedar Coniferous Forest
- FOC4-1 Fresh-Moist White Cedar Coniferous Forest
- FOC4-2 Fresh-Moist White Cedar-Hemlock Coniferous Forest
- FODM4-12 Dry-Fresh Exotic Deciduous Forest
- MEGM3 Dry-Fresh Graminoid Meadow
- MEGM4 Fresh-Moist Graminoid Meadow
- MEMM4 Fresh-Moist Mixed Meadow
- OAGM1 Annual Row Crops
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- OAGM4 Open Pasture
- THCM1-2 Dry-Fresh Native Coniferous Regeneration Thicket
- THDM2-6 Buckthorn Deciduous Shrub Thicket
- SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
- SWM1-1 White Cedar-Hardwood Mineral Mixed Swamp
- SWT2-2 Willow Mineral Thicket Swamp
- MAM2-2 Reed Canary Grass Mineral Meadow Marsh
- MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh
- MAS2-1 Cattail Mineral Shallow Marsh
- HR(D) Deciduous Hedgerow

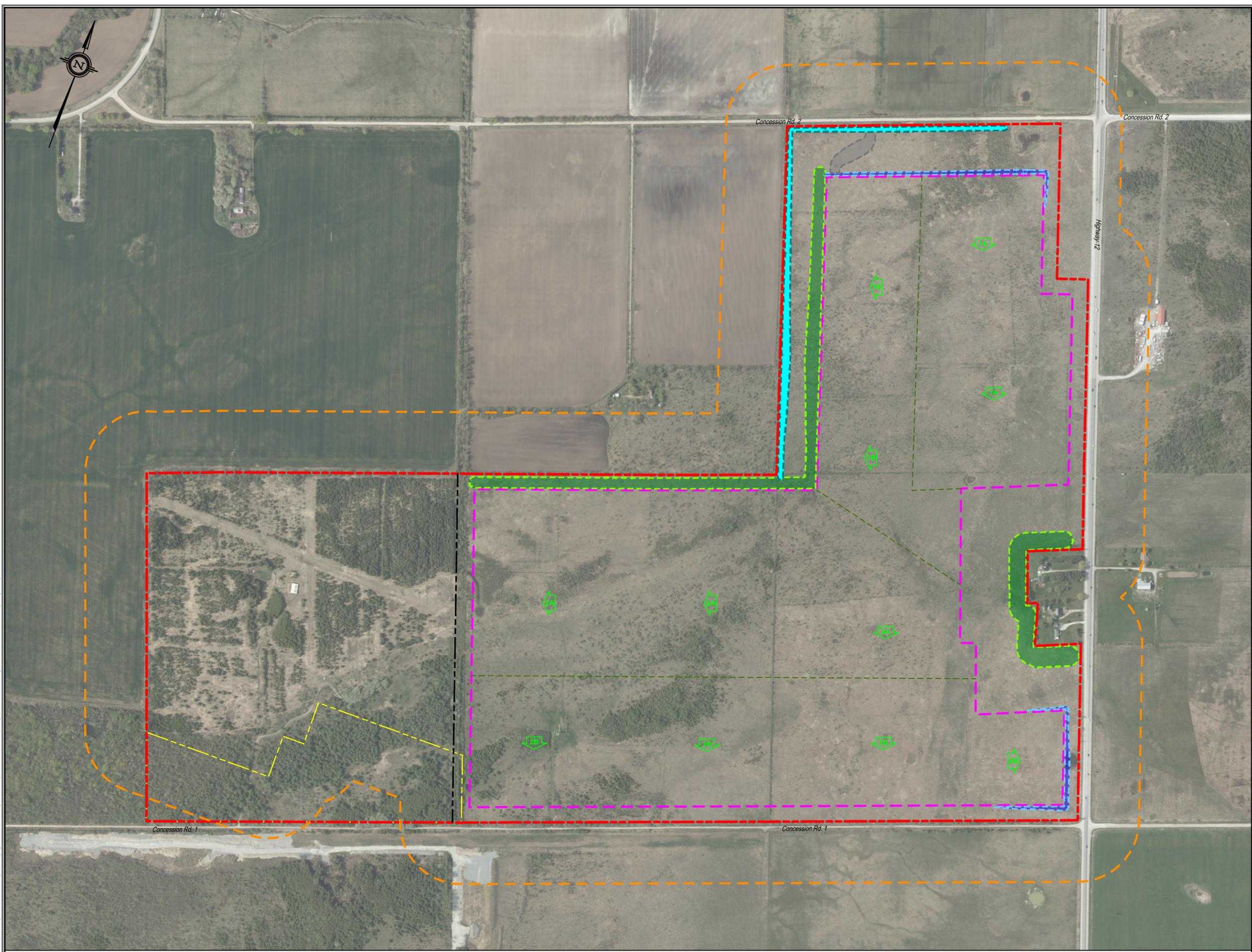
- Notes:**
- In addition to Bat Maternity Colonies within SWM1-1, treed areas and structures west of rail line may provide habitat for SAR bats
 - Golden-winged Warbler: All lands >120m west of rail line, and THD/THCM1-2 south of Concession Road 1
 - Eastern Wood-pewee and Wood Thrush: All woodlands >120m west of rail line.



Significant Wildlife Habitat	
Brechin Quarry Brechin, ON	
DATE ISSUED: December 2023	Figure No.
CREATED BY: JLM	5c
PROJECT NO.: 18-288b	
REFERENCE: Simcoe County Maps	

Plotted by: ALJU on December 12, 2023 at 1:43pm
 File: P:\18_projects\18-288_symphony_golf - feasibility studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg Layout: EIS4c PlotScale: 1

Plotted by: ALJ on December 12, 2023 at 1:45pm
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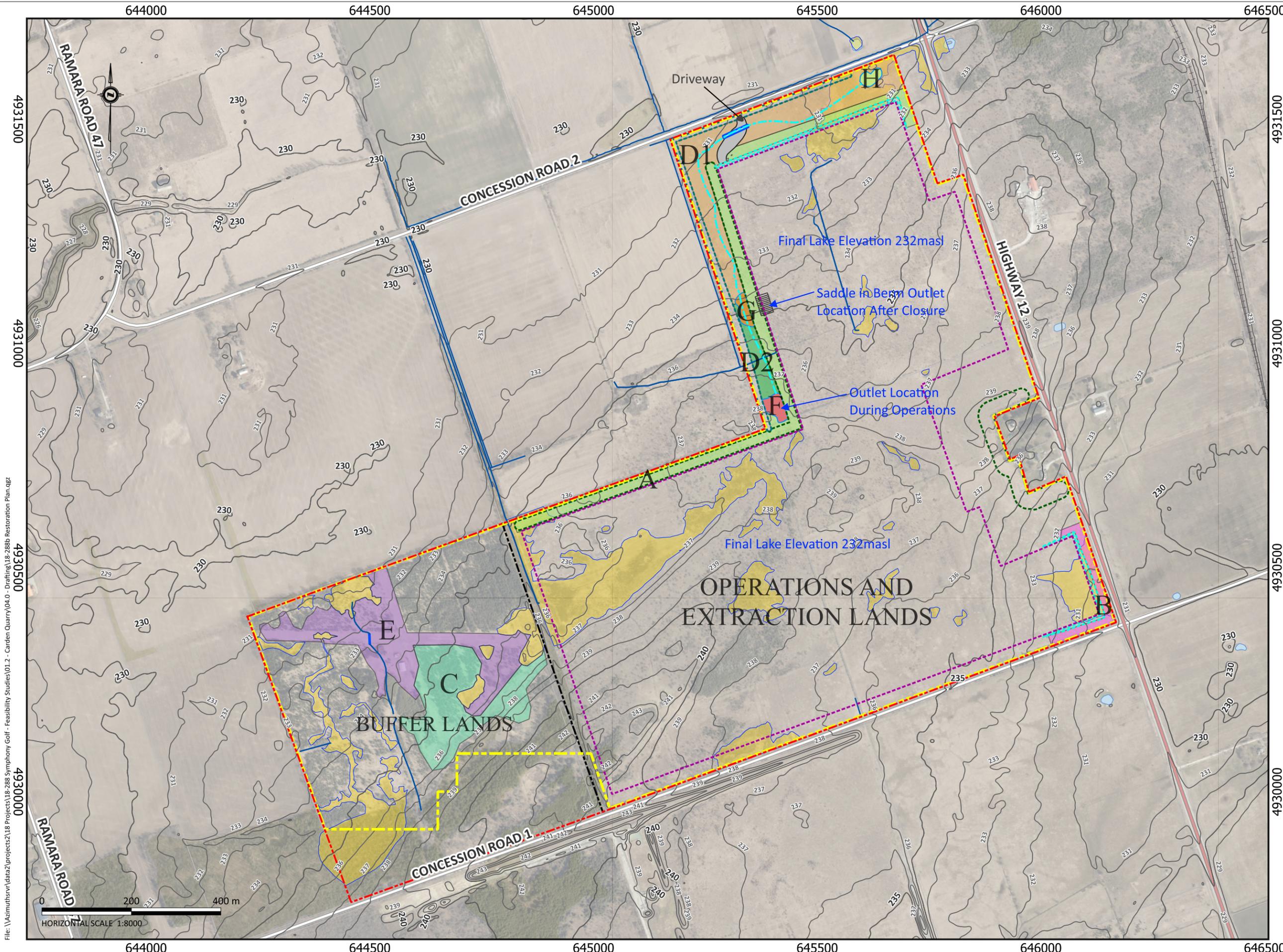
- LEGEND:**
- Approx. Property Boundary
 - License Boundary
 - Former Rail Line
 - Study Area Limit
 - Limit of Extraction (MHBC, 2023)
 - █ Berm - Noise Attenuation
 - █ Berm - Habitat Corridor Water Retention
 - █ Berm - Final Lake Water Retention
 - █ Access Road

NOTES:
 1. Refer to Appendix A for drainage feature mapping prepared by RiverStone.

60m 0 120m
 HORIZONTAL SCALE 1:4,000



Quarry Operations	
Brechin Quarry Brechin, ON	
DATE ISSUED:	December 2023
CREATED BY:	JLM
PROJECT NO.:	18-288b
REFERENCE:	Simcoe County Maps
Figure No.	6



LEGEND

- Approx. Property Boundary
- License Boundary
- MHBC Limit of Extraction
- Waterbody
- Drainage Feature
- Road
- Highway

Contours (OMAFRA DTM 2022 Derived)

- Major Contour - 5m Intervals
- Minor Contour - 1m Intervals
- Constructed Watercourse for Water Management Programme
- Existing Wetlands

Restoration Areas

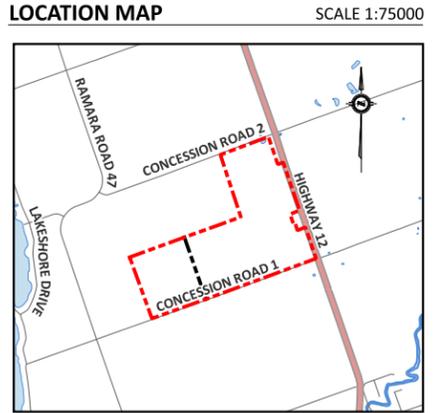
- Area A: Upland Planting Zone(4.6ha)
- Area B: Upland Planting Zone(0.8ha)
- Area C: Upland Planting Zone (Woodland Rehabilitation - Linkage)(4.1ha)
- Area D1: Wetland Edge Planting Zone (During Operations and Closure)(4.2ha)
- Area D2: Wetland Edge Planting Zone (During Operations - Upland After Closure) (0.6ha)
- Area E: Wetland Edge Planting Zone (Creek / Wetland Rehabilitation)(5.2ha)

Permanently Flooded Zone

- Area F: Permanently Flooded Zone(0.22ha)
- Area G: Permanently Flooded Zone(0.17ha)
- Area H: Permanently Flooded Zone(0.13ha)

MHBC Berm Footprint

- Berm - Final Lake Water Retention
- Berm - Habitat Corridor Water Retention
- Berm - Noise Attenuation



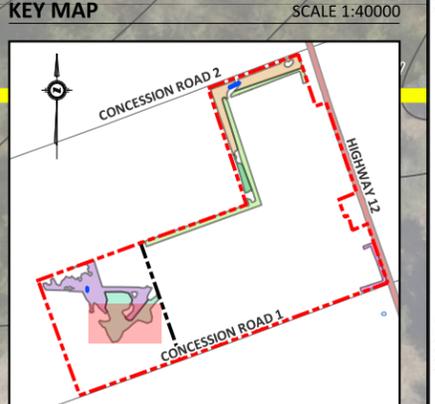
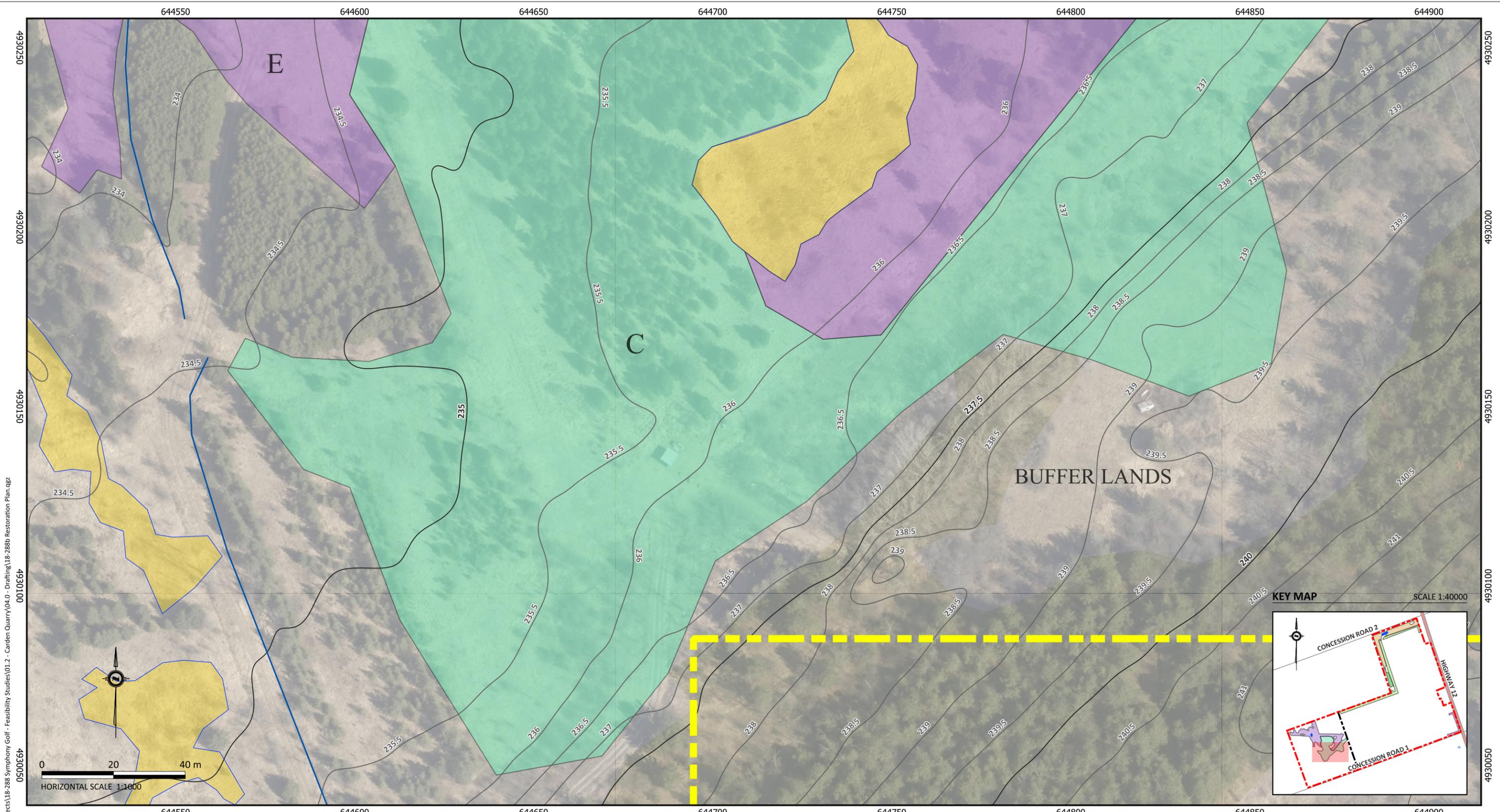
AZIMUTH ENVIRONMENTAL CONSULTING, INC.
ENVIRONMENTAL ASSESSMENTS & APPROVALS

NATURAL RESTORATION PLAN - KEY MAP

**BRECHIN QUARRY
BRECHIN, ON**

DATE ISSUED: DECEMBER 2023	Figure No.
CREATED BY: A.L.	7
PROJECT NO.: 18-288b	
BASE MAP: Simcoe County	

File: \\Azimuths\svr\data2\projects\18-288\Symphony Golf - Feasibility Studies\101.2 - T10\Quarry - Drafting\Quarry - Drafting\Restoration Plan.dwg



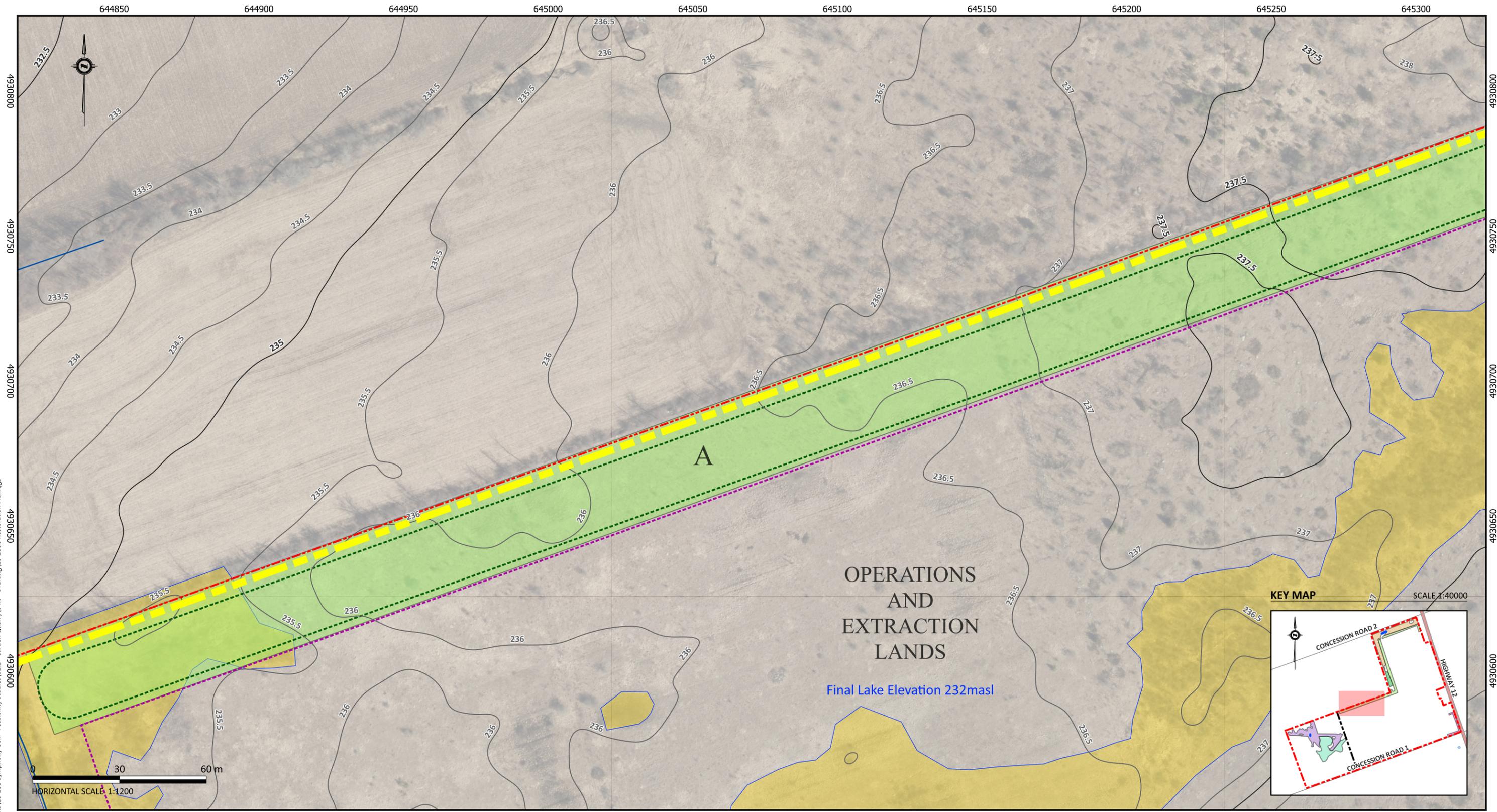
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- LEGEND**
- Approx. Property Boundary
 - License Boundary
 - Drainage Feature
 - Existing Wetlands
- Contours (OMAFRA DTM 2022 Derived)**
- Major Contour - 2.5m Intervals
 - Minor Contour - 0.5m Intervals

- Restoration Areas**
- Area C: Upland Planting Zone (Woodland Rehabilitation - Linkage) (4.1ha)
 - Area E: Wetland Edge Planting Zone (Creek / Wetland Rehabilitation) (5.2ha)

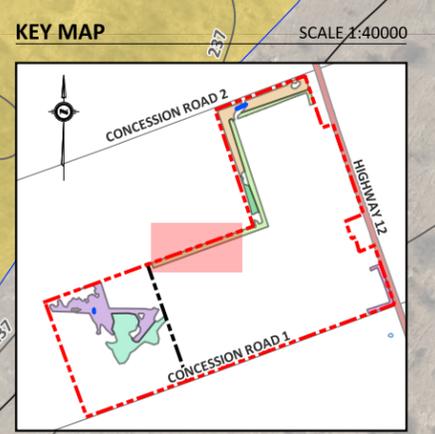
- NOTES**
- Refer to Figure 71 for General Planting Instructions and Planting Specifications Table.

BRECHIN QUARRY BRECHIN, ON		NATURAL RESTORATION PLAN - AREA C & E	
 AZIMUTH ENVIRONMENTAL CONSULTING, INC. ENVIRONMENTAL ASSESSMENTS & APPROVALS		DATE ISSUED: DECEMBER 2023	Figure No.
		CREATED BY: A.L.	7A
		PROJECT NO.: 18-2888b	
		BASE MAP: Simcoe County	



OPERATIONS AND EXTRACTION LANDS

Final Lake Elevation 232masl



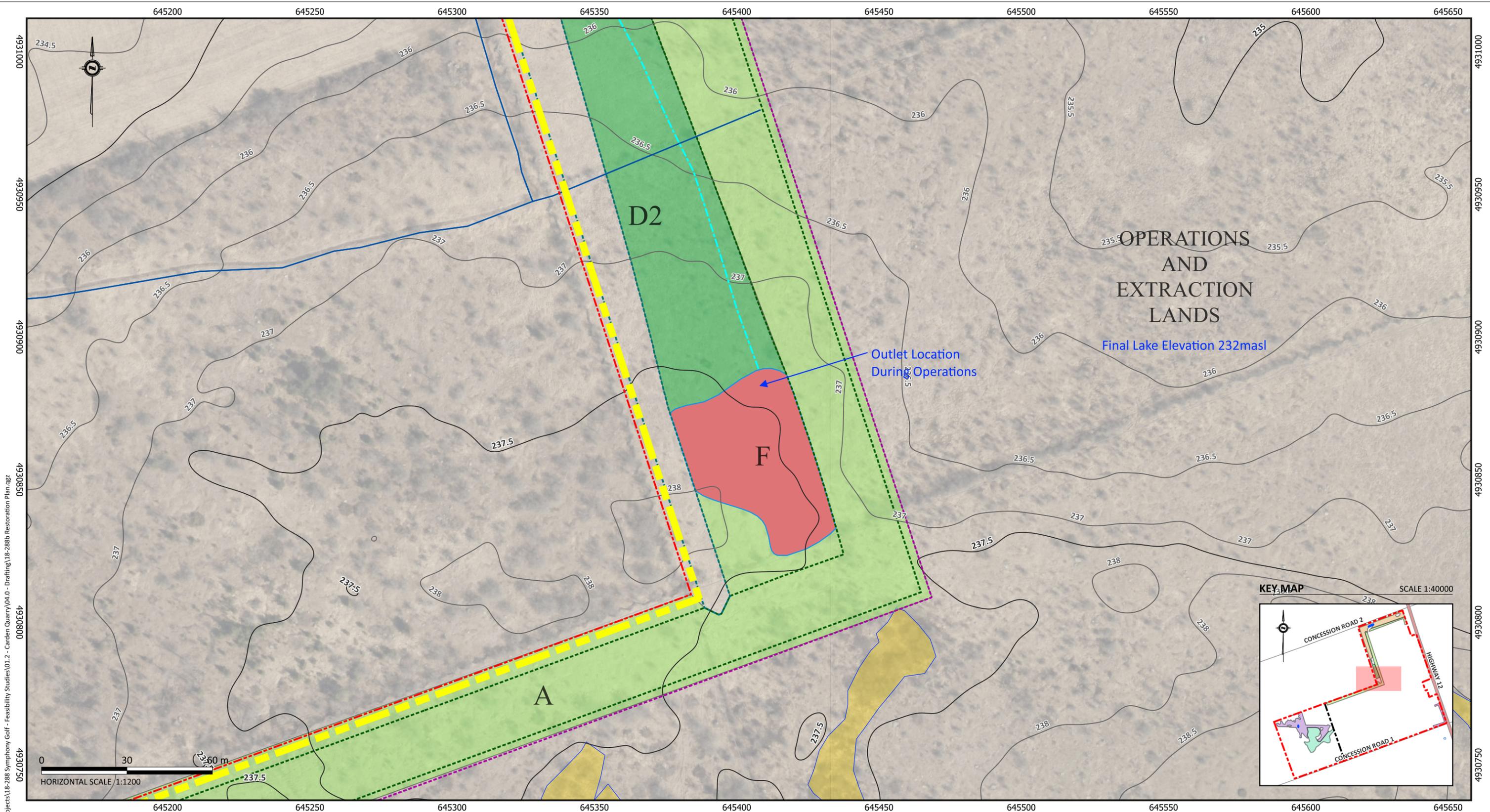
- LEGEND**
- Approx. Property Boundary
 - License Boundary
 - MHBC Limit of Extraction
 - Drainage Feature
 - Existing Wetlands
 - Contours (OMAFRA DTM 2022 Derived)**
 - 102.5 Major Contour - 2.5m Intervals
 - 100 Minor Contour - 0.5m Intervals

- Restoration Areas**
- Area A: Upland Planting Zone
 - MHBC Berm Footprint**
 - Berm - Noise Attenuation

- NOTES**
1. Refer to Figure 71 for General Planting Instructions and Planting Specifications Table.

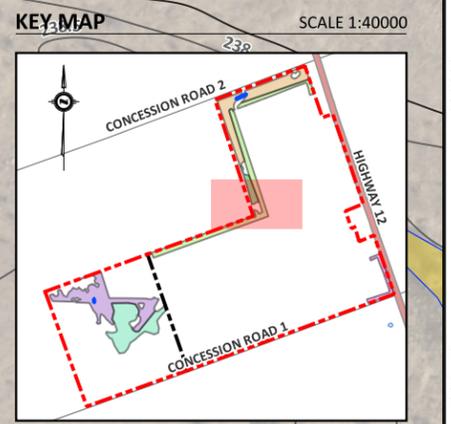
BRECHIN QUARRY BRECHIN, ON		NATURAL RESTORATION PLAN - AREA A	
 ENVIRONMENTAL ASSESSMENTS & APPROVALS		DATE ISSUED: DECEMBER 2023	Figure No.
		CREATED BY: A.L.	7C
		PROJECT NO.: 18-288b	
		BASE MAP: Simcoe County	

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OPERATIONS AND EXTRACTION LANDS
 Final Lake Elevation 232masl

Outlet Location During Operations



LEGEND

	Approx. Property Boundary
	License Boundary
	MHBC Limit of Extraction
	Drainage Feature
	Existing Wetlands
Contours (OMAFRA DTM 2022 Derived)	
	Major Contour - 2.5m Intervals
	Minor Contour - 0.5m Intervals

	Constructed Watercourse for Water Management Programme
Restoration Areas	
	Area A: Upland Planting Zone (4.6ha)
	Area D2: Wetland Edge Planting Zone (During Operations - Upland After Closure) (0.6ha)
	Area F: Permanently Flooded Zone(0.22ha)

MHBC Berm Footprint

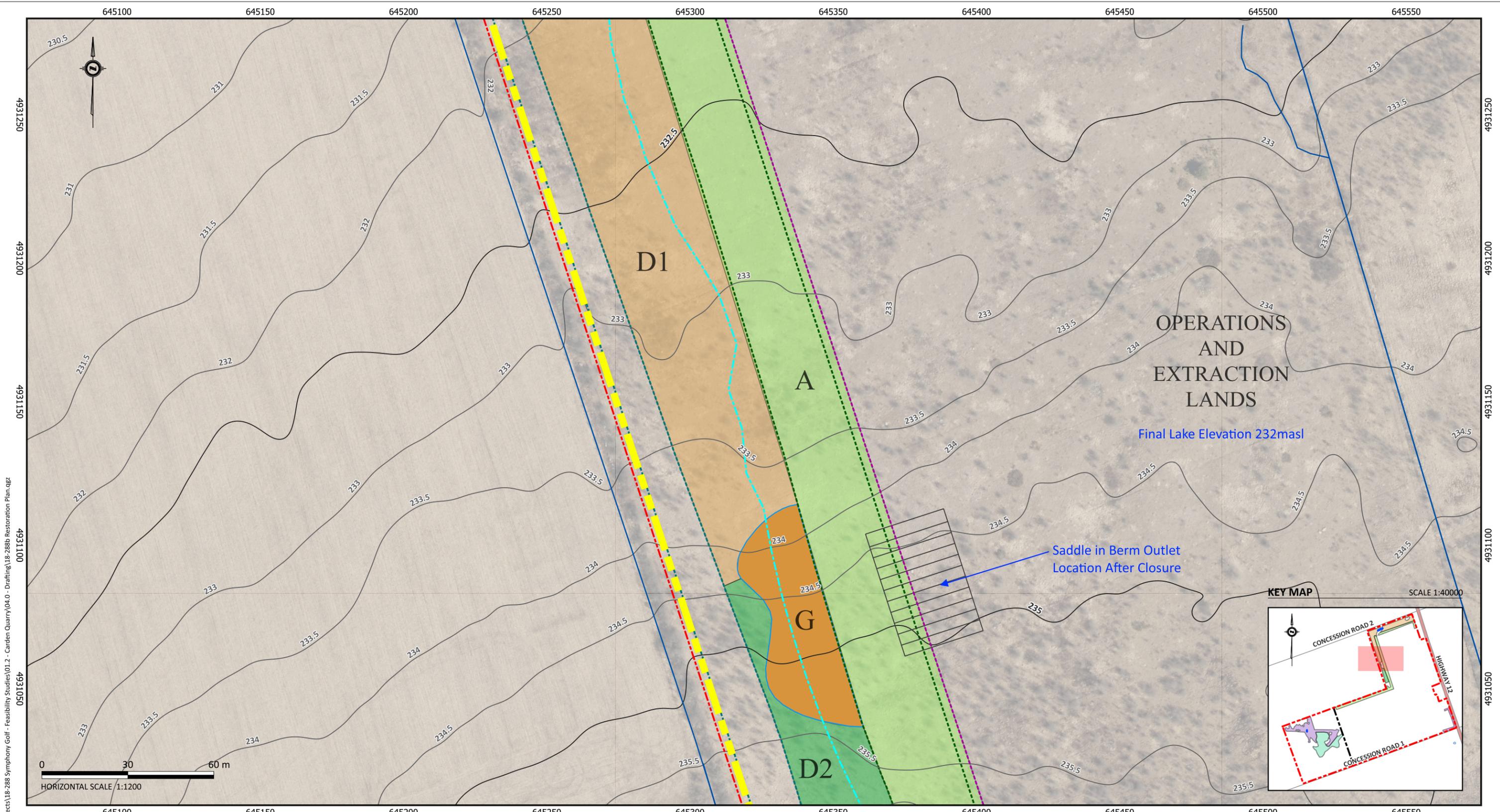
	Berm - Habitat Corridor Water Retention
	Berm - Noise Attenuation

NOTES

1. Refer to Figure 71 for General Planting Instructions and Planting Specifications Table.

BRECHIN QUARRY BRECHIN, ON		NATURAL RESTORATION PLAN - AREA A, D2 & F	
 ENVIRONMENTAL ASSESSMENTS & APPROVALS		DATE ISSUED: DECEMBER 2023	Figure No.
		CREATED BY: A.L.	7D
		PROJECT NO.: 18-288b	
		BASE MAP: Simcoe County	

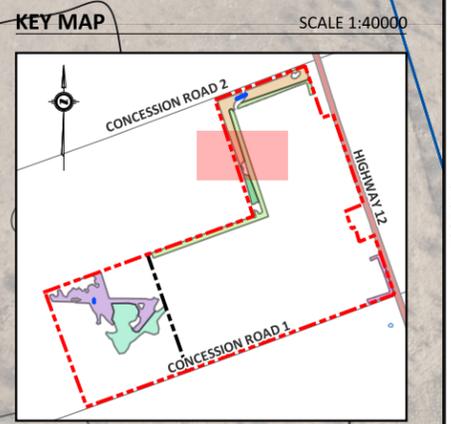
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OPERATIONS AND EXTRACTION LANDS

Final Lake Elevation 232masl

Saddle in Berm Outlet Location After Closure



- LEGEND**
- Approx. Property Boundary
 - License Boundary
 - MHBC Limit of Extraction
 - Drainage Feature
 - Contours (OMAFRA DTM 2022 Derived)**
 - 2.5 Major Contour - 2.5m Intervals
 - 0.5 Minor Contour - 0.5m Intervals

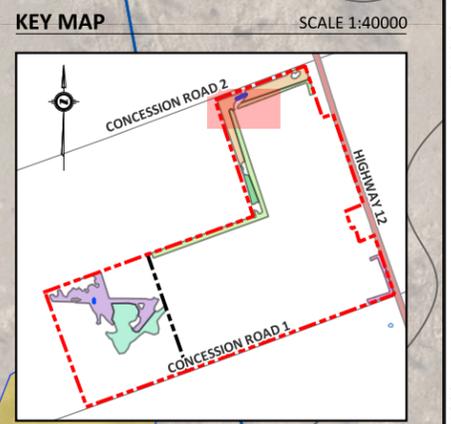
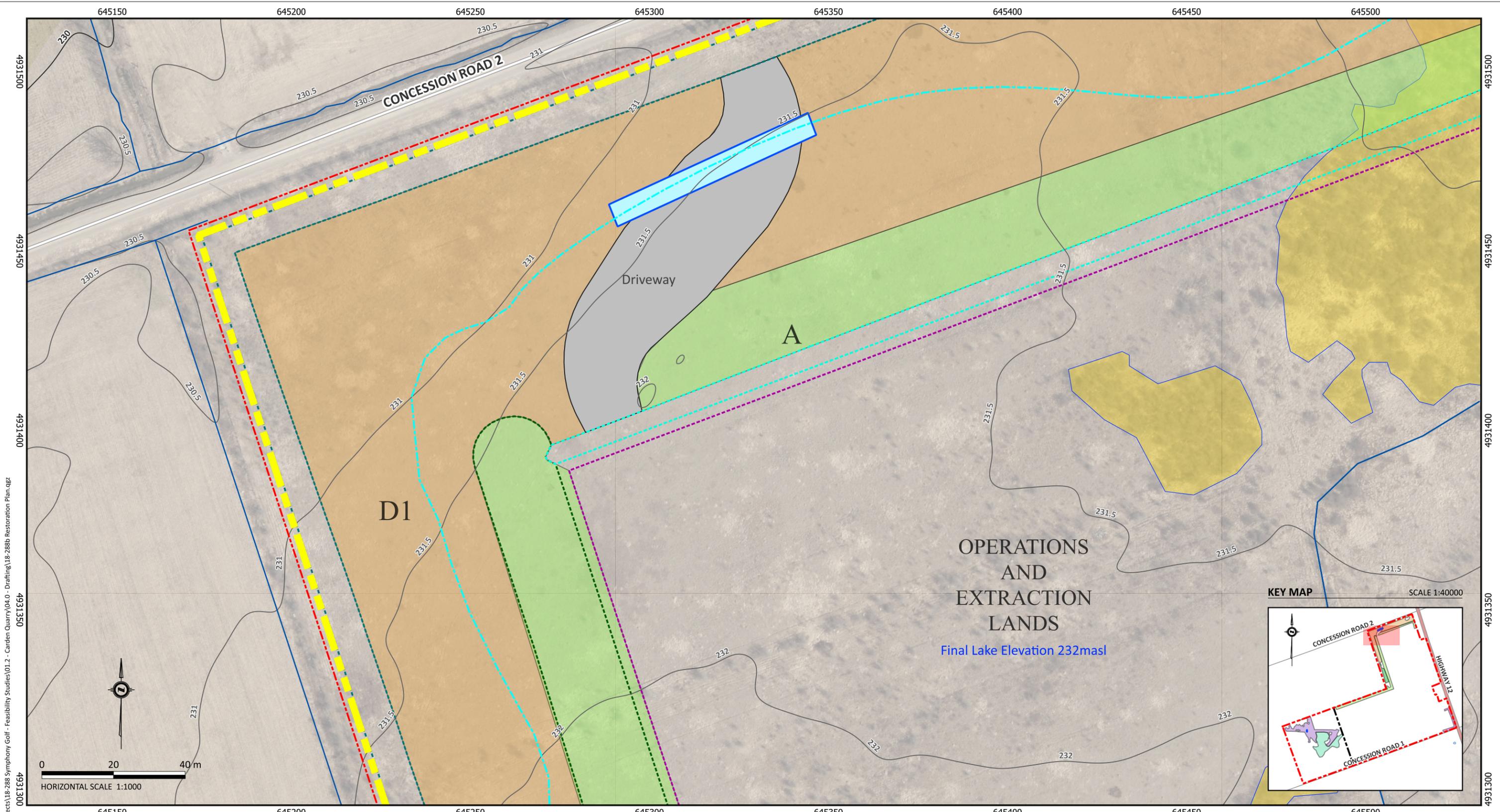
- Restoration Areas**
- Area A: Upland Planting Zone (4.6ha)
 - Area D1: Wetland Edge Planting Zone (During Operations and Closure) (4.2ha)
 - Area D2: Wetland Edge Planting Zone (During Operations - Upland After Closure) (0.6ha)

- Area G: Permanently Flooded Zone(0.17ha)**
- Area G: Permanently Flooded Zone(0.17ha)
 - MHBC Berm Footprint**
 - Berm - Habitat Corridor Water Retention
 - Berm - Noise Attenuation

- NOTES**
- Refer to Figure 71 for General Planting Instructions and Planting Specifications Table.

BRECHIN QUARRY BRECHIN, ON		NATURAL RESTORATION PLAN - AREA A, D1, D2 & F	
		DATE ISSUED: DECEMBER 2023	Figure No.
		CREATED BY: A.L.	7E
		PROJECT NO.: 18-288b	
		BASE MAP: Simcoe County	

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- LEGEND**
- Approx. Property Boundary
 - License Boundary
 - MHBC Limit of Extraction
 - Drainage Feature
 - Existing Wetlands
 - Culvert
 - Road

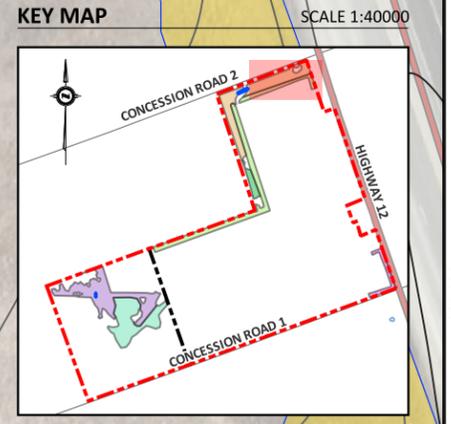
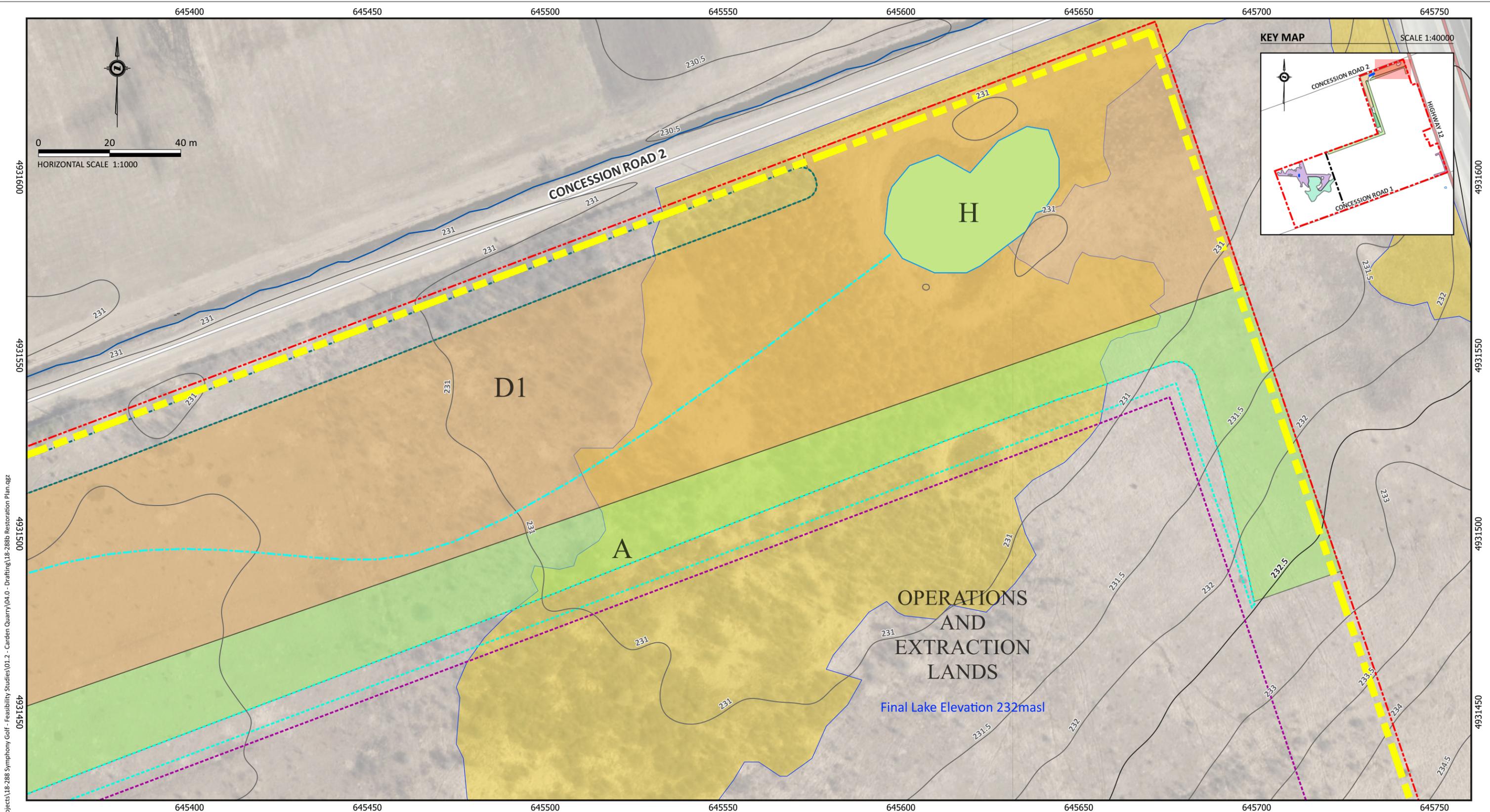
- Contours (OMAFRA DTM 2022 Derived)**
- Major Contour - 2.5m Intervals
 - Minor Contour - 0.5m Intervals
- Restoration Areas**
- Area A: Upland Planting Zone (4.6ha)
 - Area D1: Wetland Edge Planting Zone (During Operations and Closure) (4.2ha)

- MHBC Berm Footprint**
- Berm - Final Lake Water Retention
 - Berm - Habitat Corridor Water Retention
 - Berm - Noise Attenuation

- NOTES**
- Refer to Figure 71 for General Planting Instructions and Planting Specifications Table.

BRECHIN QUARRY BRECHIN, ON		NATURAL RESTORATION PLAN - AREA A & D1	
 AZIMUTH ENVIRONMENTAL CONSULTING, INC. ENVIRONMENTAL ASSESSMENTS & APPROVALS		DATE ISSUED: DECEMBER 2023	Figure No. 7F
		CREATED BY: A.L.	
		PROJECT NO.: 18-288b	
		BASE MAP: Simcoe County	

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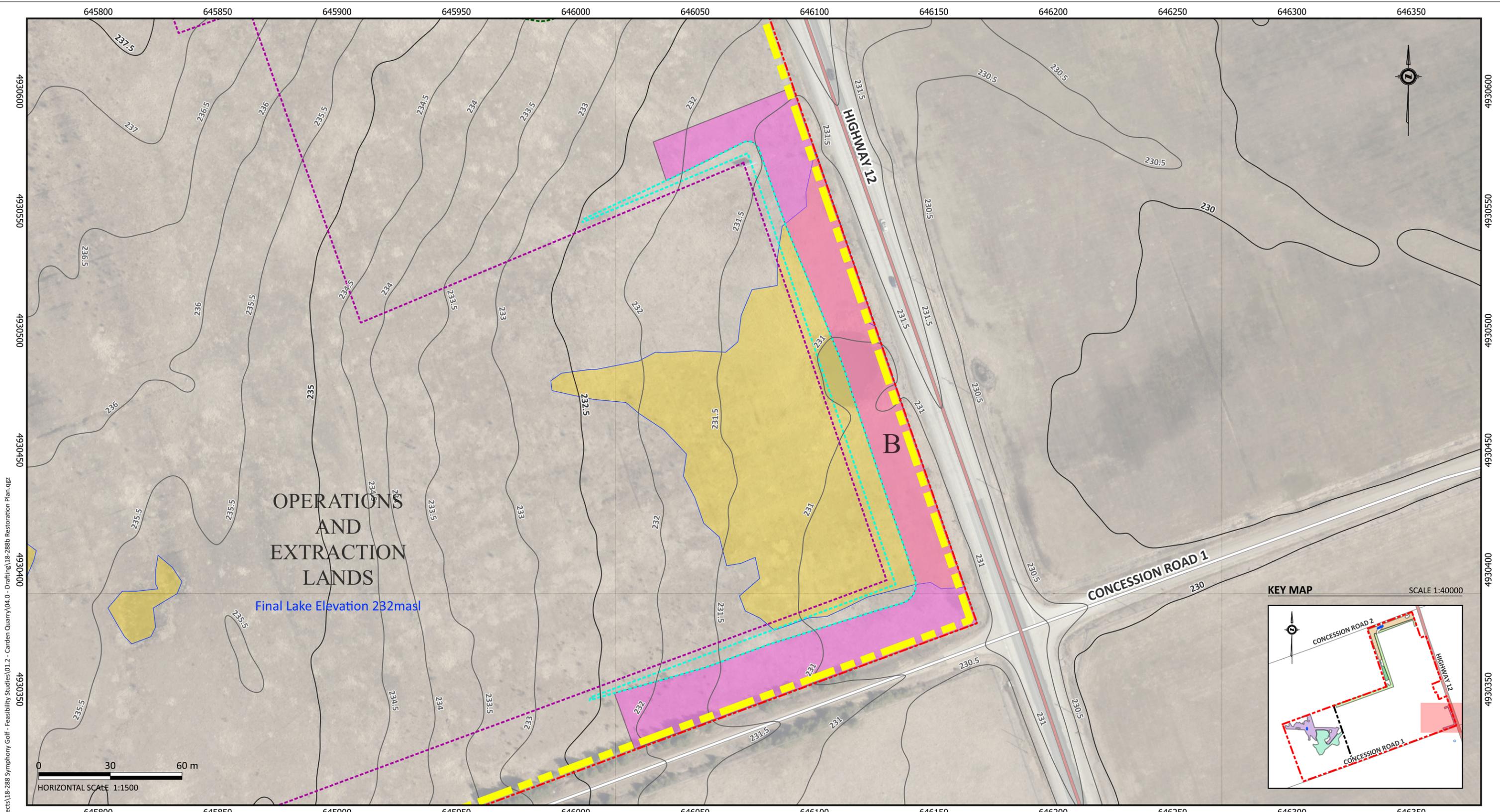
- LEGEND**
- Approx. Property Boundary
 - License Boundary
 - MHBC Limit of Extraction
 - Existing Wetlands
 - Drainage Feature
 - Road
 - Highway
 - Contours (OMAFRA DTM 2022 Derived)**
 - Major Contour - 2.5m Intervals

- Minor Contour - 0.5m Intervals
- Constructed Watercourse for Water Management Programme
- Restoration Areas**
- Area A: Upland Planting Zone (4.6ha)
- Area D1: Wetland Edge Planting Zone (During Operations and Closure) (4.2ha)
- Area H: Permanently Flooded Zone(0.13ha)**
- Area H: Permanently Flooded Zone(0.13ha)

- MHBC Berm Footprint**
- Berm - Final Lake Water Retention
 - Berm - Habitat Corridor Water Retention

- NOTES**
1. Refer to Figure 71 for General Planting Instructions and Planting Specifications Table.

<p>BRECHIN QUARRY BRECHIN, ON</p> <p>ENVIRONMENTAL ASSESSMENTS & APPROVALS</p>		<p>NATURAL RESTORATION PLAN - AREA A, D1 & H</p>	
DATE ISSUED: DECEMBER 2023		Figure No.	
CREATED BY: A.L.		7G	
PROJECT NO.: 18-2888b			
BASE MAP: Simcoe County			



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- LEGEND**
- Approx. Property Boundary
 - License Boundary
 - MHBC Limit of Extraction
 - Existing Wetlands
 - Road
 - Highway
 - Contours (OMAFRA DTM 2022 Derived)**
 - Major Contour - 2.5m Intervals
 - Minor Contour - 0.5m Intervals

- Area B: Upland Planting Zone (0.8ha)**
- Area B: Upland Planting Zone (0.8ha)
 - MHBC Berm Footprint**
 - Berm - Final Lake Water Retention
 - Berm - Noise Attenuation

- NOTES**
1. Refer to Figure 71 for General Planting Instructions and Planting Specifications Table.

<p>BRECHIN QUARRY BRECHIN, ON</p> <p><i>ENVIRONMENTAL ASSESSMENTS & APPROVALS</i></p>	<p>NATURAL RESTORATION PLAN - AREA B</p>	<p>Figure No.</p> <p style="font-size: 2em; font-weight: bold;">7H</p>
<p>DATE ISSUED: DECEMBER 2023</p> <p>CREATED BY: A.L.</p> <p>PROJECT NO.: 18-288b</p> <p>BASE MAP: Simcoe County</p>		

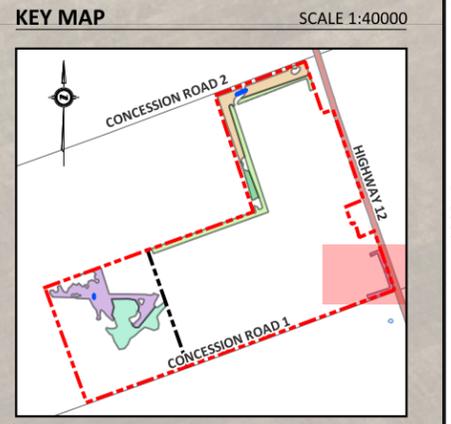


Table 1: Site Investigation Record

Lots 11, 12 13, Concession 1, Brechin Quarry

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
04-Feb-19	08:00-17:30	6	2	100	None, Snowpack 10-25 cm	Site Reconnaissance Survey Raptor Wintering #1
11-Feb-19	08:00-15:30	-8	3	50	None, Snowpack 20-40 cm	Site Reconnaissance Survey Raptor Wintering #2
25-Apr-19	16:00-22:15	12 (min), 17 (max)	1	20	None	Bat Snag Assessment Turtle Emergence #1 Waterfowl Stopover/Nesting #1 Amphibian Breeding #1
29-Apr-19	08:00-14:00	3 (min), 7 (max)	3	40-100 (hazy, thin)	None	Bat Snag Assessment Watercourse Assessment #1 Waterfowl Stopover/Nesting #2
07-May-19	12:30-15:30	9 (min), 11 (max)	3	0	None	Turtle Emergence #2 Waterfowl Stopover/Nesting #3 Reptile Observations (Incidental)
08-May-19	09:15-12:15	7 (min), 9 (max)	3	0	None	Turtle Emergence #3 Waterfowl Stopover/Nesting #4

Table 1: Site Investigation Record

Lots 11, 12 13, Concession 1, Brechin Quarry

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
29-May-19	16:15-23:15	13 (min), 16 (max)	3	40-100	None	Turtle Emergence #4 Turtle Nesting Survey #1 Waterfowl Stopover/Nesting #5 Watercourse Assessment #2 Amphibian Breeding #2 Reptile Observations (Incidental)
06-Jun-19	06:00-10:00	11 (min), 13 (max)	0-1	0-30	None	Turtle Emergence #5 Waterfowl Stopover/Nesting #7 Dawn Breeding Birds #1 Reptile Observations (Incidental)
12-Jun-19	21:00-23:00	18	1	40	None (moon vis)	Evening Breeding Birds #1 Turtle Nesting Survey #2
19-Jun-19	06:00-15:30	14 (min), 22 (max)	0-1	30	None	Dawn Breeding Birds #2 Late Spring/Early Summer Veg Reptile Observations (Incidental)
25-Jun-19	21:00-23:15	21 (max), 19 (min)	0	0	None	Amphibian Breeding #3 Turtle Nesting Survey #3

Table 1: Site Investigation Record

Lots 11, 12 13, Concession 1, Brechin Quarry

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
27-Jun-19	06:00-09:45	18 (min), 21 (max)	1	5	None	Dawn Breeding Birds #3 Reptile Observations (Incidental)
08-Jul-19	08:30-16:00	20 (min), 25 (max)	1	0	None	Early Summer Vegetation Reptile Observations (Incidental) Initial site review of drainage features and watercourse delineations
09-Jul-19	12:30-22:30	27 (max), 21 (min)	2-0	0-5	None	Early Summer Vegetation Evening Breeding Birds #2 Reptile Observations (Incidental)
10-Jul-19	12:45-22:45	26 (min), 28 (max)	3-1	5-80	None	Early Summer Vegetation Evening Breeding Birds #3 Reptile Observations (Incidental)
25-Jul-19	--	26	2-3	--	None	Locate monitoring stations, watercourse refinement, watercourse monitoring (RiverStone)
22-Aug-19	--	21	1-3	--	None	Watercourse monitoring (RiverStone)

Table 1: Site Investigation Record

Lots 11, 12 13, Concession 1, Brechin Quarry

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
17-Sep-19	09:30-16:30	26	3	0	None	Late Summer Vegetation Reptile Observations (Incidental)
18-Sep-19	08:30-15:30	24	3	25	None	Late Summer Vegetation Reptile Observations (Incidental)
25-Sep-19	--	25	1-3	--	None	Watercourse monitoring, watercourse electrofishing (RiverStone)
23-Oct-19	--	10	1-4	--	None	Watercourse monitoring (RiverStone)
28-Apr-20	--	11	2-3	--	None	Watercourse monitoring (RiverStone)
11-Nov-20	10:00-13:00	17	2	0	None	Initial Site Review with LSRCA
20-Jan-21	12:50-15:20	-9	1-2	100	V. light flurries	Raptor Wintering #3
17-Feb-21	11:15-14:00	-7	0	100	V. light flurries	Raptor Wintering #4
26-Feb-21	13:15-15:45	2	1	5	None	Raptor Wintering #5
12-Jul-21	08:30-16:00	24	3	40	None	Woodland/Wetland Staking Exercise (LSRCA) Reptile Observations (Incidental)
01-Oct-21	08:00-13:00	11 (min), 17 (max)	1	90	None	Wetland Supplementary Data Collection Reptile Observations (Incidental)
21-Apr-22	09:30-11:05	5	2	50	None	Turtle Emergence #6
09-May-22	09:00-10:50	14	2	10	None	Turtle Emergence #7
11-May-22	09:25-10:45	17 (min), 19 (max)	1	20	None	Turtle Emergence #8
12-May-22	09:00-10:20	14 (min), 20 (max)	1	0	None	Turtle Emergence #9
24-May-22	09:35-11:00	12 (min), 15 (max)	2-3	50	None	Turtle Emergence #10
08-Jun-22	09:25-10:50	16 (min), 17 (max)	2	0	None	Turtle Emergence #11
09-Jun-22	15:20-16:55	18	2	50	None	Turtle Emergence #12

Table 1: Site Investigation Record**Lots 11, 12 13, Concession 1, Brechin Quarry**

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
11-Jun-22	10:10-11:40	18 (min), 19 (max)	2	0	None	Turtle Emergence #13
14-Jun-22	12:45-15:15	21 (min), 22 (max)	1-2	5	None	Turtle Emergence #14
15-Jun-22	11:00-13:00	20 (min), 22 (max)	1-2	10-15	None	Turtle Emergence #15
13-Jul-23	09:00-14:00	20	4	60	None	Supplementary ELC/Vegetation west of rail line
17-Jul-23	09:00-16:30	25	2-3	30	None	Supplementary ELC/Vegetation west of rail line
19-Jul-23	09:00-16:30	24	1	30	None	Supplementary ELC/Vegetation west of rail line
28-Jul-23	09:00-16:30	29	3-4	50	None	Supplementary ELC/Vegetation west of rail line
17-Aug-23	09:00-14:00	19 (min), 24 (max)	3	0-100	None	Supplementary ELC/Vegetation within Parcel B

*Time(s) indicate duration of survey undertaken for entire property, including lands adjacent to evaluated wetland(s).

Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Initial Assessment
Restricted Species	--	END	END	Requires rich, moist, undisturbed and relatively mature Sugar Maple-dominated deciduous woods in areas of circumneutral soil such as over limestone or marble bedrock. ESA Protection: Species and regulated habitat protection	Not identified during the vascular plant survey program.
Bank Swallow	<i>Riparia riparia</i>	THR	THR	Nests in burrows excavated in natural and human-made settings with vertical sand and silt faces. Commonly found in sand or gravel pits, road cuts, lakeshore bluffs, and along riverbanks (COSEWIC, 2013a). ESA Protection: Species and general habitat protection	No suitable habitat observed within the study area limits. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Barn Swallow	<i>Hirundo rustica</i>	SC	THR	Ledges and walls of man-made structures such as buildings, barns, boathouses, garages, culverts and bridges. Also nest in caves, holes, crevices and cliff ledges (COSEWIC, 2011a). ESA Protection: N/A	Aerial foraging activity observed during the breeding bird survey program, however species was not observed to land within the study area limits. No nests were observed within the study area limits therefore no potential for breeding/nesting activity occurs onsite.
Black Ash	<i>Fraxinus nigra</i>	END	No Status	Facultative wetland tree species frequently found in floodplain forests, swamps, seepage areas, shoreline margins and fens. Occupied sites are generally seasonally-flooded (COSEWIC, 2018a). ESA Protection: Species and general habitat protection (ESA protections take effect January 27, 2024).	Not identified within lands east of the rail line during the vascular plant survey program. Black Ash trees documented in the western portion of the property, particularly within and adjacent to existing swamp proximal to the western property boundary.
Black Tern	<i>Chlidonias niger</i>	SC	Not at Risk	Colonial nesters typically found within marshes. Its preferred nesting habitat is a hemi-marsh (<i>i.e.</i> a wetland with 50:50 open water and emergent vegetation). Nests are usually built on an upturned cattail root, floating vegetation mat or patch of mud (Cadman <i>et al.</i> , 2007). ESA Protection: N/A	Hemi-marsh with suitable composition of 50/50 open water to emergent vegetation cover does not occur within the study area limits. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Blanding's Turtle	<i>Emydoidea blandingii</i>	THR	END	Blanding's Turtles are a primarily aquatic species that prefer wetland habitats, lakes, ponds, slow-moving streams, etc., however they may utilize upland areas to search for suitable basking and nesting sites. In general, preferred wetland sites are eutrophic and characterized by clear, shallow water, with organic substrates and high density of aquatic vegetation (COSEWIC, 2016a). ESA Protection: Species and general habitat protection	Potentially suitable wintering, nesting, basking, and foraging habitat occurs within minor open water units within lands east of the rail line. No suitable habitat features occur within lands west of the rail line. Not identified during turtle wintering or turtle nesting habitat surveys, or incidentally throughout the course of the field program. Refer to Section 4.2.3.2 of main text for further discussion.
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	Nests primarily in forage crops (<i>e.g.</i> hayfields and pastures) dominated by a variety of species such as clover, Timothy, Kentucky Bluegrass, tall grass, and broadleaved plants. Also occurs in wet prairie, graminoid peatlands, and abandoned fields dominated by tall grasses. Does not generally occupy fields of row crops (<i>e.g.</i> corn, soybeans, wheat) or short-grass prairie. Sensitive to habitat size and has lower reproductive success in small habitat fragments (COSEWIC, 2010a). ESA Protection: Species and general habitat protection	Breeding activities observed within pastureland within lands east of the rail line during the breeding bird survey program, and the continuous adjacent meadow northwest of the property. Meadow units within lands west of the rail line are generally restricted in size or linear and surrounded by treed vegetation types (<i>e.g.</i> former airport runway) such that open country conditions required by the species are not present. Pastureland located to the south of the property beyond Concession Road 1 also has potential to provide habitat function. See section 4.2.3.1 for further discussion.
Butternut	<i>Juglans cinerea</i>	END	END	Commonly found in riparian habitats, but is also found in rich, moist, well-drained loams, and well-drained gravels. Butternut is intolerant of shade (COSEWIC, 2017). ESA Protection: Species and general habitat protection	Not identified within lands east of the rail line during the vascular plant survey program. Two (2) immature individuals were identified in the western portion of the property during the vascular plant survey program.
Canada Warbler	<i>Cardellina canadensis</i>	SC	THR	Wet, mixed deciduous-coniferous forests with a well developed shrub layer. Shrub marshes, Red-Maple stands, cedar stands, Black Spruce swamps, larch and riparian woodlands along rivers and lakes (COSEWIC, 2020). ESA Protection: N/A	Woodland units within study area are generally dense and immature in character, typically representing naturalizing plantation, and do not provide the community structure required to support the species' life processes. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Cerulean Warbler	<i>Dendroica cerulea</i>	THR	END	Associated with large tracts of mature deciduous forest with tall trees and an open understory. Found in both wet bottomland forests and upland areas (COSEWIC, 2010b). ESA Protection: Species and general habitat protection	Large tracts of mature deciduous forest not located within the study area limits. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Chimney Swift	<i>Chaetura pelagica</i>	THR	THR	Nests primarily in chimneys though some populations (<i>i.e.</i> in rural northern areas) may nest in cavity trees (COSEWIC, 2018b). Recent changes in chimney design may be a significant factor in recent declines in numbers (Cadman <i>et al.</i> , 2007). ESA Protection: Species and general habitat protection	No uncapped chimneys or structures that may otherwise provide suitable habitat located within the study area limits. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Common Five-lined Skink (Southern Shield population)	<i>Plestiodon fasciatus</i>	SC	SC	Southern Shield population -rocky outcrops embedded in a matrix of coniferous and deciduous forest, and individuals in these populations seek refuge under rocks overlaid on open bedrock (COSEWIC, 2021a). ESA Protection: N/A	Rocky outcrops such as those associated with the Southern Shield were not identified within the study area limits. Wooded portions of the study area generally consisted of immature, degraded woodland units (many due to cattle grazing and refuge) of relatively low biodiversity and habitat complexity. No suitable habitat for the species.
Common Nighthawk	<i>Chordeiles minor</i>	SC	THR	Open habitats including sand dunes, beaches recently logged/burned over areas, forest clearings, short grass prairies, pastures, open forests, bogs, marshes, lakeshores, gravel roads, mine tailings, quarries, and other open relatively clear areas (COSEWIC, 2018c). ESA Protection: N/A	Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.

Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Initial Assessment
Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>	THR	THR	<p>Prefers habitats with sandy, well-drained soil and open vegetation cover, such as open woods, brushland, fields, forest edges, and disturbed sites, typically near a water source. Often found in shoreline areas, beach and dune habitats, and other disturbed sites with evidence of human modification (COSEWIC, 2021b).</p> <p>ESA Protection: Species and general habitat protection</p>	<p>Species records do not occur in the vicinity of the study area. The closest records for Eastern Hog-nosed Snake occur at least 20km east and northeast of the site.</p> <p>Habitat types within the subject property do not feature open rocky areas, open sandy areas, or similar features typically associated with preferred habitat for the species. Meadows, wetlands and woodlands on the subject property have the potential to provide highly marginal habitat function for the species.</p> <p>Species not observed throughout the course of the field program. Surveys were conducted east of the rail line across 12 dates in 2019-2021 under suitable seasonal/weather conditions however the species was not observed (May 7, May 29, June 6, June 19, June 27, July 8, July 9, July 10, September 17, September 18, 2019, July 12 and October 1, 2021). Supplementary surveys occurred west of the rail line across 4 dates in 2023 under suitable seasonal/weather conditions however the species was not observed (July 17, July 19, July 28, and August 17, 2023).</p>
Eastern Meadowlark	<i>Sturnella magna</i>	THR	THR	<p>Most common in grassland, pastures, savannahs, as well as anthropogenic grassland habitats, including hayfields, weedy meadows, young orchards, golf courses, restored surface mines, etc. Occasionally nest in row crop fields such as corn and soybean, but there are considered low-quality habitat. Large tracts of grassland are preferred over smaller fragments and the minimum area required is estimated at 5 ha. (COSEWIC, 2011b).</p> <p>ESA Protection: Species and general habitat protection</p>	<p>Breeding and nesting activities observed within pastureland east of the rail line during the breeding bird survey program, and the continuous adjacent meadow northwest of the property.</p> <p>Meadow units west of the rail line are generally restricted in size or linear and surrounded by treed vegetation types (e.g. former airport runway) such that open country conditions required by the species are not present.</p> <p>Pastureland located to the south of the property beyond Concession Road 1 also has potential to provide habitat function.</p> <p>See section 4.2.3.1 for further discussion.</p>
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	SC	SC	<p>Found in wetland habitats with both flowing and standing water such as marshes, bogs, fens, ponds, lake shorelines and wet meadows. Most sightings occur near the water's edge (COSEWIC, 2012a).</p> <p>ESA Protection: N/A</p>	<p>Wetlands and adjacent meadows and thickets on the subject properties have the potential to provide habitat function for the species.</p> <p>Surveys were conducted within lands east of the rail line, across 12 dates in 2019-2021 under suitable seasonal/weather conditions however the species was not observed (May 7, May 29, June 6, June 19, June 27, July 8, July 9, July 10, September 17, September 18, 2019, July 12 and October 1, 2021). Supplementary surveys occurred in lands west of the rail line across 4 dates in 2023 under suitable seasonal/weather conditions, however the species was not observed (July 17, July 19, July 28, and August 17 2023).</p>
Eastern Small-footed Myotis	<i>Myotis lleibii</i>	END	No status	<p>Generally occurs in mountainous or rocky regions as well as in buildings, on the face of rock bluffs and beneath slabs of rock and stones. Hibernation is typically confined to caves and old mines (Best and Jennings, 1997).</p> <p>ESA Protection: Species and general habitat protection</p>	<p>Rocky outcrops and/or rocky slabs, rock rows, etc. not located within the study area. Potential overwintering sites such as caves, mines/shafts, or similar features with underground access not located within the study area.</p> <p>Surveys were conducted across 12 dates in 2019-2021 under suitable seasonal/weather conditions and included a review of the abandoned foundation and silo in the southern portion of the property, however the species was not observed (May 7, May 29, June 6, June 19, June 27, July 8, July 9, July 10, September 17, September 18, 2019, July 12 and October 1, 2021).</p>
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	THR	THR	<p>Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances, are preferred nesting habitats (COSEWIC, 2009a).</p> <p>ESA Protection: Species and general habitat protection</p>	<p>Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.</p>
Eastern Wood-pewee	<i>Contopus virens</i>	SC	SC	<p>Mostly in mature and intermediate-age deciduous and mixed forests having an open understory. It is often associated with forests dominated by Sugar Maple and oak. Usually associated with forest clearings and edges within the vicinity of its nest (COSEWIC, 2012b).</p> <p>ESA Protection: N/A</p>	<p>Not identified within lands east of the rail line or adjacent lands during the breeding bird survey program, or incidentally throughout the course of the field program.</p> <p>Potentially suitable habitat for the species occurs within lands west of the rail line. As dawn breeding bird surveys were not undertaken for lands >120m from the western edge of the rail line, the species is treated as present within western portions of the property, in lieu of completing species-targeted assessments.</p>
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	SC	THR	<p>Areas of early successional scrub surrounded by mature forests including dry uplands, swamp forests, and marshes (COSEWIC, 2006).</p> <p>ESA Protection: N/A</p>	<p>Not identified within lands east of the rail line or adjacent lands during the breeding bird survey program, or incidentally throughout the course of the field program.</p> <p>Marginal potentially suitable habitat for the species occurs within lands west of the rail line, and a potential for higher quality habitat occurs within a large thicket southwest of the property. As dawn breeding bird surveys were not undertaken for lands >120m from the western edge of the rail line, the species is treated as present in lieu of completing species-targeted assessments.</p>
Grasshopper Sparrow <i>pratensis</i> subspecies	<i>Ammodramus savannarum pratensis</i>	SC	SC	<p>Typically breeds in large human-created grasslands (≥6 ha), such as pastures and hayfields, and natural prairies, such as alvars, characterized by well-drained, often poor soil dominated by low, sparse perennial herbaceous vegetation (COSEWIC, 2013b).</p> <p>ESA Protection: N/A</p>	<p>Open meadow within lands east of the rail line provides suitable habitat for the species. Breeding activity was observed during the breeding bird survey program east of the rail line (MEGM3/MEGM4). A single observation of the species also occurred east of the rail line, however the individual was not observed again indicating that breeding activities were unlikely to be occurring in this location ("possible breeding" only in accordance with Ontario Breeding Bird Atlas guidelines).</p> <p>Meadow units west of the rail line are generally restricted in size or linear and surrounded by treed vegetation types (e.g. former airport runway) such that open country conditions required by the species are not present.</p>
Henslow's Sparrow	<i>Ammodramus henslowii</i>	END	END	<p>Requires grassland habitat and occurs more frequently and at higher densities in large patches of suitable habitat. Nests in tallgrass prairie, wet meadow, and marsh habitats as well as agricultural grasslands, lightly grazed pasture and grasslands on reclaimed surface mines (COSEWIC, 2011c).</p> <p>ESA Protection: Species and general habitat protection</p>	<p>Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.</p> <p>Meadow units west of the rail line are generally restricted in size or linear and surrounded by treed vegetation types (e.g. former airport runway) such that open country conditions required by the species are not present.</p>

Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Initial Assessment
Horned Grebe	<i>Podiceps auritus</i>	SC	SC	Breeding occurs primarily in Western Canada in small, semi-permanent or permanent ponds, marshes and shallow bays. The species requires open waters in rich emergent wetland vegetation for breeding purposes. Migration areas (including Southern Ontario) similar occurs in lakes, rivers, and marshes (COSEWIC, 2009b). ESA Protection: N/A	Not identified during waterfowl stopover/staging and waterfowl nesting surveys. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Least Bittern	<i>Ixobrychus exilis</i>	THR	THR	Breed strictly in marshes of emergents (usually cattails) that have relatively stable water levels and interspersed areas of open water (COSEWIC, 2009b). ESA Protection: Species and general habitat protection	Marshes with emergent vegetation and stable (permanent or semi-permanent) water levels limited throughout the study area, therefore potential habitat for the species is highly marginal and limited to minor open water units east of the rail line. Not identified during the breeding bird survey program. Not identified incidentally during evening amphibian surveys or other surveys throughout the course of the field program.
Little Brown Myotis	<i>Myotis lucifugus</i>	END	END	Forests and regularly aging human structures as maternity roost sites. Regularly associated with attics of older buildings and barns for summer maternity roost colonies. Overwintering sites are characteristically mines or caves, but can often include buildings (MNR, 2014) (COSEWIC, 2013c). ESA Protection: Species and general habitat protection	Potential overwintering sites such as caves, mines/shafts, or similar features with underground access not located within the study area. Suitable manmade structures with potential to provide maternity roosting habitat not located east of the rail line. Mature "snag" trees (<i>i.e.</i> large deciduous or coniferous trees with holes/cracks/splits that could provide access for roosting bats, typically in the early stages of decay) not located east of the rail line. Woodland units are immature and highly degraded (as active pasture) and are not expected to offer significant habitat function for roosting bats. Woodlands located west of the rail line may provide maternity roosting habitat for bats. Vacant structures on lands west of the rail line associated with the former airport facility may provide suitable roosting habitat for the species.
Loggerhead Shrike	<i>Lanius ludovicianus</i>	END	END (<i>mirgans</i> subspecies)	Breeding habitat characterized by open areas dominated by grasses and/or forbs, interspersed with scattered shrubs or small trees and bare ground. Suitable habitat includes pasture, old fields, prairie, savannah, pinyon-juniper woodland, shrub-steppe and alvar (COSEWIC, 2014). ESA Protection: Species and general habitat protection	Not identified during the breeding bird survey program, or incidentally throughout the course of the field program. Meadow units west of the rail line are generally restricted in size or linear and surrounded by treed vegetation types (<i>e.g.</i> former airport runway) such that open country conditions required by the species are not present.
Monarch	<i>Danaus plexippus</i>	SC	SC	Breeding habitat is confined to sites where milkweed, the sole food of caterpillars, grow. Milkweeds grow in a variety of environments, including meadows in farmlands, along roadsides and in ditches, open wetlands, dry sandy areas, short and tall grass prairie, river banks, irrigation ditches, arid valleys, and south-facing hills (COSEWIC, 2016b). ESA Protection: N/A	Species directly observed in open meadows (MEGM3/MEMG4) on the property. Host plant Common Milkweed (<i>Asclepias syriaca</i>) is widespread at a low density throughout the study area and greater landscape.
Northern Myotis	<i>Myotis septentrionalis</i>	END	END	Maternity roost sites are generally located within deciduous and mixed forests and focused in snags including loose bark and cavities of trees. Overwintering sites are characteristically mines or caves (COSEWIC, 2013c). ESA Protection: Species and general habitat protection	Potential overwintering sites such as caves, mines/shafts, or similar features with underground access not located within the study area. Mature "snag" trees (<i>i.e.</i> large deciduous or coniferous trees with holes/cracks/splits that could provide access for roosting bats, typically in the early stages of decay) not located east of the rail line. Woodland units are immature and highly degraded (as active pasture) and are not expected to offer habitat function for roosting bats. Woodlands located west of the rail line may provide maternity roosting habitat for bats.
Northern Map Turtle	<i>Graptemys geographica</i>	SC	SC	Inhabits rivers and lakes where it basks on emergent rocks, banks, logs and fallen trees. Prefer shallow, soft-bottomed aquatic habitats with exposed objects for basking (COSEWIC, 2012c). ESA Protection: N/A	No large water bodies such as rivers or lakes located within the study area limits. No suitable habitat. Not identified during turtle wintering or turtle nesting habitat surveys, or incidentally throughout the course of the field program.
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SC	THR	Natural forest openings, forest edges near natural openings (such as wetlands) or open to semi-open forest stands. Occasionally human made openings (such as clear cuts). Presence of tall snags and residual live trees is essential (COSEWIC, 2018d). ESA Protection: N/A	Mature forest with associated natural forest openings and similar environs typical of habitats utilized by the species not identified within the study area limits. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Peregrine Falcon	<i>Falco peregrinus</i>	SC	SC	Breeding and nesting occurs primarily along cliffs in the vicinity of large river and lake systems, however manmade structures such as tall buildings and bridges can also be utilized. The species is known to occupy a wide variety of habitats to carry out other aspects of its life history (COSEWIC, 2017). ESA Protection: N/A	Cliffs associated with large river/lake systems not located within the study area limits. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	END	END	Occurs in open deciduous forests, particularly those dominated by oak and beech, grasslands, forest edges, orchards, pastures along rivers and roads, urban parks, golf courses, cemeteries, beaver ponds and timber stands that have been treated with herbicides (COSEWIC, 2018e). ESA Protection: Species and general habitat protection	Mature deciduous forest dominated by oak and beech, with associated intermittent grassland/parkland conditions not located within the study area limits. Not identified during the breeding bird survey program, or incidentally throughout the course of the field program.
Rusty-patched Bumblebee	<i>Bombus affinis</i>	END	END	Occurs in a wide variety of habitat types including open habitats such as mixed farmland, urban settings, savannah, open woodlands, and sand dunes. The species is most commonly associated with oak savannah ecosystems (MECP, 2023). ESA Protection: Species and general habitat protection	Oak savannah does not occur within the study area, however open habitats on the property are consistent with the generalist habitat preferences for the species. NHIC of records do not identify occurrences of the species in Simcoe County, and the majority of records occur in Southwestern Ontario and along the Lake Ontario shoreline. Not identified incidentally throughout the course of the field program.
Short-eared Owl	<i>Asio flammeus</i>	THR	SC	A wide variety of unforested habitats are used, including grasslands, fallow pastures, and occasionally fields planted with row-crops (COSEWIC, 2021c). ESA Protection: Species and general habitat protection	Not identified during raptor wintering surveys, the breeding bird survey program, or incidentally throughout the course of the field program.
Snapping Turtle	<i>Chelydra serpentina</i>	SC	SC	Habitat is characterized by slow-moving water with a soft mud bottom and dense aquatic vegetation. Often located in ponds, sloughs, shallow bays or river edges and slow streams, or areas combining several of these wetland habitats (COSEWIC, 2008). ESA Protection: N/A	One (1) Snapping Turtle was observed incidentally on June 12, 2022, swimming within the McNabb Drain and moving west, beyond the northern property limit, north of Concession Road 2.

Common Name	Species Name	ESA	SARA	Key Habitats Used By Species ¹	Initial Assessment
Tri-colored Bat	<i>Perimyotis subflavus</i>	END	END	<p>Maternity roost sites include forests and modified landscapes (barns or human-made structures). Overwintering sites include mines and caves (COSEWIC, 2013c).</p> <p>ESA Protection: Species and general habitat protection</p>	<p>Potential overwintering sites such as caves, mines/shafts, or similar features with underground access not located within the study area. Suitable manmade structures with potential to provide maternity roosting habitat not located within lands east of the rail line.</p> <p>Mature "snag" trees (<i>i.e.</i> large deciduous or coniferous trees with holes/cracks/splits that could provide access for roosting bats, typically in the early stages of decay) not located within lands east of the rail line. Woodland units are immature and highly degraded (as active pasture) and are not expected to offer habitat function for roosting bats.</p> <p>Woodlands located west of the rail line may provide maternity roosting habitat for bats. Vacant structures west of the rail line associated with the former airport facility may provide suitable roosting habitat for the species.</p>
Wood Thrush	<i>Hylocichla mustelina</i>	SC	THR	<p>Found in moist, deciduous hardwood or mixed stands, often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches (COSEWIC, 2012d).</p> <p>ESA Protection: N/A</p>	<p>One (1) Wood Thrush identified in woodlands west of the rail line (CUP3-2) within 120m of the rail line boundary.</p> <p>Additional potentially suitable habitat for the species may occur within woodlands located >120m from the western boundary of the rail line. The species is treated as present in this portion of the property in lieu of completing species-targeted assessments in this portion of the property.</p>
Yellow-banded Bumblebee	<i>Bombus terricola</i>	SC	SC	<p>Habitat generalist species that occupies a variety of grassland, open country, farmland, and urban environs (MECP, 2023).</p> <p>ESA Protection: N/A</p>	<p>Not identified incidentally throughout the course of the field program.</p>
Yellow Rail	<i>Coturnicops noveboracensis</i>	SC	SC	<p>Nest in wet marshy areas of short grass-like vegetation. The habitat must remain wet throughout the breeding season (COSEWIC, 2009c).</p> <p>ESA Protection: N/A</p>	<p>Not identified during the breeding bird survey program. Not identified incidentally during evening amphibian surveys or other surveys throughout the course of the field program.</p> <p>Wetlands west of the rail line are dominated by long grass, principally Reed Canary Grass (<i>Pharis arundinacea</i>) which does not typically provide suitable habitat for the species.</p>

¹ Habitat as outlined within the MECP's Species at Risk in Ontario website files (<https://www.ontario.ca/page/species-risk>), or Species Specific COSEWIC Reports referenced in this document.

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COSEWIC. 2006. COSEWIC assessment and status report on the Golden-winged Warbler *Vermivora chrysoptera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 30 pp.

COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle *Chelydra serpentina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.

COSEWIC. 2009a. COSEWIC assessment and update status report on the Whip-poor-will *Caprimulgus vociferus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 28 pp.

COSEWIC. 2009b. COSEWIC assessment and update status report on the Least Bittern *Ixobrychus exilis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 36 pp.

COSEWIC. 2009c. COSEWIC assessment and status report on the Yellow Rail *Coturnicops noveboracensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 32 pp.

COSEWIC. 2010a. COSEWIC assessment and update status report on the Bobolink *Dolichonyx oryzivorus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 42 pp.

COSEWIC. 2010b. COSEWIC assessment and update status report on the Cerulean Warbler *Dendroica cerulea* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 40 pp.

COSEWIC. 2011a. COSEWIC assessment and update status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.

COSEWIC. 2011b. COSEWIC assessment and update status report on the Eastern Meadowlark *Sturnella magna* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 40 pp.

COSEWIC. 2011c. COSEWIC assessment and update status report on the Henslow's Sparrow *Ammodramus henslowii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 37 pp.

COSEWIC. 2012a. COSEWIC assessment and status report on the Eastern Ribbonsnake *Thamnophis sauritus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 39 pp.

COSEWIC. 2012b. COSEWIC assessment and status report on the Eastern Wood-pewee *Contopus virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 39 pp.

COSEWIC. 2012c. COSEWIC assessment and status report on the Northern Map Turtle *Graptemys geographica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 63 pp.

COSEWIC. 2012d. COSEWIC assessment and status report on the Wood Thrush *Hylocichla mustelina* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 46 pp.

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COSEWIC. 2013b. COSEWIC assessment and status report on the Grasshopper Sparrow pratensis subspecies *Ammodramus savannarum pratensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 36 pp.

COSEWIC. 2013c. COSEWIC assessment and update status report on the Little Brown Myotis *Myotis lucifugus*, Northern Myotis *Myotis septentrionalis* and Tri-colored Bat *Perimyotis subflavus* in Canada. Committee on the Status of Endangered Wildlife

COSEWIC. 2014. COSEWIC assessment and update status report on the Loggerhead Shrike *Lanius ludovicianus ssp.* and the Prairie subspecies *Lanius ludovicianus excubitorides* in Canada. Committee on the Status of Endangered Wildlife in Canada.

COSEWIC. 2016a. COSEWIC assessment and status report on the Blanding's Turtle *Emydoidea blandingii*, Nova Scotia population and Great Lakes/St. Lawrence population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa.

COSEWIC. 2016b. COSEWIC assessment and status report on the Monarch *Danaus plexippus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 59 pp.

COSEWIC. 2017. COSEWIC assessment and status report on the Butternut *Juglans cinerea* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 74 pp.

COSEWIC. 2018a. COSEWIC assessment and status report on the Black Ash *Fraxinus nigra* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 95 pp.

COSEWIC. 2018b. COSEWIC assessment and status report on the Chimney Swift *Chaetura pelagica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 49 pp.

COSEWIC. 2018c. COSEWIC assessment and status report on the Common Nighthawk *Chordeiles minor* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 50 pp.

COSEWIC. 2018d. COSEWIC assessment and status report on the Olive-sided Flycatcher *Contopus cooperi* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 52 pp.

COSEWIC. 2018e. COSEWIC assessment and status report on the Red-headed Woodpecker *Melanerpes erythrocephalus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 60 pp.

COSEWIC. 2020. COSEWIC assessment and status report on the Canada Warbler *Wilsonia canadensis* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 54 pp.

COSEWIC. 2021a. COSEWIC assessment and status report on the Five-lined Skink *Eumeces fasciatus*, Carolinian population and Great Lakes/St. Lawrence population in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xvi + 61

COSEWIC. 2021b. COSEWIC assessment and status report on the Eastern Hog-nosed Snake *Heterodon platirhinos* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 45 pp.

COSEWIC. 2021c. COSEWIC assessment and status report on the Short-eared Owl *Asio flammeus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 69 pp.

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Table 3a: Vascular Plant List, Brechin Quarry

Surveyors: D. Stuart, S. Martin

AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²													Conservation Rankings ³			Regional ⁴	
			FOC2-2	SWD4-3	SWT2-2a	SWT2-2b	SWT2-2c	MAM2-2a	MAM2-2b	MAM2-6	CUW1a	CUW1b	CUW1c	THDM2-6a	THDM2-6b	THDM2-6c	MEGM3/MEGM4a	GRANK	SRANK	TRACK
Aceraceae	<i>Acer x freemanii</i>	(Acer rubrum X Acer saccharinum)			X	X											GNA	SNA	N	
Alismataceae	<i>Alisma plantago-aquatica</i>	Common Water Plantain			X			X								X	G5	S5	N	
Anacardiaceae	<i>Rhus typhina</i>	Staghorn Sumac								X							G5	S5	N	
Anacardiaceae	<i>Toxicodendron radicans var. rydbergii</i>	Western Poison Ivy		X	X	X	X				X	X	X	X	X	X	G5T5	S5	N	
Apiaceae	<i>Daucus carota</i>	Wild Carrot	X	X	X	X	X	X	X		X	X				X	GNR	SE5	N	
Apiaceae	<i>Pastinaca sativa</i>	Wild Parsnip														X	GNR	SE5	N	
Apiaceae	<i>Sium suave</i>	Hemlock Water-parsnip				X											G5	S5	N	
Apocynaceae	<i>Apocynum androsaemifolium</i>	Spreading Dogbane					X				X	X			X	X	G5	S5	N	
Asclepiadaceae	<i>Asclepias syriaca</i>	Common Milkweed					X		X	X					X	X	G5	S5	N	
Asclepiadaceae	<i>Vincetoxicum rossicum</i>	European Swallow-wort											X	X	X	X	GNR	SE5	N	
Asteraceae	<i>Achillea millefolium</i>	Common Yarrow	X	X	X	X	X	X				X	X	X	X	X	G5	SE	N	
Asteraceae	<i>Ambrosia artemisiifolia</i>	Annual Ragweed														X	G5	S5	N	
Asteraceae	<i>Anaphalis margaritacea</i>	Pearly Everlasting											X				G5	S5	N	
Asteraceae	<i>Antennaria neglecta</i>	Field Pussytos	X							X						X	G5	S5	N	
Asteraceae	<i>Arctium minus</i>	Common Burdock	X							X							GNR	SE5	N	
Asteraceae	<i>Bidens cernua</i>	Nodding Beggarticks			X												G5	S5	N	
Asteraceae	<i>Bidens frondosa</i>	Devil's Beggarticks			X											X	G5	S5	N	
Asteraceae	<i>Cirsium arvense</i>	Canada Thistle										X	X				GNR	SE5	N	
Asteraceae	<i>Cirsium vulgare</i>	Bull Thistle					X	X		X						X	GNR	SE5	N	
Asteraceae	<i>Erigeron annuus</i>	Annual Fleabane		X	X							X	X	X	X	X	G5	S5	N	
Asteraceae	<i>Erigeron philadelphicus</i>	Philadelphia Fleabane			X							X					G5	S5	N	
Asteraceae	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod		X	X	X		X	X		X		X	X	X	X	G5	S5	N	
Asteraceae	<i>Inula helenium</i>	Elecampane											X				GNR	SE5	N	
Asteraceae	<i>Lactuca canadensis</i>	Canada Lettuce				X		X					X				G5	S5	N	
Asteraceae	<i>Leucanthemum vulgare</i>	Oxeye Daisy	X	X	X	X	X	X		X		X	X	X	X	X	GNR	SE5	N	
Asteraceae	<i>Packera paupercula var. paupercula</i>	Balsam Groundsel			X								X		X	X	G5T5	S5	N	
Asteraceae	<i>Pilosella aurantiaca</i>	Orange Hawkweed			X					X			X		X	X	GNR	SE5	N	
Asteraceae	<i>Pilosella caespitosa</i>	Meadow Hawkweed		X						X	X	X	X	X	X	X	GNR	SE5	N	
Asteraceae	<i>Pilosella officinarum</i>	Mouse-ear Hawkweed														X	GNR	SE5	N	
Asteraceae	<i>Pilosella sp.</i>	A Hawkweed	X														N/A	N/A	N/A	
Asteraceae	<i>Solidago altissima ssp. altissima</i>	Eastern Late Goldenrod		X		X		X		X		X	X	X	X	X	GNR	S5	N	
Asteraceae	<i>Solidago canadensis var. canadensis</i>	Canada Goldenrod			X			X	X	X			X		X	X	G5T5	S5	N	
Asteraceae	<i>Solidago juncea</i>	Early Goldenrod										X	X	X	X	X	G5	S5	N	
Asteraceae	<i>Solidago nemoralis ssp. nemoralis</i>	Gray-stemmed Goldenrod		X	X			X			X	X	X	X	X	X	G5T5	S5	N	
Asteraceae	<i>Solidago ptarmicoides</i>	Upland White Goldenrod											X			X	G5	S5	N	
Asteraceae	<i>Solidago rugosa var. rugosa</i>	Northern Rough-leaved Goldenrod				X								X			G5T5	S5	N	
Asteraceae	<i>Symphyotrichum ciliolatum</i>	Lindley's Aster	X	X	X						X	X	X	X	X	X	G5	S5	N	
Asteraceae	<i>Symphyotrichum cordifolium</i>	Heart-leaved Aster	X	X	X					X	X	X	X	X	X	X	G5	S5	N	
Asteraceae	<i>Symphyotrichum ericoides var. ericoides</i>	White Heath Aster		X													G5T5	S5	N	R-2
Asteraceae	<i>Symphyotrichum lanceolatum ssp. lanceolatum</i>	Panicled Aster		X	X	X	X	X	X			X	X	X	X	X	G5T5	S5	N	
Asteraceae	<i>Symphyotrichum lateriflorum</i>	Calico Aster	X	X	X	X	X	X	X		X	X	X	X	X	X	G5	S5	N	
Asteraceae	<i>Symphyotrichum novae-angliae</i>	New England Aster	X	X	X	X	X	X	X	X	X	X	X	X	X	X	G5	S5	N	
Asteraceae	<i>Symphyotrichum puniceum</i>	Swamp Aster		X	X	X	X		X								G5	S5	N	
Asteraceae	<i>Taraxacum officinale</i>	Common Dandelion	X	X	X	X		X		X	X	X		X		X	G5	SE5	N	

Table 3a: Vascular Plant List, Brechin Quarry

Surveyors: D. Stuart, S. Martin

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FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²													Conservation Rankings ³			Regional ⁴	
			FOC2-2	SWD4-3	SWT2-2a	SWT2-2b	SWT2-2c	MAM2-2a	MAM2-2b	MAM2-6	CUW1a	CUW1b	CUW1c	THDM2-6a	THDM2-6b	THDM2-6c	MEGM3/MEGM4a	GRANK	SRANK	TRACK
Asteraceae	<i>Tragopogon dubius</i>	Yellow Goat's-beard						X						X	X	X	GNR	SE5	N	
Asteraceae	<i>Tussilago farfara</i>	Colt's-foot						X									GNR	SE5	N	
Betulaceae	<i>Betula papyrifera</i>	Paper Birch	X				X	X				X					G5	S5	N	
Boraginaceae	<i>Buglossoides arvensis</i>	Corn-gromwell						X								X	GNR	SE5	N	
Boraginaceae	<i>Echium vulgare</i>	Common Viper's-bugloss							X		X		X	X	X	GNR	SE5	N		
Brassicaceae	<i>Capsella bursa-pastoris</i>	Common Shepherd's Purse							X						X	GNR	SE5	N		
Brassicaceae	<i>Lepidium campestre</i>	Field Peppergrass							X						X	GNR	SE5	N		
Cabombaceae	<i>Brasenia schreberi</i>	Watershield			X		X									G5	S5	N		
Caprifoliaceae	<i>Lonicera tatarica</i>	Tartarian Honeysuckle			X				X			X		X	X	GNR	SE5	N		
Caprifoliaceae	<i>Viburnum lentago</i>	Nannyberry				X										G5	S5	N		
Caprifoliaceae	<i>Viburnum opulus ssp. opulus</i>	Cranberry Viburnum		X									X		X	GNR	SE3?	N		
Caryophyllaceae	<i>Cerastium fontanum</i>	Common Mouse-ear Chickweed							X							GNR	SE5	N		
Caryophyllaceae	<i>Saponaria officinalis</i>	Bouncing-bet							X							GNR	SE5	N		
Clusiaceae	<i>Hypericum perforatum</i>	Common St. John's-wort		X				X			X	X	X	X	X	GNR	SE5	N		
Cornaceae	<i>Cornus alternifolia</i>	Alternate-leaved Dogwood								X						G5	S5	N		
Cornaceae	<i>Cornus racemosa</i>	Gray Dogwood													X	G5?	S5	N		
Cornaceae	<i>Cornus stolonifera</i>	Red-osier Dogwood		X	X	X	X	X	X	X	X	X	X	X	X	G5	S5	N		
Cucurbitaceae	<i>Echinocystis lobata</i>	Wild Mock-cucumber								X						G5	S5	N		
Cupressaceae	<i>Juniperus communis</i>	Ground Juniper	X	X	X	X	X		X		X		X	X	X	G5	S5	N		
Cupressaceae	<i>Juniperus virginiana</i>	Eastern Red Cedar				X						X			X	G5	S5	N		
Cupressaceae	<i>Thuja occidentalis</i>	Eastern White Cedar	X		X					X	X	X	X	X	X	G5	S5	N		
Cyperaceae	<i>Carex aurea</i>	Golden-fruited Sedge			X		X		X		X	X			X	G5	S5	N		
Cyperaceae	<i>Carex bebbii</i>	Bebb's Sedge				X	X		X				X			G5	S5	N		
Cyperaceae	<i>Carex blanda</i>	Woodland Sedge										X	X	X		G5?	S5	N		
Cyperaceae	<i>Carex flava</i>	Yellow Sedge			X		X					X		X	X	G5	S5	N		
Cyperaceae	<i>Carex gracillima</i>	Graceful Sedge								X	X			X	X	G5	S5	N		
Cyperaceae	<i>Carex granularis</i>	Meadow Sedge	X	X	X	X	X	X	X		X	X	X	X	X	G5	S5	N		
Cyperaceae	<i>Carex hystericina</i>	Porcupine Sedge			X		X									G5	S5	N		
Cyperaceae	<i>Carex lupulina</i>	Hop Sedge			X	X										G5	S5	N		
Cyperaceae	<i>Carex molesta</i>	Troublesome Sedge					X		X				X		X	G4	S4S5	N	R-2	
Cyperaceae	<i>Carex pellita</i>	Woolly Sedge					X								X	G5	S5	N		
Cyperaceae	<i>Carex projecta</i>	Necklace Sedge					X						X			G5	S5	N		
Cyperaceae	<i>Carex spicata</i>	Spiked Sedge					X		X		X	X		X	X	GNR	SE5	N	R-5	
Cyperaceae	<i>Carex stipata</i>	Awl-fruited Sedge		X		X	X						X	X		G5	S5	N		
Cyperaceae	<i>Carex tenera</i>	Slender Sedge		X									X			G5	S5	N		
Cyperaceae	<i>Carex vulpinoidea</i>	Fox Sedge		X	X	X	X	X	X		X		X		X	G5	S5	N		
Cyperaceae	<i>Eleocharis palustris</i>	Creeping Spike-rush			X		X								X	G5?	S5	N		
Cyperaceae	<i>Scirpus atrovirens</i>	Dark-green Bulrush		X	X	X	X	X	X		X	X	X		X	G5?	S5	N		
Cyperaceae	<i>Scirpus cyperinus</i>	Cottongrass Bulrush		X		X	X	X	X		X	X	X	X	X	G5	S5	N		
Cyperaceae	<i>Scirpus microcarpus</i>	Red-tinge Bulrush			X	X										G5	S5	N		
Dipsacaceae	<i>Dipsacus fullonum</i>	Fuller's Teasel													X	GNR	SE5	N		
Equisetaceae	<i>Equisetum arvense</i>	Field Horsetail		X	X	X	X	X							X	G5	S5	N		
Fabaceae	<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil		X	X	X	X	X	X	X	X	X	X		X	GNR	SE5	N		
Fabaceae	<i>Medicago lupulina</i>	Black Medic		X	X		X	X	X		X		X	X	X	GNR	SE5	N		

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Surveyors: D. Stuart, S. Martin

AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²													Conservation Rankings ³			Regional ⁴	
			FOC2-2	SWD4-3	SWT2-2a	SWT2-2b	SWT2-2c	MAM2-2a	MAM2-2b	MAM2-6	CUW1a	CUW1b	CUW1c	THDM2-6a	THDM2-6b	THDM2-6c	MEGM3/MEGM4a	GRANK	SRANK	TRACK
Fabaceae	<i>Melilotus albus</i>	White Sweet-clover					X										G5	SE5	N	
Fabaceae	<i>Melilotus officinalis</i>	Yellow Sweet-clover				X							X	X	X	X	GNR	SE5	N	
Fabaceae	<i>Robinia pseudoacacia</i>	Black Locust								X							G5	SE5	N	
Fabaceae	<i>Trifolium hybridum</i>	Alsike Clover		X	X	X	X	X				X		X	X	X	GNR	SE5	N	
Fabaceae	<i>Trifolium pratense</i>	Red Clover	X		X	X		X	X	X	X		X	X	X	X	GNR	SE5	N	
Fabaceae	<i>Trifolium repens</i>	White Clover			X			X		X	X			X		X	GNR	SE5	N	
Fabaceae	<i>Vicia cracca</i>	Tufted Vetch		X	X	X		X	X	X			X	X		X	GNR	SE5	N	
Fagaceae	<i>Quercus macrocarpa</i>	Bur Oak			X									X			G5	S5	N	
Geraniaceae	<i>Geranium robertianum</i>	Herb-Robert								X							G5	S5	N	
Grossulariaceae	<i>Ribes americanum</i>	Wild Black Currant								X							G5	S5	N	
Grossulariaceae	<i>Ribes cynosbati</i>	Prickly Gooseberry								X							G5	S5	N	
Halorigaceae	<i>Myriophyllum sp.</i>	A Milfoil						X									N/A	N/A	N/A	
Iridaceae	<i>Sisyrinchium montanum var. montanum</i>	Strict Blue-eyed-grass			X		X			X		X		X	X	X	G5T4T	S5	N	
Juncaceae	<i>Juncus articulatus ssp. articulatus</i>	Jointed Rush				X	X	X								X	G5	S5	N	
Juncaceae	<i>Juncus brevicaudatus</i>	Narrow-panicled Rush														X	G5	S5	N	
Juncaceae	<i>Juncus compressus</i>	Flattened Rush						X								X	G5	SE5	N	
Juncaceae	<i>Juncus dudleyi</i>	Dudley's Rush				X	X	X						X	X	X	G5	S5	N	
Juncaceae	<i>Juncus effusus</i>	Soft Rush			X			X									G5	S5	N	
Juncaceae	<i>Juncus sp.</i>	A Rush			X												N/A	N/A	N/A	
Juncaceae	<i>Juncus tenuis</i>	Path Rush			X	X	X	X				X	X	X	X	X	G5	S5	N	
Lamiaceae	<i>Leonurus cardiaca</i>	Common Motherwort	X							X							GNR	SE5	N	
Lamiaceae	<i>Lycopus americanus</i>	American Water-horehound			X	X					X						G5	S5	N	
Lamiaceae	<i>Mentha arvensis</i>	Field Mint								X							G5	S5	N	
Lamiaceae	<i>Nepeta cataria</i>	Catnip	X							X							GNR	SE5	N	
Lamiaceae	<i>Prunella vulgaris ssp. lanceolata</i>	Self-heal	X	X	X	X						X	X	X	X	X	G5T5	S5	N	
Lamiaceae	<i>Toxicodendron radicans var. radicans</i>	Northern Water-horehound		X	X						X					X	G5	S5	N	
Lythraceae	<i>Lythrum salicaria</i>	Purple Loosestrife						X				X	X		X		G5	SE5	N	
Malvaceae	<i>Malva neglecta</i>	Dwarf Cheeseweed								X							GNR	SE5	N	
Oleaceae	<i>Fraxinus pennsylvanica</i>	Green Ash			X	X	X	X		X		X		X		X	G5	S4	N	
Oleaceae	<i>Syringa vulgaris</i>	Common Lilac								X							GNR	SE5	N	
Onagraceae	<i>Epilobium strictum</i>	Downy Willowherb				X											G5	S4	N	R-2
Orchidaceae	<i>Cypripedium parviflorum var. makasin</i>	Small Yellow Lady's-slipper			X												G5T4T	S4S5	N	
Orchidaceae	<i>Spiranthes cernua</i>	Nodding Ladies'-tresses									X					X	G5	S5	N	
Oxalidaceae	<i>Oxalis stricta</i>	European Wood-sorrel								X							G5	S5	N	R-5
Pinaceae	<i>Pinus banksiana</i>	Jack Pine												X			G5	S5	N	
Pinaceae	<i>Pinus sylvestris var. sylvestris</i>	Scots Pine											X	X			GNR	SE5	N	
Plantaginaceae	<i>Plantago lanceolata</i>	English Plantain					X			X	X	X		X	X	X	G5	SE5	N	
Plantaginaceae	<i>Plantago major</i>	Common Plantain	X			X					X	X		X		X	G5	SE5	N	
Plantaginaceae	<i>Plantago rugelii</i>	Rugel's Plantain					X										G5	S5	N	
Poaceae	<i>Agrostis gigantea</i>	Redtop				X	X	X		X	X	X	X	X	X	X	G4G5	SE5	N	
Poaceae	<i>Agrostis stolonifera</i>	Creeping Bentgrass				X	X	X	X				X	X		X	G5	SE5	N	
Poaceae	<i>Bromus commutatus</i>	Hairy Brome										X	X	X	X	X	GNR	SE4	N	
Poaceae	<i>Bromus inermis</i>	Awnless Brome		X	X			X						X		X	G5TNR	SE5	N	
Poaceae	<i>Calamagrostis canadensis</i>	Bluejoint Reedgrass														X	G5	S5	N	

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			FOC2-2	SWD4-3	SWT2-2a	SWT2-2b	SWT2-2c	MAM2-2a	MAM2-2b	MAM2-6	CUW1a	CUW1b	CUW1c	THDM2-6a	THDM2-6b	THDM2-6c	MEGM3/MEGM4a	GRANK	SRANK	TRACK
Poaceae	<i>Dactylis glomerata</i>	Orchard Grass						X			X		X	X	X	X	GNR	SE5	N	
Poaceae	<i>Danthonia spicata</i>	Poverty Oatgrass			X											X	G5	S5	N	
Poaceae	<i>Dichanthelium implicatum</i>	Wooly Panicgrass					X					X	X			X	GNR	S5	N	
Poaceae	<i>Dichanthelium sp.</i>	A Panicgrass		X							X			X			N/A	N/A	N/A	
Poaceae	<i>Digitaria sanguinalis</i>	Hairy Crabgrass							X							X	G5	SE5	N	
Poaceae	<i>Elymus repens</i>	Creeping Wildrye			X	X		X					X	X		X	GNR	SE5	N	
Poaceae	<i>Festuca rubra ssp. rubra</i>	Red Fescue		X	X	X	X	X				X	X	X	X	X	G5T5	SE5	N	
Poaceae	<i>Glyceria striata</i>	Fowl Mannagrass			X						X						G5	S5	N	
Poaceae	<i>Hordeum jubatum ssp. jubatum</i>	Foxtail Barley														X	G5T5	S5?	N	
Poaceae	<i>Phalaris arundinacea</i>	Reed Canary Grass			X	X	X	X	X				X	X		X	G5	S5	N	
Poaceae	<i>Phleum pratense</i>	Common Timothy		X		X	X	X				X	X	X	X	X	GNR	SE5	N	
Poaceae	<i>Poa compressa</i>	Canada Bluegrass		X				X		X			X	X	X	X	GNR	SE5	N	
Poaceae	<i>Poa nemoralis</i>	Woods Bluegrass														X	G5	SE3	N	
Poaceae	<i>Poa palustris</i>	Fowl Bluegrass			X		X										G5	S5	N	
Poaceae	<i>Poa pratensis ssp. pratensis</i>	Kentucky Bluegrass	X		X					X					X	X	G5T5	SE5	N	
Poaceae	<i>Schedonorus arundinaceus</i>	Tall Fescue					X	X					X	X		X	GNR	SE5	N	
Polygonaceae	<i>Persicaria maculosa</i>	Spotted Lady's-thumb														X	G3G5	SE5	N	
Polygonaceae	<i>Polygonum aviculare ssp. aviculare</i>	Prostrate Knotweed														X	GNRTN	SE5	N	
Polygonaceae	<i>Rumex crispus</i>	Curly Dock			X	X	X			X			X	X		X	GNR	SE5	N	
Primulaceae	<i>Lysimachia ciliata</i>	Fringed Loosestrife		X			X			X	X					X	G5	S5	N	
Primulaceae	<i>Lysimachia thyrsoiflora</i>	Water Loosestrife			X												G5	S5	N	
Ranunculaceae	<i>Anemone virginiana var. virginiana</i>	Virginia Anemone														X	G5T5	S5?	N	
Ranunculaceae	<i>Ranunculus acris</i>	Tall Buttercup	X	X	X	X	X	X	X	X		X	X	X	X	X	G5	SE5	N	
Ranunculaceae	<i>Ranunculus repens</i>	Creeping Buttercup			X		X									X	GNR	SE5	N	
Rhamnaceae	<i>Rhamnus cathartica</i>	Common Buckthorn	X	X	X	X	X	X	X	X	X	X	X	X	X	X	GNR	SE5	N	
Rosaceae	<i>Agrimonia gryposepala</i>	Hooked Agrimony			X	X							X	X	X	X	G5	S5	N	
Rosaceae	<i>Crataegus sp.</i>	a Hawthorn			X							X	X	X	X	X	N/A	N/A	N/A	
Rosaceae	<i>Dasiphora fruticosa</i>	Shrubby Cinquefoil			X											X	G5	S5	N	
Rosaceae	<i>Fragaria virginiana</i>	Wild Strawberry	X	X	X	X	X	X	X	X	X		X	X	X	X	G5	S5	N	
Rosaceae	<i>Geum aleppicum</i>	Yellow Avens	X			X					X	X				X	G5	S5	N	
Rosaceae	<i>Geum triflorum</i>	Three-flowered Avens		X										X		X	G5	S4	N	
Rosaceae	<i>Malus pumila</i>	Common Apple	X		X		X		X	X	X		X	X	X	X	G5	SE4	N	
Rosaceae	<i>Potentilla argentea</i>	Silvery Cinquefoil							X				X			X	GNR	SE5	N	
Rosaceae	<i>Potentilla norvegica</i>	Norwegian Cinquefoil							X								G5	S5	N	
Rosaceae	<i>Potentilla recta</i>	Sulphur Cinquefoil	X				X	X	X			X	X	X	X	X	GNR	SE5	N	
Rosaceae	<i>Prunus virginiana</i>	Choke Cherry	X		X	X	X			X	X	X	X	X	X	X	G5	S5	N	
Rosaceae	<i>Rosa acicularis</i>	Prickly Rose														X	G5	S5	N	
Rosaceae	<i>Rosa blanda</i>	Smooth Rose					X						X			X	G5	S5	N	
Rosaceae	<i>Rosa multiflora</i>	Multiflora Rose														X	GNR	SE4	N	
Rosaceae	<i>Rubus idaeus ssp. strigosus</i>	Wild Red Raspberry														X	G5T5	S5	N	
Rosaceae	<i>Rubus occidentalis</i>	Black Raspberry	X							X							G5	S5	N	
Rosaceae	<i>Sorbus aucuparia</i>	European Mountain-ash								X							G5	SE4	N	
Rubiaceae	<i>Galium mollugo</i>	Smooth Bedstraw							X		X	X	X	X	X	X	GNR	SE5	N	
Rubiaceae	<i>Galium palustre</i>	Marsh Bedstraw		X	X	X	X	X				X				X	G5	S5	N	

Table 3a: Vascular Plant List, Brechin Quarry

Surveyors: D. Stuart, S. Martin

AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²													Conservation Rankings ³			Regional ⁴		
			FOC2-2	SWD4-3	SWT2-2a	SWT2-2b	SWT2-2c	MAM2-2a	MAM2-2b	MAM2-6	CUW1a	CUW1b	CUW1c	THDM2-6a	THDM2-6b	THDM2-6c	MEGM3/MEGM4a	GRANK	SRANK	TRACK	Simcoe
Salicaceae	<i>Populus balsamifera</i>	Balsam Poplar		X	X													G5	S5	N	
Salicaceae	<i>Populus grandidentata</i>	Large-tooth Aspen			X													G5	S5	N	
Salicaceae	<i>Populus tremuloides</i>	Trembling Aspen		X	X		X	X		X	X	X			X	X		G5	S5	N	
Salicaceae	<i>Salix bebbiana</i>	Bebb's Willow		X	X	X	X	X						X		X		G5	S5	N	
Salicaceae	<i>Salix discolor</i>	Pussy Willow		X	X	X	X									X		G5	S5	N	
Salicaceae	<i>Salix eriocephala</i>	Heart-leaved Willow		X	X	X	X					X				X		G5	S5	N	
Salicaceae	<i>Salix petiolaris</i>	Meadow Willow		X	X	X	X	X		X		X	X	X	X	X		G5	S5	N	
Scrophulariaceae	<i>Linaria vulgaris</i>	Butter-and-eggs	X															GNR	SE5	N	
Scrophulariaceae	<i>Penstemon hirsutus</i>	Hairy Beardtongue														X		G4	S4	N	
Scrophulariaceae	<i>Verbascum thapsus</i>	Common Mullein					X			X						X		GNR	SE5	N	
Solanaceae	<i>Solanum dulcamara</i>	Climbing Nightshade									X							GNR	SE5	N	
Typhaceae	<i>Typha angustifolia</i>	Narrow-leaved Cattail				X	X	X								X		G5	SE5	N	
Typhaceae	<i>Typha latifolia</i>	Broad-leaved Cattail			X	X	X	X								X		G5	S5	N	
Ulmaceae	<i>Ulmus americana</i>	American Elm	X	X	X	X	X	X		X	X	X		X	X	X		G5?	S5	N	
Urticaceae	<i>Boehmeria cylindrica</i>	False Nettle			X													G5	S5	N	
Urticaceae	<i>Urtica dioica ssp. gracilis</i>	Slender Stinging Nettle														X		G5T5	S5	N	
Vitaceae	<i>Parthenocissus inserta</i>	Thicket Creeper	X	X	X					X	X			X	X	X		G5	S5	N	
Vitaceae	<i>Vitis riparia</i>	Riverbank Grape		X	X	X		X			X	X		X	X	X		G5	S5	N	

¹ Nomenclature based on Ministry of Natural Resources and Forestry (MNR) Natural Heritage Information Centre (NHIC, 2023)

² ELC Codes based on Ecological Land Classification for Southern Ontario manual (Lee *et al.*, 1998)

³ Conservation Rankings: From Ontario Ministry of Natural Resources, Natural Heritage Information Centre (http://nhic.mnr.gov.on.ca/nhic_.cfm)

⁴ Riley, J.L. 1989. Distribution and Status of the Vascular Plants of Central Region, Ontario. Ministry of Natural Resources. Parks and Recreational Areas Section, OMNR, Open File Ecological Report SR8902, Central Region, Richmond Hill, Ontario. XiX + 110 pp.

Table 3b: Vascular Plant List, Brechin Quarry

Surveyor: Dan Stuart, David d'Entremont, Jordan Wrobel

AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²												Conservation Rankings ³			Regional ⁴			
			FOC2-2	FOC4-1a	SWM1-1	MAM2-2h	MAM2-2k	MAM2-2p	CUP3-2	CUP3a	CUP3b	CUW1c	CUW1f	CUW1g	THCMI-2a	THCMI-2b	GRANK	SRANK	TRACK	Simcoe	
Aceraceae	<i>Acer negundo</i>	Manitoba Maple																G5	S5	N	
Aceraceae	<i>Acer saccharinum</i>	Silver Maple					X											G5	S5	N	
Aceraceae	<i>Acer saccharum</i>	Sugar Maple									X	X	X					G5	S5	N	
Anacardiaceae	<i>Rhus typhina</i>	Staghorn Sumac	X															G5	S5	N	
Anacardiaceae	<i>Toxicodendron radicans var. rydbergii</i>	Western Poison Ivy	X	X	X	X	X	X	X	X	X	X	X	X	X	X		G5	S5	N	
Apiaceae	<i>Daucus carota</i>	Wild Carrot						X	X	X	X	X	X	X	X	X		GNR	SE5	N	
Apocynaceae	<i>Apocynum cannabinum</i>	Hemp Dogbane							X					X				GNR	S5	N	
Apocynaceae	<i>Asclepias incarnata</i>	Swamp Milkweed					X	X										G5	S5	N	
Apocynaceae	<i>Asclepias syriaca</i>	Common Milkweed				X	X	X	X	X			X	X	X			G5	S5	N	
Apocynaceae	<i>Vincetoxicum rossicum</i>	European Swallowwort		X				X	X	X	X	X	X	X	X	X		GNR	SE5	N	
Asteraceae	<i>Cirsium arvense</i>	Canada Thistle							X	X	X	X	X					G5	SE5	N	
Asteraceae	<i>Cirsium vulgare</i>	Bull Thistle								X								GNR	SE5	N	
Asteraceae	<i>Erigeron annuus</i>	Annual Fleabane											X					G5	S5	N	
Asteraceae	<i>Erigeron philadelphicus</i>	Philadelphia Fleabane			X				X									G5	S5	P	
Asteraceae	<i>Erigeron strigosus</i>	Rough Fleabane								X	X	X	X					G5	S5	N	
Asteraceae	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod				X	X		X	X	X	X	X	X	X			G5	S5	N	
Asteraceae	<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed				X	X											G5	S5	N	
Asteraceae	<i>Hieracium sp.</i>	a Hawkweed							X		X							N/A	N/A	N/A	
Asteraceae	<i>Leucanthemum vulgare</i>	Oxeye Daisy			X				X		X			X	X			GNR	SE5	N	
Asteraceae	<i>Mycelis muralis</i>	Wall Lettuce	X	X														GNR	SE2	N	
Asteraceae	<i>Pilosella caespitosa</i>	Meadow Hawkweed						X										GNR	SE5	N	
Asteraceae	<i>Solidago altissima</i>	Tall Goldenrod		X	X		X	X	X	X	X	X	X	X	X			G5	S5	P	
Asteraceae	<i>Solidago canadensis</i>	Canada Goldenrod	X			X	X		X		X	X	X	X	X			G5	S5	N	
Asteraceae	<i>Solidago gigantea</i>	Giant Goldenrod			X													G5	S5	P	
Asteraceae	<i>Solidago juncea</i>	Early Goldenrod							X		X	X	X	X	X			G5	S5	N	
Asteraceae	<i>Solidago nemoralis</i>	Grey-stemmed Goldenrod							X		X	X	X	X	X			G5	S5	P	
Asteraceae	<i>Solidago rugosa</i>	Rough-stemmed Goldenrod			X				X		X	X	X					G5	S5	N	
Asteraceae	<i>Sonchus arvensis</i>	Field Sow-thistle				X	X			X	X	X	X	X	X			GNR	SE5	N	
Asteraceae	<i>Symphyotrichum ciliolatum</i>	Lindley's Aster							X		X							G5	S5	N	
Asteraceae	<i>Symphyotrichum ericoides</i>	White Heath Aster									X	X	X					G5	S5	P	R-2
Asteraceae	<i>Symphyotrichum lanceolatum</i>	Panicled Aster	X		X	X	X	X	X	X	X	X	X					G5	S5	P	
Asteraceae	<i>Symphyotrichum lateriflorum</i>	Calico Aster					X	X	X	X	X	X	X					G5	S5	P	
Asteraceae	<i>Symphyotrichum novae-angliae</i>	New England Aster	X	X					X	X	X	X	X	X	X			G5	S5	N	
Asteraceae	<i>Symphyotrichum puniceum</i>	Purple-stemmed Aster				X	X											G5	S5	N	
Asteraceae	<i>Symphyotrichum urophyllum</i>	Arrow-leaved Aster	X	X				X		X	X	X	X					G4G5	S4	N	
Asteraceae	<i>Taraxacum officinale</i>	Common Dandelion							X	X	X	X	X					G5	SE5	N	
Asteraceae	<i>Taraxacum palustre</i>	Marsh Dandelion									X	X	X					GNR	SE5	N	
Asteraceae	<i>Tussilago farfara</i>	Coltsfoot			X													GNR	SE5	N	
Berberidaceae	<i>Berberis vulgaris</i>	Common Barberry									X	X	X					GNR	SE5	N	
Boraginaceae	<i>Lithospermum officinale</i>	European Gromwell		X														GNR	SE5	N	
Campanulaceae	<i>Campanula medium</i>	Canterbury Bellflower		X														GNR	SE1	N	
Caprifoliaceae	<i>Lonicera tatarica</i>	Tatarian Honeysuckle	X	X			X	X			X	X	X	X	X			GNR	SE5	N	
Caprifoliaceae	<i>Lonicera x bella</i>	(<i>Lonicera morrowii</i> X <i>Lonicera tatarica</i>)					X	X			X	X	X					GNA		N	
Caprifoliaceae	<i>Viburnum lentago</i>	Nannyberry			X		X				X	X	X					G5	S5	N	
Caprifoliaceae	<i>Viburnum opulus</i>	Cranberry Viburnum		X					X		X	X	X	X	X			G5	S5	N	

Table 3b: Vascular Plant List, Brechin Quarry

Surveyor: Dan Stuart, David d'Entremont, Jordan Wrobel

AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²												Conservation Rankings ³			Regional ⁴	
			FOC2-2	FOC4-1a	SWMI-1	MAM2-2h	MAM2-2k	MAM2-2p	CUP3-2	CUP3a	CUP3b	CUW1c	CUW1f	CUW1g	THCMI-2a	THCMI-2b	GRANK	SRANK	TRACK
Caprifoliaceae	<i>Viburnum opulus var. opulus</i>	Cranberry Viburnum				X			X							G5TNR	SE4?	N	
Celastraceae	<i>Celastrus orbiculatus</i>	Oriental Bittersweet											X			GNR	SE2	N	
Clusiaceae	<i>Hypericum perforatum</i>	Common St. John's-wort	X						X		X	X	X			GNR	SE5	N	
Cornaceae	<i>Cornus sericea</i>	Red-osier Dogwood	X		X	X	X		X	X	X	X	X	X	X	G5	S5	N	
Cupressaceae	<i>Juniperus communis</i>	Common Juniper							X	X	X	X	X	X	X	G5	S5	N	
Cupressaceae	<i>Thuja occidentalis</i>	Eastern White Cedar	X	X	X				X	X	X	X	X	X	X	G5	S5	N	
Cyperaceae	<i>Carex aurea</i>	Golden Sedge							X				X			G5	S5	N	
Cyperaceae	<i>Carex bebbii</i>	Bebb's Sedge					X									G5	S5	N	
Cyperaceae	<i>Carex blanda</i>	Woodland Sedge	X													G5	S5	N	
Cyperaceae	<i>Carex eburnea</i>	Bristle-leaved Sedge								X	X	X				G5	S5	N	
Cyperaceae	<i>Carex flava</i>	Yellow Sedge					X				X	X	X			G5	S5	N	
Cyperaceae	<i>Carex gracillima</i>	Graceful Sedge			X			X			X	X	X			G5	S5	N	
Cyperaceae	<i>Carex granularis</i>	Limestone Meadow Sedge							X		X	X	X	X	X	G5	S5	N	
Cyperaceae	<i>Carex interior</i>	Inland Sedge						X								G5	S5	N	
Cyperaceae	<i>Carex laevivaginata</i>	Smooth-sheathed Sedge						X								G5	S4	N	
Cyperaceae	<i>Carex pedunculata</i>	Long-stalked Sedge							X							G5	S5	N	
Cyperaceae	<i>Carex pellita</i>	Woolly Sedge								X	X	X				G5	S5	N	
Cyperaceae	<i>Carex radiata</i>	Eastern Star Sedge		X	X											G5	S5	N	
Cyperaceae	<i>Carex retrorsa</i>	Retorse Sedge					X									G5	S5	N	
Cyperaceae	<i>Carex sp.</i>	a Sedge		X						X						N/A	N/A	N/A	
Cyperaceae	<i>Carex spicata</i>	Spiked Sedge											X			GNR	SE5	N	R-5
Cyperaceae	<i>Carex stipata</i>	Awl-fruited Sedge			X											G5	S5	N	
Cyperaceae	<i>Carex vulpinoidea</i>	Fox Sedge					X									G5	S5	N	
Cyperaceae	<i>Scirpus atrovirens</i>	Dark-green Bulrush				X	X	X								G5	S5	N	
Cyperaceae	<i>Scirpus cyperinus</i>	Common Woolly Bulrush				X	X									G5	S5	N	
Dryopteridaceae	<i>Athyrium filix-femina var. angustum</i>	Northeastern Lady Fern			X											G5T5	S5	N	
Dryopteridaceae	<i>Dryopteris intermedia</i>	Evergreen Wood Fern							X							G5	S5	N	
Dryopteridaceae	<i>Dryopteris marginalis</i>	Marginal Wood Fern		X	X											G5	S5	N	
Dryopteridaceae	<i>Onoclea sensibilis</i>	Sensitive Fern			X											G5	S5	N	
Equisetaceae	<i>Equisetum arvense</i>	Field Horsetail			X		X				X	X	X			G5	S5	N	
Fabaceae	<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil				X	X	X	X	X	X	X	X	X	X	GNR	SE5	N	
Fabaceae	<i>Medicago lupulina</i>	Black Medick	X		X											GNR	SE5	N	
Fabaceae	<i>Trifolium pratense</i>	Red Clover	X						X	X	X					GNR	SE5	N	
Fabaceae	<i>Trifolium repens</i>	White Clover							X							GNR	SE5	N	
Fabaceae	<i>Vicia cracca</i>	Tufted Vetch	X		X	X	X		X	X	X	X	X	X	X	GNR	SE5	N	
Fagaceae	<i>Quercus macrocarpa</i>	Bur Oak	X	X	X		X		X		X	X	X			G5	S5	N	
Geraniaceae	<i>Geranium robertianum</i>	Herb-Robert		X	X											G5	S5	N	
Grossulariaceae	<i>Ribes americanum</i>	American Black Currant	X				X			X						G5	S5	N	
Grossulariaceae	<i>Ribes cynosbati</i>	Eastern Prickly Gooseberry		X	X				X				X			G5	S5	N	
Grossulariaceae	<i>Ribes rubrum</i>	European Red Currant		X												G4G5	SE5	N	
Juglandaceae	<i>Juglans nigra</i>	Black Walnut		X												G5	S4?	N	R-1
Juncaceae	<i>Juncus articulatus ssp. articulatus</i>	Jointed Rush				X										G5TNR	S5	N	
Juncaceae	<i>Juncus dudleyi</i>	Dudley's Rush				X	X									G5	S5	N	
Juncaceae	<i>Juncus tenuis</i>	Path Rush				X										GNR	S5	N	
Lamiaceae	<i>Clinopodium vulgare ssp. vulgare</i>	Wild Basil							X							G5T5	S5	N	

Table 3b: Vascular Plant List, Brechin Quarry

Surveyor: Dan Stuart, David d'Entremont, Jordan Wrobel

AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²												Conservation Rankings ³			Regional ⁴	
			FOC2-2	FOC4-1a	SWM1-1	MAM2-2h	MAM2-2k	MAM2-2p	CUP3-2	CUP3a	CUP3b	CUW1c	CUW1f	CUW1g	THCMI-2a	THCMI-2b	GRANK	SRANK	TRACK
Lamiaceae	<i>Lycopus uniflorus</i>	Northern Water-horehound			X		X									G5	S5	N	
Lamiaceae	<i>Mentha canadensis</i>	Canada Mint			X			X								G5	S5	N	
Lamiaceae	<i>Prunella vulgaris</i>	Common Self-heal	X	X	X	X	X		X		X		X			G5	S5	N	
Liliaceae	<i>Maianthemum stellatum</i>	Star-flowered False Solomon's Seal		X	X											G5	S5	N	
Lythraceae	<i>Lythrum salicaria</i>	Purple Loosestrife					X									G5	SE5	N	
Monotropaceae	<i>Hypopitys monotropa</i>	Pinesap										X				G5	S4	N	
Oleaceae	<i>Fraxinus americana</i>	White Ash		X			X									G4	S4	N	
Oleaceae	<i>Fraxinus nigra</i>	Black Ash			X		X									G5	S4	Y	
Oleaceae	<i>Fraxinus pennsylvanica</i>	Red Ash	X	X	X	X	X	X	X	X	X	X	X			G4	S4	N	
Oleaceae	<i>Syringa vulgaris</i>	Common Lilac						X								GNR	SE5	N	
Onagraceae	<i>Circaea canadensis</i>	Broad-leaved Enchanter's Nightshade	X	X	X			X	X		X			X		G5	S5	N	
Onagraceae	<i>Epilobium parviflorum</i>	Small-flowered Hairy Willowherb								X						GNR	SE4	N	
Orchidaceae	<i>Epipactis helleborine</i>	Broad-leaved Helleborine	X	X	X						X	X	X			GNR	SE5	N	
Pinaceae	<i>Picea abies</i>	Norway Spruce				X	X			X	X	X	X	X	X	G5	SE3	N	
Pinaceae	<i>Picea glauca</i>	White Spruce				X	X	X		X	X	X	X	X	X	G5	S5	N	
Pinaceae	<i>Picea pungens</i>	Blue Spruce								X						G5	SE1	N	
Pinaceae	<i>Pinus strobus</i>	Eastern White Pine	X	X				X	X							G5	S5	N	
Pinaceae	<i>Pinus sylvestris</i> var. <i>sylvestris</i>	Scots Pine						X			X	X	X			GNRT	SE5	N	
Plantaginaceae	<i>Plantago lanceolata</i>	English Plantain						X	X		X			X	X	G5	SE5	N	
Plantaginaceae	<i>Plantago major</i>	Common Plantain	X				X									G5	SE5	N	
Poaceae	<i>Agrostis gigantea</i>	Redtop			X		X	X	X	X	X	X	X	X	X	G4G5	SE5	N	
Poaceae	<i>Agrostis stolonifera</i>	Creeping Bentgrass			X	X	X					X				G5	SE5	N	
Poaceae	<i>Bromus ciliatus</i>	Fringed Brome	X													G5	S5	N	
Poaceae	<i>Bromus inermis</i>	Smooth Brome		X			X	X	X	X	X	X	X	X	X	G5T5	SE5	N	
Poaceae	<i>Dactylis glomerata</i>	Orchard Grass		X					X	X						GNR	SE5	N	
Poaceae	<i>Elymus repens</i>	Quackgrass				X							X			GNR	SE5	N	
Poaceae	<i>Festuca rubra</i>	Red Fescue				X				X						G5	S5	P	
Poaceae	<i>Glyceria striata</i> var. <i>striata</i>	Fowl Mannagrass	X		X			X		X						G5T5	S5	N	
Poaceae	<i>Lolium arundinaceum</i>	Tall Ryegrass					X		X		X	X	X	X	X	GNR	SE5	N	
Poaceae	<i>Muhlenbergia mexicana</i>	Mexican Muhly			X											G5	S5	N	
Poaceae	<i>Phalaris arundinacea</i>	Reed Canarygrass			X	X	X		X	X	X	X	X	X	X	G5	S5	N	
Poaceae	<i>Phleum pratense</i>	Common Timothy	X				X	X				X	X	X	X	GNR	SE5	N	
Poaceae	<i>Poa compressa</i>	Canada Bluegrass					X	X		X		X	X	X	X	GNR	SE5	N	
Poaceae	<i>Poa pratensis</i>	Kentucky Bluegrass							X							G5	S5	P	
Primulaceae	<i>Lysimachia nummularia</i>	Creeping Yellow Loosestrife	X					X		X						GNR	SE5	N	
Ranunculaceae	<i>Ranunculus acris</i>	Common Buttercup							X	X	X		X			G5	SE5	N	
Rhamnaceae	<i>Frangula alnus</i>	Glossy Buckthorn											X			GNR	SE5	N	
Rhamnaceae	<i>Rhamnus cathartica</i>	European Buckthorn	X	X	X	X	X	X	X	X	X	X	X	X	X	GNR	SE5	N	
Rosaceae	<i>Crataegus monogyna</i>	English Hawthorn											X			G5	SE4	N	
Rosaceae	<i>Crataegus punctata</i>	Dotted Hawthorn									X	X	X	X	X	G5	S5	N	
Rosaceae	<i>Crataegus</i> sp.	a Hawthorn		X				X			X	X	X	X	X	N/A	N/A	N/A	
Rosaceae	<i>Fragaria virginiana</i>	Wild Strawberry	X					X		X	X	X	X			G5	S5	N	
Rosaceae	<i>Geum aleppicum</i>	Yellow Avens					X			X						G5	S5	N	
Rosaceae	<i>Geum canadense</i>	Canada Avens					X				X					G5	S5	N	
Rosaceae	<i>Malus pumila</i>	Common Apple	X	X	X			X	X		X	X	X			G5	SE4	N	

Table 3b: Vascular Plant List, Brechin Quarry

Surveyor: Dan Stuart, David d'Entremont, Jordan Wrobel

AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²												Conservation Rankings ³			Regional ⁴		
			FOC2-2	FOC4-1a	SWM1-1	MAM2-2h	MAM2-2k	MAM2-2p	CUP3-2	CUP3a	CUP3b	CUW1c	CUW1f	CUW1g	THCMI-2a	THCMI-2b	GRANK	SRANK	TRACK	Simcoe
Rosaceae	<i>Potentilla recta</i>	Sulphur Cinquefoil							X								GNR	SE5	N	
Rosaceae	<i>Prunus serotina</i>	Black Cherry							X								G5	S5	N	
Rosaceae	<i>Prunus virginiana</i>	Chokecherry	X	X				X	X		X	X	X	X	X	X	G5	S5	N	
Rosaceae	<i>Rosa multiflora</i>	Multiflora Rose					X										GNR	SE5	N	
Rosaceae	<i>Rubus idaeus ssp. strigosus</i>	North American Red Raspberry										X	X	X			G5T5	S5	N	
Rosaceae	<i>Rubus occidentalis</i>	Black Raspberry									X	X	X	X			G5	S5	N	
Rosaceae	<i>Sorbus aucuparia</i>	European Mountain-ash			X												G5	SE4	N	
Rosaceae	<i>Spiraea alba</i>	White Meadowsweet						X									G5	S5	N	
Rubiaceae	<i>Galium asprellum</i>	Rough Bedstraw						X									G5	S5	N	
Rubiaceae	<i>Galium mollugo</i>	Smooth Bedstraw		X					X	X	X				X	X	GNR	SE5	N	
Rubiaceae	<i>Galium palustre</i>	Common Marsh Bedstraw			X							X	X	X			G5	S5	N	
Salicaceae	<i>Populus alba</i>	White Poplar	X				X		X								G5	SE5	N	
Salicaceae	<i>Populus balsamifera</i>	Balsam Poplar							X								G5	S5	N	
Salicaceae	<i>Populus tremuloides</i>	Trembling Aspen	X				X	X						X			G5	S5	N	
Salicaceae	<i>Salix bebbiana</i>	Bebb's Willow										X	X	X			G5	S5	N	
Salicaceae	<i>Salix discolor</i>	Pussy Willow				X	X										G5	S5	N	
Salicaceae	<i>Salix eriocephala</i>	Cottony Willow					X										G5	S5	N	
Salicaceae	<i>Salix petiolaris</i>	Meadow Willow				X	X	X				X					G5	S5	N	
Scrophulariaceae	<i>Veronica officinalis</i>	Common Speedwell		X								X	X	X			G5	SE5	N	
Solanaceae	<i>Solanum dulcamara</i>	Bittersweet Nightshade									X						GNR	SE5	N	
Tiliaceae	<i>Tilia americana</i>	Basswood		X	X			X	X			X	X	X			G5	S5	N	
Typhaceae	<i>Typha angustifolia</i>	Narrow-leaved Cattail					X										G5	SE5	N	
Typhaceae	<i>Typha latifolia</i>	Broad-leaved Cattail				X											G5	S5	N	
Ulmaceae	<i>Ulmus americana</i>	White Elm	X	X	X	X	X	X	X	X	X	X	X	X			G4	S5	N	
Violaceae	<i>Viola pubescens</i>	Yellow Violet									X						G5	S5	N	
Violaceae	<i>Viola sp.</i>	a Violet		X							X	X	X	X			N/A	N/A	N/A	
Vitaceae	<i>Parthenocissus vitacea</i>	Thicket Creeper		X	X			X	X	X	X	X	X	X			G5	S5	N	
Vitaceae	<i>Vitis riparia</i>	Riverbank Grape	X		X	X		X		X	X	X	X	X	X	X	G5	S5	N	

¹ Nomenclature based on Ministry of Natural Resources and Forestry (MNR) Natural Heritage Information Centre (NHIC, 2023)

² ELC Codes based on Ecological Land Classification for Southern Ontario manual (Lee et al., 1998, 2008)

³ Conservation Rankings: From Ontario Ministry of Natural Resources and Forestry, Natural Heritage Information Centre (<https://www.ontario.ca/page/natural-heritage-information-centre>)

⁴ Riley, J.L. 1989. Distribution and Status of the Vascular Plants of Central Region, Ontario. Ministry of Natural Resources. Parks and Recreational Areas Section, OMNR, Open File Ecological Report SR8902, Central Region, Richmond Hill, Ontario. XiX + 110 pp.

Table 3c: Vascular Plant List, Brechin Quarry

Surveyors: Dan Stuart, David d'Entremont, Jordan Wrobel

AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²						Conservation Rankings ³			Regional ⁴
			THDM2-6e	THDM2-6g	THDM2-6h	MEGM4	MEMM3/MEMM4b	HR (D)	GRANK	SRANK	TRACK	
Aceraceae	<i>Acer negundo</i>	Manitoba Maple					X		G5	S5	N	
Aceraceae	<i>Acer saccharinum</i>	Silver Maple			X		X	X	G5	S5	N	
Aceraceae	<i>Acer saccharum</i>	Sugar Maple						X	G5	S5	N	
Anacardiaceae	<i>Rhus typhina</i>	Staghorn Sumac	X	X			X		G5	S5	N	
Anacardiaceae	<i>Toxicodendron radicans var. rydbergii</i>	Western Poison Ivy	X	X	X		X	X	G5	S5	N	
Apiaceae	<i>Daucus carota</i>	Wild Carrot		X	X	X	X		GNR	SE5	N	
Apocynaceae	<i>Apocynum androsaemifolium</i>	Spreading Dogbane		X					G5	S5	N	
Apocynaceae	<i>Apocynum cannabinum</i>	Hemp Dogbane					X		GNR	S5	N	
Apocynaceae	<i>Asclepias incarnata</i>	Swamp Milkweed					X		G5	S5	N	
Apocynaceae	<i>Asclepias syriaca</i>	Common Milkweed					X	X	G5	S5	N	
Apocynaceae	<i>Vincetoxicum rossicum</i>	European Swallowwort	X	X	X	X	X	X	GNR	SE5	N	
Asteraceae	<i>Achillea millefolium</i>	Common Yarrow		X	X	X	X		G5	SE5?	N	
Asteraceae	<i>Ambrosia artemisiifolia</i>	Common Ragweed	X	X			X		G5	S5	N	
Asteraceae	<i>Centaurea x moncktonii</i>	(<i>Centaurea jacea</i> X <i>Centaurea nigra</i>)					X		GNR	TN	N	
Asteraceae	<i>Cirsium arvense</i>	Canada Thistle		X			X		G5	SE5	N	
Asteraceae	<i>Cirsium vulgare</i>	Bull Thistle		X	X		X		GNR	SE5	N	
Asteraceae	<i>Erigeron annuus</i>	Annual Fleabane		X	X		X	X	G5	S5	N	
Asteraceae	<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod		X	X		X		G5	S5	N	
Asteraceae	<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed					X		G5	S5	N	
Asteraceae	<i>Hieracium sp.</i>	a Hawkweed		X					N/A	N/A	N/A	
Asteraceae	<i>Leucanthemum vulgare</i>	Oxeye Daisy					X		GNR	SE5	N	
Asteraceae	<i>Pilosella caespitosa</i>	Meadow Hawkweed	X	X			X		GNR	SE5	N	
Asteraceae	<i>Solidago altissima</i>	Tall Goldenrod	X	X	X		X	X	G5	S5	P	
Asteraceae	<i>Solidago canadensis</i>	Canada Goldenrod	X	X			X		G5	S5	N	
Asteraceae	<i>Solidago juncea</i>	Early Goldenrod	X	X		X	X		G5	S5	N	
Asteraceae	<i>Solidago ptarmicoides</i>	Upland White Goldenrod					X		G5	S5	N	
Asteraceae	<i>Sonchus arvensis</i>	Field Sow-thistle					X		GNR	SE5	N	
Asteraceae	<i>Sonchus oleraceus</i>	Common Sow-thistle					X		GNR	SE5	N	
Asteraceae	<i>Symphotrichum ciliolatum</i>	Lindley's Aster		X			X		G5	S5	N	

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			THDM2-6e	THDM2-6g	THDM2-6h	MEGM4	MEMM3/MEMM4b	HR (D)	GRANK	SRANK	TRACK	Simcoe
Asteraceae	<i>Symphotrichum ericoides</i>	White Heath Aster					X		G5	S5	P	R-2
Asteraceae	<i>Symphotrichum lanceolatum</i>	Panicled Aster		X	X	X	X	X	G5	S5	P	
Asteraceae	<i>Symphotrichum lateriflorum</i>	Calico Aster		X	X	X	X	X	G5	S5	P	
Asteraceae	<i>Symphotrichum novae-angliae</i>	New England Aster		X	X	X	X	X	G5	S5	N	
Asteraceae	<i>Symphotrichum puniceum</i>	Purple-stemmed Aster			X		X		G5	S5	N	
Asteraceae	<i>Symphotrichum urophyllum</i>	Arrow-leaved Aster	X	X	X	X	X	X	G4G5	S4	N	
Asteraceae	<i>Taraxacum officinale</i>	Common Dandelion		X	X	X	X		G5	SE5	N	
Asteraceae	<i>Tragopogon dubius</i>	Yellow Goatsbeard				X			GNR	SE5	N	
Asteraceae	<i>Tragopogon pratensis</i>	Meadow Goatsbeard			X		X		GNR	SE5	N	
Asteraceae	<i>Tussilago farfara</i>	Coltsfoot		X			X		GNR	SE5	N	
Berberidaceae	<i>Berberis vulgaris</i>	Common Barberry					X		GNR	SE5	N	
Boraginaceae	<i>Lithospermum officinale</i>	European Gromwell						X	GNR	SE5	N	
Brassicaceae	<i>Alliaria petiolata</i>	Garlic Mustard		X					GNR	SE5	N	
Campanulaceae	<i>Campanula rapunculoides</i>	Creeping Bellflower		X			X		GNR	SE5	N	
Caprifoliaceae	<i>Lonicera tatarica</i>	Tatarian Honeysuckle	X	X	X		X		GNR	SE5	N	
Caprifoliaceae	<i>Lonicera x bella</i>	(<i>Lonicera morrowii</i> X <i>Lonicera tatarica</i>)	X	X	X		X	X	GNA		N	
Caprifoliaceae	<i>Viburnum lentago</i>	Nannyberry					X		G5	S5	N	
Caprifoliaceae	<i>Viburnum opulus</i>	Cranberry Viburnum	X	X			X	X	G5	S5	N	
Caryophyllaceae	<i>Cerastium fontanum</i>	Common Mouse-ear Chickweed		X	X		X		GNR	SE5	N	
Celastraceae	<i>Celastrus orbiculatus</i>	Oriental Bittersweet		X			X		GNR	SE2	N	
Clusiaceae	<i>Hypericum perforatum</i>	Common St. John's-wort		X	X	X	X		GNR	SE5	N	
Convolvulaceae	<i>Convolvulus arvensis</i>	Field Bindweed					X		GNR	SE5	N	
Cornaceae	<i>Cornus sericea</i>	Red-osier Dogwood		X	X		X	X	G5	S5	N	
Cupressaceae	<i>Juniperus communis</i>	Common Juniper	X	X			X		G5	S5	N	
Cupressaceae	<i>Juniperus virginiana</i>	Eastern Red Cedar					X		G5	S5	N	
Cupressaceae	<i>Thuja occidentalis</i>	Eastern White Cedar	X	X	X		X		G5	S5	N	
Cyperaceae	<i>Carex aurea</i>	Golden Sedge					X		G5	S5	N	
Cyperaceae	<i>Carex bebbii</i>	Bebb's Sedge				X	X		G5	S5	N	
Cyperaceae	<i>Carex cristatella</i>	Crested Sedge			X		X		G5	S5	N	

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			THDM2-6e	THDM2-6g	THDM2-6h	MEGM4	MEMM3/MEMM4b	HR (D)	GRANK	SRANK	TRACK	
Cyperaceae	<i>Carex flava</i>	Yellow Sedge					X		G5	S5	N	
Cyperaceae	<i>Carex gracillima</i>	Graceful Sedge					X		G5	S5	N	
Cyperaceae	<i>Carex granularis</i>	Limestone Meadow Sedge	X	X			X		G5	S5	N	
Cyperaceae	<i>Carex hystericina</i>	Porcupine Sedge				X	X		G5	S5	N	
Cyperaceae	<i>Carex molesta</i>	Troublesome Sedge			X				G4	S4S5	N	R-2
Cyperaceae	<i>Carex retrorsa</i>	Retrorse Sedge			X		X		G5	S5	N	
Cyperaceae	<i>Carex spicata</i>	Spiked Sedge		X	X		X		GNR	SE5	N	R-5
Cyperaceae	<i>Carex vulpinoidea</i>	Fox Sedge		X		X	X		G5	S5	N	
Cyperaceae	<i>Scirpus atrovirens</i>	Dark-green Bulrush		X	X		X		G5	S5	N	
Cyperaceae	<i>Scirpus cyperinus</i>	Common Woolly Bulrush					X		G5	S5	N	
Cyperaceae	<i>Scirpus pendulus</i>	Hanging Bulrush		X			X		G5	S5	N	
Equisetaceae	<i>Equisetum arvense</i>	Field Horsetail					X		G5	S5	N	
Equisetaceae	<i>Equisetum variegatum</i>	Variegated Scouring-rush		X					G5	S5	N	
Fabaceae	<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil	X	X	X	X	X	X	GNR	SE5	N	
Fabaceae	<i>Medicago sativa</i>	Alfalfa		X					GNR	SE5	N	
Fabaceae	<i>Melilotus albus</i>	White Sweet-clover				X	X		G5	SE5	N	
Fabaceae	<i>Robinia pseudoacacia</i>	Black Locust		X					G5	SE5	N	
Fabaceae	<i>Securigera varia</i>	Purple Crown-vetch			X				GNR	SE5	N	
Fabaceae	<i>Trifolium hybridum</i>	Alsike Clover		X	X		X		GNR	SE5	N	
Fabaceae	<i>Trifolium pratense</i>	Red Clover			X	X	X		GNR	SE5	N	
Fabaceae	<i>Trifolium repens</i>	White Clover					X		GNR	SE5	N	
Fabaceae	<i>Vicia cracca</i>	Tufted Vetch	X	X	X	X	X	X	GNR	SE5	N	
Fagaceae	<i>Quercus macrocarpa</i>	Bur Oak		X			X	X	G5	S5	N	
Gentianaceae	<i>Centaurium erythraea</i>	European Centaury			X				GNR	SE3	N	
Geraniaceae	<i>Geranium robertianum</i>	Herb-Robert						X	G5	S5	N	
Grossulariaceae	<i>Ribes americanum</i>	American Black Currant					X		G5	S5	N	
Grossulariaceae	<i>Ribes cynosbati</i>	Eastern Prickly Gooseberry		X				X	G5	S5	N	
Iridaceae	<i>Sisyrinchium montanum</i>	Strict Blue-eyed-grass		X			X		G5	S5	N	
Juglandaceae	<i>Juglans cinerea</i>	Butternut					X		G3	S2?	Y	

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			THDM2-6e	THDM2-6g	THDM2-6h	MEGM4	MEMM3/MEMM4b	HR (D)	GRANK	SRANK	TRACK		
Juglandaceae	<i>Juglans nigra</i>	Black Walnut		X	X				X	G5	S4?	N	R-1
Juncaceae	<i>Juncus articulatus ssp. articulatus</i>	Jointed Rush	X	X				X		G5TNR	S5	N	
Juncaceae	<i>Juncus dudleyi</i>	Dudley's Rush		X	X	X	X			G5	S5	N	
Lamiaceae	<i>Clinopodium vulgare ssp. vulgare</i>	Wild Basil	X	X				X		G5T5	S5	N	
Lamiaceae	<i>Glechoma hederacea</i>	Ground-ivy						X		GNR	SE5	N	
Lamiaceae	<i>Lycopus americanus</i>	American Water-horehound			X					G5	S5	N	
Lamiaceae	<i>Lycopus uniflorus</i>	Northern Water-horehound		X				X		G5	S5	N	
Lamiaceae	<i>Prunella vulgaris</i>	Common Self-heal		X	X			X		G5	S5	N	
Liliaceae	<i>Asparagus officinalis</i>	Garden Asparagus		X						G5?	SE5	N	
Liliaceae	<i>Hemerocallis fulva</i>	Orange Daylily			X					GNA	SE5	N	
Lythraceae	<i>Lythrum salicaria</i>	Purple Loosestrife						X		G5	SE5	N	
Oleaceae	<i>Fraxinus americana</i>	White Ash						X		G4	S4	N	
Oleaceae	<i>Fraxinus pennsylvanica</i>	Red Ash	X	X	X	X	X	X		G4	S4	N	
Oleaceae	<i>Syringa vulgaris</i>	Common Lilac	X	X				X		GNR	SE5	N	
Onagraceae	<i>Circaea canadensis</i>	Broad-leaved Enchanter's Nightshade			X			X	X	G5	S5	N	
Onagraceae	<i>Epilobium ciliatum</i>	Northern Willowherb			X					G5	S5	N	
Onagraceae	<i>Epilobium coloratum</i>	Purple-veined Willowherb				X				G5	S5	N	R-4
Onagraceae	<i>Epilobium parviflorum</i>	Small-flowered Hairy Willowherb		X						GNR	SE4	N	
Orchidaceae	<i>Epipactis helleborine</i>	Broad-leaved Helleborine		X		X			X	GNR	SE5	N	
Pinaceae	<i>Picea abies</i>	Norway Spruce						X		G5	SE3	N	
Pinaceae	<i>Picea glauca</i>	White Spruce	X	X	X	X	X	X		G5	S5	N	
Pinaceae	<i>Pinus strobus</i>	Eastern White Pine	X	X	X	X	X			G5	S5	N	
Pinaceae	<i>Pinus sylvestris var. sylvestris</i>	Scots Pine				X	X			GNRTN	SE5	N	
Plantaginaceae	<i>Plantago lanceolata</i>	English Plantain		X	X			X		G5	SE5	N	
Plantaginaceae	<i>Plantago major</i>	Common Plantain		X	X			X		G5	SE5	N	
Poaceae	<i>Agrostis gigantea</i>	Redtop	X	X	X	X	X			G4G5	SE5	N	
Poaceae	<i>Agrostis stolonifera</i>	Creeping Bentgrass		X	X			X		G5	SE5	N	
Poaceae	<i>Bromus inermis</i>	Smooth Brome	X	X	X	X	X	X		G5T5	SE5	N	
Poaceae	<i>Dactylis glomerata</i>	Orchard Grass	X	X				X		GNR	SE5	N	

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Poaceae	<i>Danthonia spicata</i>	Poverty Oatgrass	X	X			X		G5	S5	N	
Poaceae	<i>Dichanthelium implicatum</i>	Slender-stemmed Panicgrass		X	X		X		G5T5	S5	N	
Poaceae	<i>Echinochloa crus-galli</i>	Large Barnyard Grass		X					GNR	SE5	N	
Poaceae	<i>Elymus repens</i>	Quackgrass	X	X	X		X		GNR	SE5	N	
Poaceae	<i>Festuca rubra</i>	Red Fescue		X		X	X		G5	S5	P	
Poaceae	<i>Glyceria striata var. striata</i>	Fowl Mannagrass			X		X		G5T5	S5	N	
Poaceae	<i>Lolium arundinaceum</i>	Tall Ryegrass		X	X		X	X	GNR	SE5	N	
Poaceae	<i>Panicum virgatum</i>	Old Switch Panicgrass					X		G5	S4	N	
Poaceae	<i>Phalaris arundinacea</i>	Reed Canarygrass	X	X	X	X	X	X	G5	S5	N	
Poaceae	<i>Phleum pratense</i>	Common Timothy	X	X	X	X	X	X	GNR	SE5	N	
Poaceae	<i>Poa compressa</i>	Canada Bluegrass		X	X	X	X		GNR	SE5	N	
Poaceae	<i>Poa pratensis</i>	Kentucky Bluegrass		X	X		X		G5	S5	P	
Polygonaceae	<i>Rumex crispus</i>	Curled Dock			X	X	X		GNR	SE5	N	
Ranunculaceae	<i>Ranunculus acris</i>	Common Buttercup		X	X	X	X	X	G5	SE5	N	
Rhamnaceae	<i>Endotropis alnifolia</i>	Alder-leaved Buckthorn					X		G5	S5	N	
Rhamnaceae	<i>Rhamnus cathartica</i>	European Buckthorn	X	X	X	X	X	X	GNR	SE5	N	
Rosaceae	<i>Agrimonia gryposepala</i>	Hooked Agrimony					X		G5	S5	N	
Rosaceae	<i>Crataegus monogyna</i>	English Hawthorn					X		G5	SE4	N	
Rosaceae	<i>Crataegus sp.</i>	a Hawthorn			X		X	X	N/A	N/A	N/A	
Rosaceae	<i>Fragaria virginiana</i>	Wild Strawberry	X	X	X	X	X	X	G5	S5	N	
Rosaceae	<i>Geum aleppicum</i>	Yellow Avens					X	X	G5	S5	N	
Rosaceae	<i>Geum canadense</i>	Canada Avens				X	X	X	G5	S5	N	
Rosaceae	<i>Malus pumila</i>	Common Apple	X	X	X	X	X		G5	SE4	N	
Rosaceae	<i>Potentilla recta</i>	Sulphur Cinquefoil		X			X		GNR	SE5	N	
Rosaceae	<i>Prunus virginiana</i>	Chokecherry	X	X	X	X	X	X	G5	S5	N	
Rosaceae	<i>Rosa blanda</i>	Smooth Rose			X		X		G5	S5	N	
Rosaceae	<i>Rosa multiflora</i>	Multiflora Rose					X		GNR	SE5	N	
Rosaceae	<i>Rubus idaeus ssp. strigosus</i>	North American Red Raspberry		X	X	X	X	X	G5T5	S5	N	
Rosaceae	<i>Rubus occidentalis</i>	Black Raspberry		X	X		X	X	G5	S5	N	

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AEC18-288

FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	Vegetation Communities ²						Conservation Rankings ³			Regional ⁴
			THDM2-6e	THDM2-6g	THDM2-6h	MEGM4	MEMM3/MEMM4b	HR (D)	GRANK	SRANK	TRACK	
Rosaceae	<i>Sorbus aucuparia</i>	European Mountain-ash						X	G5	SE4	N	
Rubiaceae	<i>Galium asprellum</i>	Rough Bedstraw						X	G5	S5	N	
Rubiaceae	<i>Galium mollugo</i>	Smooth Bedstraw	X	X	X	X	X	X	GNR	SE5	N	
Rubiaceae	<i>Galium palustre</i>	Common Marsh Bedstraw		X	X	X			G5	S5	N	
Salicaceae	<i>Populus alba</i>	White Poplar		X				X	G5	SE5	N	
Salicaceae	<i>Populus balsamifera</i>	Balsam Poplar						X	G5	S5	N	
Salicaceae	<i>Populus tremuloides</i>	Trembling Aspen						X	G5	S5	N	
Salicaceae	<i>Salix discolor</i>	Pussy Willow		X					G5	S5	N	
Salicaceae	<i>Salix eriocephala</i>	Cottony Willow						X	G5	S5	N	
Salicaceae	<i>Salix petiolaris</i>	Meadow Willow			X			X	G5	S5	N	
Scrophulariaceae	<i>Verbascum thapsus</i>	Common Mullein						X	GNR	SE5	N	
Scrophulariaceae	<i>Veronica longifolia</i>	Long-leaved Speedwell			X				GNR	SE3	N	
Solanaceae	<i>Solanum dulcamara</i>	Bittersweet Nightshade						X	GNR	SE5	N	
Tiliaceae	<i>Tilia americana</i>	Basswood		X				X	G5	S5	N	
Typhaceae	<i>Typha angustifolia</i>	Narrow-leaved Cattail		X				X	G5	SE5	N	
Typhaceae	<i>Typha latifolia</i>	Broad-leaved Cattail						X	G5	S5	N	
Typhaceae	<i>Typha x glauca</i>	(<i>Typha angustifolia</i> X <i>Typha latifolia</i>)						X	GNA		N	
Ulmaceae	<i>Ulmus americana</i>	White Elm	X	X	X	X	X	X	G4	S5	N	
Urticaceae	<i>Urtica gracilis ssp. gracilis</i>	Slender Stinging Nettle						X	G5T5	S5	N	
Valerianaceae	<i>Valeriana officinalis</i>	Common Valerian			X				GNR	SE3	N	
Violaceae	<i>Viola pubescens</i>	Yellow Violet						X	G5	S5	N	
Vitaceae	<i>Parthenocissus vitacea</i>	Thicket Creeper	X	X	X			X	G5	S5	N	
Vitaceae	<i>Vitis riparia</i>	Riverbank Grape	X	X	X			X	G5	S5	N	

¹ Nomenclature based on Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC, 2022)

² ELC Codes based on Ecological Land Classification for Southern Ontario manual (Lee et al., 1998, 2008)

³ Conservation Rankings: From Ontario Ministry of Natural Resources and Forestry, Natural Heritage Information Centre (<https://www.ontario.ca/page/natural-heritage-information-centre>)

⁴ Riley, J.L. 1989. Distribution and Status of the Vascular Plants of Central Region, Ontario. Ministry of Natural Resources. Parks and Recreational Areas Section, OMNR, Open File Ecological Report SR8902, Central Region, Richmond Hill, Ontario. XiX + 110 pp.

Table 3c: Vascular Plant List, Brechin Quarry

Surveyors: Dan Stuart, David d'Entremont, Jordan Wrobel

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			Vegetation Communities ²					Conservation Rankings ³			Regional ⁴	
FAMILY ¹	SCIENTIFIC NAME ¹	COMMON NAME ¹	THDM2-6e	THDM2-6g	THDM2-6h	MEGM4	MEMM3/MEMM4b	HR (D)	GRANK	SRANK	TRACK	Simcoe

Table 4a: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
FO (FOREST)	Tree cover >60%.
Coniferous Forest (FOC)	Coniferous tree species >75% of canopy cover.
FOC2-2 (Dry-Fresh White Cedar Coniferous Forest)	This community features a sparse (<10%) emergent canopy consisting of White Elm (<i>Ulmus americana</i>) with dense (>60%) underlying subcanopy dominated by Eastern White Cedar (<i>Thuja occidentalis</i>) with White Elm and Paper Birch (<i>Betula papyrifera</i>) associates. Understory layer is composed of very sparse (<<10%) Common Apple (<i>Malus pumila</i>) and Common Juniper (<i>Juniperus communis</i>) along the community's fringes. Ground layer is very sparse (<<10%) showing evidence of significant degradation due to cattle grazing/refuge and consists of Wild Strawberry (<i>Fragaria virginiana</i>), Self-heal (<i>Prunella vulgaris ssp. lanceolata</i>), Tall Buttercup (<i>Ranunculus acris</i>), and Yellow Avens (<i>Geum aleppicum</i>) in roughly equal proportions.
SW (SWAMP)	Tree or shrub cover >25%; dominated by hydrophytic shrub and tree species.
Deciduous Swamp (SWD)	Tree cover >25%; trees >5 metres in height; deciduous tree species >75% of canopy cover. Typically fern and sedge rich.
SWD4-3 (White Birch-Poplar Mineral Deciduous Swamp)	Areas where flooding duration is short – substrates aerated by early-mid summer. Common in floodplains. This community features a moderately dense (25-60%) canopy/subcanopy layer dominated by Trembling Aspen (<i>Populus tremuloides</i>) with Balsam Poplar (<i>Populus balsamifera</i>) and White Elm associates. Understory is moderately dense (25-60%) and comprises Meadow Willow (<i>Salix petiolaris</i>), Trembling Aspen, Heart-leaved Willow (<i>Salix eriocephala</i>), and Pussy Willow (<i>Salix discolor</i>) in roughly equal proportions. Ground layer is dense (>60%) and is composed of Timothy (<i>Phleum pratensis</i>), Red Fescue (<i>Festuca rubra ssp. rubra</i>), Cottongrass Bulrush (<i>Scirpus cyperinus</i>) and Red-osier Dogwood (<i>Cornus stolonifera</i>) in descending order of density.
Thicket Swamp (SWT)	Tree cover ≤25%; hydrophytic shrubs >25%.
SWT2-2a (Willow Mineral Thicket Swamp)	Areas where flooding duration is short – substrates aerated by early-mid summer. This community features a very sparse (<<10%) canopy/subcanopy layer composed of White Elm, Trembling Aspen, and Green Ash (<i>Fraxinus pennsylvanica</i>). Shrub layer is dense and is composed of Meadow Willow with Red-osier Dogwood, Bebb's Willow (<i>Salix bebbiana</i>), and Pussy Willow associates. Ground layer is dense and comprises Reed Canary Grass (<i>Phalaris arundinacea</i>), Cottongrass Bulrush, Fox Sedge (<i>Carex vulpinoidea</i>), and Tall Buttercup in descending order of density.
SWT2-2b (Willow Mineral Thicket Swamp)	This community features a very sparse (<<10%) canopy/subcanopy layer composed of White Elm and Green Ash. Shrub layer is dense and comprises Meadow Willow with Red-osier Dogwood, Heart-leaved Willow, and Common Buckthorn (<i>Rhamnus cathartica</i>) associates. Ground layer is dense and comprises Reed Canary Grass (<i>Phalaris arundinacea</i>), Red-osier Dogwood, Dark-green Bulrush (<i>Scirpus atrovirens</i>), and Tall Buttercup in descending order of density.

Table 4a: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
SWT2-2c (Willow Mineral Thicket Swamp)	This community features a moderately sparse (10-25%) canopy/subcanopy layer composed of Green Ash, White Elm, Trembling Aspen, and Paper Birch in descending order of density. Shrub layer is dense and comprises Meadow Willow, Heart-leaved Willow, Green Ash, and Bebb's Willow in descending order of density. Ground layer is composed of Reed Canary Grass, Cottongrass Bulrush, Fox Sedge, and Narrow-leaved Cattail (<i>Typha angustifolia</i>) in descending order of density.
MA (MARSH)	Tree and shrub cover $\leq 25\%$. Dominated by emergent hydrophytic macrophytes.
Meadow Marsh (MAM)	Species less tolerant of prolonged flooding. Flooding seasonal – soils flooded in spring, most dry by summer. Represents the wetland-terrestrial interface.
MAM2-2a (Reed Canary Grass Mineral Meadow Marsh)	This community is located in the northeast corner of the subject property and features a very sparse ($\ll 10\%$) shrub layer composed of Green Ash and Meadow Willow. Ground layer is dense and is composed of Reed Canary Grass, Flattened Rush (<i>Juncus compressus</i>), Red Fescue, and Narrow-leaved Cattail in descending order of density.
MAM2-2b (Reed Canary Grass Mineral Meadow Marsh)	This community is located in the southeast corner of the subject property and features a very sparse ($\ll 10\%$) shrub layer composed of Meadow Willow, with minor Common Buckthorn, Green Ash, and Red-osier Dogwood associates. Ground layer is dense and is composed of Reed Canary Grass, Creeping Bentgrass (<i>Agrostis stolonifera</i>), Panicked Aster (<i>Symphotrichum lanceolatum</i>), and Grass-leaved Goldenrod (<i>Euthamia graminifolia</i>) in descending order of density.
MAM2-6 (Broad-leaved Sedge Mineral Meadow Marsh)	This community features a very sparse ($\ll 10\%$) shrub layer composed of Common Buckthorn, Red-osier Dogwood, with minor Common Apple component. Ground layer is dense and is composed of Dark-green Bulrush, Fox Sedge, Panicked Aster, and Creeping Bentgrass in descending order of density.
Shallow Marsh (MAS)	Water up to 2 metres deep; standing or flowing water for much or all of growing season. Grasses, sedges, and rushes usually dominant; hydrophytic emergent macrophyte cover $\geq 25\%$.
MAS2-1 (Cattail Mineral Shallow Marsh)	Communities dominated by Cattail species (<i>Typha spp.</i>).
CU (CULTURAL)	Community resulting from, or maintained by, cultural or anthropogenic-based disturbances.
CUW1a (Mineral Cultural Woodland)	<p>Tree cover $>35\%$ and $\leq 60\%$. Site conditions and substrate types variable. This unit is located adjacent to a former structure and shows evidence of past management as a garden or similar horticultural feature.</p> <p>This community features a moderately dense (25-60%) canopy/subcanopy layer dominated by Black Locust (<i>Robinia pseudoacacia</i>) with limited White Elm associates. Understory/shrub layer is moderately dense (25-60%) and comprises Common Lilac (<i>Syringa vulgaris</i>), Common Apple, Black Locust, and Tartarian Honeysuckle (<i>Lonicera tatarica</i>). Ground layer is dense and is composed of Kentucky Bluegrass (<i>Poa pratensis spp. pratensis</i>), Garden Bird's-foot Trefoil (<i>Lotus corniculatus</i>), Eastern Late Goldenrod (<i>Solidago altissima ssp. altissima</i>), and Tall Buttercup in descending order of density.</p>

Table 4a: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
CUW1b (Mineral Cultural Woodland)	This community features a moderately sparse (10-25%) canopy/subcanopy layer dominated by White Elm with Eastern White Cedar and Common Apple associates. A successional understory layer is dense (>60%) and is dominated by Eastern White Cedar, with Meadow Willow, Trembling Aspen, and Common Buckthorn associates. Ground layer is sparse (<10%) and is composed of Graceful Sedge (<i>Carex gracillima</i>), Common Dandelion (<i>Taraxacum officinale</i>), Oxeye Daisy (<i>Leucanthemum vulgare</i>), and Wild Strawberry in roughly equal proportions.
CUW1c (Mineral Cultural Woodland)	This community features a moderately dense (25-60%) canopy/subcanopy layer dominated by Eastern White Cedar with Green Ash, Trembling Aspen, and White Elm associates. A successional understory layer is dense (>60%) and is dominated by Eastern White Cedar, with Green Ash, Meadow Willow, and Trembling Aspen associates. Ground layer is sparse (<10%) and is composed of Garden Bird's-foot Trefoil, Hooked Agrimony (<i>Agrimonia gryposepala</i>), Eastern Poison-ivy (<i>Toxicodendron radicans var. radicans</i>) and Timothy in roughly equal proportions.
THDM2-6a (Buckthorn Deciduous Shrub Thicket)	<p>Shrub cover >25%; tree cover <25%; shrub cover varies from scattered and patchy to continuous; areas with cultural legacy typically dominated by more invasive shrub species; tree establishment inhibited by environment or have been removed by land use practices; areas recovering from cultural disturbance (e.g. clearing, pasture). Deciduous shrub species dominate; deciduous cover >75%.</p> <p>No canopy/subcanopy layer is present in this community type. Shrub layer is moderately dense (25-60%) and is heavily dominated by Common Buckthorn with occasional Scot's Pine (<i>Pinus sylvestris var. sylvestris</i>). Ground layer is dense (>60%) and comprises Timothy, Red Fescue, Garden Bird's-foot Trefoil, and Tall Buttercup.</p>
THDM2-6b (Buckthorn Deciduous Shrub Thicket)	Canopy/subcanopy layer is very sparse (<<10%) is composed of White Elm with a minor element of Eastern White Cedar. Shrub layer is moderately dense (25-60%) and is heavily dominated by Common Buckthorn with occasional Common Apple, Eastern White Cedar, and Meadow Willow. Ground layer is dense (>60%) and comprises Timothy, Red Fescue, Garden Bird's-foot Trefoil, and Tall Buttercup.
THDM2-6c (Buckthorn Deciduous Shrub Thicket)	Canopy/subcanopy layer is very sparse (<<10%) is composed of White Elm with a minor element of Eastern White Cedar. Shrub layer is moderately dense (25-60%) and comprises Common Buckthorn, Common Apple, Eastern White Cedar, and White Elm in descending order of density. Ground layer is dense (>60%) and is composed of Red Fescue, Timothy, Hooked Agrimony, and Cottongrass Bulrush in descending order of density.
MEGM3/MEGM4a (Dry-Moist Graminoid Meadow)	Tree and shrub cover <25%; open herbaceous communities; cover varies from scattered and patchy to continuous meadow; areas with a cultural legacy typically dominated by invasive plant species; shrub and tree establishment inhibited by environment or have been removed by land use practices; areas recovering from cultural disturbance (e.g. clearing, pasture). Dominated by grass-like species (e.g. grass, sedge).

Table 4a: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	<p>Canopy/subcanopy layer is very sparse (<<10%) is with occasional White Elm. Shrub layer is sparse (<10%) and comprises Common Buckthorn with a minor component of Eastern White Cedar, White Elm, and Common Juniper. Ground layer is dense (>60%) and is composed of Red Fescue, Timothy, Hairy Brome (<i>Bromus commutatus</i>), Tall Buttercup, and Garden Bird's-foot Trefoil in descending order of density.</p>
Other	Communities not described by the ELC system.
HR(D) (Deciduous Hedgerow)	Treed row featuring deciduous cover >75%.

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
FO (FOREST)	Tree cover >60%.
Coniferous Forest (FOC)	Coniferous tree species >75% of canopy cover.
FOC2-2 (Dry-Fresh White Cedar Coniferous Forest)	<p>This community features a sparse supercanopy of Eastern White Pine (<i>Pinus strobus</i>) with occasional White Poplar (<i>Populus alba</i>), however the sub-canopy layer is dense and dominated by Eastern White Cedar (<i>Thuja occidentalis</i>). White Poplar, Green Ash (<i>Fraxinus pennsylvanica</i>) and White Elm (<i>Ulmus americana</i>) are also represented in the subcaopy layer. The understory is sparse and comprises occasional Eastern White Cedar, White Poplar, Common Buckthorn (<i>Rhamnus cathartica</i>) and Red-osier Dogwood (<i>Cornus sericea</i>) in descending order of density. The ground layer is also sparse and comprises occasional Western Poison-Ivy (<i>Toxicodendron radicans</i> var. <i>rydbergii</i>), Wall Lettuce (<i>Mycelis muralis</i>), Broad-leaved Enchanter’s Nightshade (<i>Circaea canadensis</i>) and Common Self-heal (<i>Prunella vulgaris</i>) in descending order of density.</p> <p>A mapped inclusion occurs along the southern edge of this polygon west of the former rail berm: FODM4-12a (Dry-Fresh Exotic Deciduous Forest), dominated by White Poplar in the canopy layer. The subcanopy is also dominated by White Poplar, with occasional Eastern White Cedar and Green Ash associates. The understory layer is moderately sparse and comprises Eastern White Cedar, Common Buckthorn, and Green Ash in descending order of density. The ground layer is moderately dense and includes Western Poison-Ivy, Eastern White Cedar and Green Ash seedlings, and Riverbank Grape (<i>Vitis riparia</i>) in descending order of density.</p>
FOC4-1a (Fresh-Moist White Cedar Coniferous Forest)	<p>This community is dominated by Eastern White Cedar but is occasionally broken-up by small mixed forest inclusions with interspersed Green Ash. The canopy is dense, typically dominated by Eastern White Cedar, with Green Ash and Eastern White Pine associates, as well as occasional Basswood (<i>Tilia americana</i>). The subcanopy varies from somewhat sparse to somewhat dense, composed of Eastern White Cedar with lesser elements of Green Ash, Common Buckthorn and American Elm. The understory is typically somewhat sparse, largely composed of Eastern White Cedar, Common Buckthorn and Ash saplings. The ground layer is typically somewhat sparse to locally dense, comprised commonly of young Ash and Common Buckthorn with elements of Common Speedwell (<i>Veronica officinalis</i>), Thicket Creeper (<i>Parthenocissus vitacea</i>), Wall Lettuce and others.</p>
SW (SWAMP)	Tree or shrub cover >25%; dominated by hydrophytic shrub and tree species.
Mixed Swamp (SWM)	Tree cover >25%; trees >5 metres in height; deciduous tree species >75% of canopy cover. Typically fern and sedge rich.
SWM1-1 (White Cedar-Hardwood Mineral Mixed Swamp)	<p>Areas where flooding duration is short – substrates partially aerated by early-midsummer. The upper canopy of this community is somewhat sparse/interrupted and dominated by deciduous elements, with the majority of coniferous elements occurring in the subcanopy. Conifer cover is marginally above 25% overall between both layers, enough to consider mixed.</p> <p>Topography consists of shallow undulating hummocks with some more level areas.</p>

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	<p>The canopy is somewhat sparse, comprised largely of Green Ash with lesser elements of Basswood, Bur Oak (<i>Quercus macrocarpa</i>) and Riverbank Grape (<i>Vitis riparia</i>), with occasional canopy-level Eastern White Cedar. The subcanopy is dense and often dominated by Common Buckthorn, with lesser elements of Basswood, Ash and Eastern White Cedar. The understory is typically dense, comprised of Common Buckthorn, Ash, Red-osier Dogwood and young Basswood. The ground layer is dense and variable, often including components of Western Poison Ivy, Ash, <i>Carex</i> sedge species (such as Graceful Sedge (<i>C. gracillima</i>) and Awl-fruited Sedge (<i>C. stipata</i>)), Field Horsetail (<i>Equisetum arvense</i>), Creeping Bentgrass (<i>Agrostis stolonifera</i>), Fowl Mannagrass (<i>Glyceria striata</i>), Northern Water-horehound (<i>Lycopus uniflorus</i>) and others.</p>
MA (MARSH)	<p>Tree and shrub cover $\leq 25\%$. Dominated by emergent hydrophytic macrophytes.</p>
Meadow Marsh (MAM)	<p>Species less tolerant of prolonged flooding. Flooding seasonal – soils flooded in spring, most dry by summer. Represents the wetland-terrestrial interface.</p>
MAM2-2h (Reed Canary Grass Mineral Meadow Marsh)	<p>Numerous variations of this vegetation community exist across the property, (including several inclusions embedded within other ELC polygons), all likely forming under similar ecological conditions. The polygon is a disturbed, somewhat low-diversity early-successional meadow marsh occupying various low points across the property. Community experiences seasonal inundation followed by midsummer aeration. Seasonal inundation cycle may be influenced by the limited perviousness of level underlying bedrock, trapping spring water inputs as seasonally high groundwater which later tapers as summer progresses. Historical drainage ditches across the property may also complicate seasonal inundation patterns and altered the size/shape of the wetlands.</p> <p>The polygon does not feature a treed canopy or subcanopy layer. The tree/shrub layer is approx. 3-5m in height and sparse, limited to occasional Meadow Willow (<i>Salix petiolaris</i>), Red-osier Dogwood, Green Ash, and Common Buckthorn. The ground layer is dominated by dense Reed Canary Grass, with immature Red-osier Dogwood stems among moderately dense Grass-leaved Goldenrod (<i>Euthamia graminifolia</i>) interspersed along the outer edges of the polygon. A minor section in the northwest section of the polygon is dominated by Broad-leaved Cattail (<i>Typha latifolia</i>).</p>
MAM2-2k (Reed Canary Grass Mineral Meadow Marsh)	<p>The treed layer is nearly absent, with occasional tall trees sporadically occurring throughout, often including Green Ash, with some American Elm and occasional Spruces (including White Spruce (<i>Picea glauca</i>) and Norway Spruce (<i>Picea abies</i>)), especially where the polygon edge borders a planted spruce area. The subcanopy is typically sparse to very sparse, typically comprised of Green Ash with elements of American Elm, Common Buckthorn and shrub Willows. The understory is dense, dominated by dense Reed Canary Grass, with recurring aggregations of Red-osier Dogwood and lesser elements of Panicked Aster (<i>Symphotrichum lanceolatum</i>), Dark-green Bulrush (<i>Scirpus atrovirens</i>), Redtop (<i>Agrostis gigantea</i>), Grass-leaved Goldenrod and</p>

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	occasional Ash and Elm saplings. The ground layer is variably dense, often dominated by shorter Reed Canary Grass, with variable elements of Garden Bird’s-foot Trefoil (<i>Lotus corniculatus</i>), Red-osier Dogwood and others.
MAM2-2p (Reed Canary Grass Mineral Meadow Marsh)	<p>This polygon is a similar community to polygon MAM2-2k, but slightly higher proportion of trees and shrubs, and more consistently diverse in vegetation.</p> <p>The treed layer is sparse, dominated by Green Ash with lesser elements of American Elm and occasional White Spruce. The subcanopy is somewhat sparse, comprised largely of Common Buckthorn, American Elm, Green Ash, with Riverbank Grape frequently climbing subcanopy trees and occasional stems of Bur Oak near the hedgerow. The understory is dense, primarily composed of Reed Canary Grass with elements of Panicked Aster, Red-osier Dogwood, Redtop, Tall Ryegrass (<i>Lolium arundinaceum</i>) and others. The ground layer variably dense, typically dominated by shorter grasses (including substantial Reed Canary Grass), Garden Bird’s-foot Trefoil and others.</p> <p>The northeast corner of this polygon contains a very small area of elevated Trembling Aspen (<i>Populus tremuloides</i>) canopy cover and transitions into moist forest.</p>
CU (CULTURAL)	Community resulting from, or maintained by, cultural or anthropogenic-based disturbances.
CUP3-2 (White Pine Coniferous Plantation)	This naturalizing plantation is generally characterized as an open woodland with evidence of succession from previous thicket and/or orchard conditions. The community features a moderately dense supercanopy/canopy including Eastern White Pine with minor Scot’s Pine (<i>Pinus sylvestris</i>) associates. The subcanopy layer is dense and comprises Eastern White Pine, Green Ash, Common Lilac and occasional tall Common Buckthorn in descending order of density. The understory layer is moderately dense and includes Green Ash, Common Buckthorn, Common Lilac and Common Apple (<i>Malus pumila</i>). The ground layer is also moderately dense and includes seedling ash and Common Buckthorn, European Swallowwort (<i>Vincetoxicum rossicum</i>) and occasional aggregations of Western Poison-ivy.
CUP3a (Coniferous Plantation)	<p>This polygon is a coniferous plantation established over cleared post-agricultural lands shortly prior to 1997 (County of Simcoe, 2023). The community is disturbed but relatively uniform, and appears to occupy areas of fresh-moist soils with some localized dry/shallow areas present. Cover between subcanopy and canopy adds up to >60%.</p> <p>The canopy is somewhat dense, dominated primarily by White Spruce with sporadic American Elm and Green Ash. The subcanopy is also somewhat dense, similarly dominated by White Spruce, with sporadic American Elm, Green Ash and Common Buckthorn. The understory is typically dense to somewhat dense, composed mostly of Reed Canary Grass, Tall Goldenrod, Garden Bird’s-foot Trefoil and Grass-leaved Goldenrod. The ground layer is somewhat dense, commonly composed of old-field grasses and Garden Bird’s-foot Trefoil with lesser elements of Limestone Meadow Sedge, Common Buckthorn, Common Self-heal, Common Dandelion (<i>Taraxacum officinale</i>)</p>

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	and others.
CUP3b (Coniferous Plantation)	<p>Similar to CUP3a above, this polygon is a coniferous plantation established over cleared post-agricultural lands shortly prior to 1997 (County of Simcoe, 2023).</p> <p>The polygon comprises dense planted White Spruce with occasional Norway Spruce and Blue Spruce (<i>Picea pungens</i>) associates. The subcanopy layer is moderately sparse and is also dominated by White Spruce, with emergent Eastern White Cedar, White Elm, and Green Ash. The understory layer is similarly composed, with occasional Red-osier Dogwood stems observed within more moist sections of the plantation. The ground layer is overall moderately dense, however ground cover comprises a mosaic of patchy/sparse areas under dense canopy, to open fully vegetated areas where tree openings/clearings occur. The ground layer is generally composed of Smooth Brome, Canada Goldenrod (<i>Solidago canadensis</i>), Grass-leaved Goldenrod, and Western Poison-Ivy.</p>
CUW1e (Mineral Cultural Woodland)	<p>Tree cover varies between >35% and ≤60%. Site conditions and substrate types variable. Variations on this polygon are distributed generally across the west half of the property, all consisting of sparse naturalizing Spruce plantation on generally fresh-moist land with sporadic small dry/shallow elements and moist MAM2-2 corridors. The community lacks the tree cover density to classify as plantation under ELC, instead classifying loosely as naturalizing woodland, with the majority of the canopy approaching 10m rather than >10m. This community is generally representative of conditions in CUW1f and CUW1g. While these CUW1 polygons appear to have been planted contemporary with the CUP polygons in the east half of the property, planted before 1997 (County of Simcoe, 2023), density and size of trees varies greatly compared to those plantations.</p> <p>The upper canopy is sparse, dominated by Norway Spruce and White Spruce. Subcanopy layer somewhat dense (35-60%), primarily dominated by Spruce (including both Norway Spruce and White Spruce) with Eastern White Cedar, these interspersed with lesser elements of Common Buckthorn, American Elm, Green Ash and Riverbank Grape. The understory is dense, dominated by meadow-related species, composed of Reed Canary Grass, Redtop, Tall Goldenrod (<i>Solidago altissima</i>), Garden Bird’s-foot Trefoil, Tufted Vetch (<i>Vicia cracca</i>), Grass-leaved Goldenrod (<i>Euthamia graminifolia</i>) and others. The ground layer is also dense, comprised of various low old-field grasses, Garden Bird’s-foot Trefoil, Limestone Meadow Sedge (<i>Carex granularis</i>) with a variety of lesser elements including Common Self-heal, Canada Bluegrass (<i>Poa compressa</i>), Arrow-leaved Aster (<i>Symphyotrichum urophyllum</i>), English Plantain (<i>Plantago lanceolata</i>), Tall Ryegrass and others.</p> <p>A small mapped wetland inclusion occurs within this polygon: MAM2-2n. This community is essentially equivalent in composition to MAM2-2k, with a slightly higher prevalence of Green Ash and American Elm in the subcanopy and with clusters of elevated Red-osier Dogwood distributed within. This</p>

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	inclusion occurs where local topography becomes lower and is more influenced by the water table fluctuations.
CUW1f (Mineral Cultural Woodland)	<p>Species composition and context for this polygon are roughly equivalent to polygon CUW1e.</p> <p>A small mapped wetland inclusion occurs within this polygon: MAM2-2o. This polygon is similar in context and composition to MAM2-2k, with a slightly higher prevalence of Green Ash and American Elm in the subcanopy and canopy level, and clusters of elevated Red-osier Dogwood distributed within. This inclusion occurs where local topography becomes lower and is more influenced by the water table fluctuations.</p>
CUW1g (Mineral Cultural Woodland)	<p>Main polygon species composition and context are broadly equivalent to polygon CUW1e. The northeast portion of the main polygon includes a locally dense area of planted Norway Spruce that form a minor plantation element within the polygon.</p> <p>Two small mapped wetland inclusions occur within this polygon: MAM2-2m and MAM2-2q. Both are similar in composition to MAM2-2k and are primarily dominated by Reed Canary Grass. These inclusions occur where local topography becomes slightly lower and is more influenced by the water table fluctuations.</p> <p>Two small mapped terrestrial inclusions occur at the east edge of this polygon: FOC4-1b and FOC4-1c (Fresh-Moist White Cedar Coniferous Forest). These dense, Eastern White Cedar-dominated communities share a common description. The canopy is dense, dominated by Eastern White Cedar. The subcanopy is also dense, dominated by Eastern White Cedar with elements of Glossy Buckthorn (<i>Frangula alnus</i>), American Elm, Green Ash and White Spruce. The understory is somewhat sparse, dominated by Eastern White Cedar with sporadic Tall Goldenrod. The ground layer is very sparse, dominated by young Eastern White Cedar, with minor elements of Glossy Buckthorn and old-field grasses.</p>
THCM1-2a (Dry-Fresh Native Coniferous Regeneration Thicket)	<p>Tree cover in the subcanopy and canopy layers <25%, with shrub and understory tree coverage >25%. Site conditions and substrate types variable. Variations on this polygon are found in the northwest corner of the property, both consisting of sparse naturalizing Spruce plantation on generally dry-fresh land with sporadic small dry/shallow elements, and interrupted/bordered by some moist MAM2-2 corridors. This community lacks the tree cover density to classify as either plantation or woodland under ELC, instead classifying loosely as naturalizing thicket. This community is generally representative of conditions in THCM1-2b.</p> <p>The upper canopy is very sparse, dominated by Spruce (including Norway Spruce and White Spruce). The subcanopy layer is somewhat sparse, primarily dominated by Spruce (including Norway Spruce and White Spruce) with minor elements of Common Buckthorn and Eastern White Cedar. The understory is very dense, comprised of a relatively even mixture of Tall Fescue, Smooth</p>

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	<p>Brome and Redtop with lesser elements of Goldenrods and occasional Reed Canary Grass (this varying by moisture gradient but not as dominant as other areas). The ground layer is very dense, dominated primarily by Garden Bird’s-foot Trefoil, Canada Bluegrass and Tall Fescue with minor elements of shorter Goldenrod stems, Smooth Bedstraw (<i>Galium mollugo</i>) and others.</p>
<p>THCM1-2b (Dry-Fresh Native Coniferous Regeneration Thicket)</p>	<p>Species composition and context are broadly equivalent to polygon THCM1-2a.</p>
<p>THDM2-6e (Buckthorn Deciduous Shrub Thicket)</p>	<p>Shrub cover >25%; tree cover <25%; shrub cover varies from scattered and patchy to continuous. This polygon is a disturbed, sparse to somewhat dense, early-successional thicket occupying relatively level ground. The polygon includes a hedgerow-adjacent area of similarly Common Buckthorn-dominant thicket following the northeast property boundary.</p> <p>Generally, the canopy is sparse, interspersed with sporadic taller trees such as Eastern White Cedar and American Elm. The subcanopy is somewhat sparse, mostly dominated by taller Common Buckthorn with lesser elements of Eastern White Cedar, American Elm and Green Ash. The understory is dense, variable, often comprised of Smooth Brome, Common Timothy (<i>Phleum pratense</i>), Common Buckthorn, Tall Goldenrod, Chokecherry and Common Juniper (<i>Juniperus communis</i>). The ground layer is also variable, typically comprised of shorter old-field grasses, Garden Bird’s-foot Trefoil, Limestone Meadow Sedge, Wild Strawberry (<i>Fragaria virginiana</i>), Arrow-leaved Aster and others. Some areas of this polygon contain understory and ground layers similar to greater overall MEMM3/MEMM4a/b polygons.</p> <p>A mapped inclusion occurs within this polygon: THCM1-2c. This inclusion features a moderately sparse (10-25%) canopy/subcanopy layer comprising White Spruce, with occasional Norway Spruce and White Elm associates. The understory layer is similarly composed of White Spruce, Norway Spruce, White Elm, and Green Ash. The ground layer represents a mixture of meadow-adapted species including Smooth Brome, Canada Goldenrod, Garden Bird’s-foot Trefoil, Wild Carrot (<i>Daucus carota</i>), and Grass-leaved Goldenrod.</p>
<p>THDM2-6g (Buckthorn Deciduous Shrub Thicket)</p>	<p>This polygon is a disturbed, regenerating thicket approaching the woodland stage (particularly at its fringes), but remaining primarily dominated by shrubs. The polygon exists on a slightly divided topography; the majority of the polygon is on a slightly elevated, level upper tier south of the existing driveway, proceeding generally downward towards north edge (although historical driveway/ditch construction has interfered with natural elevation change of north polygon edge). Soils are rocky with emergent rocks commonly observed.</p> <p>The upper canopy is somewhat sparse, consisting of American Elm, Green Ash and Eastern White Pine. The subcanopy cover is somewhat dense to dense, dominated by Common Buckthorn, with lesser elements of Green Ash, American Elm, Eastern White Pine, Eastern White Cedar, Chokecherry and Common Apple. The understory typically dense, variable, composed of</p>

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	<p>Common Timothy, Smooth Brome, and Common Buckthorn with lesser elements of Goldenrods, non-native shrub Honeysuckles (<i>Lonicera</i> spp.), European Swallowwort and others. Ground layer dense, composed of Garden Bird’s-foot Trefoil, Common Buckthorn, Smooth Bedstraw, Arrow-leaved Aster, Wild Strawberry, Western Poison Ivy and others.</p> <p>A mapped inclusion occurs at the northeast corner of this polygon: FODM4-12b (Dry-Fresh Exotic Deciduous Forest). This deciduous forest inclusion occupies a local area of high disturbed ground and is dominated by non-native species. The canopy is dense, dominated by White Poplar (<i>Populus alba</i>), with a few sporadic stems of American Elm. The subcanopy is also very dense, dominated by Common Buckthorn and Chokecherry with sporadic Common Apple, Common Lilac, Green Ash and Eastern White Pine. The understory is relatively dense, composed of Chokecherry and Common Buckthorn. The ground layer is very dense, composed largely of Common Buckthorn and Chokecherry with lesser elements of Cranberry Viburnum and Western Poison Ivy.</p>
<p>THDM2-6h (Buckthorn Deciduous Shrub Thicket)</p>	<p>This polygon is a disturbed, regenerating thicket approaching the woodland stage (particularly at its fringes) and abuts Concession Road 1. Soils are typically fresh-moist with several very small moist pockets where water pools seasonally. Several Silver Maples (<i>Acer saccharinum</i>) occur near the road; however, given that this species is not well represented in wetlands on the property, these may have been planted.</p> <p>The canopy is sparse to somewhat sparse, with few scattered trees including American Elm, Green Ash and Silver Maple. The subcanopy is relatively dense, largely composed of Common Buckthorn, Green Ash, Hawthorn (<i>Crataegus</i> sp.), Common Apple, Chokecherry, non-native shrub Honeysuckles and Eastern White Cedar. The understory is typically dense, composed of Common Timothy, Garden Bird’s-foot Trefoil, Smooth Bedstraw, Tufted Vetch, Smooth Brome and others. The ground layer is dense, frequently composed of Garden Bird’s-foot Trefoil, Smooth Bedstraw, Bluegrasses (<i>Poa</i> spp.), Wild Strawberry and Arrow-leaved Aster.</p> <p>A small mapped inclusion occurs at the south edge of this polygon: MEMM4 (Fresh-Moist Mixed Meadow). This inclusion is similar to the remainder of the THDM2-6 polygon but trees and shrubs are locally sparse. The understory is dense, composed of Common Timothy, Garden Bird’s-foot Trefoil, Kentucky Bluegrass (<i>Poa pratensis</i>), Panicked Aster and Tufted Vetch. The ground layer is also dense, dominated by Garden Bird’s-foot Trefoil, Smooth Bedstraw, Wild Strawberry and others.</p>
<p>MEGM4 (Fresh-Moist Graminoid Meadow)</p>	<p>The polygon represents an open meadow in the southeast portion of lands west of the rail line that abuts the property limit. The polygon is sparsely treed, with a transition to thicketed vegetation and occasional mature Eastern White Pine and Green Ash in the eastern sections of the community. Younger trees (3-5m in height) are also moderately sparse throughout portions of the polygon, and include Scot’s Pine, White Elm, White Spruce, Eastern White Pine, Common</p>

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	<p>Buckthorn, and Common Apple. The ground layer is dense and comprises Timothy, Red Fescue (<i>Festuca rubra</i>), Garden Bird’s-foot Trefoil, Reed Canary Grass, Smooth Bedstraw, Redtop, Wild Strawberry, and European Swallowwort in descending order of density.</p> <p>A minor fenceline inclusion (THDM2-6f) demarks the western boundary of the polygon, consisting of moderately sparse Balsam Poplar (<i>Populus balsamifera</i>), Basswood, Eastern White Cedar in the treed layer (2-10m), and dense Common Buckthorn, Eastern White Cedar, Balsam Poplar, and Common Juniper in the shrub layer. The ground layer is moderately dense and comprises Garden Bird’s-foot Trefoil, Eastern White Cedar seedlings, Smooth Bedstraw, and occasional aggregation of Arrow-leaved Aster.</p>
<p>MEGM3/MEGM4b (Dry-Fresh Mixed Meadow/Fresh-Moist Mixed Meadow)</p>	<p>This polygon is a large, variable polygon inclusive the various open meadows where tree and shrub cover <25%. This polygon extends between and around many of the other vegetation communities throughout the property, occupying a variety of dry-fresh and fresh-moist disturbed areas. Many of these areas were historically open farmland as observed in 1989 aerial imagery (County of Simcoe, 2023), although some are disturbed lands associated with the historical small private airport. Invasive Reed Canary Grass has generally colonized much of the open lands on the property, and this is a dominant feature of these communities, although many forb elements are interspersed throughout. It should be noted that while this polygon occurs in the Carden region on relatively level underlying bedrock, alvar indicators were absent, alvar-associated species were virtually absent, and no pavements or consistent shallow-soil areas were observed.</p> <p>Overall, this community’s general composition is as follows: the treed layer is absent to very sparse, mostly occupied by few scattered White Spruce, American Elm or Green Ash. The subcanopy is also very sparse, with Common Buckthorn most consistently represented, followed by few Green Ash, American Elm and sporadic Eastern White Cedar. The understory is the dominant layer, and is very dense, composed of Reed Canary Grass, Goldenrods (including Tall Goldenrod and Canada Goldenrod), Tufted Vetch, Redtop, Smooth Brome and numerous other species. The ground layer is also typically dense and often composed of an assemblage of Garden Bird’s-foot Trefoil, Wild Strawberry, Tall Fescue, Limestone Meadow Sedge, Smooth Bedstraw and many others.</p> <p>Several inclusions are surrounded by this polygon. MAM2-2i and MAM2-2j are meadow marshes with a general composition comparable to that of polygon MAM2-2k (Reed Canary Grass Mineral Meadow Marsh). MAM2-2l is also generally similar to MAM2-2k, however it contains a sub-element of MAS2-1 (Cattail Mineral Shallow Marsh) in a location where historical earthworks appear to have occurred. Two small Coniferous Plantation inclusions (CUP3c and CUP3d) are embedded within this polygon, and both exhibit comparable characteristics to polygon CUP3a. One small Mineral Cultural Woodland inclusion (CUW1h) is also embedded within this polygon, and this inclusion</p>

Table 4b: Summary of Vegetation Communities, Brechin Quarry

Unit	Description
	exhibits comparable characteristics to polygon CUW1e.
Other	Communities not described by the ELC system.
HR(D) (Deciduous Hedgerow)	Treed row featuring deciduous cover >75%.
County of Simcoe. 2023. Interactive Map – County of Simcoe (GIS). Available online: https://opengis.simcoe.ca/public/ . Accessed August 2023.	

Table 5: Amphibian Breeding Summary

Project: 18-288 -Brechin Quarry
Observers: D. Stuart, J. Runtas

Amphibian Breeding Survey Results

Date	Sampling Station(s)*	Start Time	Species ¹								Nothing Heard	
			Wood Frog	Spring Peeper	Western Chorus Frog	Northern Leopard Frog	American Toad	Green Frog	Gray Treefrog	American Bullfrog		
25-Apr-19	1	22:16		2-5	1-2							
	2	22:04										X
	3	21:49	1-1	3		1-1						
	4	21:40										X
	5	21:32										X
	6	21:14										X
	7	21:00		3								
	8	20:57	1-1	3								
	9	20:50	1-2	3	2-3	2-4						
	10	20:44										X
	11	21:24		3	2-4							
29-May-19	1	23:12		1-2	1-2							
	2	23:03			1-2							
	3	22:47		1-3		1-1	1-2		3			
	4	22:37		1-3								
	5	22:25										X
	6	21:55		1-4								
	7	21:45		3					2-4			
	8	21:36		2-5								
	9	21:27		3					3			
	10	21:22		3								
	11	22:09		2-4	1-1				3			
25-Jun-19	1	23:33							2-7			
	2	23:24								2-3		
	3	23:05					1-1		3			
	4	22:54								2-4		
	5	22:43								2-4		
	6	22:19					1-1		3			
	7	22:10							3			
	8	22:00						1-1	3			
	9	21:51					1-1	1-2	3			
	10	21:44							3			
	11	22:32					1-1		3			

**see mapping*

** format: call code - estimated # of individuals*

Weather Conditions

Date	Air Temperature (°C)	Wind (Beaufort/Direction)	Cloud Cover	Precipitation
25-Apr-19	12	B1	50%	nil
29-May-19	13	B0	10%	nil
25-Jun-19	19	B0	0%	nil

¹ **Call Code Levels**

- 0 = none heard
- 1 = males could be individually counted
- 2 = calls overlap but numbers could be estimated
- 3 = overlapping calls, not possible to estimate numbers involved in chorus.

Table 6b: Breeding Bird Survey, Brechin Quarry EIS

Surveyors: D. Stuart, S. Martin, A. Pompilio

AEC18-288

FAMILY	SCIENTIFIC NAME	COMMON NAME	Location ^{1,2}																								Conservation Rankings ³												
			20			21			22			23			24			25			26			27			28			29			Adjacent Lands	Incidental	GRANK	SRANK	MNRF	SARA	TRACK
			Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3													

behaviour or anxiety calls of adult, V - Visiting a probably nest site, N - Nest building or excavation of nest hole (Probable Breeding); DD - Distraction display or injury feigning, NU - Used Nest or egg shells, FY - Recently fledged young, AE - Adult leaving or entering nest sites, FS - Adult carrying fecal sac, CF - Adult carrying food for young, NE - Nest containing eggs, NY - Nest with young seen or heard (Confirmed Breeding).

³ Conservation Rankings: From Ontario Ministry of Natural Resources, Natural Heritage Information Centre (<https://www.ontario.ca/page/natural-heritage-information-centre>)

Table 6c: Breeding Bird Survey, Brechin Quarry EIS

Surveyor: D. Stuart, S. Martin, A. Pompilio

AEC18-288

FAMILY	SCIENTIFIC NAME	COMMON NAME	Location ^{1,2}															Adjacent Lands	Incidental	Conservation Rankings ³								
			30			31			32			33			34					35			GRANK	SRANK	MNRF	SARA	TRACK	
			Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3			Visit 1	Visit 2	Visit 3						
Rallidae	<i>Rallus limicola</i>	Virginia Rail																			✓	G5	S5B			N		
Anatidae	<i>Branta canadensis</i>	Canada Goose																								N		
Ardeidae	<i>Ardea herodias</i>	Great Blue Heron		X																						N		
Ardeidae	<i>Egretta garzetta</i>	Great Egret																				✓	G5	S2B		Y		
Bombycillidae	<i>Bombycilla cedrorum</i>	Cedar Waxwing			S				S			S									S		G5	S5B		N		
Corvidae	<i>Corvus brachyrhynchos</i>	American Crow	H	X	H						H			H							FO		FO			N		
Fringillidae	<i>Acanthis flammea</i>	Common Redpoll																				✓	G5	S4B		N		
Corvidae	<i>Cyanocitta cristata</i>	Blue Jay		S	H			H																		N		
Cuculidae	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo				S																				N		
Phalacrocoracidae	<i>Phalacrocorax auritus</i>	Double-crested Cormorant																				✓	G5	S5B	NAR	N		
Picidae	<i>Colaptes auratus</i>	Northern Flicker																				✓	G5	S4B		N		
Fringillidae	<i>Spinus tristis</i>	American Goldfinch		X	S				FO	S/FO	X	H		X			X									N		
Regulidae	<i>Regulus calendula</i>	Ruby-crowned Kinglet																				✓	G5	S4B		N		
Icteridae	<i>Agelaius phoeniceus</i>	Red-winged Blackbird				S	S	S	S		S			H	H		S	S			S					N		
Icteridae	<i>Dolichonyx oryzivorus</i>	Bobolink						S			H	P	S	H/C	S	S	H/C	S	P		S			G5	S4B	THR	THR	Y
Icteridae	<i>Molothrus ater</i>	Brown-headed Cowbird		S																						N		
Icteridae	<i>Quiscalus quiscula</i>	Common Grackle		X				FO								X								H		N		
Icteridae	<i>Sturnella magna</i>	Eastern Meadowlark				S	S	S	H		T/S	S		T/S	S	S	T/S	S	P	S	S				THR	THR	Y	
Laridae	<i>Larus delawarensis</i>	Ring-billed Gull																								N		
Mimidae	<i>Dumetella carolinensis</i>	Gray Catbird					S																			N		
Mimidae	<i>Toxostoma rufum</i>	Brown Thrasher		S			S						S			S										N		
Laniidae	<i>Lanius borealis</i>	Northern Shrike																				✓	G5	SNA		N		
Parulidae	<i>Geothlypis trichas</i>	Common Yellowthroat				S		S	S		S	S					S									N		
Parulidae	<i>Mniotilta varia</i>	Black-and-white Warbler		S																						N		
Parulidae	<i>Oreothlypis ruficapilla</i>	Nashville Warbler			S			S	S																	N		
Parulidae	<i>Setophaga petechia</i>	Yellow Warbler	S	S		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S					N		
Parulidae	<i>Setophaga ruticilla</i>	American Redstart					S									S										N		
Passerellidae	<i>Melospiza melodia</i>	Song Sparrow	S	S	S	S	S	S	S	S	S	S	S	S		S	P	S	S	S	S					N		
Passerellidae	<i>Passerculus sandwichensis</i>	Savannah Sparrow					S			P	S	P	S	S	S	P	S	S	P	S						N		
Passerellidae	<i>Spizella pallida</i>	Clay-colored Sparrow	S	S	S	S		S				S	S	S	S	S	S	S	S	S	S					N		
Passerellidae	<i>Spizella passerina</i>	Chipping Sparrow				S																				N		
Passerellidae	<i>Spizella pusilla</i>	Field Sparrow	S	S	S	S	S	S	S	S	S	S	S	S	S		S	S			S	S				N		
Hirundinidae	<i>Tachycineta bicolor</i>	Tree Swallow																				✓	G5	S4B		N		
Vireonidae	<i>Vireo gilvus</i>	Warbling Vireo																				✓	G5	S5B		N		
Phasianidae	<i>Meleagris gallopavo</i>	Wild Turkey					S																			N		
Picidae	<i>Picoides villosus</i>	Hairy Woodpecker																				✓	G5	S5		N		
Corvidae	<i>Corvus corax</i>	Common Raven																				✓	G5	S5		N		
Phasianidae	<i>Bonasa umbellus</i>	Ruffed Grouse																				✓	G5	S4		N		
Falconidae	<i>Falco columbarius</i>	Merlin																				✓	G5	S5B	NAR	N		
Picidae	<i>Picoides pubescens</i>	Downy Woodpecker																				✓	G5	S5		N		
Anatidae	<i>Anas crecca</i>	Green-winged Teal																				✓	G5	S4		N		
Scolopacidae	<i>Scolopax minor</i>	American Woodcock																				✓	G5	S4B		N		
Troglodytidae	<i>Troglodytes aedon</i>	House Wren	S	S	S	S	S			S	S															N		
Turdidae	<i>Hylocichla mustelina</i>	Wood Thrush			S																					Y		
Turdidae	<i>Turdus migratorius</i>	American Robin			S	S		S	S				S													N		

Table 7. Significant Woodland Assessment, Brechin Quarry

Criteria ¹	Description ¹	Minimum Size (ha) ¹	Woodland A (2.85ha)	Woodland B (2.61ha)	Woodland C (0.35ha)	Woodland D (20.0 ha (approx.))	Woodland E (5.07ha)	Woodland F (1.60ha)
Size	Any woodlands of this size or greater are significant	>10ha	No	No	No	Yes	No	No
Natural Composition	Any woodlands containing this area of naturally occurring (not planted) trees listed in the table in Appendix B of the LSPP Technical Definitions that meet the definition of woodland	>4ha	Does not meet minimum size threshold	Does not meet minimum size threshold	Does not meet minimum size threshold	Mid-late successional species observed within the feature.	Mid-late successional species observed within the feature.	Does not meet minimum size threshold
Age or Tree Size	Any woodlands of this size with either: a) 10 or more trees per ha that are either greater than 100 years old or 50 cm or more in diameter; or b) containing a basal area of at least 8 square metres per hectare in native trees that are 40 cm or more in diameter	>4ha	Does not meet minimum size threshold	Does not meet minimum size threshold	Does not meet minimum size threshold	Portions of the woodland may include trees >100 years old	No trees >100 years old or >40cm diameter located within the feature.	Does not meet minimum size threshold
Proximity	Any woodlands of this size wholly or partially within 30 metres of a: significant wetland; significant habitat of an endangered or threatened species; significant woodland;	>4ha	Does not meet minimum size threshold	Does not meet minimum size threshold	Does not meet minimum size threshold	Woodland provides habitat for Butternut and Black Ash trees. Woodland may provide habitat for endangered species including Little Brown Myotis, Northern Myotis, Tri-colored Bat. Woodland provides Candidate Amphibian Breeding Habitat (Woodlands)	Woodland may provide habitat for endangered species including Little Brown Myotis, Northern Myotis, Tri-colored Bat Woodland provides Candidate Amphibian Breeding Habitat (Woodlands)	Does not meet minimum size threshold
Rarity	Any woodlands of this size containing: a provincially rare treed vegetation community with an S1, S2 or S3 in its ranking by the MNR's NHIC; or habitat of a woodland plant species with an S1, S2 or S3 in its ranking or an 8, 9, or 10 in its Southern Ontario Coefficient of Conservatism (CC) by the NHIC, consisting of 10 or more individual stems or 100 or more square metres of leaf coverage	>0.5ha	No rare/sensitive species identified	No rare/sensitive species identified	Does not meet minimum size threshold	No rare/sensitive species identified	No rare/sensitive species identified	No rare/sensitive species identified

¹Criteria based on Technical Definitions and Criteria for Key Natural Heritage Features and Key Hydrologic Features for the Lake Simcoe Protection Plan (MNRF, 2015c)

Table 8. Significant Wildlife Habitat Assessment - Criteria Schedule for Ecoregion 6E

Table 1.1 Seasonal Concentrations of Areas of Animals

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p>Waterfowl Stopover and Staging Areas (Terrestrial)</p> <p>Rationale: Habitat important to migrating waterfowl.</p>	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	Fields with sheet water during Spring (mid-March to May). <ul style="list-style-type: none"> Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. Reports and other information available from Conservation Authorities Sites documented through waterfowl planning processes (e.g. EHJV implementation plan) Field Naturalist Clubs Ducks Unlimited Canada Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area 	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” <ul style="list-style-type: none"> Any mixed species aggregations of 100 or more individuals required. The flooded field ecosite habitat plus a 100-300m radius area, dependant on local site conditions and adjacent land use is the significant wildlife habitat. Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). SWHMiST Index #7 provides development effects and mitigation measures. 	Waterfowl Stopover/Staging Area surveys occurred over six (6) days in April-early June 2019. Total use days by listed species over six (6) surveys were recorded as follows within the property limits: Green-winged Teal: 9 Presence of waterfowl during stopover/staging area surveys was substantially below use day requirements to qualify as candidate SWH. There is no expectation that any portion of the property provides candidate SWH for waterfowl stopover/staging areas.
<p>Waterfowl Stopover and Staging Areas (Aquatic)</p> <p>Rationale: Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.</p>	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	<ul style="list-style-type: none"> Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Environment Canada Naturalist clubs often are aware of staging/stopover areas OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. Sites documented through waterfowl planning processes (e.g. EHJV implementation plan) Ducks Unlimited projects Element occurrence specification by Nature Serve: http://www.natureserve.org Natural Heritage Information Centre (NHIC) Waterfowl Concentration Areas 	Studies carried out and verified presence of: <ul style="list-style-type: none"> Aggregations of 100 or more of listed species for 7 days, results in > 700 waterfowl use days. Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH. The combined area of the ELC ecosites and a 100m radius area is the SWH. Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). SWHMiST Index #7 provides development effects and mitigation measures. 	Screenings for Waterfowl Stopover and Staging Areas occurred with reference to terrestrial criteria above, but included open water nodes associated with ponds and marshes located within the study area limits.

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p>Shorebird Migratory Stopover Area</p> <p>Rationale: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.</p>	<p>Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird’s Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin</p>	<p>BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5</p>	<ul style="list-style-type: none"> Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Western hemisphere shorebird reserve network Canadian Wildlife Service (CWS) Ontario Shorebird Survey Bird Studies Canada Ontario Nature Local birders and naturalist clubs Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #8 provides development effects and mitigation measures. 	<p>Seasonally-flooded lakes, rivers, shorelines, muddy flats, or similar habitats not present within the study area.</p> <p>Meadow marsh (MAM series) wetlands limited in size and contain little standing water during the early spring. MAM series wetlands not capable of supporting high quality coastal-type habitats required for consideration as candidate SWH.</p> <p>No suitable habitat.</p>
<p>Raptor Wintering Area</p> <p>Rationale: Sites used by multiple species of individuals and used annually are most significant</p>	<p>Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl</p> <p>Special Concern: Short-eared Owl Bald Eagle</p>	<p><u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC.</p> <p>Upland: CUM; CUT; CUS; CUW.</p> <p><u>Bald Eagle:</u> Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).</p>	<ul style="list-style-type: none"> The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering sites (hawk/owl) need to be > 20 ha with a combination of forest and upland. Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands. Field area of the habitat is to be windswept with limited snow depth or accumulation. Eagle sites have open water, large trees and snags available for roosting. <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> OMNRF Ecologist or Biologist Field Naturalist Clubs Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area Data from Bird Studies Canada Results of Christmas Bird Counts Reports and other information available from Conservation Authorities. 	<p>Studies confirm the use of these habitats by:</p> <ul style="list-style-type: none"> One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two of the listed hawk/owl species. To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #10 and #11 provides development effects and mitigation measures. 	<p>Graminoid meadow east of rail line of marginal quality (due to cattle grazing) but of sufficient size. Meadow west of the rail line is not grazed and of “old field” character. During site surveys in February 2019 snowpack was found to range 10-40 cm in depth, likely too deep to support high quality raptor wintering habitat. Site surveys in January/February 2021 found snowpack to range 3-20 cm in depth (average ~10cm depth), within the suitable range for raptor wintering habitat.</p> <p>With the above considerations, overall habitat potential as candidate SWH as a Raptor Wintering Area is marginal. Five (5) screenings occurred on the subject property in February 2019 and January/February 2021 at which time no raptors were observed within the study area. As such, there is no expectation that habitat use thresholds for consideration as candidate SWH would be supported by conditions within the study area.</p>
<p>Bat Hibernacula</p> <p>Rationale: Bat hibernacula are rare habitats in all Ontario landscapes.</p>	<p>Big Brown Bat Tri-coloured Bat</p>	<p>Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2</p>	<ul style="list-style-type: none"> Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. Active mine sites should not be considered as SWH The locations of bat hibernacula are relatively poorly known. <p><u>Information Sources</u></p>	<ul style="list-style-type: none"> All sites with confirmed hibernating bats are SWH. The habitat area includes a 200m radius around the entrance of the hibernaculum, for most development types and 1000m for wind farms Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be 	<p>No mines/shafts, caves, or structures with similar access located within the study area.</p> <p>No suitable habitat.</p>

Table 8

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
		(Note: buildings are not considered to be SWH)	<ul style="list-style-type: none"> • OMNRF for possible locations and contact for local experts • Natural Heritage Information Center (NHIC) Bat Hibernaculum Ministry of Northern • Development and Mines for location of mine shafts. • Clubs that explore caves (e.g. Sierra Club) • University Biology Departments with bat experts. 	<p>conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects.</p> <ul style="list-style-type: none"> • SWHMiST Index #1 provides development effects and mitigation measures. 	
<p>Bat Maternity Colonies</p> <p>Rationale: Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.</p>	<p>Big Brown Bat Silver-haired Bat</p>	<p>Maternity colonies considered SWH are found in forested Ecosites.</p> <p>All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM</p>	<ul style="list-style-type: none"> • Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario. • Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts. 	<ul style="list-style-type: none"> • Maternity Colonies with confirmed use by; <ul style="list-style-type: none"> ○ >10 Big Brown Bats ○ >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. • SWHMiST Index #12 provides development effects and mitigation measures. 	<p>One (1) deciduous swamp (SWD4-3) community located within the south-central portion of the property, east of the rail line. Bat snag surveys were conducted in April 2019 and did not identify suitable habitat trees within the SWD4-3 unit or elsewhere east of the rail line. Wooded areas east of the rail line are early successional/immature and not characteristic of habitat utilized by bats for maternity roosting purposes.</p> <p>No deciduous or mixed woodlands located within 120m of the area east of the rail line have potential to qualify as Bat Maternity Colonies.</p> <p>Mixed woodland (swamp) in the southwest portion of the property (SWM1-1) contains a mix of second growth mid-aged to mature trees that is anticipated to provide the appropriate snag density (>10 snags/ha) conducive to Bat Maternity Colonies.</p>
<p>Turtle Wintering Areas</p> <p>Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>Midland Painted Turtle</p> <p>Special Concern: Northern Map Turtle Snapping Turtle</p>	<p>Snapping and Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO</p> <p>Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.</p>	<ul style="list-style-type: none"> • For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • EIS studies carried out by Conservation Authorities. • Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • OMNRF Ecologist or Biologist • Field Naturalist clubs • Natural Heritage Information Center (NHIC) 	<ul style="list-style-type: none"> • Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May) • Congregation of turtles is more common where wintering areas are limited and therefore significant • SWHMiST Index #28 provides development effects and mitigation measures for turtle wintering habitat. 	<p>A total of 15 screenings occurred in April – early June 2019 and April-early June 2022 to identify potential for open water areas (ponds) on the subject properties to function as Turtle Wintering Areas.</p> <p>Midland Painted Turtles were observed within the property boundaries as described in Section 4.2.2.3, summarized as follows:</p> <ul style="list-style-type: none"> • MAS2-1a (inclusion)(Figure 2a): A total of 1-2 individuals observed during any individual survey over five (5) occasions in 2022. It is not anticipated that ≥5 overwintering Midland Painted Turtles are present in this location. • MAS2-1d (inclusion)(Figure 2b): One (1) individual observed during one (1) survey in 2022. <p>No other turtles were observed throughout the</p>

Table 8

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					<p>subject property limits during the remainder of the field program. Based on the turtle emergence survey program, there is no expectation that minimum density thresholds for Turtle Wintering Area occur.</p> <p>One (1) Snapping Turtle was observed incidentally, swimming with the McNabb Drain on the north side of Concession 2 near the northeast property boundary. The individual was not observed basking and it is anticipated that the individual was utilizing the McNabb Drain for east-west movement. As no basking activity was observed despite an intensive search effort, there is no expectation that any portion of the study area would function as a Turtle Wintering Area.</p>
<p>Reptile Hibernaculum</p> <p>Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake</p> <p>Special Concern: Milksnake Eastern Ribbonsnake</p> <p>Lizard: Special Concern (Southern Shield population): Five-lined Skink</p>	<p>For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats.</p> <p>Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.</p> <p>For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3</p>	<ul style="list-style-type: none"> For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures. <p>Information Sources</p> <ul style="list-style-type: none"> In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells). Reports and other information available from Conservation Authorities. Field Naturalists clubs University herpetologists Natural Heritage Information Center (NHIC) OMNRF ecologist or biologist may be aware of locations of wintering skinks. 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct) Note: If there are Special Concern Species present, then site is SWH Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH. SWHMiST Index #13 provides development effects and mitigation measures for snake hibernacula. Presence of any active hibernaculum for skink is significant. SWHMiST Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat. 	<p>Vacant structure located in the southern portion of the property identified as having potential to provide hibernation/refuge for snakes, comprising a barn foundation, stone silo, and scattered rocks/boards.</p> <p>A total of 12 screenings of the structure occurred throughout the course of the field program during suitable conditions for snake activity, including two (2) during the spring period (May 7 and May 29, 2019), and two (2) during the fall period (September 17, September 18, 2019).</p> <p>One (1) Eastern Gartersnake was observed incidentally during a wetland staking exercise on July 5, 2021 approximately 400m northeast of the structure within a meadow (MEGM3/MEGM4a) community. No other snakes were observed during the course of the field program.</p> <p>No other snakes were observed in vicinity of the structure or elsewhere within the study area during the course of the field program.</p>
<p>Colonially -Nesting Bird Breeding Habitat (Bank and Cliff)</p> <p>Rationale:</p>	<p>Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)</p>	<p>Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles. Cliff faces, bridge abutments, silos, barns.</p>	<ul style="list-style-type: none"> Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of 1 or more nesting sites with 8or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. A colony identified as SWH will include a 50m radius habitat area from the peripheral nests. 	<p>Bank and/or cliff nesting sites and associated species not observed during the course of the field program.</p> <p>No suitable habitat.</p>

Table 8

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.		Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	<ul style="list-style-type: none"> stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation. <u>Information Sources</u> <ul style="list-style-type: none"> Reports and other information available from Conservation Authorities. Ontario Breeding Bird Atlas Bird Studies Canada; <i>NatureCounts</i> http://www.birdscanada.org/birdmon/ Field Naturalist Clubs. 	<ul style="list-style-type: none"> Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #4 provides development effects and mitigation measures. 	
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs) <u>Rationale:</u> Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	<ul style="list-style-type: none"> Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. Most nests in trees are 11 to 15 m from ground, near the top of the tree. <u>Information Sources</u> <ul style="list-style-type: none"> Ontario Breeding Bird Atlas, colonial nest records. Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). Natural Heritage Information Center (NHIC) Mixed Wader Nesting Colony Aerial photographs can help identify large heronries. Reports and other information available from CAs. MNRF District Offices Local naturalist clubs 	Studies confirming: <ul style="list-style-type: none"> Presence of 5 or more active nests of Great Blue Heron or other listed species. The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH. Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells. SWHMiST Index #5 provides development effects and mitigation measures. 	Colonial bird nesting sites and associated species not observed during the course of the field program. No suitable habitat.
Colonially-Nesting Bird Breeding Habitat (Ground) <u>Rationale:</u> Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer’s Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer’s Blackbird) MAM1 – 6; MAS1 – 3; CUM CUT CUS	<ul style="list-style-type: none"> Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. Brewers Blackbird colonies are found loosely on the ground in low bushes in close proximity to streams and irrigation ditches within farmlands. <u>Information Sources</u> <ul style="list-style-type: none"> Ontario Breeding Bird Atlas , rare/colonial species records. Canadian Wildlife Service Reports and other information available from CAs. Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area MNRF District Offices Field Naturalist clubs 	Studies confirming: <ul style="list-style-type: none"> Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern. Presence of 5 or more pairs for Brewer’s Blackbird. Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH. Studies would be done during May/June when actively nesting. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #6 provides development effects and mitigation measures. 	Colonial bird nesting sites and associated species not observed during the course of the field program. No suitable habitat.
Migratory Butterfly Stopover Areas <u>Rationale:</u> Butterfly stopover areas are extremely rare	Painted Lady Red Admiral <u>Special Concern</u> Monarch	Combination of ELC Community Series; need to have present one Community Series from each land class: <u>Field:</u> CUM	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario. <ul style="list-style-type: none"> The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south. The habitat should not be disturbed, fields/meadows 	Studies confirm: <ul style="list-style-type: none"> The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between 	Site not located within 5 kilometres of Lake Ontario.

Table 8

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment
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habitats and are biologically important for butterfly species that migrate south for the winter.		CUT CUS <u>Forest:</u> FOC FOD FOM CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. <ul style="list-style-type: none"> Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes. <u>Information Sources</u> <ul style="list-style-type: none"> OMNRF (NHIC) Agriculture Canada in Ottawa may have list of butterfly experts. Field Naturalist Clubs Toronto Entomologists Association Conservation Authorities 	years and multiple years of sampling should occur. <ul style="list-style-type: none"> Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. SWHMiST Index #16 provides development effects and mitigation measures. 	
Landbird Migratory Stopover Areas <u>Rationale:</u> Sites with a high diversity of species as well as high numbers are most significant.	All migratory songbirds. Canadian Wildlife Service Ontario website. All migratory songbirds. Canadian Wildlife Service Ontario website:	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	Woodlots need to be >10 ha in size and within 5 km of Lake Ontario. <ul style="list-style-type: none"> If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Ontario are more significant. Sites have a variety of habitats; forest, grassland and wetland complexes. The largest sites are more significant. Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5km of Lake Ontario are Candidate SWH . <u>Information Sources</u> <ul style="list-style-type: none"> Bird Studies Canada Ontario Nature Local birders and naturalist club Ontario Important Bird Areas (IBA) Program 	Studies confirm: <ul style="list-style-type: none"> Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. Studies should be completed during spring (Apr./May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". SWHMiST Index #9 provides development effects. 	Site not located within 5 kilometres of Lake Ontario.
Deer Yarding Areas <u>Rationale:</u> Winter habitat for deer is considered to be the main limiting factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer	White-tailed Deer	Note: OMNRF to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include; FOM, FOC, SWM and SWC. Or these ELC Ecosites; CUP2 CUP3 FOD3 CUT	<ul style="list-style-type: none"> Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%. 	No Studies Required: <ul style="list-style-type: none"> Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH. Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO). Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations. If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be 	Not mapped as a Deer Yarding Area based on MNRF mapping resources.

Table 8

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
range.			<ul style="list-style-type: none"> • OMNRF determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual”. • Woodlots with high densities of deer due to artificial feeding are not significant. 	considered as outlined in Table 1.4.1 of this Schedule. <ul style="list-style-type: none"> • SWHMiST Index #2 provides development effects and mitigation measures. 	
Deer Winter Congregation Areas Rationale: Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions.	White-tailed Deer	All Forested Ecosites with these ELC Community Series; FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	<ul style="list-style-type: none"> • Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on MNRF studies or assessment. • Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands . • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. • Woodlots with high densities of deer due to artificial feeding are not significant. <u>Information Sources</u> <ul style="list-style-type: none"> • MNRF District Offices • LIO/NRVIS 	Studies confirm: <ul style="list-style-type: none"> • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques, ground or road surveys. or a pellet count deer density survey. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST Index #2 provides development effects and mitigation measures. 	Not mapped as a Deer Winter Congregation Area based on MNRF mapping resources.

Table 1.2.1 Rare Vegetation Communities

Rare Vegetation Community	Candidate SWH			Confirmed SWH	Assessment
	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria	
Cliffs and Talus Slopes Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO TAS TAT CLO CLS CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	Most cliff and talus slopes occur along the Niagara Escarpment. <u>Information Sources</u> <ul style="list-style-type: none"> • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF District • Natural Heritage Information Center (NHIC) has location information available on their website • Field Naturalist clubs • Conservation Authorities 	<ul style="list-style-type: none"> • Confirm any ELC Vegetation Type for Cliffs or Talus Slopes • SWHMiST Index #21 provides development effects and mitigation measures. 	Vegetation community not identified through application of ELC program.
Sand Barren Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.	A sand barren area >0.5ha in size. <u>Information Sources</u> <ul style="list-style-type: none"> • MNRF Districts • Natural Heritage Information Center (NHIC) has location information available on their website. • Field Naturalist clubs • Conservation Authorities 	<ul style="list-style-type: none"> • Confirm any ELC Vegetation Type for Sand Barrens • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.) • SWHMiST Index #20 provides development effects and mitigation measures. 	Vegetation community not identified through application of ELC program.

Rare Vegetation Community	Candidate SWH			Confirmed SWH	Assessment
	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria	
	treed (SBT1). Tree cover always ≤ 60%.				
<p>Alvar</p> <p>Rationale: Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregions 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.</p>	<p>ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2</p> <p>Five Alvar Species: 1) <i>Carex crawei</i> 2) <i>Panicum philadelphicum</i> 3) <i>Eleocharis compressa</i> 4) <i>Scutellaria parvula</i> 5) <i>Trichostema brachiatum</i></p> <p>These indicator species are very specific to Alvars within Ecoregion 6E.</p>	<p>An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.</p>	<p>An Alvar site > 0.5 ha in size.</p> <p>Information Sources</p> <ul style="list-style-type: none"> Alvars of Ontario (2000), Federation of Ontario Naturalists. Ontario Nature – Conserving Great Lakes Alvars. Natural Heritage Information Center (NHIC) has location information available on their website OMNRF Districts Field Naturalist clubs Conservation Authorities 	<ul style="list-style-type: none"> Field studies that identify four of the five Alvar Indicator Species at a Candidate Alvar site is Significant. Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses. SWHMiST Index #17 provides development effects and mitigation measures. 	<p>Vegetation community not identified through application of ELC program.</p> <p>Portions of graminoid meadow (MEMG3/MEGM4a) comprise areas of thinner topsoils (shallowest areas approximately 15cm depth), however these areas were actively grazed by cattle (up to 2019) and consist of meadow species typical of anthropogenic pastureland (>50% of vegetative cover is exotic species).</p> <p>No alvar indicator species were identified during vegetation surveys that occurred on the subject properties</p>
<p>Old Growth Forest</p> <p>Rationale: Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.</p>	<p>Forest Community Series: FOD FOC FOM SWD SWC SWM</p>	<p>Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.</p>	<p>Woodland areas 30 ha or greater in size or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest.</p> <p>Information Sources</p> <ul style="list-style-type: none"> OMNRF Forest Resource Inventory mapping OMNRF Districts. Field Naturalist clubs Conservation Authorities Sustainable Forestry Licence (SFL) companies will possibly know locations through field operations. Municipal forestry departments 	<p>Field Studies will determine:</p> <ul style="list-style-type: none"> If dominant trees species are >140 years old, then the area containing these trees is Significant Wildlife Habitat. The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present). The area of forest ecosites combined or an eco-element within an ecosite that contains the old growth characteristics is the SWH. Determine ELC vegetation types for the forest area containing the old growth characteristics. SWHMiST Index #23 provides development effects and mitigation measures. 	<p>Woodlands within the study area are generally immature/early successional in character. Mature woodland near the southwest corner of the property is not estimated to include old growth trees >140 years old.</p> <p>No evidence of Old Growth Forest age or structure is located within the study area.</p>
<p>Savannah</p> <p>Rationale: Savannahs are extremely rare habitats in Ontario.</p>	<p>TPS1 TPS2 TPW1 TPW2 CUS2</p>	<p>A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.</p>	<p>No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p>Information Sources</p> <ul style="list-style-type: none"> Natural Heritage Information Center (NHIC) has location information available on their website OMNRF Districts Field Naturalist clubs Conservation Authorities 	<p>Field studies confirm one or more of the Savannah indicator species listed in Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used.</p> <ul style="list-style-type: none"> Area of the ELC Ecosite is the SWH. Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). SWHMiST Index #18 provides development effects and mitigation measures. 	<p>Vegetation community not identified through application of ELC program.</p>
<p>Tallgrass Prairie</p>	<p>TPO1</p>	<p>A Tallgrass Prairie has ground</p>	<p>No minimum size to site. Site must be restored or a</p>	<p>Field studies confirm one or more of the Prairie</p>	<p>Vegetation community not identified through</p>

Table 8

Rare Vegetation Community	Candidate SWH			Confirmed SWH	Assessment
	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria	
<p>Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.</p>	TPO2	cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.	<p>natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Natural Heritage Information Center (NHIC) has location information available on their website OMNRF Districts Field Naturalist clubs Conservation Authorities 	<p>indicator species listed in Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used.</p> <ul style="list-style-type: none"> Area of the ELC Ecosite is the SWH. Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). SWHMiST Index #19 provides development effects and mitigation measures. 	application of ELC program.
<p>Other Rare Vegetation Communities</p> <p>Rationale: Plant communities that often contain rare species which depend on the habitat for survival.</p>	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	<p>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M</p> <p>The OMNRF/NHIC will have up to date listing for rare vegetation communities.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Natural Heritage Information Center (NHIC) has location information available on their website OMNRF Districts Field Naturalist clubs Conservation Authorities 	<p>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG.</p> <ul style="list-style-type: none"> Area of the ELC Vegetation Type polygon is the SWH. SWHMiST Index #37 provides development effects and mitigation measures. 	Other rare vegetation communities not identified through application of ELC program.

1.2.2 Specialized Habitat for Wildlife

Wildlife Habitat	Wildlife Species	Candidate SHW		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p>Waterfowl Nesting Area</p> <p>Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.</p>	<p>American Black Duck</p> <p>Northern Pintail</p> <p>Northern Shoveler</p> <p>Gadwall</p> <p>Blue-winged Teal</p> <p>Green-winged Teal</p> <p>Wood Duck</p> <p>Hooded Merganser</p> <p>Mallard</p>	<p>All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH:</p> <p>MAS1</p> <p>MAS2</p> <p>MAS3</p> <p>SAS1</p> <p>SAM1</p> <p>SAF1</p> <p>MAM1</p> <p>MAM2</p> <p>MAM3</p> <p>MAM4</p> <p>MAM5</p> <p>MAM6</p> <p>SWT1</p> <p>SWT2</p> <p>SWD1</p> <p>SWD2</p> <p>SWD3</p> <p>SWD4</p> <p>Note: includes adjacency to Provincially Significant Wetlands</p>	<p>A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur.</p> <ul style="list-style-type: none"> Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Ducks Unlimited staff may know the locations of particularly productive nesting sites. OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. Reports and other information available from Conservation Authorities. 	<p>Studies confirmed:</p> <ul style="list-style-type: none"> Presence of 3 or more nesting pairs for listed species excluding Mallards, or; Presence of 10 or more nesting pairs for listed species including Mallards. Any active nesting site of an American Black Duck is considered significant. Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest. SWHMiST Index #25 provides development effects and mitigation measures. 	<p>Waterfowl nesting area surveys occurred over six (6) days in April-early June 2019.</p> <p>Total probable nesting sites (pairs observed, females flushed) throughout the course of waterfowl nesting surveys were as follows within the study area limits:</p> <p>Mallard: 3</p> <p>Presence of waterfowl during nesting surveys was substantially below the threshold to qualify as candidate SWH (10 nesting Mallard pairs). There is no expectation that any portion of the property provides candidate SWH for waterfowl nesting areas within areas east of the rail line or adjacent lands.</p> <p>In lieu of completing detailed waterfowl nesting surveys for wetlands west of the rail line >120m from the limit of the rail berm, Waterfowl Nesting Habitat is treated as present within those units.</p>

Table 8

Wildlife Habitat	Wildlife Species	Candidate SHW		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p>Bald Eagle and Osprey Nesting, Foraging and Perching Habitat</p> <p>Rationale: Nest sites are fairly uncommon in Eco-region 6E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.</p>	<p>Osprey</p> <p>Special Concern Bald Eagle</p>	<p>ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands</p>	<p>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</p> <ul style="list-style-type: none"> Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. Nature Counts, Ontario Nest Records Scheme data. OMNRF Districts Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented Reports and other information available from Conservation Authorities. Field Naturalists clubs 	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none"> One or more active Osprey or Bald Eagle nests in an area. Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat. To be significant a site must be used annually. When found inactive, the site must be known to be inactive for > 3 years or suspected of not being used for >5 years before being considered not significant. Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #26 provides development effects and mitigation measures. 	<p>Bald Eagle and/or Osprey nesting sites not observed during the course of the field program.</p> <p>No suitable habitat.</p>
<p>Woodland Raptor Nesting Habitat</p> <p>Rationale: Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.</p>	<p>Northern Goshawk Cooper’s Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk</p>	<p>May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3</p>	<p>All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat. Interior habitat determined with a 200m buffer</p> <ul style="list-style-type: none"> Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers Hawk nest along forest edges sometimes on peninsulas or small off-shore islands. In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> OMNRF Districts. Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented. Check data from Bird Studies Canada. Reports and other information available from Conservation Authorities. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 1 or more active nests from species list is considered significant. Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha area of habitat is the SWH . (The 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest). Barred Owl – A 200m radius around the nest is the SWH. Broad-winged Hawk and Coopers Hawk– A 100m radius around the nest is the SWH. Sharp-Shinned Hawk – A 50m radius around the nest is the SWH. Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial. (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. SWHMiST Index #27 provides development effects and mitigation measures. 	<p>No suitable woodland/forest stands >30 ha in size with >10 ha of interior habitat within the study area limits.</p> <p>No raptor nests observed during the course of the field program.</p>
<p>Turtle Nesting Areas</p> <p>Rationale: These habitats are rare and when</p>	<p>Midland Painted Turtle</p> <p><u>Special Concern Species</u> Northern Map Turtle</p>	<p>Exposed mineral soil (sand or gravel) areas adjacent (<100m) or within the following ELC Ecosites: MAS1 MAS2</p>	<ul style="list-style-type: none"> Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 5 or more nesting Midland Painted Turtles. One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the 	<p>Sand/gravel banks with exposed soil limited to dugout pond edges where located on the property, and the eastern face of the abandoned rail berm.</p> <p>Municipal road embankments in the</p>

Table 8

Wildlife Habitat	Wildlife Species	Candidate SHW		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
identified will often be the only breeding site for local populations of turtles.	Snapping Turtle	MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. <ul style="list-style-type: none"> Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> <ul style="list-style-type: none"> Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. Natural Heritage Information Center (NHIC) Field Naturalist clubs 	nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH. <ul style="list-style-type: none"> Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100m area of habitat. Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. SWHMiST Index #28 provides development effects and mitigation measures for turtle nesting habitat. 	vicinity of the subject property do not qualify as SWH. <p>Turtle nesting surveys occurred over three (3) evenings in May/June 2019, with supporting daytime surveys over six (6) days in June/early July 2019. No turtle nests (predated or active) were observed during targeted surveys or incidentally through the course of the field program.</p>
Seeps and Springs <u>Rationale:</u> Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system. <ul style="list-style-type: none"> Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species. <u>Information Sources</u> <ul style="list-style-type: none"> Topographical Map Thermography Hydrological surveys conducted by Conservation Authorities and MOE. Field Naturalists clubs and landowners. Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped. 	Field Studies confirm: <ul style="list-style-type: none"> Presence of a site with 2 or more seeps/springs should be considered SWH. The area of a ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat. SWHMiST Index #30 provides development effects and mitigation measures. 	No seeps or spring observed within the study area.
Amphibian Breeding Habitat (Woodland). <u>Rationale:</u> These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	<ul style="list-style-type: none"> Presence of a wetland, pond or woodland pool (including vernal pools) >500m² (about 25m diameter) within or adjacent (within 120m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat. <u>Information Sources</u> <ul style="list-style-type: none"> Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records. Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. OMNRF District OMNRF wetland evaluations 	Studies confirm; <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with Call Level Codes of 3. A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. The habitat is the wetland area plus a 230m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. SWHMiST Index #14 provides development effects and mitigation measures. 	Amphibian breeding surveys documented >20 breeding individuals (full choruses) of two (2) listed frog species within potential amphibian breeding habitat on the subject property as follows: <p>SWT2-2a/MAS2-6: Spring Peeper, Gray Treefrog</p> <p>MAM2-2h: Spring Peeper, Gray Treefrog</p> <p>The above wetlands qualify as Amphibian Breeding Habitat (Woodland) as they occur “adjacent” (within 120m) of a forest ELC type.</p> <p>Wetland units SWT2-2a/MAM2-6 and MAM2-2h meet SWH criteria and should</p>

Table 8

Wildlife Habitat	Wildlife Species	Candidate SHW		Confirmed SWH Defining Criteria	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			<ul style="list-style-type: none"> Field Naturalist clubs Canadian Wildlife Service Amphibian Road Call Survey Ontario Vernal Pool Association: http://www.ontariovernalpools.org 		<p>be treated as candidate Amphibian Breeding Habitat (Woodland) for the purposes of this assessment. Woodland within a 230m radius extending from occupied wetlands (meeting SWH criteria) are also considered Candidate SWH.</p> <p>In lieu of completing detailed amphibian breeding surveys for wetlands west of the rail line located >120m from the limit of the rail berm, Candidate Amphibian Breeding Habitat (Woodland) is treated as present within those units.</p>
<p>Amphibian Breeding Habitat (Wetlands)</p> <p>Rationale: Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.</p>	<p>Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog</p>	<p>ELC Community Classes SW, MA, FE, BO, OA and SA.</p> <p>Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.</p>	<ul style="list-style-type: none"> Wetlands >500m² (about 25m diameter), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Ontario Herpetofaunal Summary Atlas (or other similar atlases) Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. OMNRF Districts and wetland evaluations Reports and other information available from Conservation Authorities 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant. The ELC ecosite wetland area and the shoreline are the SWH. A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. SWHMiST Index #15 provides development effects and mitigation measures. 	<p>Amphibian breeding surveys did not record >20 breeding individuals of two or more of the listed species within wetlands >120 m from qualifying woodland ELC codes.</p> <p>See Amphibian Breeding Habitat (Woodland) above for additional information related to evening amphibian breeding surveys implemented within the study area.</p>
<p>Woodland Area-Sensitive Bird Breeding Habitat</p> <p>Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.</p>	<p>Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren</p> <p>Special Concern: Cerulean Warbler Canada Warbler</p>	<p>All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD</p>	<p>Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha.</p> <ul style="list-style-type: none"> Interior forest habitat is at least 200 m from forest edge habitat. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Local bird clubs. Canadian Wildlife Service (CWS) for the location of forest bird monitoring. Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species. Reports and other information available from Conservation Authorities. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. Conduct field investigations in spring and early summer when birds are singing and defending their territories. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #34 provides development effects and mitigation measures. 	<p>No woodlands within interior forest habitat (>200 m from forest edge habitat) are located within the study area limits.</p> <p>No suitable habitat.</p>

Table 8

1.3 Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species)

Wildlife Habitat	Wildlife Species	Candidate SHW		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p>Marsh Breeding Bird Habitat</p> <p>Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.</p>	<p>American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan</p> <p>Special Concern: Black Tern Yellow Rail</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1</p> <p>For Green Heron: All SW, MA and CUM1 sites.</p>	<ul style="list-style-type: none"> Nesting occurs in wetlands. All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> OMNRF District and wetland evaluations. Field Naturalist clubs Natural Heritage Information Center (NHIC) Records. Reports and other information available from Conservation Authorities. Ontario Breeding Bird Atlas 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species. Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. Area of the ELC ecosite is the SWH. Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #35 provides development effects and mitigation measures. 	<p>Breeding bird surveys and incidental observations east of the rail line and adjacent lands recorded presence of one (1) calling Virginia Rail within the SWT2-2a unit.</p> <p>If Virginia Rail nesting is assumed in this location, the community does not meet habitat use thresholds required to be considered as candidate SWH.</p> <p>Marshlands west of the rail line are limited to minor meadow marsh units dominated by Reed Canary Grass (<i>Phalaris arundinacea</i>) that are not anticipated to be conducive for breeding activities by listed species. Standing water within these units does not persist beyond the spring months, such that shallow water conditions required to support marsh bird breeding do not occur. No suitable habitat is anticipated within lands west of the rail line or adjacent lands.</p>
<p>Open Country Bird Breeding Habitat</p> <p>Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.</p>	<p>Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow</p> <p>Special Concern Short-eared Owl</p>	<p>CUM1 CUM2</p>	<p>Large grassland areas (includes natural and cultural fields and meadows) >30 ha.</p> <ul style="list-style-type: none"> Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years). Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Agricultural land classification maps, Ministry of Agriculture. Local bird clubs. Ontario Breeding Bird Atlas Reports and other information available from Conservation Authorities. 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> Presence of nesting or breeding of 2 or more of the listed species. A field with 1 or more breeding Short-eared Owls is to be considered SWH. The area of SWH is the contiguous ELC ecosite field areas. Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #32 provides development effects and mitigation measures. 	<p>Open meadow (MEGM3/MEGM4a) that comprises the majority lands east of the rail line was subject to active/intensive pasturing by cattle up to 2019. Intensive livestock pasturing has occurred within the past 5 years, and therefore the subject property does not qualify as candidate Open Country Bird Breeding Habitat.</p> <p>Meadow units lands west of the rail line do not exceed 30ha and are therefore not considered suitable habitat.</p> <p>Pastureland, hayfields, and/or old-field meadows on adjacent lands (north of Concession Road 2 and east of Highway 12) may provide suitable conditions to support Open County Bird Breeding Habitat (Figure 5a-5b, and is treated as such for the purposes of this assessment.</p>

Table 8

Wildlife Habitat	Wildlife Species	Candidate SHW		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
<p>Shrub/Early Successional Bird Breeding Habitat</p> <p>Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.</p>	<p>Indicator Spp: Brown Thrasher Clay-coloured Sparrow Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher</p> <p>Special Concern: Yellow-breasted Chat Golden-winged Warbler</p>	<p>CUT1 CUT2 CUS1 CUS2 CUW1 CUW2</p> <p>Patches of shrub ecosites can be complexed into a larger habitat for some bird species</p>	<p>Large field areas succeeding to shrub and thicket habitats >10ha in size.</p> <ul style="list-style-type: none"> Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (<i>i.e.</i> no row-cropping, haying or live-stock pasturing in the last 5 years). Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Agricultural land classification maps, Ministry of Agriculture. Local bird clubs Ontario Breeding Bird Atlas Reports and other information available from Conservation Authorities. 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. The area of the SWH is the contiguous ELC ecosite field/thicket area. Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. SWHMiST Index #33 provides development effects and mitigation measures. 	<p>One (1) upland shrub thicket or early successional woodland community >10ha in size is located within the subject property, THDM2-6 located east of the rail line. Active livestock pasturing has occurred within this vegetation community in the past 5 years, and therefore the subject property does not qualify as candidate Shrub/Early Successional Bird Breeding Habitat.</p> <p>A large thicket is located south of Concession Road 1 on adjacent lands (Figure 5c). The unit exceeds 10ha in size and therefore may provide Shrub/Early Successional Bird Breeding Habitat, and is treated as such for the purposes of this assessment.</p>
<p>Terrestrial Crayfish</p> <p>Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.</p>	<p>Chimney or Digger Crayfish; (<i>Fallicambarus fodiens</i>)</p> <p>Devil Crayfish or Meadow Crayfish; (<i>Cambarus Diogenes</i>)</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM</p> <p>CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.</p>	<p>Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish.</p> <ul style="list-style-type: none"> Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Information sources from “Conservation Status of Freshwater Crayfishes” by Dr. Premek Hamr for the WWF and CNF March 1998. 	<p>Studies Confirm:</p> <ul style="list-style-type: none"> Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult. SWHMiST Index #36 provides development effects and mitigation measures. 	<p>Terrestrial crayfish burrows were observed in the northeast portion of the property (SWT2-2b), the southeast portion of the property (adjacent to a dug pond; MAS2-1c (incl.)), and the west portion of the property (MAM2-2k).</p>
<p>Special Concern and Rare Wildlife Species</p> <p>Rationale: These species are quite rare or have experienced significant population declines in Ontario.</p>	<p>All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.</p>	<p>All plant and animal element occurrences (EO) within a 1 or 10km grid.</p> <p>Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.</p>	<p>When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. NHIC Website “Get Information” : http://nhic.mnr.gov.on.ca Ontario Breeding Bird Atlas Expert advice should be sought as many of the rare spp. have little information available about their requirements. 	<p>Studies Confirm:</p> <ul style="list-style-type: none"> Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species <i>e.g.</i> specific nesting habitat or foraging habitat. SWHMiST Index #37 provides development effects and mitigation measures. 	<p>Presence of Special Concern species and provincially rare (S1-S3) species documented during the field program and/or or treated as present within the study area limits as follows, discussed in greater detail in Section 4.7.7:</p> <ul style="list-style-type: none"> Barn Swallow (SC); Wood Thrush (SC); Eastern Wood-pewee (SC); Grasshopper Sparrow (SC); Golden-winged Warbler (SC); Monarch (SC);

Table 8

Wildlife Habitat	Wildlife Species	Candidate SHW		Confirmed SWH	Assessment
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
					<ul style="list-style-type: none"> • Snapping Turtle (SC); and, • Chimney/Meadow Crayfish (S3)

1.4 Animal Movement Corridors

Wildlife Habitat	Wildlife Species	Candidate SHW		Confirmed SWH	Assessment
		ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria	
<p>Amphibian Movement Corridors</p> <p>Rationale: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.</p>	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. <ul style="list-style-type: none"> • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1 	Movement corridors between breeding habitat and summer habitat. <ul style="list-style-type: none"> • Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat –Wetland) of this Schedule. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • MNRF District Office • Natural Heritage Information Center (NHIC) • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs 	<ul style="list-style-type: none"> • Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. • Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant. • Corridors should have at least 15m of vegetation on both sides of waterway or be up to 200m wide of woodland habitat and with gaps <20m. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat. • SWHMiST Index #40 provides development effects and mitigation measures. 	Confirmed SWH for Amphibian Breeding Habitat (Wetlands) required for consideration of Amphibian Movement Corridors. Not identified, as detailed above. No suitable habitat.
<p>Deer Movement Corridors</p> <p>Rationale: Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.</p>	White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule. <ul style="list-style-type: none"> • A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion. • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges). <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • MNRF District Office • Natural Heritage Information Center (NHIC). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs 	<ul style="list-style-type: none"> • Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. • Corridors that lead to a deer wintering habitat should be unbroken by roads and residential areas. • Corridors should be at least 200m wide with gaps <20m and if following riparian area with at least 15m of vegetation on both sides of waterway. • Shorter corridors are more significant than longer corridors. • SWHMiST Index #39 provides development effects and mitigation measures. 	Deer Winter Congregation Areas and Deer Yarding Areas not mapped by MNRF within the study area. Woodlands within the property limits consist of primarily immature successional woodland, not providing typical conditions for deer movement corridors. No suitable habitat.



APPENDICES

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 - Appendix B: Municipal and Regional Background Information**
 - Appendix C: LSRCA Background and Correspondence**
 - Appendix D: Provincial Background and Correspondence**
 - Appendix E: Photographic Record**
 - Appendix F: OWES Evaluations**
 - Appendix G: Simplified Operation Schematic**
 - Appendix H: Curriculum Vitae**
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APPENDIX A

Fisheries Assessment (RiverStone Environmental Solutions)



FISHERIES ASSESSMENT

Brechin Quarry
LCP Quarry Limited
Ramara Township
December 2023



RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.



RIVERSTONE

ENVIRONMENTAL SOLUTIONS INC.

December 14, 2023
RS #2019-046

LCP Quarry Limited
c/o **Scott Kirby**
Suite 500
145 Adelaide Street West
Toronto, Ontario
M5H 4E5

***SUBJECT:* Fisheries & Drainage Feature Assessment, Proposed Brechin Quarry, Ramara Township Quarry, County of Simcoe**

Dear Mr. Kirby,

RiverStone Environmental Solutions Inc. is pleased to provide you with the enclosed Fisheries Assessment.

Please contact us if there are any questions regarding the report, or if further information is required.

Best regards,

RiverStone Environmental Solutions Inc.

Bev Wicks, Ph.D.
Senior Ecologist / Principal

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1 BACKGROUND

RiverStone Environmental Solutions Inc. (hereafter, “RiverStone”) was retained by LCP Quarry Limited (the ‘proponent’) to prepare a Fisheries Assessment. The assessment was undertaken for a property described as Part Lots 11, 12, and 13, Concession A (hereafter, “subject property”; see **Figure 1**) in the Township of Ramara, County of Simcoe for inclusion in Natural Environment Report (NER) to support an application for a below the water table quarry under the *Aggregate Resources Act* (ARA).

The subject property supports various natural heritage features that require considerations under the ARA, as well as other applicable planning policies and environmental regulations. Such features include terrestrial resources such as wetlands and habitat for species protected under the provincial *Endangered Species Act* (ESA), as well as aquatic resources, including drainage features and associated fish habitat functions. The focus of the assessment is the latter, including identification and characterization of existing conditions related to drainage features contained within the subject property and/or adjacent lands. This targeted approach was required to assess permanency, fish community, fish habitat and fisheries values, channel characteristics, substrates, riparian conditions, potential impacts to fish and fish habitat, and options for fish habitat improvements related to future rehabilitation.

It is noted that terrestrial resources and an overall impact assessment are being included as part of the broader Natural Environment Report (NER), prepared by Azimuth Environmental Consulting Inc. (‘Azimuth’). Azimuth and RiverStone has worked jointly to collect information to inform the NER; however, RiverStone’s scope has been primarily focused on aquatic resources. This report is intended to serve as a reference resource to the NER, to be included as an appendix in that report.

1.1 Study Purpose

This Fisheries Assessment has been prepared for inclusion in the NER prepared by Azimuth. Under the ARA, a “site” is defined as “the land or land under water to which a licence or permit or an application therefor relates”.

Per MNR’s *Aggregate Resources Ontario: Technical Reports and Information Standards* (OMNR, August 2020) purpose of a Level 1 NER is to describe the existing natural environmental conditions on and within 120 m of the property (i.e., study area), and to determine whether any of the following features are present:

- a) Significant wetlands
- b) Other coastal wetlands in Ecoregions 5E, 6E, 7E
- c) Fish habitat
- d) Significant woodlands and significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary’s River)
- e) Habitat of endangered and threatened species
- f) Significant wildlife habitat
- g) Significant Areas of Natural and Scientific Interest (ANSIs)
- h) Within the area of one or more provincial plan(s), any key natural heritage features not included in (a) through (g)

When any of the above features are identified further assessment is required to assess the potential for negative impacts on the identified feature(s) of significance. If potential impacts are identified, then the

assessment should provide recommendations for appropriate preventative, mitigative, and remedial measures. The scope of work contained in this report is intended to address the fish habitat component.

2 APPROACH AND METHODS

2.1 General Approach

The approach and methods used to carry out this assessment are detailed in this section. Broadly speaking, this includes:

1. Identifying a study area in which to focus assessment efforts.
2. Gathering background biophysical information for the study area to become familiar with relevant features and site characteristics prior to on-site investigation.
3. Conducting site investigations to field-verify the presence or absence of drainage features identified during background information gathering, and to characterize the form and function of each feature.
4. Preparing a summary of the hydrological and ecological functions of each watercourse, primarily from a fish habitat perspective, including flow, structure, and connectivity of each feature.

2.2 Identification of Study Area

The primary focus of this assessment is the subject property on which application is proposed. As such, the study area is equivalent to the limits of the subject property as shown on **Figure 1** and **Figure 2**. The study area also incorporates a 120 m radius around all limits of the proposed development footprint, except where existing built development disrupts any functional connection to lands within this 120 m radius. This is intended to ensure appropriate consideration for natural heritage features and functions of adjacent lands, consistent with direction in the ARA Standards, Natural Heritage Reference Manual (NHRM) under the Provincial Policy Statement (PPS).

2.3 Review of Background Information Sources

Background biophysical information pertaining to the subject property and adjacent lands (i.e., lands within approximately 120 m of the subject property) was collected from a variety of sources. These include:

- **Township of Ramara Official Plan (Jan 2016 Consolidation) and Schedules.**
- **County of Simcoe Official Plan (Feb 2023 Consolidation) and Schedules.**
- **Lake Simcoe Region Conservation Authority** regulated area mapping per Ontario Regulation 179/06.
- **Ministry of Natural Resources and Forestry – Ontario Base Mapping.**
- **Agricultural Information Atlas (AgMaps).** Ontario Ministry of Agricultural, Farming, and Rural Affairs:
(<https://www.lioapplications.lrc.gov.on.ca/AgMaps/Index.html?viewer=AgMaps.AgMaps&locale=en-CA>).
- **Aquatic Species at Risk Maps** mapping generated by Fisheries and Oceans Canada.

- **Current and Historical Aerial Photographs** of the subject property and adjacent lands.

2.4 **Site Assessment Methods**

The results of the background screening exercise outlined above in **Section 2.2** informed the scoping of targeted site investigations carried out by RiverStone in 2019 and 2020 (**Table 1**). Curriculum vitae of the primary site investigators is provided in **Appendix 1**. Site investigations were focused on characterizing the general topography of the site and associated drainage patterns, including a formal assessment of ‘headwater drainage’ characteristics. Where appropriate, features were delineated with a survey-grade GPS receiver capable of 2 m accuracy. Representative photographs taken during the site investigation are assembled in **Appendix 2**. An additional site review was completed with Lake Simcoe and Region Conservation Authority (LSRCA) on November 12, 2021, to review tributaries and wetlands.

Table 1. Site Investigations Undertaken by RiverStone on the Subject Property.

Date	Primary Task	Staff
July 8, 2019	Initial site review, watercourse delineation	B. Wicks, K. Trimble, C. Mann, J. LeMesurier.
July 25, 2019	Locate monitoring stations, watercourse refinement, watercourse monitoring	C. Mann
Aug 22, 2019	Watercourse monitoring	C. Mann
Sept 25, 2019	Watercourse monitoring, watercourse electro fishing	C. Mann, A. Shaw
Oct 23, 2019	Watercourse monitoring	C. Mann
Apr 28, 2020	Watercourse monitoring	C. Mann

2.4.1 *Watercourse Identification*

Aerial photography/ortho-imagery and background information sources listed in **Section 2.2** were reviewed to identify preliminary locations of drainage features/watercourses within the study area. Preliminary watercourse mapping was also available from initial site investigations undertaken by Azimuth in support of the NER. Mapping was compiled to depict the various interpreted drainage alignments to inform targeted site investigations. As per **Table 1**, the initial site investigation was undertaken on July 8 (2019) and focused on confirming the presence of the various drainage features identified through background review. The alignment of these features was formally delineated in all accessible locations within the study area by walking the approximate centerline of the feature and taking location points with a high-accuracy GPS receiver. Where flow was absent due to seasonally-dry conditions, other physical characteristics were used to identify drainage alignments, such as topography, substrate, and presence of riparian vegetation communities.

2.4.2 *Watercourse Monitoring & Characterization*

Once identified, drainage features were assessed and monitored to inform a general characterization of the structure and function of each feature. Twelve individual aquatic assessment/monitoring stations were established to evaluate conditions in consistent, representative locations during each monitoring

visit. The location of each monitoring station is depicted on **Figure 2**, labelled as WQ (1-12). Details on the following parameters were collected where applicable/feasible:

- Bank full width
- Wetted width
- Standing water depth
- Velocity
- Bank stability
- Culvert dimensions
- Water temperature
- Dissolved oxygen
- Conductivity
- pH
- Vegetation characteristics
- General observations

The assessed parameters were used to inform conclusions regarding feature permanency, fish community, fish habitat and fisheries values, and options for fish habitat improvements related to future rehabilitation (if/where applicable). The various watercourse monitoring dates are listed in **Table 1** above; a data collection summary is provided in **Appendix 4**.

2.4.3 Targeted Fish Sampling and Fish Habitat Assessment

RiverStone conducted a fisheries habitat assessment to characterize aquatic features and fish habitat in the study area. The habitat features that were documented include bankfull and wetted width, max water depth, velocity, bank stability, substrate types, water temperature, dissolved oxygen (DO), conductivity, pH, and in feature and riparian vegetation.

The presence or absence of fish habitat was ascertained through review of relevant background information sources (per Section 2.3) and the results of targeted and habitat-based assessments on-site. Formal assessment for fish presence was completed on September 25, 2019. Each watercourse that showed either intermitted or permanent flows was assessed for fish community structure using single pass electrofishing on the property within the identified tributaries. The sampling reaches were not blocked at either end during the assessment. A total of four (4) sampling stations were established, coinciding with water sampling stations WQ1, 2, 4, and 6, as per **Figure 2**.

2.5 Impact Assessment

2.6 Applicable Environmental Policies

There are several relevant environmental policies (e.g., statutes, regulations, plans, guidance documents, etc.) that may apply to the application, that are listed below. An assessment of the applications consistency with these environmental policies is offered in **Section 5**.

- Provincial *Conservation Authorities Act*, R.S.O. 1990, c. C.27, including:
 - O. Reg. 179/06 – Lake Simcoe Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses

- Lake Simcoe Region Conservation Authority Watershed Development Policies
- Provincial *Lake Simcoe Protection Act*, S.O. 2008, c. 23, including:
 - Lake Simcoe Protection Plan, O.C. 977/2009
 - Technical Definitions and Criteria for Identifying Key Natural Heritage Features and Key Hydrologic Features for the Lake Simcoe Protection Plan (MNR 2015)
- Provincial *Endangered Species Act*, S.O. 2007, c. 6, including:
 - O. Reg. 230/08 – Species at Risk in Ontario List
 - O. Reg. 242/08 – General (i.e., “Exemption Regulation”)
- Federal *Fisheries Act*, R.S.C. 1985, c. F-14, including:
 - Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations, S.O.R/2013-191
 - Fisheries Protection Policy Statement (Fisheries and Oceans Canada 2013)

3 EXISTING CONDITIONS

3.1 General Site Description

The subject property is situated ~2.8 km south of the Village of Brechin, on the west side of Highway 12. The property is bordered to the south by Concession Road 1, to the north by Concession Road 2, to the east by Highway 12, and to the west by private land. Two existing ARA licenced active quarries are located to the south and northeast. The subject property is vacant and was previously utilized as pasture for cattle, with the southwest corner consisting of an abandoned airfield surrounded by coniferous plantation and other successional forest communities. Agricultural land is abundant on the surrounding landscape, with most lands being utilized for crops or pasture. The vegetation characteristics across the subject property are reflective of these historic and ongoing disturbances, with variable successional vegetation being dominant in all locations.

The subject property is situated within the Simcoe Lowlands physiographic region that consists of lowlands bordering Georgian Bay and Lake Simcoe (Chapman and Putnam 1984). The property occurs within a broad swath of clay plain that underlies most of the areas east and northeast of the Lake Simcoe shoreline. This region extends inland before transitioning to limestone plain, where overburden becomes notably thinner and sedimentary bedrock exposures are common. Ontario Soil Survey data identifies a complex of soil types overlapping the subject property, including Farmington Loam, Smithfield Clay Loam, Otonabee Loam, and Emily Loam (Shallow Phase). Conditions across the property generally consist of shallow, calcareous soils with variable stone content, except for those in the Smithfield series (northern portion of site) which are stone-free and imperfectly draining.

Overall, the subject property is relatively level with minimal elevation change. As shown in **Figure 1**, the subject property contains a topographic high above 241 masl in the east and central portions of the property (local topographic high point). The landscape exhibits a slight decrease in elevation towards the north, south, and west. Surface flows are directed accordingly through a series of defined channels and undefined riparian ‘swales’ to roadside drainage ditches along the perimeter of the subject property and adjacent lands. Most surface drainage is directed off-site and ultimately westward to Lake Simcoe;

however, multiple drainage features appear to terminate in isolated pond features with no surface outlet.

Further site-specific details, including vegetation community descriptions and hydrogeological information can be obtained from the main body of the NER and the Level 1 and Level 2 Hydrogeological Assessment (Azimuth, 2023).

3.2 Drainage Feature Characterization

The following section outlines the characteristics of the various watercourses/drainage features documented throughout the study area. As discussed, all features were identified through a combination of background review, preliminary in-field assessment by Azimuth, and further in-field refinement and verification by RiverStone. The location and field-verified alignment of all identified features is depicted on **Figure 2**, with individual features referenced as **Tributaries A-H**, inclusive. Additional surface water descriptions and details are provided in the Level 1 and Level 2 Hydrogeological Assessment, Proposed Brechin Quarry (Azimuth Environmental Consulting Inc., July 2023)

3.2.1 *Tributary A*

Existing OBM mapping depicts **Tributary A** as originating in the northeastern portion of the subject property, flowing north to the northern property limit along Concession Rd. 2. The southern headwaters of the OBM-mapped watercourse could not be located in the field; it is assumed that the mapping is inaccurate and/or the southern upstream extent of the feature has been altered through historic agricultural practices.

Tributary A has a catchment area of 43.7 ha (Azimuth, 2023). There is an online dug pond (**Pond 1**) that occurs along the mapped alignment of **Tributary A**, proximate to Concession Rd. 2 (WQ1 Station). The pond collects overland surface water from the southern area of the catchment before overtopping into a field in braided channels and flowing under Concession Road 2 via a culvert into the McNabb Drain.

The southern portion of the **Tributary A** catchment is active pastureland with no evidence of a channel, but occasional pockets of moist soil were observed. Evidence of historic ditching/channelization was observed along the alignment moving north towards Concession Road 2. The channel was observed to be more defined and wider ~75 cm for about 150 m, coinciding with the southern limit of a vegetation community generally described as thicket swamp. The channel profile ranged from ~30-75 cm wide, ~15-20 cm deep, with muck substrates. During the spring 2020 site investigation, staff observed a standing water depth of ~4 cm and wetted width of ~42 cm in this northern portion of the channel (see WQ1 on **Figure 2**).

Within the thicket swamp community, **Tributary A** becomes braided and diffuse with no defined channel. Between **Pond 1** and 190 m to the south the low-lying area and shrub thicket swamp showed heavy soil disturbance caused by cattle.

Tributary A is an intermittent feature and is fish habitat from Pond 1 downstream to the confluence with **Tributary H** (McNabb Drain).

3.2.2 *Tributary B*

Tributary B was identified on OBM as originating in a shrub thicket community in the north portion of the south pasture area (**Figure 2**) and has a catchment area of 26.5 ha (Azimuth, 2023). There was no defined channel at the mapped origin of this feature; however, the area is situated in a subtle depression where areas of standing water (~15 cm) were noted during the spring 2020 site visit. A defined channel was first observed ~80 m west of the mapped origin of the feature, consisting of a ditch ~ 1.13 m wide and 28 cm deep, within an area of open pasture. This area is densely vegetated (primarily grasses) with pockets of standing water up to 12 cm deep; however, there was no observable flow during any of the monitoring visits. **Tributary B** directs overland flow in a westerly direction towards an online pond feature (**Pond 2**) to the east of the airfield lands (WQ9). **Pond 2** had water present throughout the monitoring period and the Hydrogeological Assessment (Azimuth 2023) suggests that the pond may be supported by shallow perched ground water. The online pond showed heavy disturbance by cattle. The OBM mapping shows the tributary moving west from Pond 2, however, no outlet was observed along the OMB mapped flow path. Based on field observations and mapping completed by both RiverStone and Azimuth, **Tributary B** outlets from **Pond 2** and flows north connecting with **Tributary G**. Tributary B would be considered intermittent based on the data collected.

3.2.3 *Tributary C*

Tributary C occurs on adjacent lands, with about 35,000m² of its catchment on the subject property. The tributary appears to be part of the tile drain system for the agricultural fields. Based on general observations from the subject property, the tributary consists of a dug drainage ditch on adjacent lands that runs along a portion of the west property boundary. At the time of assessment, the adjacent property was in a ploughed condition. Based on general observations the watercourse is ~ 1.2 - 1.5 m wide with occasional standing water, including a wetted width of ~70 cm and a depth of ~3 to 7 cm. The start of the ditch is ~150 m north of the property line with no direct connection to the subject property. No direct connection to **Tributary H** was observed.

3.2.4 *Tributary D/E/F*

Tributary D/E/F all appear to originate on the western portion of the study area and are located outside the area proposed for extraction. A combination of surface water pockets, ditching, and culverts move surface water to the northeastern property limit at which point the flows then appear to become part of two tile drains that form the downstream extent of **Tributaries E** and **F** on adjacent lands. The network of channels and surface water pockets in this area of the subject property are poorly defined and ultimately flow via tile drains and outlet to the west at County Road 47. The field observations and mapping are somewhat different than what is mapped on OBM. During field verification of the tributary alignments, there was no evidence of a channel or connection between **Tributary D** and **Tributary B**, or **Pond 2** located to the east side of the old rail alignment. A berm has been constructed at the east end of the airfield runway that appears to limit surface water flow between **Tributary B/G/Pond 2** and the eastern tributaries (**D, E, and F**). There was no evidence of a defined channel proximate to the western edge of the rail line and constructed berm; differing from the OBM mapped location. Both the Azimuth field map and the OBM mapped depict **Tributary D and E** watercourse intersecting at the access road into the airfield. In this area a more defined channel is observable in some locations. A 1-1.5 m deep dug channel about 1.15 m wide with varying depths of water 0.5 to 1.0 m flows in a northerly direction toward a small dug pond at the edge of the existing airstrip. Standing water was noted in the pond during the spring 2020 site visit, with a 4.0 cm depth and wetted width of 35-60.0 cm. No standing water or flow was observed throughout the 2019

monitoring period; however, pockets of saturated soils were evident. The pond feature where **Tributary D** terminates was monitored (WQ10) over the summer of 2019 and observed to be dry by September.

There was no observable connection between any channels observed on the western most portion of the subject property and the adjacent lands. It is anticipated that **Tributary E** follows the general direction indicated on the OBM mapping moving in a northwest direction via tile drains across agricultural field and bisects County Road 47 just south of the County Road 47 and Concession Road 2 intersection. Assessment of this portion of watercourse was attempted from the County Road 47 Right-of-way; however, no channel was found. A tile drain outlet was located at WQ12 and was monitored during the summer of 2019. The drain outlet was dry for most of the year with flow only observed in late October 2019. Based on Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) online mapping, the agricultural field has had random tile drainages installed. With a lack of water and no connection to tributaries providing fish habitat, it was concluded that **Tributary E** has been highly altered and does not support any fisheries functions.

Tributary F is located on adjacent lands to the west of the study area. OBM shows a watercourse across an agricultural field that had been ploughed for crops during the summer of 2019. The assessment of the watercourse was conducted from the right-of-way of County Road 47, and no defined channel or indication of watercourse was observed. Within the right-of-way a tile drain (WQ 11) was monitored through the summer of 2019, with no flow observed at any time. Based on OMAFRA online mapping, the agricultural field has had random tile drainage installed. During the spring 2020 site visit, the portion of watercourse between the end of drain and roadside ditch had been cleaned out. This area supported a wetted width of 57.0 cm, water depth of 4.0 cm and a velocity of 0.4 m/s. With a lack of a defined watercourse, limited flow, and no direct connection to tributaries providing fish habitat, it was concluded that **Tributary F** does not contribute to fish habitat.

All these tributaries would be considered ephemeral or intermittent.

3.2.5 *Tributary G*

Tributary G is a continuation of **Tributary B** and online with **Pond 2**. **Tributary G** has a catchment area of 76.0 ha (Azimuth, 2023), that includes the catchment area for **Tributary B** described above. The south portion of this tributary, closest to the pond, consists of a dug drainage ditch that runs along a hedgerow between the pasture lands (east portion of study area) and former airfield (west portion of study area) The ditch is ~ 1.6-1.9 m wide and ~0.75 cm deep and directs overland flow from the pond at WQ9 in a northly direction until it flows on to adjacent private lands to the north. The northern reach could only be assessed from the right-of-way of Concession Road 2 and aerial imagery. It appears that the channel consists of a dug drainage ditch along an access road between two (2) agricultural fields. Fields on either side of the ditch are mapped by OMAFRA as having both systematic and random tile drainage installed. Flows from this tributary are directed under Concession Road 2 via culvert to the McNabb Drain.

Data was collected for **Tributary G** at WQ4, WQ8 and WQ9 stations. WQ4 is located on the south side of Concession Road 2, WQ8 is at the upstream limit of **Tributary G** on the subject property, and WQ9 is associated with Pond 2. During high water levels it is speculated that this tributary directs flows from the pond at WQ9 (termination of **Tributary B**) towards the north. Standing water was observed at WQ4 throughout the summer with water temperatures of between 6.0 and 19.2°C. Based on data collected at WQ4 during the spring 2020 site visit, the south portion of **Tributary G** (adjacent

to the north property boundary) had a standing depth of 6.0 cm, a wetted width of 45-70 cm, with flow of 0.1 m/s. **Tributary G** converges with the McNabb Drain (**Tributary H**) via a culvert under Concession Road 2.

At WQ8 the channel was dry except during the April 2020 site visit. Baseflow in this feature becomes limited in the upper reaches, following spring freshet when **Pond 2** becomes equilibrated (Azimuth, 2023). Additional contributions to baseflow were observed in the lower reaches closest to Concession Road 2, from the tile drain outlets from the eastern agricultural fields.

A single Northern Pike was identified in the tributary proximate to the culvert (WQ4) on September 25, 2019. During periods of high flow there would be direct connection between the McNabb Drain and **Tributary G**, making this reach of the watercourse direct fish habitat during at least some portion of the year.

3.2.6 Tributary H (McNabb Drain)

Tributary H is located to the north of Concession Road 2 and receives most of the surface water contributions from the extraction area of the proposed licence. The catchment area of the McNabb Drain upstream of **Tributary A** is 125 ha and consists of wetlands east of Highway 12, industrial areas, and portions of the Lafarge Quarry (Azimuth, 2023). The tributary consists of the roadside ditch running parallel to Concession Road 2 before turning north between agricultural fields and then west toward County Road 47. Mapping by OMAFRA identifies the tributary as a constructed open or unknown drain (McNabb Drain) with a Department of Fisheries and Oceans classification of “F”. This classification is assigned to streams having intermittent flows and no species sensitivities, restricting in-stream activities to periods without flow, and only requiring authorization if maintenance can not be complete while the channel is dry, frozen or without flow.

Tributary H was monitored at three stations (WQ2, 3 and 6) in the summer of 2019. Stations 2 and 3 had standing water present throughout the summer months but no measurable flow. Flow was recorded on three (3) occasions at 0.4, 0.6 and 0.6 m/s at downstream station WQ6. Water temperature ranged from 7.3 to 20.0 °C. Fish were caught at the monitoring station adjacent to County Road 47 (WQ6), in addition to the Northern Pike observed in **Tributary G** (WQ4) that is directly linked to **Tributary H** via culvert. With the presence of fish in the lower reaches and at a connected culvert, along with the presence of water and flow throughout the year, it is concluded that **Tributary H** would be considered direct fish habitat.

Drain maintenance was undertaken in the McNabb Drain/**Tributary H** sometime between the last sampling in 2019 and spring sampling in 2020. During the 2019 monitoring season, the majority of **Tributary H** was very dense with Cattail and muck substrates. Prior to the April 28, 2020, site visit, the ditch had been cleaned out with vegetation removed. Downstream reaches, (south of Hwy 47) the channel takes a more natural form as it moves west to Lake Simcoe.

3.2.7 Pond in Southeast Corner of Study Area

A pond is located in the southeast corner of the study area. This pond was initially visited during the July 25, 2019, site visit, with observations of fish, but no inlet or outlet. Based on the pond being an isolated feature, further monitoring was not conducted.

3.3 Fish Habitat Assessment

3.3.1 *Fish Sampling Results*

Water features that may contain fish habitat include lakes, ponds (other than human-made offline ponds), permanent and intermittent watercourses, headwater drainage features, and wetlands. As discussed in **Section 2.4.3**, potentially suitable locations for fish sampling were selected based on the presence of water. Three (3) sampling points (**Figure 2**) were identified and sampled by RiverStone on September 25, 2019, with results outline in **Table 2** below.

Table 2 Fish collected by RiverStone Environmental on September 25, 2019.

Fish Species		Station Number		
Common name	Scientific name	1(WQ 6)	2 (WQ 4)	3 (WQ 1)
Central Mudminnow	<i>Umbra limi</i>	2	-	2
Creek Chub	<i>Semotilus atromaculatus</i>	7	-	-
Northern Pike	<i>Esox lucius</i>	-	1	-

*Sampling event used backpack electrofishing unit

3.3.2 *Habitat of Aquatic Endangered and Threatened Species*

Based on a review of background information, including biodiversity databases and federal habitat mapping for aquatic species at risk, there is no expectation that drainage features within the study area support habitat for any aquatic species listed as endangered or threatened under the *Endangered Species Act*.

3.3.3 *Fish Habitat Summary*

Fish were caught at three of the sampling stations, including at the furthest downstream point of **Tributary H** (WQ6), at the culvert under Concession Road 2 (WQ4), and within **Tributary A** at the pond feature (WQ1). Based on fish presence we conclude that **Tributary H** represents direct fish habitat. Based on fish captured and habitat connectivity, it is also assumed that **Tributary G** would represent direct fish habitat on a seasonal basis. **Tributary A**, downstream of **Pond 1** is also fish habitat, although fish passage is only seasonal between Pond 1 and the McNabb Drain (**Tributary H**). In addition, RiverStone incidentally observed forage fish (species unknown) within the pond located in the southeast corner of the subject property. **Figure 3** provides a visual summary of areas identified as fish habitat within the study area and permanency of flows.

4 IMPACT ASSESSMENT

Based on the results of the background information collected and field investigations as detailed in this report and in concert with the review of the proposed extraction and phasing plan (**Appendix 4**) and the Rehabilitation Plan that forms part of the ARA Site Plans the following sections provide an assessment of potential impacts to fish and fish habitat.

4.1 Impact Assessment Approach

To carry out an ecological assessment of potential impacts associated with the proposed licence within the subject property, RiverStone has employed the following approach:

1. *Predict* impacts to fish and fish habitat based on the proposed extraction plan, including both direct and indirect impacts over all project life stages (i.e., operation to post-rehabilitation).
2. *Evaluate the significance* of the predicted impacts to fish and fish habitat based on their spatial extent, magnitude, timing, frequency (how often), and duration (how long).
3. *Assess the probability or likelihood* that the predicted impacts will occur at the level of significance expected (e.g., high, medium, low probability).
4. Where the potential for negative impacts exists, regulatory recommendations and ecologically meaningful *mitigation measures* are offered to avoid such impacts first, and where impacts cannot be fully avoided to minimize and/or compensate such impacts as appropriate.

Direct impacts are those in which there is a direct cause-effect relationship between a proposed activity within the quarry extraction area on fish and fish habitat. In the context of the ARA application considered herein, direct impacts largely pertain to the necessary removal of vegetation and drainage features within the extraction area. Indirect impacts may include disturbance effects or alteration of local water balance to onsite and off-site features. The major project phases for which impacts must be assessed include the operational phase and a post-rehabilitation phase. The operational phase has active extraction operations as well as maintenance of dewatered conditions with excess water being pumped out of the quarry in accordance with MECP permit to take water (PTTW) and environmental compliance approval conditions. The flood back phase is the period after cessation of extraction, during which the water table is allowed to return to natural (unmanaged) conditions and final rehabilitation commitments are fulfilled. The post-rehabilitation phase occurs when all rehabilitation activities are complete.

The following assessment evaluates the potential for negative impacts resulting from the activities proposed as part of the ARA application, as well as mitigation measures to address the potential for negative impacts.

4.1 Water Quality and Quantity and Fish Habitat

The potential for negative impacts to fish and fish habitat comes primarily from land use change or construction practices that modify water quantity (baseflow and/or groundwater contributions), quality (chemical and thermal properties), or alters the physical structure within the watercourse or associated buffers. Additionally, blasting, and operational practices (dust, fuel storage, spills etc.) can also impact fish and fish habitat.

Azimuth (2023) completed a comprehensive Hydrogeologic Assessment and determined that the relative contribution of groundwater to the surface water features assessed in the study area was insignificant and thus there would be no impact to the assessed tributaries over the lifespan of the quarry (Azimuth 2023) with respect to groundwater. In developing the design of the quarry, the surface water catchments located within the property and the proposed extraction areas were considered in detail. The potential for surface water quality/quantity impacts was considered through the various phases of the proposed application. This corresponds to Phase 1 and Phase 2 in the accompanying

Azimuth Level 1 and Level 2 Hydrogeological Assessment (2023). In terms of fish and fish habitat the surface water features considered herein are **Tributaries A, G, and H** (McNabb Drain) with **Tributaries G and H** (McNabb Drain) occurring on lands adjacent to the property.

In general, the results of Azimuth (2023) surface water assessment determined that the water balance to **Tributary A** in the reach that provides fish habitat (**Pond 1** and downstream) would be maintained either through installation of a sump and pumping to a Central Discharge Structure that would outlet to Pond 1. **Tributary G** water balance would not be impacted during Phase 1; however, a significant portion of its upstream catchment would be removed during Phase 2, including **Pond 2** and **Tributary B**, ultimately becoming part of the quarry lake. Removal of the catchment area would result in a significant loss of base flow, thus decreasing the availability of fish habitat in **Tributary G**.

Azimuth (2023) provides a detailed description on water management for Tributary A as per below:

Water management will include establishment of a Quarry floor sump and pumping to a Central Discharge Structure (COS) located at or near the property boundary at the south limit of Tributary C. The COS will be a man-made discharge pond that releases water towards the Tributary A-Pond 1 subwatershed by a passive weir. Within the property setback on the west side of Phase 1, a flow channel and wetland will be constructed to offset a wetland area that will be removed during Phase 2. The constructed channel will direct water from the COS along the west side of Phase 1 and then east along the Concession 2 berm to discharge to Pond 1 and Tributary A, reaching the McNabb Drain. During Phase 1, the Quarry footprint only includes areas within the Tributary A catchment. As such, changes to existing conditions are considered to be minimal, as the discharge point from the site will remain from Pond 1 to the McNabb Drain. During Phase 2, water from the Quarry footprint that was originally in the areas of Tributary G, the Tributary C roadside ditch and the Southeast Corner catchments will also be discharged via the COS and to the McNabb Drain.

With respect to **Tributary H** (McNabb Drain), Azimuth predicts that "...total volume released to McNabb Drain increases by 32% and at the end of Phase 2, the volume is increased by 143%. The **Tributary G** sub-watershed upstream of the McNabb Drain has an area of 60.85 ha, of which 25.4 ha is on-site. Runoff from 22.2 ha of this sub-watershed will be re-directed into **Tributary A**, which will decrease runoff to **Tributary G** from the on-site catchment by 87%, with a corresponding increase for **Tributary A**. This does not change the overall runoff to **Tributary H**, but moves the outlet point upstream by approximately 1,000 m.

Water quality and quantity must be maintained to ensure the protection of fish and fish habitat. Baseflow contributions to fish bearing water must be at a minimum maintained on a seasonal basis to ensure the protection of fish and fish habitat. The quality (thermal and water chemistry parameters) should be consistent with the existing condition and able to support aquatic life. The findings in the Hydrogeological Assessment (Azimuth, 2023) indicates that seasonal changes in baseflow in **Tributary H** because of the application, remain within the natural variation that is currently experienced in the feature. All water discharged either directly or indirectly to **Tributary H** will need to maintain the appropriate water quality as per MECP requirement. As a result the discharge water will be appropriate quality to ensure no negative impacts of aquatic life as approved by MECP.

Tributary A

Results of the onsite assessments concluded that the downstream reach of **Tributary A** and **Pond 1** is direct fish habitat, supporting a small population of tolerant warmwater fish species within the online pond. Removal of part of this features catchment area during extraction will impact the direct fish habitat and connectivity with the McNabb Drain, if loss of baseflow is not mitigated. Based on data provided by Azimuth (2023), the catchment area of **Pond 1** is 45.8 ha with 43.7 ha inside the licence boundary. Full extraction will capture 34 ha of this. But all the runoff from this area, plus an additional area of 61 ha from **Tributaries C, G** and the southeast corner will be released to the **Tributary A / Pond 1** sub-watershed so **Pond 1** will receive more water, up to the end of Phase 2. While the quarry fills to become a lake, flow from the site through Pond 1 will be reduced by 87% if all the surplus is retained to fill the quarry. Once the lake has filled, flow from the site through **Pond 1** will be reduced by 13% compared to pre-extraction amounts. To ensure that removal of the portion of the tributary within the extraction area does not result in impacts to fish or fish habitat downstream, RiverStone recommends:

- **Baseflow to Pond 1 and connectivity between the pond and the McNabb Drain Tributary must be maintained.**
- **Blast designs should be in accordance with Fisheries and Oceans Canada (DFO) *Guidelines for the use of explosives in or near Canadian fisheries waters* provided in Appendix 9.**
- **A qualified professional should be retained to prepare a blasting plan that is compliant with DFO regulations.**
- **Removal of the portions of the tributary that are located within the extraction area should be part of a request for review by DFO and DFO requirements shall be complied with.**

Tributary G

Results of the onsite assessments concluded that **Tributary G** provides direct fish habitat during some months of the year. Removal of the upstream reaches (**Tributary B** and **Pond 1**) of this feature as part of the proposed new licence will result in direct impacts to fish or fish habitat on adjacent lands. Removal of portions of the catchment area will result in a decrease in baseflow contributed to **Tributary G** resulting in extended dry periods and potential loss of any seasonal connection to the upstream reaches. The loss of portions of this feature may result in a HADD and requires at minimum a review by DFO. The Site Plan has incorporated rehabilitation efforts related to fish and fish habitat including a new channel and wetlands that will work to mitigate the impact of this loss of natural feature and function.

- **RiverStone recommends a request for project review be submitted to DFO for the removal of Tributary G and DFO requirements shall be complied with.**

Tributary H/McNabb Drain

Results of the onsite assessments concluded that **Tributary H/McNabb Drain** was direct fish habitat. The Site Plan indicates that all discharge from the quarry will be directed through the COS and into **Tributary H** via **Pond 1** and **Tributary A**. The discharge location proposed, at the upstream limit of Tributary H in the study area will, mitigate the potential loss baseflow from **Tributary G**. The Hydrogeological Assessment (Azimuth 2023) indicates additional baseflow contribution will be

released to the McNabb Drain during the operational life of the quarry. The estimated increase of about 20% was considered minimal in light of the large surface flow contributions from upstream of the property and would be within the Tributary's natural variation. After Phase 1, flow in McNabb Drain will increase by 4%. After Phase 2, flow in McNabb Drain will increase by 20%. During lake filling, flow in McNabb Drain will decrease by 11%. Once the Quarry Lake is full, flow in McNabb Drain will be 4% higher. There is no anticipated impacts to fish and fish habitat in the **Tributary H** provided the recommendations for the other tributaries are implemented.

It is noted that **Tributary H** is a Municipal Drain Class F, according to the DFO classification system (OMAFRA 2020).

5 PLANNING & REGULATORY CONSIDERATIONS

There are several planning policies and environmental regulations that apply to this license application under the ARA, including those in municipal official plans (i.e., Ramara, Simcoe County), provincial plans (e.g., Lake Simcoe Protection Plan), and regulations under the provincial ESA, ARA, and federal Fisheries Act. A detailed discussion of policy conformity and regulatory compliance is contained in the main body of the NER report prepared by Azimuth (2023). The information and conclusions contained within this assessment are intended to inform the fish habitat portion of the NER. As this assessment is focused on characterizing and identifying potential impacts to fish habitat, the compliance and conformity discussion herein is limited to reviewing key provisions of the Federal *Fisheries Act* based on the areas of identified fish habitat within the study area.

The following section summarize the federal environmental policies that apply to the proposed development plan and describe how the recommendations provided in this report will ensure the works as proposed conform with these policies (where applicable).

5.1 Federal Fisheries Act, R.S.C. 1985, amended 2019-08-28

The *Federal Fisheries Act* states that:

34.4 (1) No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish.

35. (1) No person shall carry on any work, undertaking or activity that results in harmful alteration, disruption or destruction of fish habitat

DFO further states that “under subsection 35(1) a person may carry on such works, undertakings or activities without contravening this prohibition, provided that they are carried on under the authority of one of the exceptions listed in subsection 35(2), and in accordance with the requirements of the appropriate exception. In most cases, this exception would be Ministerial authorizations granted to proponents in accordance with the *Authorizations Concerning Fish and Fish Habitat Protection Regulations*.”

Consistent with the assessment carried out per preceding sections fish habitat (as defined within the *Fisheries Act*) are present within the site or study area. **Tributaries A, G, and H** all contain direct fish habitat. Large portions of the upstream catchment (**Tributary B** and **Pond 2**) of **Tributary G** will be removed over the life of the quarry. As such, it is the opinion of RiverStone that activities proposed on the site may result in a HADD as described under the *Fisheries Act*, and that an Authorization under

the Section 35(2) may be required. A request for project review should be submitted to DFO to determine if an offsetting plan is required.

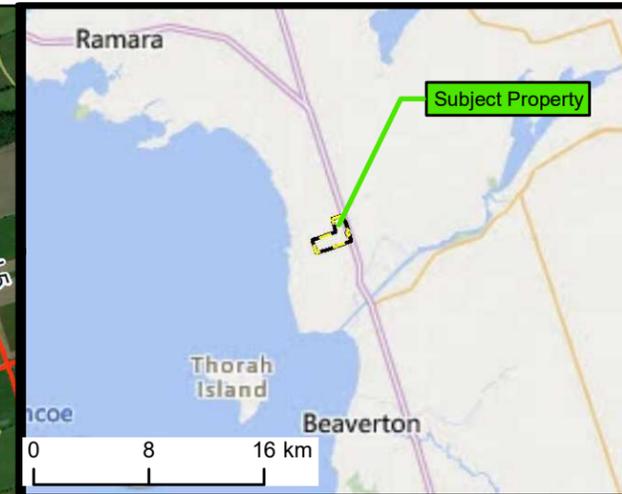
6 **CONCLUSIONS**

The preceding report provides the results of RiverStone's FHA including details regarding the historic and current existing ecological conditions of the subject property and adjacent lands.

In summary, through the completion of the Fish Habitat Assessment, **Tributaries A, G, and H** were determined to have some permanency or continuous flow, supporting the presence of fish and fish habitat. All ponds on the property contain fish; however only **Pond 1** and **Pond 2** are fish habitat under the DFO definition. **Pond 3** is not considered fish habitat as it is isolated and offline. Mitigation measures, and agency consultation will be required for all identified fish habitat features. Subject to the implementation of RiverStone's recommendations, the proposed Brechin Quarry will not result in negative impacts to adjacent fish habitat and the removal of any on-site fish habitat will be completed in compliance with federal requirements. The management of these features should be considered further in the NER report and in conjunction with other policy and legislation as applicable.



Lake Simcoe



Legend

- Ontario Base Mapping (OBM)**
- Roads
- 5 m Contours
- Planning Boundaries**
- ▭ Subject Property



Orthorectified aerial photo - spring 2022

Scale	RS Project No.	Date Last Updated	By
1:24,000	2019-046	Dec 14, 2023	JG



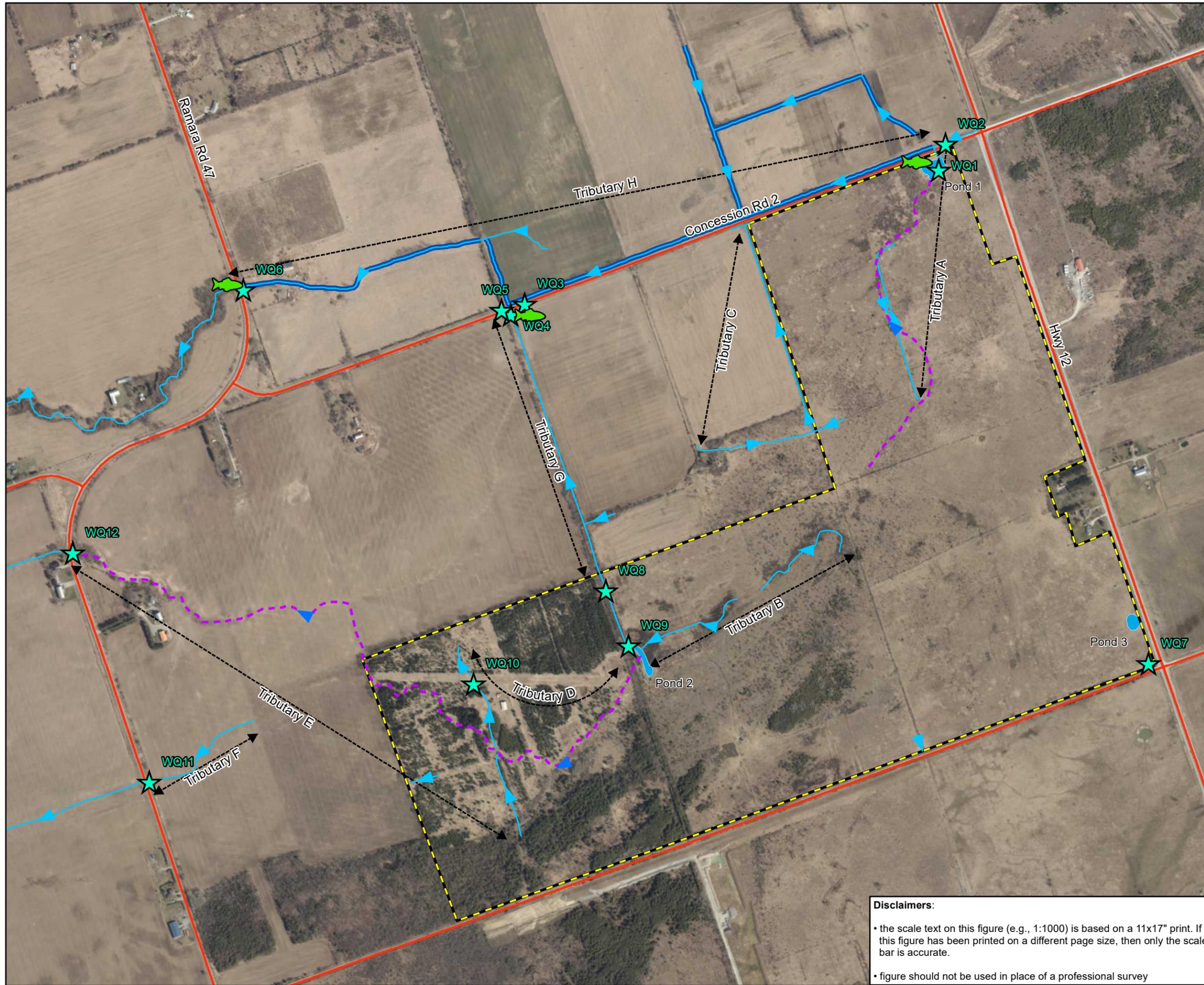
Figure 1. Location Of Subject Property
Part Lots 11, 12 and 13, Concession A, Township of Ramara, County of Simcoe.

Prepared for: LCP Quarry Limited

Inset: General Location of Subject Property

Disclaimers:

- the scale text on this figure (e.g., 1:1000) is based on a 11x17" print. If this figure has been printed on a different page size, then only the scale bar is accurate.
- figure should not be used in place of a professional survey



Legend

- Ontario Base Mapping (OBM)**
- Roads
- Planning Boundaries**
- ▭ Subject Property
- Features with Natural Heritage Value - Identified by the Relevant Approval Authorities**
- LIO Identified**
- McNabb Drain (Constructed Drain)
- Biophysical Features+Functions-RiverStone**
- ▶ Watercourse (Delineated by Azimuth)
- ▶ Watercourse (Delineated by OBM)
- Features with Natural Heritage Value - Identified by RiverStone**
- Pond
- Survey Stations**
- ★ Water Quality
- Electrofishing**
- 🐟 Fish Observed

Orthorectified aerial photo - spring 2022

Scale	RS Project No.	Date Last Updated	By
1:9,000	2019-046	Dec 14, 2023	JG

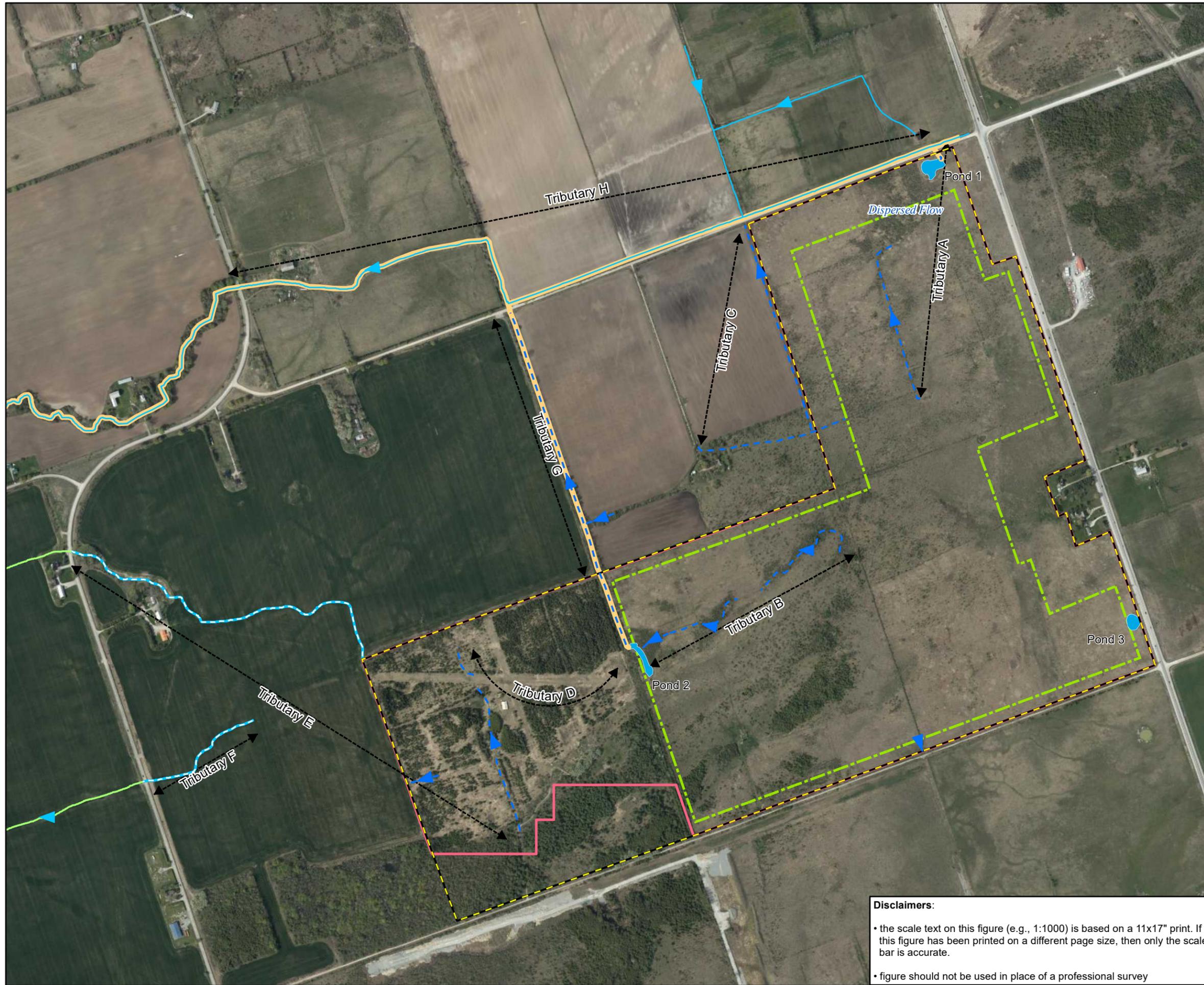
0 130 260 Metres

Figure 2. Existing Conditions
 Part Lots 11, 12 and 13, Concession A, Township of Ramara, County of Simcoe.

Prepared for: LCP Quarry Limited

Disclaimers:

- the scale text on this figure (e.g., 1:1000) is based on a 11x17" print. If this figure has been printed on a different page size, then only the scale bar is accurate.
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Legend

Ontario Base Mapping (OBM)

— Roads

Planning Boundaries

▭ Subject Property

— MHBC - LICENCE BOUNDARY

— MHBC - LIMIT OF EXTRACTION

Biophysical Features and Functions

Watercourse Type

▶ Permanent Watercourse (McNabb Drain)

▶ Intermittent Watercourse

— Tile Drain

▶ Watercourse Not Evaluated By RiverStone

Features with Natural Heritage Value - Identified by RiverStone

■ Pond

■ Fish Bearing Watercourse

Orthorectified aerial photo - spring 2022

Scale	RS Project No.	Date Last Updated	By
1:9,000	2019-046	Dec 14, 2023	JG



Figure 3. Identified Fish Habitat
Part Lots 11, 12 and 13, Concession A, Township of Ramara, County of Simcoe.

Prepared for: LCP Quarry Limited

Disclaimers:

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- figure should not be used in place of a professional survey

Appendix 1. CV's





RIVERSTONE

ENVIRONMENTAL SOLUTIONS INC.

Beverley J. Wicks, Ph.D.
Senior Ecologist, Principal

CAREER AND ACADEMIC HISTORY

2008 – Present	Senior Ecologist, Principal; RiverStone Environmental Solutions Inc.
2002 – 2008	Aquatic Biologist; Michalski Nielsen Associates Limited
2001	Research Assistant; Simon Fraser University, Burnaby, BC
1998 – 2001	Ph.D., University of British Columbia, Aquatic/Fisheries Toxicology
1998 – 2001	Research Assistant; University of British Columbia, Vancouver, BC
1997	Fisheries Biologist; Department of Environment, Lands and Parks, Vancouver, BC
1994 – 1996	M.Sc., University of Guelph, Guelph, ON
1993	Fisheries Technician; Trout Unlimited/Ontario Ministry of Natural Resources
1990 – 1992	Fisheries Technician; Ontario Ministry of Natural Resources, Muskoka Lakes Fisheries Assessment Unit
1989 – 1994	Honours B.Sc. (Agr.) University of Guelph, Guelph, ON

Professional Experience

Bev is a senior ecologist and project manager specializing in the characterization and management of fish and aquatic habitat. With 20 years of experience, she has managed many projects involving both terrestrial and aquatic systems including: completing species at risk assessment, fish habitat surveys and mapping, habitat rehabilitation and impact assessment for development and infrastructure, and water quality impact assessment. Bev manages and reviews both terrestrial and aquatic aspects of natural heritage planning exercises with results intended for incorporation into municipal and provincial policy.

The following is a partial list of consulting-based project experience for 2008–2023.

Ecological Site Assessments & Environmental Impact Studies/Statements

- Existing Ecological Conditions Assessment in the **Region of Peel**; *for the Regional Municipality of Peel*; **Key Tasks**: As part of a Municipal Class EA, project management, fish habitat assessment, impact analysis, assessment of policy compliance, and development of mitigation plan, and reporting in support of the rehabilitation of multiple bridge and culverts along Highway 50.
- Existing Ecological Conditions Assessment for three structures in the **Town of Caledon**; *for the Town of Caledon*; **Key Tasks**: As part of three separate Municipal Class EAs, project management, fish habitat assessment, impact analysis, assessment of policy compliance, and development of mitigation plan, and reporting in support of the rehabilitation of multiple structures along municipal roadways.
- Natural Environment Addendum in the **Town of Caledon/City of Brampton**; *for the Regional Municipality of Peel*; **Key Tasks**: project management, fish habitat assessment, impact analysis, assessment of policy compliance, and development of mitigation plan, and reporting in support of the expansion of Mayfield Road.

- Natural Environment Level 1 and Level 2 Technical Report in the **City of the Kawartha Lakes**; *for private client*; **Key Tasks:** project management, fish habitat assessment, impact analysis, assessment of policy compliance, and development of mitigation plan to facilitate licensing of quarry under *Aggregate Resources Act* and obtaining a permit under *Endangered Species Act, 2007*
- Natural Environment Level 1 and Level 2 Technical Report in the **Township of Lake of Bays**; *for private client*; **Key Tasks:** project management, fish habitat assessment, impact analysis, assessment of policy compliance, development of mitigation plan to facilitate licensing of quarry under *Aggregate Resources Act* and avoidance of habitat protected under *Endangered Species Act, 2007*
- Natural Environment Level 1 and Level 2 Technical Report in the **Town of Bracebridge**; *for private client*; **Key Tasks:** project management, fish habitat and SAR assessment, impact analysis, assessment of policy compliance, development of mitigation plan to facilitate licensing of quarry under *Aggregate Resources Act, Fisheries Act review*, and avoidance of habitat protected under *Endangered Species Act, 2007*
- Natural Environment Level 1 and Level 2 Technical Report in the **Township of Ramara**; *for private client*; **Key Tasks:** project management, fish habitat and species at risk assessment, impact analysis, assessment of policy compliance, development of mitigation plan to facilitate licensing of quarry under *Aggregate Resources Act* and avoidance of habitat protected under *Endangered Species Act, 2007*
- Fisheries and Species at Risk for Natural Environment Level 1 and Level 2 Technical Report in the **Township of Faraday**; *for private client*; **Key Tasks:** project management, fish habitat assessment, impact analysis, assessment of policy compliance, development of mitigation plan to facilitate licensing of quarry under *Aggregate Resources Act, Fisheries Act review*, overall benefit permitting work and avoidance of habitat protected under *Endangered Species Act, 2007*
- Fish Habitat Impact Assessment and Water Quality Monitoring in the **Township of Muskoka Lakes**; *for private client*; **Key Tasks:** fish and aquatic habitat and impact assessment, development of water quality monitoring program to establish baseline conditions, and reporting as part of a Level ½ Natural Environment Report in support of a proposed quarry.
- Species at Risk and Fisheries Assessment in the **Township of Guelph/Eramosa**; *for River Valley Developments Inc.*; **Key Tasks:** project management, fisheries assessment, obtaining of permitting and approvals for the renewal of active extraction at an existing licensed quarry.
- Natural Environment Addendum in the **Town of Caledon/City of Brampton**; *for the Regional Municipality of Peel*; **Key Tasks:** project management, agency liaison, fish and aquatic habitat surveys, identification and assessment of significant natural heritage features, mitigation opportunities, reporting, permitting and approvals for the widening and reconstruction of ~7 Km of Mayfield Road (Phases 1 and 2).
- Environmental Impact Statement Addendum in the **Township of Southgate**; *Flato Developments Inc.*; **Key Tasks:** ELC, species at risk habitat assessment, wetland delineation, fisheries and aquatic habitat assessment, botanical inventory in support of a two phase plan of subdivision.
- Environmental Impact Assessment in the **Town of Uxbridge-Durham Region**; *for private client*; **Key Tasks:** project management, impact assessment, environmental conditions report, and analysis of impacts and mitigation measures, tree preservation and edge management plan, and TRCA permits for a 35-lot estate subdivision development.
- Environmental Impact Assessment in the **Town of Mt Albert-York Region**; *for private client*; **Key Tasks:** project management, existing site conditions, opportunities and constraint analysis, report completion, analysis of impacts and mitigation measures and permitting for a 602-lot estate subdivision development.
- Natural Heritage Evaluation in **King Township-York Region**; *for private client*; **Key Tasks:** project management, policy review, mapping of ecological constraints and report preparation for development of an equestrian centre.

- Environmental Impact Study for island property in the **Township of The Georgian Bay**; *for private client*; **Key Tasks:** project management, identification of fish habitat and significant natural heritage features, assessment of policy compliance, analysis of impacts potentially resulting from proposed multiple lot severance.
- Ecological Site and Impact Assessment on Kyle Island in the **Township of The Archipelago**; *for private client*; **Key Tasks:** project management, identification of fish habitat and significant natural heritage features, assessment of policy compliance, analysis of impacts potentially resulting from proposed single-lot severance.
- Site Evaluation Report for property on Drag Lake in the **Township of Dysart et al**; *for private client*; **Key Tasks:** project management, identification of SAR and fish habitat and significant natural heritage features, assessment of policy compliance, analysis of impacts potentially resulting from proposed multi-lot severance.
- Site Evaluation Report for property on Taylor Island in the **Town of Gravenhurst**; *for private client*; **Key Tasks:** project management, identification of fish habitat and significant natural heritage features, assessment of policy compliance, analysis of impacts potentially resulting from proposed rezoning.
- Environmental Screening and Site Plan in the **Township of Seguin**; *for private client*; **Key Tasks:** project management, identification of significant natural heritage features, assessment of policy compliance, analysis of impacts potentially resulting from proposed land use as a result of re-zoning.
- Site Evaluation Report for property on Kawagama Lake in the **Township of Havelock**; *for private client*; **Key Tasks:** project management, identification of fish habitat and significant natural heritage features, aquatic impact assessment, assessment of policy compliance, analysis of impacts potentially resulting from proposed single-lot severance.
- Significant Natural Heritage Feature Assessment for the **Town of Bracebridge** Official Plan Review; *for Town of Bracebridge*; **Key Tasks:** project management, review existing significant natural heritage feature information in urban and near urban area for Town of Bracebridge.

Environmental Policy and Assessment

- Significant Natural Heritage Feature Assessment for the **Town of Bracebridge** Official Plan Review; *for Town of Bracebridge*; **Key Tasks:** project management, review existing significant natural heritage feature information in urban and near urban area for Town of Bracebridge.
- Large Natural Area Review and Policy Recommendations for the **District Municipality of Muskoka**; **Key Tasks:** scientific literature review, identification of data gaps and present recommendations to establish defensible planning benchmarks for the District of Muskoka.
- Background Research and Literature Review for the **Ontario Ministry of Natural Resources**; Impacts of cottage and shoreline development and associated activities on ecosystem features and functions for the purpose of policy development in Provincial Parks; scientific literature review, identification of data gaps and summary of potential and documented impact.
- Class Environmental Assessment Screening Report on the Severn River in the **Township of Severn** ; *for private client*; **Key Tasks:** project management, fish habitat assessment, impact analysis of application to dredge, and assessment of compliance with federal policy to facilitate dredging of marina.

Aquatic Habitat and Fisheries Assessments

- Fish Habitat Impact Assessment and Creek Channel Design Lakeshore Drive and Centennial Park Improvements in the **City of Barrie**; *for IBI Group*; **Key Tasks:** project management, permitting and agency liaison, contract tendering, construction monitoring, stream assessment, identification of fish habitat, data

management, and analysis of impacts and mitigation measures for road reconstruction and park improvements project.

- Fish Habitat and Species at Risk Level 1 Assessment on Cole Lake in the **Township of Carling**; *for private client*; **Key Tasks**: project management, identification of fish habitat and significant natural heritage features, assessment of policy compliance, analysis of impacts potentially resulting from proposed single-lot severance.
- Fish Habitat Assessment on Georgian Bay, in the **Township of Georgian Bay**; *for private client*; **Key Tasks**: project management, fish habitat assessment, assessment of policy compliance.
- Environmental Evaluation Report in the **Town of East Gwillimbury**; *for private client*; **Key Tasks**: identification of fish habitat and significant natural heritage features, assessment of policy compliance, and analysis of impacts potentially resulting from subdivision development.

Fisheries Mitigation and Compensation/ DFO/MNR/CA Permit Applications

- Barrie Essa Road Reconstruction; for **City of Barrie**; **Key Tasks**: project management, fish habitat assessment, natural channel design and permitting, and construction mitigation measures development and monitoring protocol
- Fisheries Assessment for Highway 101 **Foleyete** for **Ministry of Transportation**; **Key Tasks**: project management, stream and fish habitat assessment, analysis of impacts and mitigation measures, agency approvals, construction monitoring.
- Muskoka Wharf Shoreline Assessment/Compensation Project at the Muskoka Wharf on Lake Muskoka in the **Town of Gravenhurst**; *for The Town of Gravenhurst*; **Key Tasks**: project management, fish habitat assessment, design of rehabilitated shoreline, and construction mitigation measures development and monitoring protocol.
- Fish Habitat Compensation, on the Mill Pond in the **Town of Parry Sound**; *for Crofter's Food Ltd*; **Key Tasks**: project management, fish habitat assessment, obtain permits and develop compensation plan.
- Kearney – Un-named Creek Rehabilitation, in the **Township of Perry**; *for private client*; **Key tasks**: project management, fish habitat assessment, obtain permits and develop restoration and compensation plan.
- Culvert Replacement, Mitigation and Compensation, in the **Town Parry Sound**; *for private client*; **Key Tasks**; project management, fish habitat assessment, obtain permits and develop restoration and compensation plan.
- Fisheries permitting and compensation for new Coaster in the **City of Vaughn**; *for Canada's Wonderland*; **Key Tasks**: project management, fish habitat assessment, permitting, compensation plan, construction mitigation measures and monitoring protocol.
- County Road 28 Reconstruction near Minesing Swamp in the **County of Simcoe**; *for R.J. Burnside and Associates*; **Key Tasks**: project management, fish habitat assessment, permitting, compensation plan, construction mitigation and monitoring.

Limnology, Water Quality/Sediment Quality Investigations

- Muskoka Lakes Association Water Quality Initiative Program in various townships of the **District of Muskoka**; *for the Muskoka Lakes Association* **Key Tasks**: project management, science and technical advisor, directed analysis of yearly water quality program and making scientific recommendations, and educational support.

- Aquatic Study in Lake Couchiching in the **County of Simcoe**; *for Totten Sims Hubicki Associates*; **Key Tasks**: project management, aquatic monitoring and benthic invertebrates assessment, impact analysis for Westshore Water and Sewage project.
- Bond Head – Environmental Monitoring, Holland River in the **Township of East Gwillimbury**; *for Geranium Homes*; **Key Tasks**: project management, collection and analysis of water quality data, background conditions report.
- Muskoka River Benthic and Water Quality Analysis in the **District of Muskoka**; *for the Town of Hunstville*; **Key Tasks**: project management, water monitoring and benthic invertebrates assessment, impact analysis.
- Phase 1 and Phase 2 Water Quality Impact Assessment on Lake Joseph in the **Township of Muskoka Lakes**; *for private client*; **Key Tasks**: project management, identification of significant natural heritage features, locate suitable development envelopes, and analysis of impacts and mitigation measures for single lot severance and development on identified over-threshold waterbody.
- Phase 2 Water Quality Impact Assessment on Medora Lake in the **Township of Muskoka Lakes**; *for private client*; **Key Tasks**: project management, identification of significant natural heritage features, locate suitable development envelopes, and analysis of impacts and mitigation measures for single lot severance and development on identified over-threshold waterbody.
- Phase 2 Water Quality Impact Assessment on Three Mile Lake in the **Township of Muskoka Lakes**; *for private client*; **Key Tasks**: project management, identification of significant natural heritage features, locate suitable development envelopes, and analysis of impacts and mitigation measures for single lot severance and development on identified over-threshold waterbody.

Relevant Certification or Training Courses

2021	CISEC Training and Certification
2020	Fisheries Protection Program Fisheries Act Training, Fisheries and Oceans Canada Central and Arctic Region.
2018	Natural Channel Systems Training
2013	Fisheries Assessment and Fisheries Contract Specialist, as per Ministry of Transportation / Department of Fisheries and Oceans / Ontario Ministry of Natural Resources, fisheries protocol training
2012	Water Management and Wetland Restoration MNR
2009	Ontario Benthos Biomonitoring Network participant, Ontario Ministry of the Environment
2003	Ichthyology course, Royal Ontario Museum Centre of Biodiversity and Conservation Biology

Publications

Wicks, B.J. and D.J. Randall. 2002. The effect of sub lethal ammonia exposure on fed and unfed rainbow trout: the role of glutamine in the regulation of ammonia. *Comparative Biochemistry and Physiology. Part A: Molecular and Integrative Physiology.* 132: 275-285.

Wicks, B.J. and D.J. Randall. 2002. The effect of feeding and fasting on ammonia toxicity in juvenile rainbow trout, *Oncorhynchus mykiss*. *Aquatic Toxicology.* 59:71-82.

- Wicks, B.J.**, Q. Tang, R. Joensen, D.J. Randall. 2002. Swimming and ammonia toxicity in salmonids: the effect of sub lethal ammonia exposure on the swimming performance of coho salmon and the acute toxicity of ammonia in swimming and resting rainbow trout. *Aquatic Toxicology*. 59:55-69.
- Rosenfeld, J.S., M. Porter, M. Pearson, **B. Wicks**, P. Van Dishoeck, T. Patton, E. Parkinson, G. Hass, and J. D. McPhail. 2001. The influence of temperature and habitat on the distribution of chiselmouth, *Acrocheilus alutaceus* in British Columbia. *Env. Biol. Fish.* 62: 401-413.
- Val, A.L., **B.J. Wicks** and D.J. Randall. 2001. Anaemia and polycythaemia affect levels of ATP and GTP in fish red blood cells. Proceeding of the Sixth International Symposium on Fish Physiology, Toxicology, and Water Quality. Baja, Mexico.
- Randall, D.J. and **B.J. Wicks**. 1999. Fish ammonia production, excretion and toxicity. Paper presented in the Fifth International Symposium on Fish Physiology, Toxicology and Water Quality, 9-12 November 1998, City University of Hong Kong.
- Wicks, B.J.**, L.A. Barker, B.J. Morrison and F.W.H. Beamish. 1998. Gonadal variation in Great Lakes sea lamprey larvae. *J. Great Lakes Res.* 24: 962-968.
- Barker, L.A. B.J. Morrison, **B.J. Wicks** and F.W.H. Beamish. 1998. Potential fecundity of landlocked sea lamprey larvae, *Petromyzon marinus*, with typical and atypical gonads. *Copeia*. 1998: 1070-1075.
- Barker, L.A., B.J. Morrison, **B.J. Wicks** and F.W.H. Beamish. 1997. Age discrimination and statolith diversity in sea lamprey from streams with varying alkalinity. *Trans. Am. Fish. Soc.* 126:1021-1026.

Appendix 2. Select Photos from the Site Investigation



Photo 1. Tributary A, drainage ditch along edge of pasture (September 25, 2019)



Photo 2. Pond 1 feature along Tributary A adjacent to Concession Road 2 (September 25, 2019).



Photo 3. Shrub thicket community at the origin of Tributary B (July 25, 2019).



Photo 4. Defined portion of Tributary B, no water present, overgrown with vegetation (September 25, 2019).



Photo 5. Tributary C, ditch between pasture and airfield, no water present, overgrown with vegetation (July 25, 2019).



Photo 4. Pond 2 at termination of Tributary C and Tributary B, on outlet observed (September 25, 2019).



Photo 7. Location of OBM mapped watercourse in upland cultural meadow location. No channel observed (September 25, 2019).



Photo 8. Channelized portion of Tributary D upstream of pond adjacent airstrip (September 25, 2019).



Photo 9. Pond located at the termination of Tributary D. Feature was dry by end of September (September 25, 2019).



Photo 10. Outlet of tile drain for Tributary E at County Road 47 (September 25, 2019).



Photo 11. Watercourse within ROW at outlet of tile drain for Tributary F at County Road 47 (September 25, 2019).



Photo 12. Outlet of tile drain for Tributary F at County Road 47 (July 25, 2019).



Photo 13. Conditions within the ROW at Concession Road 2 at Tributary G (September 25, 2019).



Photo 14. Upstream conditions of Tributary H from the ROW at County Road 47 (September 25, 2019).



Photo 15. Tributary H conditions along Concession Road 2 (July 25, 2019).



Photo 16. Tributary H conditions along Concession Road 2 at Highway 12 intersection (July 25, 2019).

Appendix 3. Tributary Monitoring Summary

Water Quality/Tributary Assessment Stations

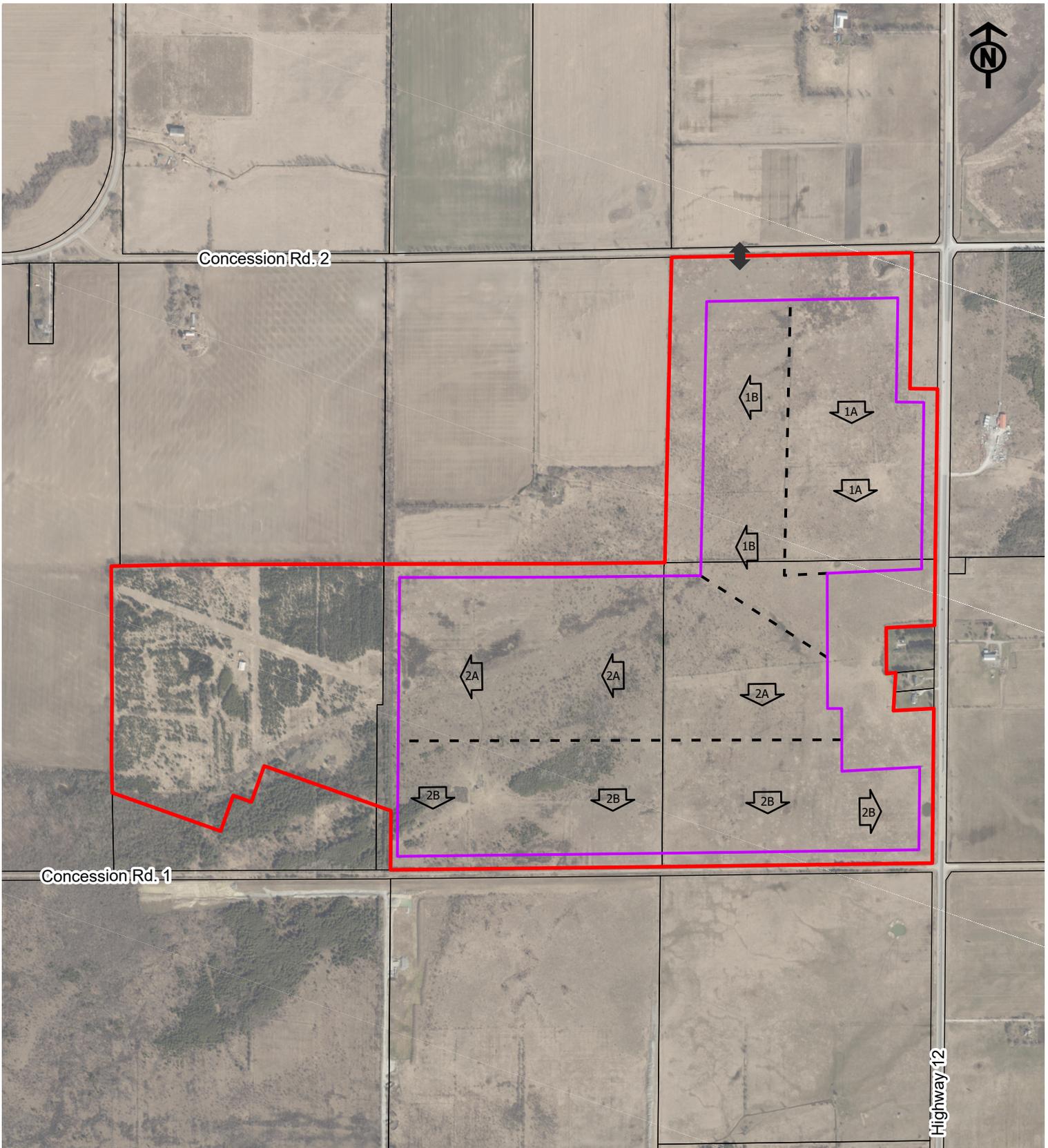
Station WQ	Sampling Date	Bankful	Wet Width (m)	Max Water Depth (m)	Velocity (m/s)	Bank Stability Right	Bank Stability Left	Culvert Dimension (m)	Water Temperature (°C)	DO (%Sat.)	DO (mg/l)	Conductivity	pH	Aquatic Vegetation	Riparian Vegetation	Comments
1 (Pond)	2019-07-25	N/A	N/A	0.26	Standing water	Cattle Rutting	Cattle Rutting	N/A	28.0	N/A	N/A	N/A	N/A	Narrowleaf Cattail, Hardstem Bulrush, Canada Bluejoint	Cultural Meadow species	Heavy use by cattle
	2019-08-22	N/A	10.00	0.18	Standing water	Cattle Rutting	Cattle Rutting	N/A		N/A	N/A	N/A	N/A	No additions	No additions	Heavy use by cattle
	2019-09-25	N/A	8.00	0.30	Standing water	Cattle Rutting	Cattle Rutting	N/A	18.8	99.9	9.21	1078	8.06	No additions	No additions	Heavy use by cattle
	2019-10-23	N/A	10	0.35	Standing water	Cattle Rutting	Cattle Rutting	N/A	10.4	61.0	6.78	1192	8.14	No additions	No additions	Heavy use by cattle
	2020-04-28	N/A	10	0.30	Standing Water	Cattle Rutting	Cattle Rutting	N/A	9.7	83.4	9.42	816	8.17	No additions	No additions	
2	2019-07-25	2.34	1.36	0.06	Standing water	Good	Good	N/A	Not enough for an accurate reading	Narrowleaf Cattail	Thicket Creeper, Reed Canary Grass, Wild carrot,					
	2019-08-22	2.34	1.25	0.03	Standing water	Good	Good	N/A	18.8	25.7	2.38	3045	7.69	No additions	No additions	
	2019-09-25	2.34	1.60	0.05	Standing water	Good	Good	N/A	16.4	28.7	2.47	16.870	7.68	No additions	No additions	
	2019-10-23	2.34	1.64	0.21	Standing water	Good	Good	N/A	9.1	46.5	5.22	1020	7.93	No additions	No additions	
	2020-04-28	2.34	1.80	0.27	Standing water	Recent cleaning	Moderate	N/A	8.2	71.6	8.39	584	8.20	No additions	No additions	
3	2019-07-25	2.20	0.87	0.07	Standing water	Good	Good	N/A	20.0	N/A	22.00	N/A	N/A	Reed Canary, Narrowleaf Cattail	Reed Canary, American Elm, Green Ash, Canada Bluejoint	
	2019-08	2.20	0.92	0.10	Standing water	Good	Good	N/A	19.4	21.8	1.99	663	7.66	No additions	No additions	
	2019-09	2.20	1.32	0.14	Standing water	Good	Good	N/A	15.9	10.4	1.02	1854	7.59	No additions	No additions	
	2019-10-23	2.20	1.76	0.26	Standing water	Good	Good	N/A	9.5	35.4	4.03	1409	7.73	No additions	No additions	
	2020-04-28	2.20	1.60	0.12	0.2	Recent cleaning	Moderate	N/A	7.7	95.1	11.33	622	8.18	No additions	No additions	
4	2019-07-25	1.50	1.00	0.13	Standing water	Good	Good	0.75	Not enough for an accurate reading	N/A	N/A	N/A	N/A	None	Red-osier Dogwood, Riverbank Grape, Reed Canary Grass, Canada Bluejoint	
	2019-08-22	1.5	1.02	0.13	Standing water	Good	Good	0.75	19.2	77.4	7.07	593	7.70	No additions	No additions	
	2019-09-25	1.5	1.25	0.18	Standing water	Good	Good	0.75	16.4	71.5	7.03	582	7.75	No additions	No additions	
	2019-10-23	1.5	1.42	0.29	Standing water	Good	Good	0.75	11.8	57.9	6.24	537	7.99	No additions	No additions	
	2020-04-28	1.5	0.85	0.09	0.1	Good	Good	0.75	6.0	82.0	10.12	357	8.38	No additions	No additions	
5	2019-07-25	0.75	Dry	Dry	Dry	Good	Good	N/A	N/A	N/A	N/A	N/A	N/A	None	Pison Ivy, Service Berry species, Green Ash, White Pine, Timthy, Canada Bluejoint, Aster species	
	2019-08-22	0.75	Dry	Dry	Dry	Good	Good	N/A	Dry no reading	No additions	No additions					
	2019-09-25	0.75	Dry	Dry	Dry	Good	Good	N/A	Dry no reading	No additions	No additions					
	2019-10-23	0.75	Dry	Dry	Dry	Good	Good	N/A	Dry no reading	No additions	No additions					
	2020-04-28	0.75	Dry	Dry	Dry	Good	Good	N/A	Dry no reading	No additions	No additions					
6	2019-07-25	3.03	1.47 moist ground	Dry	Dry	Good	Good	2.00	N/A	N/A	N/A	N/A	N/A	None	Reed Canary Grass, Green Ash, Gray Dogwood, Manitoba Maple	
	2019-08-22	3.03	Dry	Dry	Dry	Good	Good	2.00	19.7	43.3	3.93	678	7.85	No additions	No additions	
	2019-09-25	3.03	2.50	0.05	0.6	Good	Good	2.00	15.4	56.7	5.62	530	7.93	No additions	No additions	
	2019-10-23	3.03	2.70	0.08	0.6	Good	Good	2.00	9.8	55.8	6.31	787	7.92	No additions	No additions	

Water Quality/Tributary Assessment Stations

Station WQ	Sampling Date	Bankful	Wet Width (m)	Max Water Depth (m)	Velocity (m/s)	Bank Stability Right	Bank Stability Left	Culvert Dimension (m)	Water Temperature (°C)	DO (%Sat.)	DO (mg/l)	Conductivity	pH	Aquatic Vegetation	Riparian Vegetation	Comments
	2020-04-28	3.03	2.60	0.07	0.4	Moderate - Recent vegetation removal	Moderate - Recent vegetation removal	2.00	7.3	93.4	11.30	560	8.01	No additions	No additions	
7	2019-07-25	2.9	Dry	Dry	Dry	Good	Good	0.75	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Narrowleaf Cattail, Awl-fruited Sedge, woolgrass Bulrush	Reed Canary Grass, Willow species, Aster species, Chicory, Birdsfoot Trefoil,	
	2019-08-22	2.9	Dry	Dry	Dry	Good	Good	0.75	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	
	2019-09-25	2.9	Dry	Dry	Dry	Good	Good	0.75	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	
	2019-10-23	2.9	Dry	Dry	Dry	Good	Good	0.75	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	Standing water in culvert
	2020-04-28	2.9	1.95 - Moist	Dry	Dry	Good	Good	1.75	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions
8	2019-07-25	1.6	1.20 moist ground	Dry	Dry	Good	Good	N/A	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	None	Red-osier Dogwood, Thicket Creeper, American Elm, Cow vetch, Poison Ivy, Reed Canary Grass, Climbing Nighshade, Raspberry	
	2019-08-22	1.6	Dry	Dry	Dry	Good	Good	N/A	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	None	No additions	
	2019-09-25	1.6	Dry	Dry	Dry	Good	Good	N/A	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	None	No additions	
	2019-10-23	1.6	Dry	Dry	Dry	Good	Good	N/A	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	
	2020-04-28	1.6	0.70	0.06	N/A	Good	Good	N/A	7.5	54.1	6.43	304	8.32	No additions	No additions	
9 (Pond)	2019-07-25	N/A	9.00	0.25	N/A	Good	Good	N/A	23.0	N/A	N/A	N/A	N/A	Reed Canary Grass, Canada Bluejoint, Managrass species	Slender Willow	Heavy use by cattle
	2019-08	N/A	5.00	0.12	N/A	Good	Good	N/A	25.2	52.6	4.33	451	7.65	No additions	No additions	
	2019-09-25	N/A	4.00	0.1-0.15	N/A	Good	Good	N/A	18.7	80.6	7.50	407	7.77	No additions	No additions	
	2019-10-23	N/A	5.00	0.20	N/A	Good	Good	N/A	11.3	68.8	7.63	298	7.71	No additions	No additions	
	2020-04-28	N/A	8.00	0.12	N/A	Good	Good	N/A	9.7	52.0	5.84	317	8.59	No additions	No additions	
10 (Pond)	2019-07-25	N/A	5.00	0.62	N/A	Good	Good	0.35	16.0	Not enough water for accurate reading	Narrow Cattail, Canada Bluejoint, Reed Canary Grass	Reed Canary Grass, Milkweed,				
	2019-08-22	N/A	0.50	0.30	N/A	Good	Good	0.35	17.0	14.0	1.29	697	7.05	No additions	No additions	
	2019-09-25	N/A	Dry	Dry	N/A	Good	Good	0.35	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	
	2019-10-23	N/A	2.50	0.45	N/A	Good	Good	0.35	9.0	8.4	1.00	575	7.34	No additions	No additions	
	2020-04-28	N/A	5.00	0.70	N/A	Good	Good	0.35	6.0	29.0	3.42	382	8.12			
11	2019-07-25	1.3	Dry	Dry	N/A	Good	Good	0.65	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	None	Reed Canary Grass, Green Ash, Tembling Aspen, Speckled Alder, dock species,	No water coming out of drain
	2019-08-22	1.3	Dry	Dry	N/A	Good	Good	0.65	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	
	2019-09-25	1.3	Dry	Dry	N/A	Good	Good	0.65	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	
	2019-10-23	1.3	Dry	Dry	N/A	Good	Good	0.65	11.1	26.5	2.91	485	7.77	No additions	No additions	no water at station, info taken just below. NO water out of drain
	2020-04-28	1.3	0.57	0.04	0.4	Moderate - Recent vegetation removal	Moderate - Recent vegetation removal	0.65	5.4	79.9	9.90	365	8.42	No additions	No additions	
12	2019-07-25	1.3	Dry	Dry	N/A	Good	Good	1.13	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	None	Spotted Jewelweed, Riverbank Grape, Common Blackberry, Black Willow, Reed Canary Grass,	No water coming out of drain
	2019-08-22	1.3	Dry	Dry	N/A	Good	Good	1.13	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	
	2019-09-25	1.3	Dry	Dry	N/A	Good	Good	1.13	Dry no reading	Dry no reading	Dry no reading	Dry no reading	Dry no reading	No additions	No additions	
	2019-10-23	1.3	1.07	0.03	Not enough to register	Good	Good	1.13	12.4	59.9	6.41	467	8.12	No additions	No additions	Flow out of tile drain
	2020-04-28	1.3	1.07	0.03	0.2	Good	Good	2.13	6.2	105.1	12.31	369	8.16	No additions	No additions	

Appendix 4. Operation Schematic





BRECHIN QUARRY SIMPLIFIED OPERATION SCHEMATIC

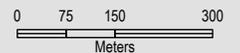
Proposed Brechin Quarry
 Part of Lots 11&12, Concession 1
 Township of Ramara
 County of Simcoe

LEGEND

- Subject Lands and Proposed Licence Boundary
- Proposed Limit of Extraction
- Phasing Area
- Proposed Entrance / Exit
- Parcel Fabric

DATE December 2023

SOURCES
 2022 Ortho Photography County of Simcoe GIS



12135B - Planning Report Figures



APPENDIX B

Municipal and Regional Background Information



SCHEDULE 5.1

To the County of Simcoe Official Plan

LAND USE DESIGNATIONS

Designations

-  Settlements
-  Greenlands
-  Agricultural
-  Rural
-  Strategic Settlement Employment Areas and Economic Employment Districts
-  Lands not subject to this plan

 Settlement Area Boundary Under Appeal

 General Location of Site-Specific Appeals

 Lands Subject to Non-Decision

Reference Data

-  Settlement Area Boundary
-  Built Boundaries
-  Special Development Area: Friday Harbour Resort
- Greenbelt Plan - Protected Countryside
-  (Refer to Schedule 5.3.3 For Details)
- Niagara Escarpment Plan Area
-  (Refer to Schedule 5.3.1 For Details)
- Oak Ridges Moraine Conservation Plan Area
-  (Refer to Schedule 5.3.2 For Details)
-  Provincial Highway
-  County Road
-  Trans Canada Pipeline
-  Lake Simcoe Protection Plan - Watershed Boundary

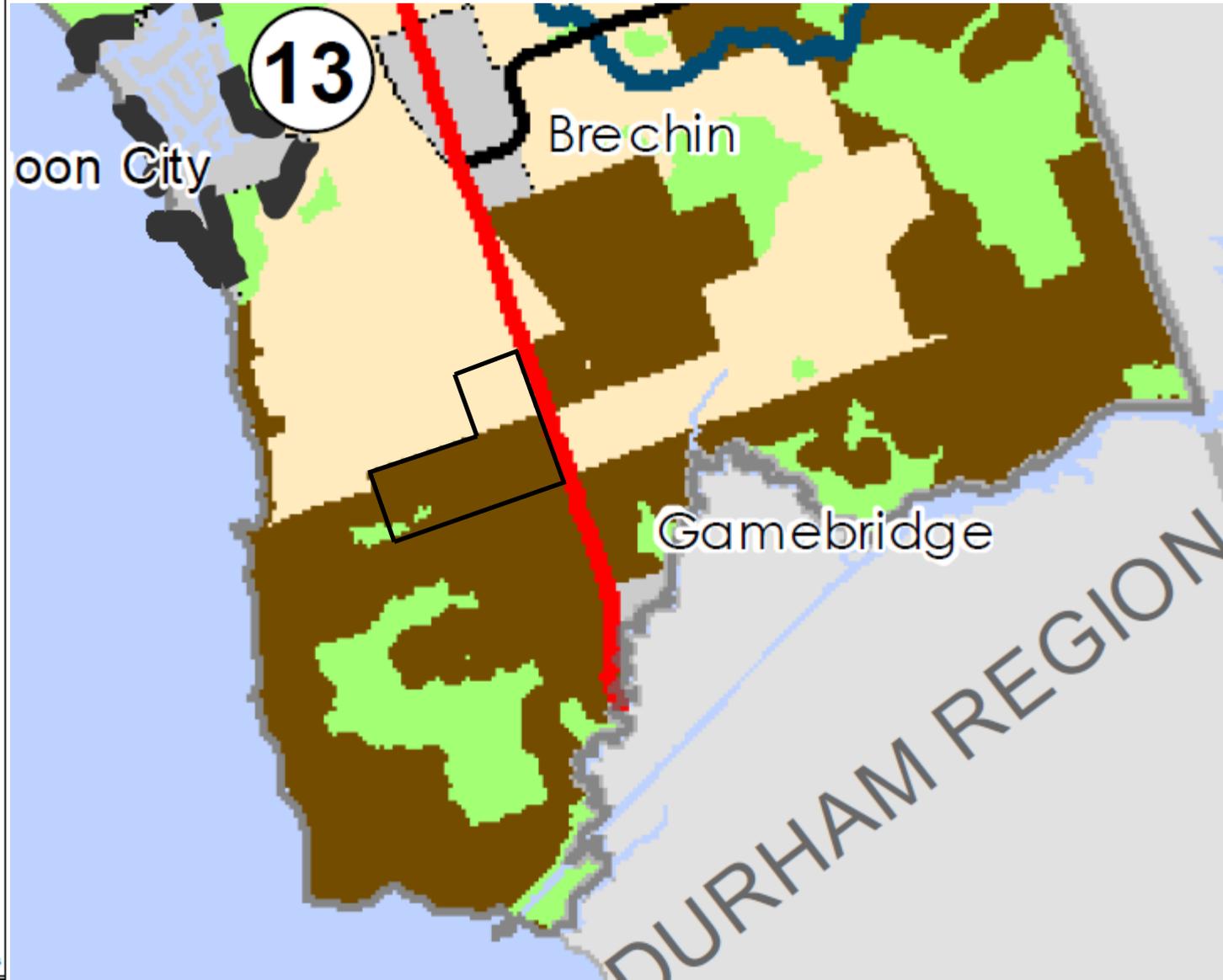
* Greenbelt Plan – Protected Countryside, Oak Ridges Moraine Conservation Plan Area and Niagara Escarpment Plan Area are included within the Greenbelt Plan Area

This schedule must be referred to in conjunction with the text of the County of Simcoe Official Plan

Office Consolidation February 2023

Printed: 2023/02/14

Property Location (Approximate)





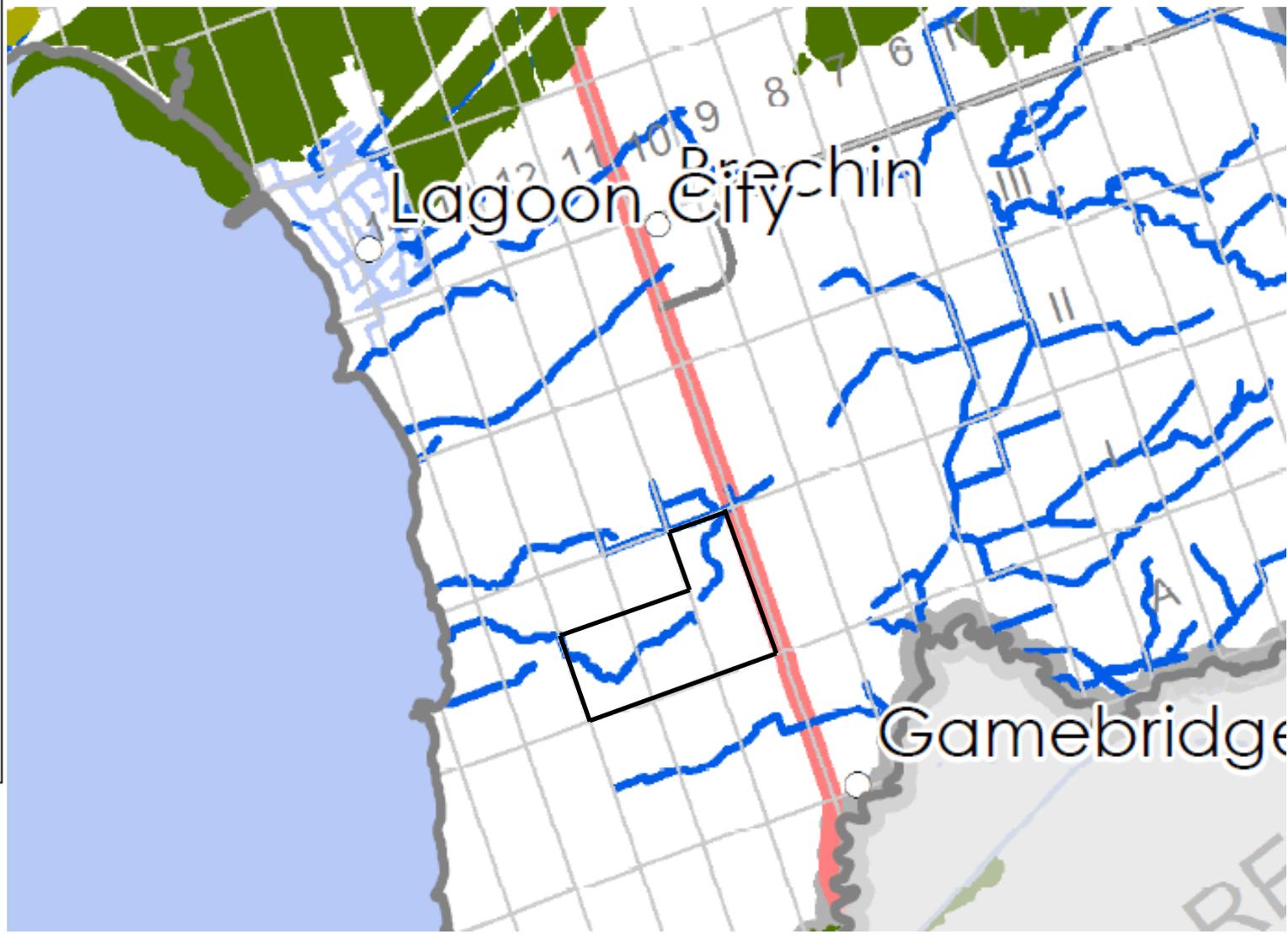
SCHEDULE 5.2.2

To the County of Simcoe Official Plan
STREAMS AND EVALUATED WETLANDS

-  Provincially Significant Wetland
-  Locally Significant Wetland
-  Watercourse
-  Lands not subject to this plan



Property Location (Approximate)



This schedule must be referred to in conjunction with the text of the County of Simcoe Official Plan - November 25, 2008

Source: Midhurst District MNR
Approved by OMB on May 9, 2016

Printed: 2018/05/19



SCHEDULE 5.2.3

To the County of Simcoe Official Plan

AREAS OF NATURAL AND SCIENTIFIC INTEREST

 Oak Ridges Moraine ANSI

 ANSI - Provincial

 ANSI - Regional

 Lands not subject to this plan

This schedule must be referred to in conjunction with the text of the
County of Simcoe Official Plan - November 25, 2008
Source: Ministry of Natural Resources

Approved by the OMB on April 19, 2013

Printed: 5/17/2013



Property Location (Approximate)

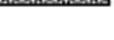


SCHEDULE A LAND USE PLAN TOWNSHIP OF RAMARA



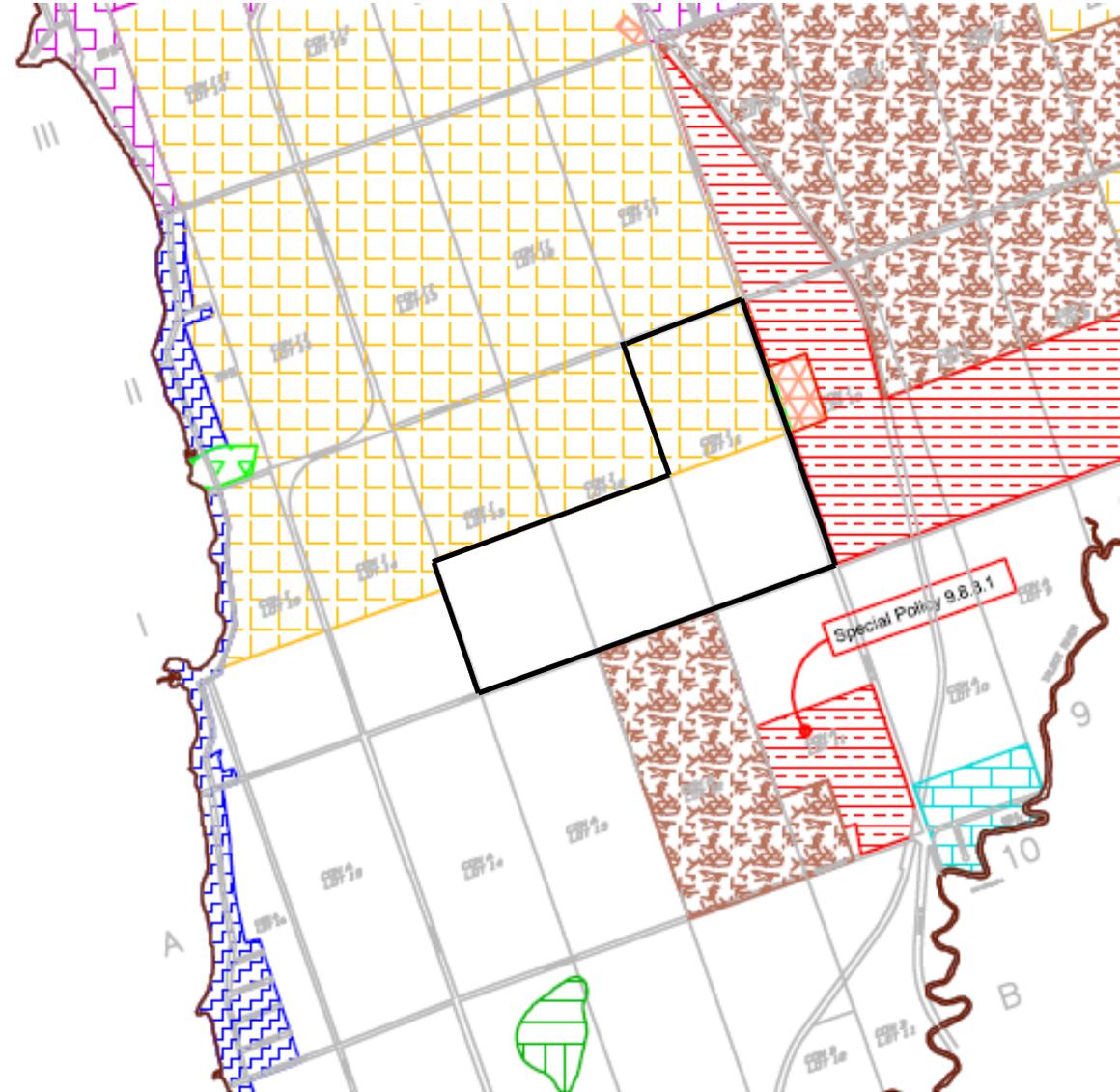
Property Location (Approximate)



- NATURAL AREA PROTECTION 
- AGRICULTURE 
- RURAL 
- VILLAGE 
- HAMLET 
- SHORELINE RESIDENTIAL 
- INDUSTRIAL 
- DESTINATION COMMERCIAL 
- HIGHWAY COMMERCIAL 
- MINERAL AGGREGATE 
- EXTRACTION AREA 
- ESTATE RESIDENTIAL 
- RAMA ROAD SPECIAL DEVELOPMENT AREA 

Notes: RAMA RESERVE 

Major Lakes and Watercourses Are not designated
except where they are "Natural Heritage Protection"



SCHEDULE C NATURAL AREA FRAMEWORK TOWNSHIP OF RAMARA

Core Areas and Corridors



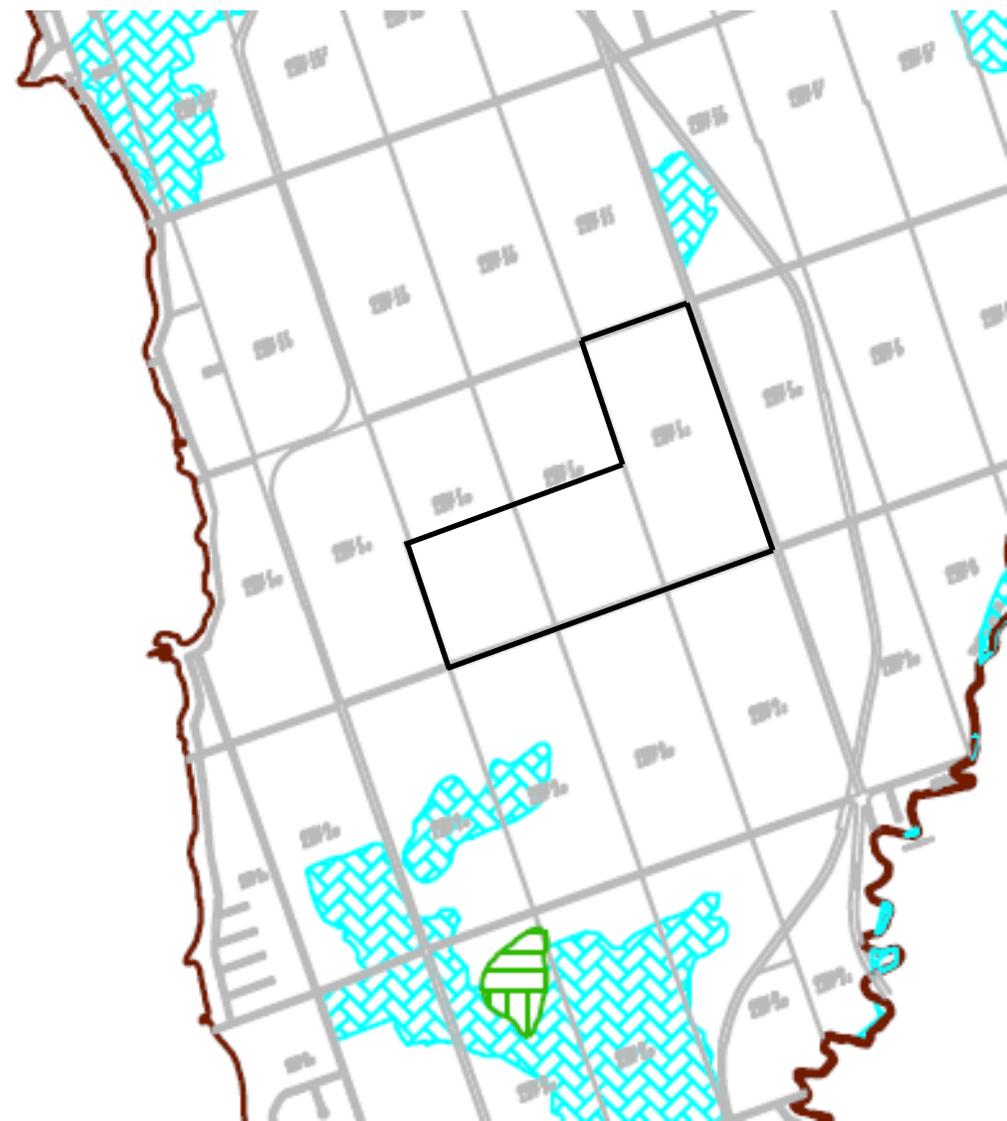
Supportive and Complimentary
Areas and Corridors



Notes: RAMA RESERVE



Property Location (Approximate)





APPENDIX C

LSRCA Background and Correspondence



Lake Simcoe Region
conservation authority



Property Location (Approximate)



Legend

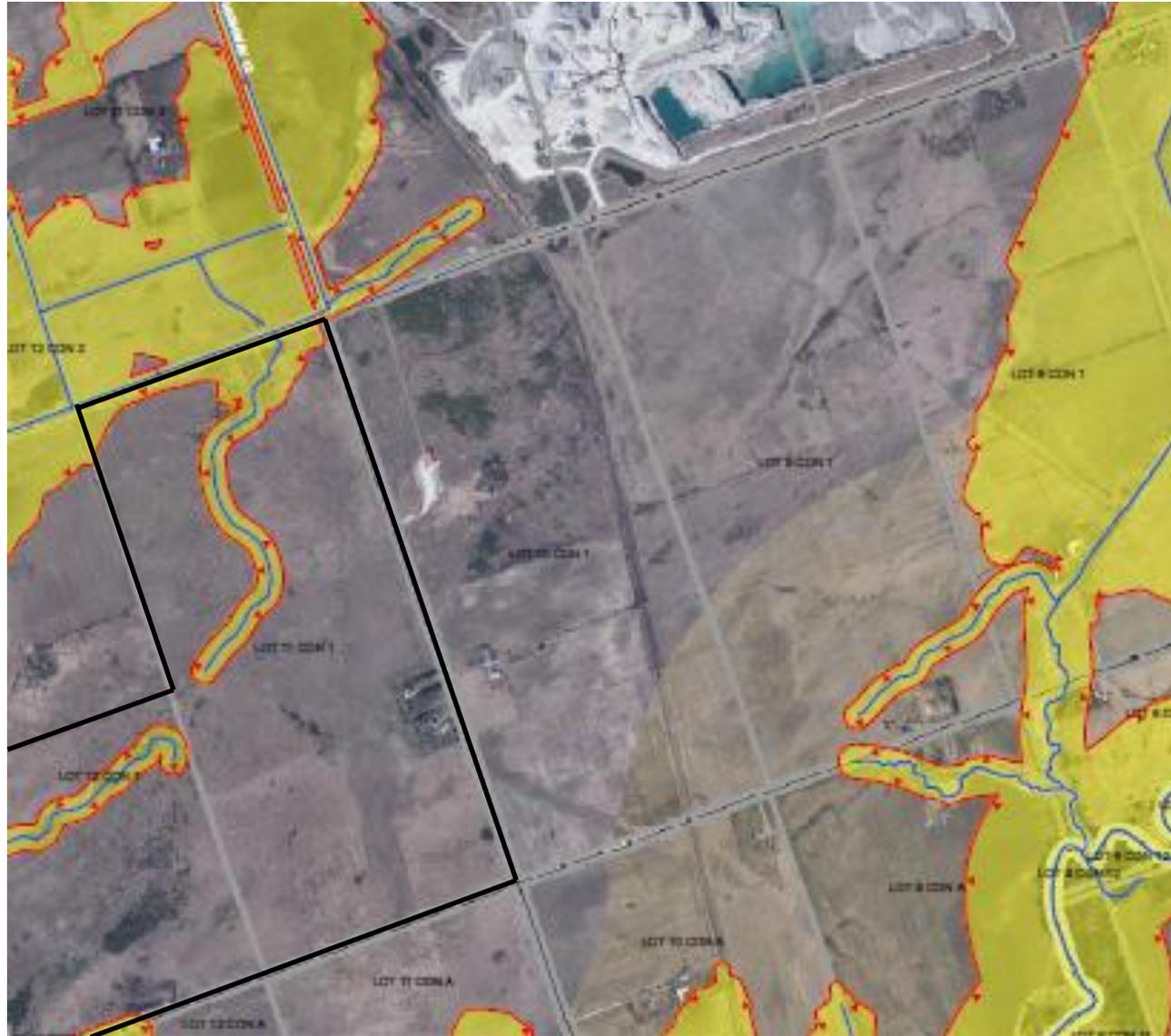
-  WATERCOURSE
-  ROAD
-  REGULATION AREA
-  LOT_CONCESSION
-  LSRCA JURISDICTION
-  MUNICIPAL BOUNDARY
-  LAKE SIMCOE





Legend

-  WATERCOURSE
-  ROAD
-  REGULATION AREA
-  LOT_CONCESSION
-  LSRCA JURISDICTION
-  MUNICIPAL BOUNDARY
-  LAKE SIMCOE





Technical Memorandum

From: Dan Stuart, Azimuth Environmental Consulting, Inc.
To: Melinda Bessey, Director – Planning, LSRCA
Kate Lillie, Natural Heritage Ecologist, LSRCA

**Re: Natural Heritage Work Plan
Proposed Brechin Quarry, Township of Ramara**

Project: 18-288
Date: April 6, 2021

The following memorandum summarizes the current work plan for the natural heritage survey program (terrestrial and aquatic components) being completed at the proposed Brechin Quarry Site located at 2530/2440 Concession 1 and 1646/1506 Highway 12 in Brechin, Ontario. The purpose of this summary is to act as a Terms of Reference (ToR) for review by the Lake Simcoe Region Conservation Authority (LSRCA) with respect to natural heritage studies completed to support an *Aggregate Resources Act* (ARA) application. In addition, the work is being completed to support *Planning Act* applications for a Township Official Plan Amendment and Township Zoning By-law Amendment. The natural heritage work plan is a joint effort between Azimuth Environmental Consulting, Inc. (Azimuth) and RiverStone Environmental Solutions Inc. (RiverStone). The work program has been divided between Azimuth and RiverStone such that terrestrial studies (vegetation and wildlife) were completed by Azimuth and fisheries and aquatic ecology studies were completed by RiverStone. Azimuth is also coordinating the physical monitoring programs, such as ground water levels and surface water flows.

Terrestrial Ecology Program

The terrestrial ecology program comprising vegetation and wildlife studies was completed by Azimuth in 2019 (with supplementary raptor wintering surveys in early 2021) and included a comprehensive investigation of vascular plants and plant communities, raptor wintering, bat roosting habitat, migratory waterfowl and nesting, dawn and evening breeding bird, turtle overwintering and nesting, snake habitat, and amphibian breeding with potential to occur within the property limits and planning area.

The following summary lists site investigations related to terrestrial ecology undertaken in the study area to date:

- Evaluating/mapping vegetation community types based on Ecological Land Classification methods (ELC; Ecological Land Classification for Southern Ontario: First Approximation and its Applications. SCSS Field Guide FG-02) including a detailed vascular plant inventory [late spring/early summer (June 19, July 8, July 9, July 10) and late summer (September 17 and September 18)];



- Five (5) winter site reconnaissance and raptor wintering area surveys (February 4 and February 11, with supplementary surveys on January 22, February 17 and 26, 2021);
- One (1) inventory of mature “snag” or cavity trees with potential to provide maternity roosting habitat for bat species (April 25);
- Five (5) spring turtle basking surveys to determine whether water bodies on the property have potential to provide turtle overwintering habitat (April 25, May 7, May 8, May 29, and June 6);
- Six (6) waterfowl stopover/staging (terrestrial) and waterfowl nesting surveys (April 25, April 29, May 7, May 8, May 29, and June 6);
- Thirteen (13) screenings for snake habitat with focus on structure foundation and rocky portions of the property (May 7, May 8, May 29, June 6, June 12, June 19, June 25, June 27, July 8, July 9, July 10, September 17, September 18);
- Three (3) evening amphibian frog call surveys (April 25, May 29, and June 25) to determine the location and extent of amphibian breeding habitat;
- Three (3) dawn breeding bird screenings (June 6, June 19, and June 27);
- Three (3) evening turtle nesting surveys (May 29, June 12, and June 25) with supporting daytime nesting activity surveys (June 6, June 19, June 27, July 8, July 9, and July 10);
- Three (3) evening breeding bird surveys (including Eastern Whip-poor-will; June 12, July 9, and July 10);
- Observations for other Significant Wildlife Habitat (SWH) categories during appropriate seasonal conditions; and
- A record of all incidental wildlife observations during site visits.

Following collection of the above environmental data, Azimuth is in the process of completing the following:

- Conducting a Species at Risk (SAR) habitat assessment using field data collected by Azimuth during site visits and other data available and/or provided by agencies to confirm environmental constraints, and approval requirements under the *Endangered Species Act, 2007*; and,
- Assessing the potential direct and indirect impacts of the proposed development on the natural heritage features and functions identified on or adjacent to the development parcel.

Environmental features mapping illustrating preliminary vegetation community limits according to ELC standards, and point counts utilized for dawn breeding bird, evening breeding bird, and evening amphibians surveys is attached to this memorandum.



Fisheries & Aquatic Ecology Program

The fisheries and aquatic ecology program was completed by RiverStone in 2019 and included the following studies:

- Headwater Drainage Feature assessment for all watercourses within the study area; and,
- Fish habitat assessment for watercourses, including presence/absence sampling.

Watercourse mapping illustrating drainage features, sampling locations, and flow within the study area is attached to this memorandum.

Conclusion

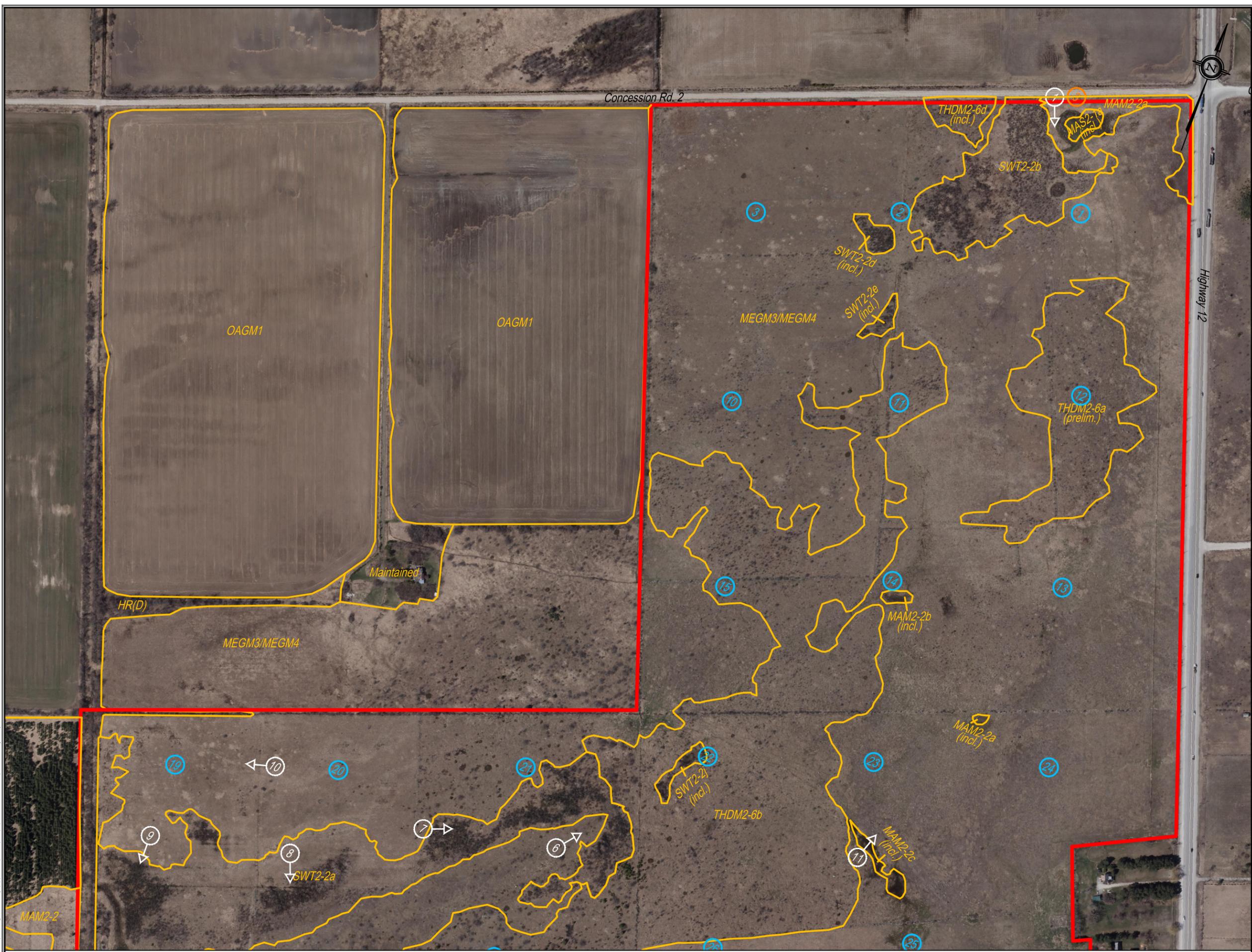
We trust that the details presented in this work plan are appropriate and sufficient for use as a ToR. If you have any questions or would like to discuss further, please do not hesitate to contact us.

DCS:

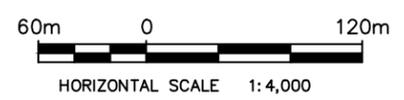
cc: Mike Jones, Azimuth Environmental Consulting, Inc.
cc: Bev Wicks, RiverStone Environmental Solutions Inc.

Attachments:

Attachment 1: Figure - Environmental Features Mapping (Azimuth)
Attachment 2: Figure – Electrofishing Sites and Watercourses (RiverStone)



- LEGEND:**
- Approx. Property Boundary
 - ⊙ Structures
 - ⊕ Dawn Breeding Bird Point Count Station
 - ⊕ Evening Breeding Bird Point Count Station
 - ⊕ Amphibian Stations and Direction (white)
 - Vegetation Communities
- FOC2-2 Dry-Fresh White Cedar Coniferous Forest
 MEGM3 Dry-Fresh Graminoid Meadow
 MEGM4 Fresh-Moist Graminoid Meadow
 THCM1 Dry-Fresh Coniferous Regeneration Thicket
 THCM1-2/ Dry-Moist Native Coniferous
 THDM2-6 Buckthorn Deciduous Shrub Thicket
 CLW1 Mineral Cultural Woodland
 SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
 SWT2-2 Willow Mineral Thicket Swamp
 MAM2-2 Reed Canary Grass Mineral Meadow Marsh
 MAS2-1 Cattail Mineral Shallow Marsh
 OAGM1 Annual Row Crops
 HR(D) Deciduous Hedgerow
 HR(C) Coniferous Hedgerow



AZIMUTH ENVIRONMENTAL CONSULTING, INC.

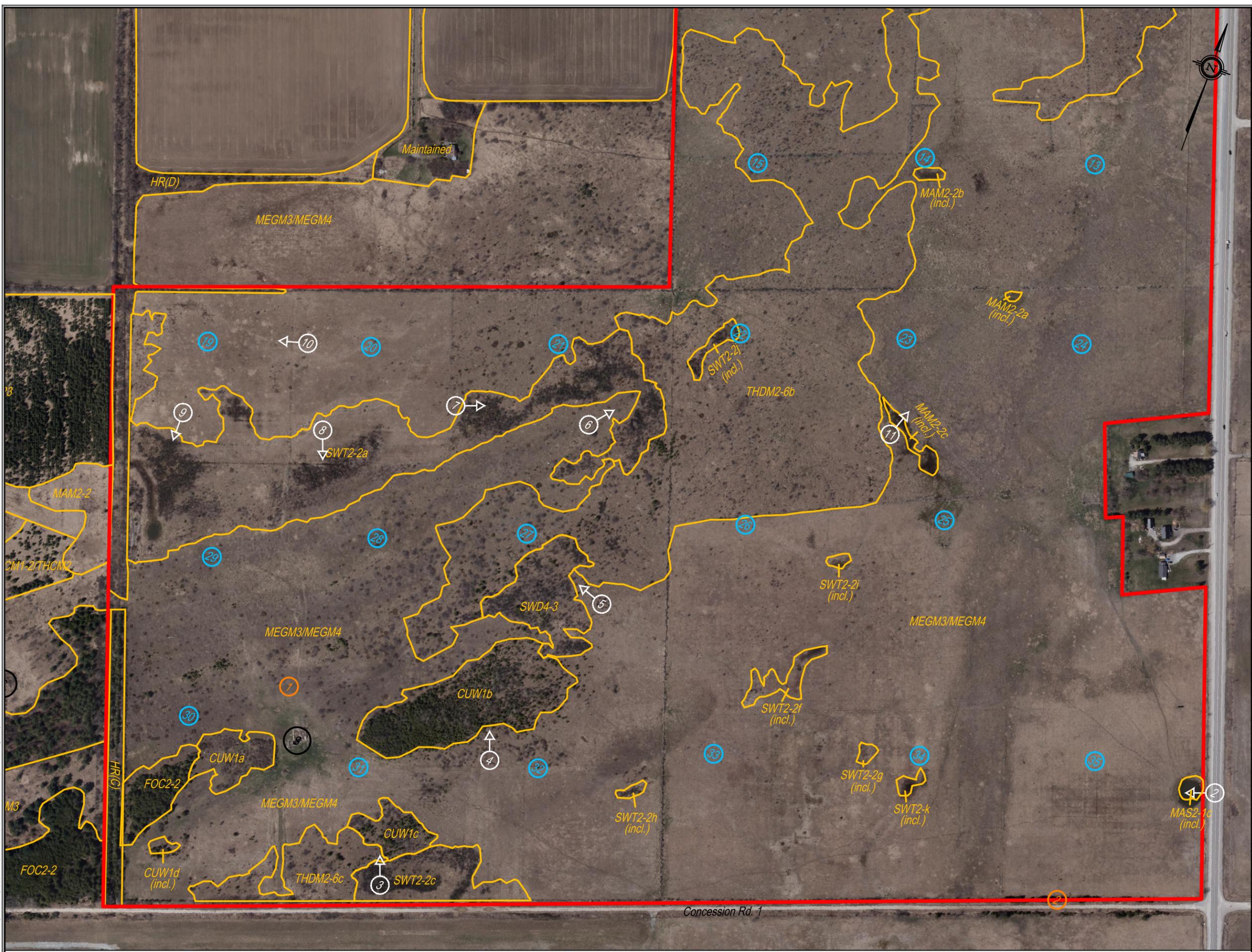
Environmental Features

DRAFT

Carden Quarry
Brechin, ON

DATE ISSUED:	November 2020	Figure No.
CREATED BY:	JLM	2a
PROJECT NO.:	18-288b	
REFERENCE:	Simcoe County Maps	

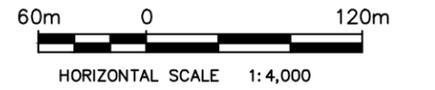
Plotted by: JMCARTNEY on November 6, 2020 at 8:25am
 File: C:\Users\jmcartney\AppData\Local\Temp\epublish_10284\18-288b.dwg Layout: EIS2a Plotcode: 5
 DAYSTAMP: M:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg



LEGEND:

- Approx. Property Boundary
- Structures
- Dawn Breeding Bird Point Count Station
- Evening Breeding Bird Point Count Station
- ← Amphibian Stations and Direction (white)
- Vegetation Communities

FOC2-2	Dry-Fresh White Cedar Coniferous Forest
MEGM3	Dry-Fresh Graminoid Meadow
MEGM4	Fresh-Moist Graminoid Meadow
THCM1	Dry-Fresh Coniferous Regeneration Thicket
THCM1-2/	Dry-Moist Native Coniferous
THDM2-6	Buckthorn Deciduous Shrub Thicket
CUW1	Mineral Cultural Woodland
SWD4-3	White Birch-Poplar Mineral Deciduous Swamp
SWT2-2	Willow Mineral Thicket Swamp
MAM2-2	Reed Canary Grass Mineral Meadow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
OAGM1	Annual Row Crops
HR(D)	Deciduous Hedgerow
HR(C)	Coniferous Hedgerow



AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Environmental Features

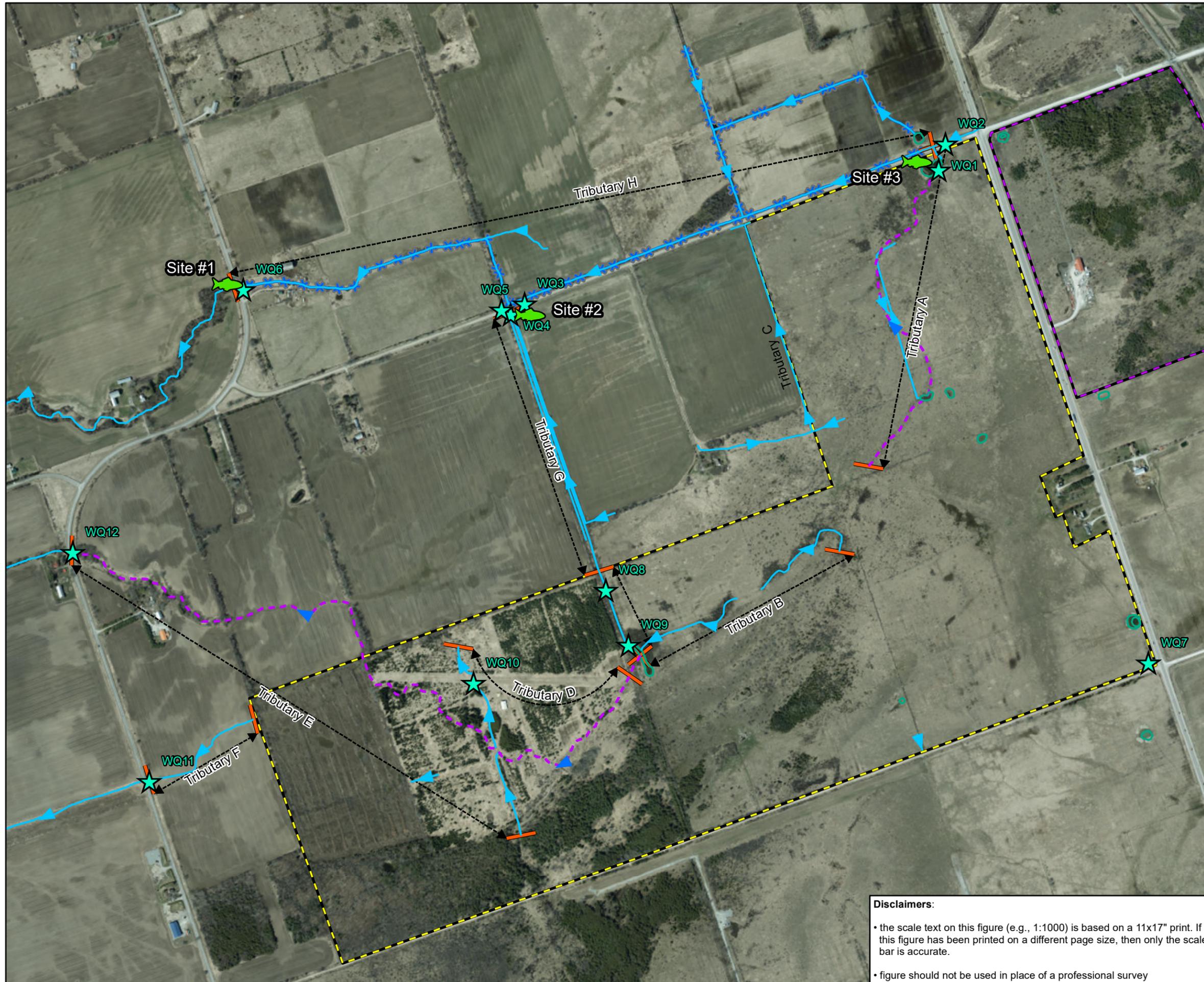
DRAFT

Carden Quarry
Brechin, ON

DATE ISSUED:	November 2020	Figure No.
CREATED BY:	JLM	2b
PROJECT NO.:	18-288b	
REFERENCE:	Simcoe County Maps	

Plotted by: JMCARTNEY on November 6, 2020 at 8:27am
File: C:\Users\jmcartney\AppData\Local\Temp\epublish_10284\18-288b.dwg Layout: EIS2b Plotcode: 5

DAYSTAMP: M:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg



Legend

- Planning Boundaries**
- Subject Property
- Additional Talisker Owned Lands
- Features with Recognized Natural Heritage Value - Identified by the Province or the Relevant Approval Authorities**
- LIO Identified**
- McNabb Drain (Constructed Drain)
- Biophysical Features+Functions-RiverStone**
- Watercourse (Delineated by Azimuth)
- Watercourse (Delineated by OBM)
- Open Water (Delineated by Azimuth)
- Tributary Boundary
- Survey Stations**
- Water Quality
- Electrofishing**
- Site

Orthorectified aerial photo - spring 2018

Scale	RS Project No.	Date Last Updated	By
1:9,000	2019-046	May 13, 2020	JG



Figure . Electrofishing Sites, And Watercourses Delineated By Azimuth And OBM

Prepared for MNRF

Disclaimers:

- the scale text on this figure (e.g., 1:1000) is based on a 11x17" print. If this figure has been printed on a different page size, then only the scale bar is accurate.
- figure should not be used in place of a professional survey

Dan Stuart

From: Kate Lillie [K.Lillie@lsrca.on.ca]
Sent: April-13-21 3:36 PM
To: Dan Stuart
Cc: Mike Jones; Brad Pettersone; Bev Wicks; Glenn Cunnington; Melinda Bessey; Kevin Trimble; Brian Zeman; James Newlands; Caroline Hawson; Deb McCabe
Subject: RE: Brechin Quarry Terms of Reference
Attachments: 18-288 - Brechin Quarry Hydrogeology Work Plan -issued 6Apr2021.pdf; 18-288 - Brechin Quarry Natural Heritage Work Plan - 6Apr2021.pdf

Hi Dan,

Thanks for your email and for providing the attached work plans. I've included my colleague Caroline Hawson (Hydrogeologist) on this email. I've asked that she review the hydrogeology work plan and provide any feedback and/or confirm that it's acceptable separately.

I've reviewed the natural heritage workplan and can confirm that it is appropriate for this site and proposal. Please ensure that the final report includes a detailed description of proposed works and figures showing the anticipated phasing and limits of disturbance. The final report must also demonstrate that the proposal conforms to all applicable natural heritage policies, including LSPP designated policies 6.41-6.44.

It was very helpful to see the site in person late last year. As discussed though, the woodland and wetland limits will need to be confirmed through a staking exercise with LSRCA. Woodland can be done at any time, but wetland must be completed between mid-June and September. Please contact us to coordinate.

If there are any questions with what I've provided above, please let me know.

Kind regards,

Kate Lillie, HBSc, EP, ISA

Natural Heritage Ecologist

Lake Simcoe Region Conservation Authority

120 Bayview Parkway,

Newmarket, Ontario L3Y 3W3

905-895-1281, ext. 286 | 1-800-465-0437

k.lillie@LSRCA.on.ca | www.LSRCA.on.ca

Please note: the LSRCA Board of Directors approved a change to our Fee Policy. The new fees will take effect on January 1, 2021. Please click [here](#) for the new fee schedule.

Twitter: @LSRCA

Facebook: LakeSimcoeConservation

The information in this message (including attachments) is directed in confidence solely to the person(s) named above and may not be otherwise distributed, copied or disclosed. The message may contain information that is privileged, confidential and exempt from disclosure under the Municipal Freedom of Information and Protection of Privacy Act and by the Personal Information Protection Electronic Documents Act. If you have received this message in error, please notify the sender immediately and delete the message without making a copy. Thank you.

From: Dan Stuart <dstuart@azimuthenvironmental.com>

Sent: April 6, 2021 3:38 PM

To: Melinda Bessey <M.Bessey@lsrca.on.ca>; Kate Lillie <K.Lillie@lsrca.on.ca>

Cc: Mike Jones <Mike@Azimuthenvironmental.Com>; Brad Pettersone <bpettersone@azimuthenvironmental.com>;

Bev Wicks <bev@rsenviro.ca>; Glenn Cunnington <glenn@rsenviro.ca>; Kevin Trimble <kevin@rsenviro.ca>; Brian

Zeman <bzeman@mhbcplan.com>; James Newlands <jnewlands@mhbcplan.com>

Subject: Brechin Quarry Terms of Reference

CAUTION: This email originated outside of LSRCA. DO NOT click links or open attachments unless you recognize the sender and trusted content. If in doubt, contact the IT Helpdesk at ITHelpdesk@lsrca.on.ca

Hi Melinda & Kate,

As discussed during our site visit last fall, please see the attached Terms of Reference for the hydrogeological and natural heritage work programs at proposed quarry south of Brechin. My apologies for the delay getting these to you.

Please review and let us know if you have any questions or concerns with the attached, or if no comments confirm the provided Terms of Reference are acceptable.

Thanks very much,

Dan Stuart
Ecology Lead

Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, ON, L4N 9A1
cell: (705) 794-0975
dstuart@azimuthenvironmental.com
www.azimuthenvironmental.com

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APPENDIX D

Provincial Background and Correspondence

Midhurst District MNRF Information Request Form



Name:

Company Name:

Email Address:

Phone Number:

Project Name:

Property Address:

Township/Municipality:

Lot & Concession:

UTM Coordinates:
(NAD83) Easting (X) Northing (Y)

Project Description:

Project Type: Planning Act Aggregates Resources Act Environmental Assessment Act
 Other

Have you previously contacted someone at MNRF for information on this site? Yes No

If yes, when and who?

Prior to requesting information from MNRF, please review available online information and attach a summary of your initial screening. Please include a list of features/ habitats on site and summary of the species at risk that are reasonable to expect could be present based on the available habitats. Available MNRF species at risk, fisheries and natural heritage data can be found at [Make a Natural Heritage Map](#), [Land Information Ontario](#), and [Species at Risk-Ontario](#)

Please indicate in the box below, any additional information required.

Please provide a map of accurate scale to illustrate footprint/study area of the proposed activity in relation to the surrounding landscape (e.g. property boundaries, roads, waterbodies, natural features, towns, and other human landmarks). Use of aerial photography is strongly encouraged. Include scale, north arrow and legend.

Please forward the completed form to: ***MIDHURSTINFO@ontario.ca***

Or send by mail:

*Midhurst District, Ministry of Natural Resources and Forestry
2284 Nursery Road, Midhurst, ON L9X 1N8*



**MNRF Information Request Form
Attachment**

Initial Screening- SAR

Date: January 30, 2019

Project Ref: AEC 18-288

Azimuth Contact: Dan Stuart, Terrestrial Ecologist
Email dstuart@azimuthenvironmental.com
Phone 705 721-8451 x 208

Attachments: Study Area Location Map, Natural Features Map

Project Name: Symphony Natural Heritage Assessment (Brechin)

Activity Description: Preliminary Natural Heritage Constraints Assessment

Study Area: Lots 11, 12, part of 13, Concession 1 (Township of Ramara) south of Brechin on west side of Highway 12 – *see attached Study Area Location Map*

Comprehensive SAR List/Initial Screening Based on On-line and Other Sources¹:

- Mammals: Little Brown Myotis (END), Northern Long-eared Myotis (END), Tri-colored Bat (END), Eastern Small-footed Myotis (END);
- Reptiles and Amphibians: Blanding's Turtle (THR), Snapping Turtle (SC), Eastern Ribbonsnake (SC), Five-lined Skink (SC);
- Birds: Barn Swallow (THR), Bobolink (THR), Eastern Meadowlark (THR), Chimney Swift (THR), Short-eared Owl (SC), Common Nighthawk (SC), Eastern Wood-pewee (SC), Wood Thrush (SC), Golden-winged Warbler (SC),
- Plants: Butternut (END); and
- Insects: Monarch Butterfly (SC).

¹*On-line and other sources:* Species at Risk Ontario (<https://www.ontario.ca/environment-and-energy/species-risk-ontario-list>); Land Information Ontario (<https://www.ontario.ca/page/land-information-ontario>); Make a Natural Heritage Map - Natural Heritage Information Centre (Squares 17PK4429, 17PK4529, 17PK4530 and 17PK4531) (http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US); Ontario Breeding Bird Atlas (Squares 17PK43) (<http://www.birdsontario.org/atlas/maps.jsp?lang=en>); Ontario Reptile and Amphibian Atlas (Squares 17PK43 and surrounding squares) (<https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/>), eBird (<https://ebird.org/explore>); Fisheries and Oceans Canada (<http://www.dfo->



mpo.gc.ca/species-especes/index-eng.htm); *Fish Online* (<https://www.gisapplication.lrc.gov.on.ca/FishONLine/Index.html?site=FishONLine&viewer=FishONLine&locale=en-US>); *Ontario Butterfly Atlas* (http://www.ontarioinsects.org/atlas_online.htm); and *Atlas of the Mammals of Ontario* (Dobbyn, J. 1994. Federation of Ontario Naturalists).

List of Features/Habitats within Property Limits:

- Study area consists primarily of active agricultural and active pastureland (*see attached Natural Features Mapping*)
- Southwest portion of property consists of a former air strip – currently comprising a complex of successional meadow, thicket, coniferous plantation, and immature woodland communities (*see attached Natural Features Mapping*);
- MNRF Unevaluated Wetland – adjacent to northeast property limit;
- Watercourse traverses property on northeast/southwest axis – likely intermittent
- Thicket – complexed with successional meadow in vicinity of former air strip – southwest portion of property
- Woodland – likely immature forest and plantation, southwestern portion of property.

Consolidated SAR List Expected in Area Based on Habitat²:

- Mammals: Little Brown Myotis (END), Northern Long-eared Myotis (END), Tri-colored Bat (END);
- Reptiles and Amphibians: Blanding’s Turtle (THR), Snapping Turtle (SC), Eastern Ribbonsnake (SC), Five-lined Skink (SC);
- Birds: Barn Swallow (THR), Bobolink (THR), Eastern Meadowlark (THR), Short-eared Owl (SC), Common Nighthawk (SC), Eastern Wood-pewee (SC), Wood Thrush (SC), Golden-winged Warbler (SC),
- Plants: Butternut (END); and
- Insects: Monarch Butterfly (SC).

²List of SAR to be assessed relative to existing habitat types on the property.

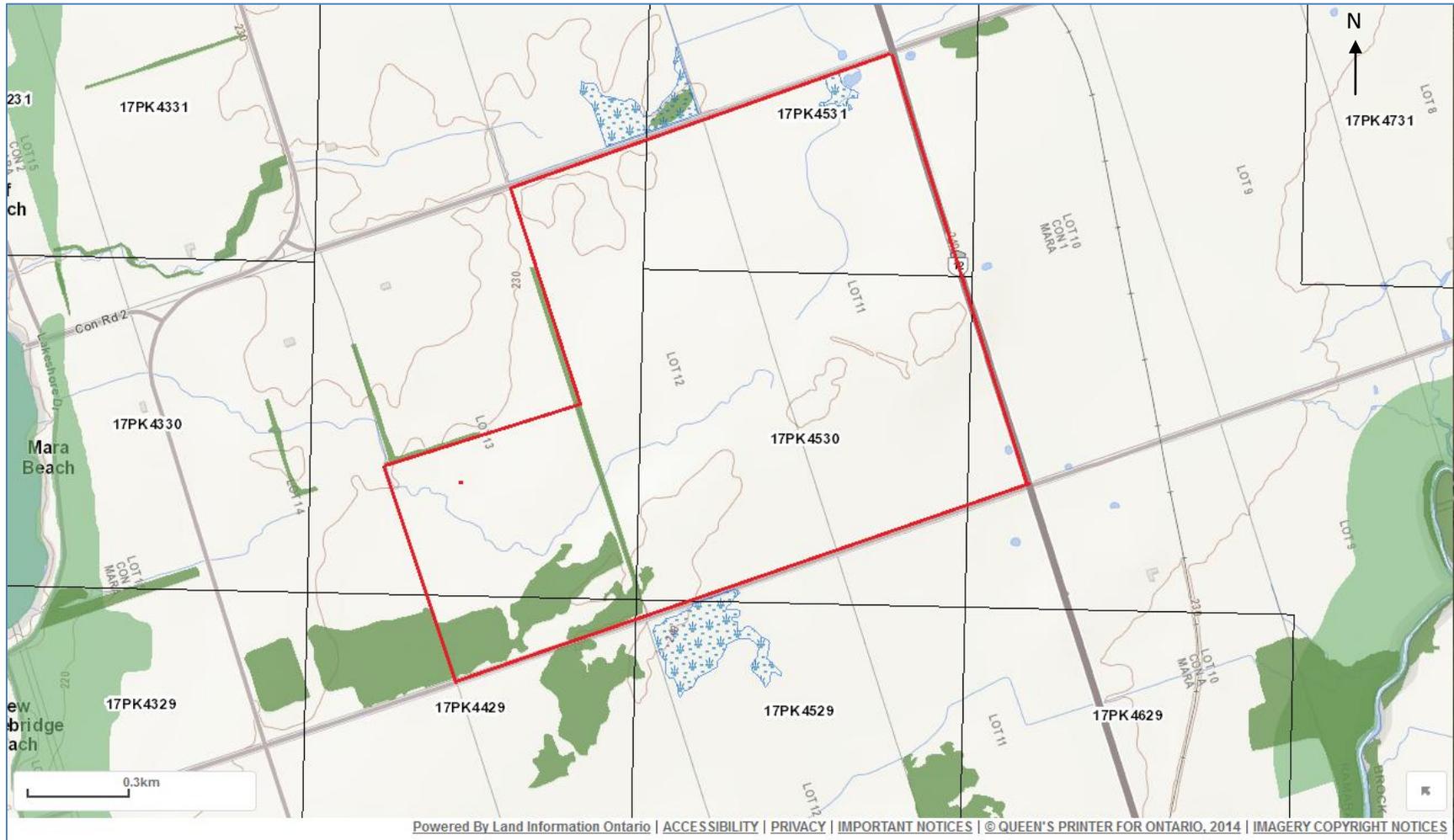
Information Requested:

- Confirmation that the Consolidated List of SAR expected in the Area Based on Habitat includes all SAR of concern to the MNRF with respect to this activity; or
- Provision of additional information related to fish habitat data and/or SAR of concern to the MNRF with respect to the activity³.

³If SAR of concern are deemed “Restricted”, Azimuth will protect the species identity within reporting that would become part of the public record.



Study Area Location Map (Google Earth, 2018)



Natural Features Map (Source - http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US, accessed January 30, 2019)

Dan Stuart

From: Dan Stuart
Sent: February-05-19 1:41 PM
To: 'Shirley, Brent (MNRF)'
Subject: RE: MNRF SAR and Fish Habitat Information Request

Hi Brent,

Thank you for the information. I will review and be in touch if I have any questions.

Regards,

Dan Stuart
Terrestrial Ecologist

Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, ON, L4N 9A1
ph: (705) 721-8451 ext 208
cell: (705) 794-0975
dstuart@azimuthenvironmental.com
www.azimuthenvironmental.com

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From: Shirley, Brent (MNRF) [<mailto:brent.shirley@ontario.ca>]
Sent: February-05-19 1:12 PM
To: Dan Stuart
Subject: RE: MNRF SAR and Fish Habitat Information Request

Hi Dan,

All of our fisheries data is available in LIO now (links and guidance provided in the attached Information Request Guide). I can't find any fishery data available for the watercourse that traverses the subject property.

Please find attached a list of known and suspected SAR that could be present in Ramara Township. If habitat for the species listed is present on the subject property than you should perform the necessary surveys and fieldwork to be incorporated into your environmental impact study.

If you have any questions or concerns please don't hesitate contacting me at any time.

Best Regards,

Brent Shirley

A/ Management Biologist
Midhurst District Ministry of Natural Resources & Forestry
2284 Nursery Rd
Midhurst, ON
L9X 1N8

Phone- 705-725-7547

Fax- 705-725-7584

From: Dan Stuart <dstuart@azimuthenvironmental.com>
Sent: January-30-19 12:02 PM
To: MIDHURSTINFO (MNRF) <MIDHURSTINFO@ontario.ca>
Subject: MNRF SAR and Fish Habitat Information Request

Good afternoon,

Please see the attached SAR and Fish Habitat Information Request for a property on Lots 11, 12, and part of 13 (Concession 1) in the Township of Ramara south of Brechin. The attachment includes a completed SAR Information Request Form, attachment indicating the results of Azimuth's background review, habitat features on the property, consolidated SAR list expected in the area, and mapping of the property.

Please let me know if you have any questions or require any further information and I would be happy to assist.

Best regards,

Dan Stuart
Terrestrial Ecologist

Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, ON, L4N 9A1
ph: (705) 721-8451 ext 208
cell: (705) 794-0975
dstuart@azimuthenvironmental.com
www.azimuthenvironmental.com

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Dan Stuart

From: Snell, Shamus (MECP) [Shamus.Snell@ontario.ca]
Sent: May-30-22 10:33 AM
To: Dan Stuart
Cc: Mike Jones; skirby@symphonygolf.com
Subject: MECP SARB Review Complete: IGF & AAF - Proposed Mineral Aggregate Quarry
Attachments: NHIC_Make_A_Map_2022_05_18.JPG

Categories: Red Category

Hi Dan,

On further examination of the occurrence record, it appears it was not actually loaded into the Natural Heritage Information System (NHIC) until March 15th, 2019 which is just over a month after you would have received the response to your information request. I also checked the information contained online on NHIC's make-a-map application and confirmed that Blanding's Turtle is listed for that 1km grid square. This highlights the importance of regularly checking information sources for new occurrences as they are uploaded on a daily basis.

I have spoken to the Species at Risk Specialists, in particular our Herpetology Specialist, and there is general agreement that while some major highways like the 400 series or those with complete Jersey barriers in the center (i.e. highway 11 south of Gravenhurst) would act as barriers to movement but most two lane highways such as highway 12 would not be considered barriers to movement. Rather, these highways would be considered areas with increased mortality potential which turtles are still able to cross. This would mean the habitat within the subject property could still be accessed and utilized by Blanding's Turtle. Therefore, any suitable habitat which is defined within the General Habitat Description for Blanding's Turtle would be considered protected habitat and would be considered occupied.

With these points in mind, it means that multiple years of surveys would need to be performed to confirm absence of Blanding's Turtle from the subject property. A single years worth of additional surveys as you proposed would be insufficient to confirm absence of Blanding's Turtle. In order to proceed with the assessment of potential impacts, Species at Risk Branch (SARB) will need to receive an updated Information Gathering Form (IGF) which either:

- clearly provides evidence of **complete absence** of Blanding's Turtle and their habitat from the subject property or;
- include mapping of the habitat according to the General Habitat Description for Blanding's Turtle and an assessment of the impacts to the habitat.

Once SARB receives the additional information, it will then complete its review as it is best practice to complete reviews of projects in their entirety rather than of multiple submissions for individuals aspects of a project or specific species.

Regards,

Shamus Snell
A/ Management Biologist
Species at Risk Branch
Ministry of Environment, Conservation and Parks

Email: shamus.snell@ontario.ca

From: Dan Stuart <dstuart@azimuthenvironmental.com>

Sent: April 19, 2022 10:56 AM

To: Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>

Cc: Mike Jones <Mike@Azimuthenvironmental.Com>; skirby@symphonygolf.com

Subject: RE: MECP SARB Comments: IGF & AAF - Proposed Mineral Aggregate Quarry, Part of Lot 11 & 12, Con 1

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning Shamus,

Please see the attached revised IGF, AAF, and comment matrix for ease of review, in response to comments received from SARB on March 4, 2022 for the proposed mineral aggregate quarry on part of Lot 11 & 12, Con 1, Township of Ramara.

Feel free to add an additional column to the attached matrix if you wish to reply to individual comments directly. Azimuth requests that MECP provide a response to comment #1 in particular, regarding the proposed expanded 2022 survey program for Blanding's Turtle.

We look forward to further discussion.

Regards,

Dan Stuart
Ecology Lead

Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, ON, L4N 9A1
cell: (705) 794-0975
dstuart@azimuthenvironmental.com
www.azimuthenvironmental.com

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From: Snell, Shamus (MECP) [<mailto:Shamus.Snell@ontario.ca>]

Sent: March-04-22 8:16 AM

To: Dan Stuart

Cc: Mike Jones; skirby@symphonygolf.com

Subject: MECP SARB Comments: IGF & AAF - Proposed Mineral Aggregate Quarry, Part of Lot 11 & 12, Con 1

Hi Dan,

Below are the Ministry of Environment, Conservation and Parks (MECP) Species at Risk Branch (SARB) comments regarding the Information Gathering Form (IGF) that was submitted for Proposed Mineral Aggregate Quarry. SARB looks forward to receiving an updated IGF addressing the comments and recommendations below.

General Comments

- There is a Blanding's Turtle occurrence [REDACTED]. This occurrence would trigger the habitat protection as defined in the General Habitat Description (GHD) for Blanding's Turtle (attached). Once a Blanding's Turtle occurrence has been recorded and protected habitat has been

triggered, it takes multi-year surveys to confidently demonstrate that Blanding's Turtle are absent from the subject property. Therefore, the single year's worth of surveys which was completed is insufficient to prove absence of Blanding's Turtle and its habitat from the subject property as stated in the Survey Protocol for Blanding's Turtle. Any habitat which is suitable for Blanding's Turtle as defined by the GHD must be mapped and any adverse impacts accounted for in table 4.

- Blanding's Turtle occurrence information: [REDACTED] Comments: Female [REDACTED] Date: June 28th, 2017
- Please note the specific location of the occurrence must be kept confidential and cannot be included in any reports which may become public or in any way disclosed to a member of the public. It has been provided to Azimuth Environmental to assist with habitat mapping.
- The 2021 Bat Survey Standards Note and related protocols have been attached to this email. The IGF should be cross referenced with the note and protocols to confirm the information presented for bats is still aligned with current direction including considerations for trees of a Diameter at Breast Height (DBH) of 10 cm or more.
- Please examine if the activities associated with operation (i.e. blasting, noise, dust) of this mineral aggregate quarry will have any adverse impacts to Species at Risk.
- Please revise the name of the IGF document to match the proposed title. Further, there are a number of aggregate operations in this area that all include Brechin or Ramara in the title of the project. The proponent may wish to adopt a "common" name for this project to differentiate it from the others.
- Please provide additional information regarding the condition of the abandoned silo and its immediate area which appear to be the remnants of an old barn. In at least one instance, the IGF suggests there is no roof and imagery suggests that it is still standing but that is unclear. Please provide pictures of this area if available especially any which may show the inside of the silo. If such pictures are unavailable, please state if the inside of the silo could be accessed and if it was check for the presence of any nests and guano.

Section 1

- Please revise the primary surveyor's summary of experience to focus on their Species at Risk and Endangered Species Act experience and knowledge.

Table 2

- The survey information provided states that visual encounter surveys were performed with two different intents. Please state the number of stations that were completed for each type of visual encounter survey. In addition, please identify which type of visual encounter survey each station is associated with in attachments 2a and 2b.

Table 3

Bobolink and Eastern Meadowlark

- Please separate Bobolink and Eastern Meadowlark into their own columns so each species can be more closely examined.
- Please state the total number of individuals observed during the surveys for each species. If the specific number is unavailable, please provide an estimate.
- Please state the total number of suspected nest locations for each species.

Barn Swallow

- Barn Swallow are listed as being absent from the subject property when at least one individual was observed during surveys. Please check the box to state "individuals of the species present".

Table 4

Bobolink and Eastern Meadowlark

- Please separate Bobolink and Eastern Meadowlark into their own columns as SARB can only examine impacts to specific species.
- Category 3 habitat for Bobolink and Eastern Meadowlark has not been included or addressed in this table. Category 3 is intended to provide an area for feeding, rearing of young, resting, dispersal and concealment from predators. While this category of habitat can withstand a high level of tolerance to alteration, it is unclear how this habitat will function, if at all, if the overburden is removed. Please include and address the impacts to Category 3 habitat in this table.
- The IGF states the proponent is actively engaged with MECP regarding creation of compensatory habitat near the southwest shoreline of Lake Dalrymple. Please note the creation of habitat intended to be used as overall benefit cannot be created prior to the issuance of an Endangered Species Act authorization. If such habitat is created prior to the issuance of an authorization, it cannot be considered towards the required overall benefit. While not within the scope of this form, please be aware that overall benefit is more than just like for like or one for one replacement of habitat. More information on the concept of overall benefit can be found on our website here: <https://www.ontario.ca/page/endangered-species-act-submission-standards#section-2>
- Information for the proposed overall benefit is intended to be examined in the C-Permit Application Form (CPAF). This form is not intended to be used to examine the proposed actions associated with an authorization under Section 17(2)(c), Overall benefit permit, of the Endangered Species Act. Only actions which are a direct result of the proposed activity (mineral aggregate quarry operation) should be examined in this table. Remove information pertaining to any overall benefit actions.
- Please ensure the information regarding the impacts of the project proposal is contained within the correct column. For example, information regarding the amount of habitat to be removed for Bobolink and Eastern Meadowlark is NOT a positive effect and needs to be contained in the column for “How and to what extent each species or habitat may be ADVERSLY affected”

Figure 3a and Figure 3b

- Please include Category 3 habitat for Bobolink and Eastern Meadowlark.

A number of general comments regarding how to complete an Avoidance and Alternatives Form (AAF) have been provided below. Please consider them and revise the AAF accordingly. Once a revised AAF is provided considering the comments below, SARB will provide relevant content and specific comments regarding the AAF.

- The AAF is intended to describe alternative approaches to the activity that would either lessen or not adversely affect the protected species at risk or habitat. This is more than simply listing the mitigation measures to reduce Section 9 impacts as these are generally standard for each alternative. These alternatives examine ways which the activity or the development footprint (**e.g., alternative locations**) could be modified so that it reduces the impacts of the proposed project on Species at Risk. As an oversimplified example, a proposed crossing over Redside Dace habitat might examine four different alternatives:
 - Alternative 1) Do nothing – In this example the activity would not be performed and would not have any impacts to Species at Risk or their habitat. This alternative is generally used to demonstrate the need for the activity in the “Effectiveness in meeting the main purpose of the activity” column.
 - Alternative 2) Culverts – This example is likely to be the most impactful but may be the preferred option due to the financial limitations of the project.
 - Alternative 3) Bridge with middle support – This alternative would likely have a moderate impact to the habitat when compared to a culvert.

- Alternative 4) Free Span Bridge – The alternative could allow the project to be completed without any impacts to Redside Dace but likely to be too cost prohibitive which could be examined in detail in the “potential limitations” column. However, if the impacts to Redside Dace or their habitat don’t occur an Endangered Species at Risk Authorization may not be required for this alternative.
- When considering reasonable alternatives to your activity, you must:
 - consider at least one alternative that would completely avoid any adverse effects on species at risk;
 - identify alternatives that you considered but did not think were reasonable because of biological, technical, social or economic limitations;
 - explain why the approach you have chosen is the best alternative.
- Alternative approaches to your activity include:
 - changing the location of the activity;
 - using alternative methods, equipment or technical designs;
 - changing the geographic scale, duration and/or frequency of the potential adverse effects.

SARB looks forward to receiving a revised IGF and AAF which address the comments and suggestions made above.

Regards,

Shamus Snell
 A/ Management Biologist
 Species at Risk Branch
 Ministry of Environment, Conservation and Parks
 Email: shamus.snell@ontario.ca

From: Dan Stuart <dstuart@azimuthenvironmental.com>
Sent: January 28, 2022 10:00 AM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: Mike Jones <Mike@Azimuthenvironmental.Com>; skirby@symphonygolf.com
Subject: IGF & AAF - Proposed Mineral Aggregate Quarry, Part of Lot 11 & 12, Concession 1 (Township of Ramara)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning,

Please accept the requested Information Gathering Form and Avoidance Alternatives Form for a potential future mineral aggregate quarry on part of Lot 11 & 12, Concession 1 in the Township of Ramara (County of Simcoe), south of the community of Brechin. Both documents are available through the link below:

<https://www.dropbox.com/sh/rtul5iqfh2k4p79/AABmLQm0X-TlqXMITS4B4k9ea?dl=0>

We kindly request that MECP indicate receipt of the documents. Should you have any questions during review of the forms, please do not hesitate to reach out to me.

Regards,

Dan Stuart
 Ecology Lead

Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, ON, L4N 9A1
cell: (705) 794-0975
dstuart@azimuthenvironmental.com
www.azimuthenvironmental.com

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Brechin Quarry (Lot 11 & 12, Concession 1 Ramara) - Comment Response Matrix (IGF/AAF Submission)				
Comment #	MECP Comment (Round #1)/March 4, 2022	Azimuth Response #1 (April 19, 2022)	MECP Comment (Round #2)/May 30, 2022	Azimuth Response #2
IGP				
General Comments				
1	There is a Blinding's Turtle occurrence 1 km to the north of the subject property. This occurrence would trigger the habitat protection as defined in the General Habitat Description (GHD) for Blinding's Turtle (attached). Once a Blinding's Turtle occurrence has been recorded and protected habitat has been triggered, future multi-year surveys are considered to demonstrate that Blinding's Turtle are absent from the subject property. Therefore, the single year's worth of surveys which was completed is insufficient to prove absence of Blinding's Turtle and its habitat from the subject property as stated in the Survey Protocol for Blinding's Turtle. Any habitat which is suitable for Blinding's Turtle as defined by the GHD must be mapped and any adverse impacts accounted for in table 4. Blinding's Turtle occurrence information (see attached) is confidential. Female turtles are not due June 28th, 2017. Please see the specific location of the occurrence must be kept confidential and cannot be included in any reports which may become public or any way disclosing a number of the public. It has been provided to Azimuth Environmental to assist with habitat mapping.	There is the IGF reply. Azimuth has received a correspondence to indicate a Blinding's Turtle record exists within 2km of the property. Azimuth submitted an information request to the Ministry of Natural Resources and Forestry on January 30, 2019, to which a reply was received on February 5, 2019 indicating Blinding's Turtle are known to occur within the Township of Ramara, but an information was provided to suggest presence of the property potentially qualify as regulated habitat.	In further examination of the occurrence record, it appears it was not actually located from the Natural Heritage Information System (NHIS) until March 15th, 2019 which is just over a month after you would have received the response to your information request. I also checked the information contained online on NHIS, making application and confirmed that Blinding's Turtle is listed for that time period square. This highlights the importance of regularly checking information sources for new occurrences as they are updated on a daily basis.	acknowledging regarding NHIS record update.
2	In 2019 Azimuth completed a comprehensive ecological screening of the property, including five targeted (5) turtle emergence surveys, three (3) targeted turtle nesting surveys, and eight (8) additional surveys that included incidental observations for Blinding's Turtle, all during suitable weather and timing prescribed by the Survey Protocol for Blinding's Turtle (Environmental Monitoring) in Ontario (EMSP, 2015 "Survey Protocol"). Two (2) additional incidental sightings occurred during suitable weather conditions during 2021. As such, it is Azimuth's opinion that a detailed and comprehensive assessment has been completed to assess the presence/absence of Blinding's Turtle on the property.	In 2019 Azimuth completed a comprehensive ecological screening of the property, including five targeted (5) turtle emergence surveys, three (3) targeted turtle nesting surveys, and eight (8) additional surveys that included incidental observations for Blinding's Turtle, all during suitable weather and timing prescribed by the Survey Protocol for Blinding's Turtle (Environmental Monitoring) in Ontario (EMSP, 2015 "Survey Protocol"). Two (2) additional incidental sightings occurred during suitable weather conditions during 2021. As such, it is Azimuth's opinion that a detailed and comprehensive assessment has been completed to assess the presence/absence of Blinding's Turtle on the property.	These updates to the Species at Risk Specialists, in particular our Herpetology Specialist, and there is a general agreement that while some major highways like the 400 series or those with complete Jersey barriers in the center (i.e. Highway 11 south of Greenfield) would act as barriers to movement but areas two lane highways such as highway 12 would not be considered barriers to movement. Rather, these highways would be considered areas with increased mortality potential which turtles are still able to cross. This would mean the habitat within the subject property could still be accessed and utilized by Blinding's Turtle. Therefore, any suitable habitat which is defined within the General Habitat Description for Blinding's Turtle would be considered protected habitat and would be considered occupied.	Regarding Highway 12 barrier to movement, Azimuth disagrees with MECP's assessment, and although acknowledging that in rare circumstances traffic passage may be achievable, near-constant traffic observed on the highway during the daytime would be expected to significantly impede to turtle movement between wetlands located on the east and west sides of Highway 12. Please see Azimuth's Response to MECP Review of Information Gathering Form Reporting Blinding's Turtle Survey Program letter for discussion.
3	Azimuth notes that the Survey Protocol states "a significant species effect - typically sensitive multiple years - would be necessary to conclude that the species no longer occurs at a previously occupied site."	Azimuth notes that the Survey Protocol states "a significant species effect - typically sensitive multiple years - would be necessary to conclude that the species no longer occurs at a previously occupied site."	With these points in mind, it means that multiple years of surveys would need to be performed to confirm absence of Blinding's Turtle from the subject property. A single year's worth of additional surveys as you proposed would be insufficient to confirm absence of Blinding's Turtle. In order to proceed with the assessment of potential impacts, Species at Risk Branch (SARB) will need to receive an updated Information Gathering Form (IGF) which either:	Regarding demonstration of complete absence of Blinding's Turtle, the project team completed an additional ten (10) spring emergence visual encounter surveys in 2022 and did not observe Blinding's Turtle within the study area limits. Azimuth concludes that the survey program undertaken for Blinding's Turtle on the subject property has demonstrated complete absence of the species to a high level of confidence. Please see Azimuth's Response to MECP Review of Information Gathering Form Reporting Blinding's Turtle Survey Program letter for discussion.
4	It is unlikely that any historical connectivity between the location of observation and the property exists for Blinding's Turtles, and therefore the suggestion that any portion of the property may qualify as a "previously occupied site" is highly unlikely. Azimuth recognizes the GHD for Blinding's Turtle does not consider roadways, but recognizes that MECP consider a more nuanced approach considering the barrier to movement caused by Highway 12.	It is unlikely that any historical connectivity between the location of observation and the property exists for Blinding's Turtles, and therefore the suggestion that any portion of the property may qualify as a "previously occupied site" is highly unlikely. Azimuth recognizes the GHD for Blinding's Turtle does not consider roadways, but recognizes that MECP consider a more nuanced approach considering the barrier to movement caused by Highway 12.	Clearly provides evidence of complete absence of Blinding's Turtle and its habitat from the subject property or:	
5	Regardless of the above, Azimuth proposes to undertake five (5) additional turtle emergence surveys to spring 2022 in accordance with the Survey Protocol. It is anticipated that doing so in combination with previous surveys, will fulfill MECP's request to conduct a "multi-year" survey program and conclusively demonstrate absence of the species from the subject property. At this time Azimuth requests MECP's acknowledgment that should spring 2022 surveys yield absence of Blinding's Turtle on the subject property.	Regardless of the above, Azimuth proposes to undertake five (5) additional turtle emergence surveys to spring 2022 in accordance with the Survey Protocol. It is anticipated that doing so in combination with previous surveys, will fulfill MECP's request to conduct a "multi-year" survey program and conclusively demonstrate absence of the species from the subject property. At this time Azimuth requests MECP's acknowledgment that should spring 2022 surveys yield absence of Blinding's Turtle on the subject property.		
6	The 2021 Survey Standards Note and related protocols have been attached to this email. The IGF should be revised referenced with the note, and protocols to confirm the information presented for bats is still aligned with current direction including considerations for trees of a Diameter at Breast Height (DBH) of 10 cm or more.	Tree searches occurred in 2019 prior to release of MECP's 2021 Survey Standards Note, however detailed searches occurred with consideration for trees as small as 10cm DBH.		
7	Please examine if the activities associated with operation (i.e. Blinding, noise, dust) of this mineral exploration project will have any adverse impacts to Species at Risk.	Potential impacts due to operations have been considered for all species under the updated Table 4 within the IGF.		
8	Please revise the name of the IGF document to match the proposed site. Further, there are a number of aggregate operations in this area that all include Brechin or Ramara in the title of the project. The proposed may wish to adopt a "common" name for this project to differentiate it from the others.	IGF file name has been updated to match proposal title.		
9	Please provide additional information regarding the condition of the abandoned silo and its immediate area which appears to be the remains of an old farm. It is not standing, the IGF suggests there is an roof and imagery suggest there is a still standing but in a similar. Please provide pictures of the area if available especially any which may show the inside of the silo. If such pictures are unavailable, please state if the inside of the silo could be accessed and if it is checked for the presence of any nests and eggs.	The abandoned silo is a standing concrete cylinder with no roof, approximately 15m in height. A gap along the north side of the structure permits intense varying, allowing surveys to confirm absence of bird nesting and/or bat guano within the structure's interior.		
10		The remaining barn structure adjacent to the silo exists only as a foundation, with remaining outer walls approximately 1m in height.		
11		The above comments have been added to Table 3 of the IGF. A photo of the silo and barn foundation exterior has been attached to the IGF.		
Section 1				
12	Please revise the primary surveyor's summary of experience to focus on their Species at Risk and Endangered Species Act experience and knowledge.	Surveyor experience and knowledge in Section 1 has been updated accordingly.		
Table 2				
13	The survey information provided states that visual encounter surveys were performed with two different nests. Please state the number of locations that were completed for each type of visual encounter survey. Please state, please identify which type of visual encounter survey each station is associated with an attachment 1 and 2b.	Azimuth assumes that this comment is in relation to Blinding's Turtle visual encounter surveys.		
14	Visual encounter surveys for Blinding's Turtle do require survey "stations" (such as those used for point counts), as the Survey Protocol describes the need for surveys to access the wetland from "several different locations" or "various points to ensure the assessment is comprehensive". Based on the Survey Protocol, it is Azimuth's opinion that "survey stations" (i.e. "point count") methodology is not an appropriate survey technique for assessing potential Blinding's Turtle habitat.	Visual encounter surveys for Blinding's Turtle do require survey "stations" (such as those used for point counts), as the Survey Protocol describes the need for surveys to access the wetland from "several different locations" or "various points to ensure the assessment is comprehensive". Based on the Survey Protocol, it is Azimuth's opinion that "survey stations" (i.e. "point count") methodology is not an appropriate survey technique for assessing potential Blinding's Turtle habitat.		
15	Areas identified as potential "suitable habitat" for Blinding's Turtle (per the GHD) were identified in several locations throughout the subject property (MAS-1a (incl.), MAS-1b (incl.), MAS-2a; (incl.), SWT-2a; (incl.) 2a, 2b), all of which were screened during each visual encounter survey. Turtle nesting surveys occurred in similar manner, focusing on areas where (based on surveyor experience) nesting is most likely to occur, such as slopes, embankments, and areas of thin soil in the vicinity of potentially suitable habitats (above) for Blinding's Turtle.	Areas identified as potential "suitable habitat" for Blinding's Turtle (per the GHD) were identified in several locations throughout the subject property (MAS-1a (incl.), MAS-1b (incl.), MAS-2a; (incl.), SWT-2a; (incl.) 2a, 2b), all of which were screened during each visual encounter survey. Turtle nesting surveys occurred in similar manner, focusing on areas where (based on surveyor experience) nesting is most likely to occur, such as slopes, embankments, and areas of thin soil in the vicinity of potentially suitable habitats (above) for Blinding's Turtle.		
16		The above paragraph has been added to Table 2 for clarification.		
Table 3				
Bobolink and Eastern Meadowlark				
17	Please separate Bobolink and Eastern Meadowlark into their own columns so each species can be more easily identified and tracked.	Bobolink and Eastern Meadowlark have been separated into separate columns. Bobolink remains as Species 3 and Eastern Meadowlark as Species 4.		
18	Please state the total number of individuals observed during the surveys for each species. If the species number is unavailable, please provide an estimate.	Confirmed and estimated Bobolink and Eastern Meadowlark nesting locations are illustrated in Figure 3a/3b.		
19		A total of one (1) confirmed Eastern Meadowlark nest and a maximum of 17 estimated Eastern Meadowlark nest locations were observed on the property. Estimated nest locations were determined based on controls of repeated evidence of breeding, courtship, and territorial behaviour across three (3) dawn breeding bird surveys. Due to variation in movement between individuals across the dawn breeding bird survey program, an accurate estimate of Eastern Meadowlark is not possible as it is impractical to determine how many individuals were paired versus solo males defending breeding territory. At least two (2) pairs of Eastern Meadowlark were confirmed during the dawn breeding bird survey program. It is therefore reasonable to assume between 20 (10 nests including 2 pairs) and 30 (all nest paired) Eastern Meadowlark occurred on the property during the breeding bird survey program.		
20		A maximum of 13 estimated Bobolink nest locations were observed on the property. Estimated nest locations were determined based on controls of repeated evidence of breeding, courtship, and territorial behaviour across three (3) dawn breeding bird surveys. Due to variation in movement between individuals across the dawn breeding bird survey program, an accurate estimate of Bobolink is not possible as it is impractical to determine how many individuals were paired versus solo males defending breeding territory. At least six (6) pairs of Bobolink were confirmed during the dawn breeding bird survey program. It is therefore reasonable to assume between 19 (13 nests including 6 pairs) and 20 (all nest paired) Bobolink occurred on the property during the breeding bird survey program.		
21		The above two paragraphs have been added to their respective rows on Table 3.		
22	Please note the total number of suspected nest locations for each species.	Refer to response 9 above.		
Barn Swallows				
23	Barn Swallows are listed as being absent from the subject property when at least one individual was observed during surveys. Please check the box to state "individuals of the species present".	Check box corrected to state "individuals of species present".		
24		Please note that the "individuals of species present" and "individuals of species absent" check boxes are in reverse order between left and right columns in Table 3 on the IGF grid form, however upon finalizing the form, "individuals of species absent" always follows "individuals of species present". This glitch also affected check boxes for SAR bats and Bateman in Table 4, both of which have also been corrected for this submission.		Note: Barn Swallow has been removed from February 2022 IGF/AAF Submission, as the species has been down-listed to Special Concern as of January 2023.
Table 4				
Bobolink and Eastern Meadowlark				
25	Please separate Bobolink and Eastern Meadowlark into their own columns as SARB can only examine impacts to specific species.	Bobolink and Eastern Meadowlark have been separated into individual rows in Table 4.		
26	Category 3 habitat for Bobolink and Eastern Meadowlark has not been included or addressed in this table. Category 3 is intended to provide an area for feeding, rearing of young, resting, dispersal and concealment from predators. While this category of habitat can withstand a high level of disturbance to alteration, it is unclear how this habitat will function, if at all, if the overheads is removed. Please include and address the impacts to Category 3 habitat in this table.	Table 4 has been updated to address potential impacts to Category 3 Habitat for Bobolink and Eastern Meadowlark.		
27	The IGF states the proponent is actively engaged with MECP regarding creation of compensatory habitat near the southwest shoreline of Lake Dalrymple. Please note the creation of habitat intended to be used as overall benefit cannot be created prior to the issuance of an Endangered Species Act authorization. If such habitat is created prior to the issuance of an authorization, it cannot be considered towards the required overall benefit. While not within the scope of this form, please be aware that overall benefit is more than just like for like or one for one replacement of habitat. More information on the concept of overall benefit can be found on our website here: https://www.ontario.ca/page/endangered-species-act-submission-manual#section2	acknowledged.		
28	Information for the proposed overall benefit is intended to be examined in the C-Form Application Form (CFAD). This form is intended to be used to examine the proposed actions associated with an authorization under Section 73(2)(a) Overall benefit period, of the Endangered Species Act. Only actions which are a direct result of the proposed activity (not an aggregate quarry operation) should be examined in this table. Reserve information pertaining to any overall benefit actions.	Discussion of potential Overall Benefit actions (i.e. dedication of lands at Lake Dalrymple site) has been removed from Table 4.		
29	Please ensure the information regarding the impacts of the project proposal is contained within the correct column. For example, information regarding the amount of habitat to be removed for Bobolink and Eastern Meadowlark is NOT a positive effect and needs to be contained in the column for "flow and to what extent such species or habitat may be ADVERSELY affected".	Individuals rows assessing potential impacts to Bobolink and Eastern Meadowlark have been revised accordingly.		
Figures 3a and 3b				
30	Please include Category 3 habitat for Bobolink and Eastern Meadowlark.	Figure 3a/3b have been updated to illustrate estimated Category 3 Habitat for Bobolink and Eastern Meadowlark within the subject property limits.		

AAF				
<p>General Comments:</p>	<p>The AAF is intended to describe alternative approaches to the activity that would either lessen or not adversely affect the protected species at risk or habitat. This is more than simply listing the mitigation measures to reduce Section 9 impacts as these are generally standard for each alternative. These alternatives examine ways which the activity or the development footprint (e.g., alternative locations) could be modified so that it reduces the impacts of the proposed project on Species at Risk.</p> <p>As an oversimplified example, a proposed crossing over Redside Dace habitat might examine four different alternatives:</p> <ul style="list-style-type: none"> • Alternative 1) Do nothing – In this example the activity would not be performed and would not have any impacts to Species at Risk or their habitat. This alternative is generally used to demonstrate the need for the activity in the “Effectiveness in meeting the main purpose of the activity” column. • Alternative 2) Culverts – This example is likely to be the most impactful but may be the preferred option due to the financial limitations of the project. • Alternative 3) Bridge with middle support – This alternative would likely have a moderate impact to the habitat when compared to a culvert. • Alternative 4) Free Span Bridge – The alternative could allow the project to be completed without any impacts to Redside Dace but likely to be too cost prohibitive which would be examined in detail in the “potential limitations” column. However, if the impacts to Redside Dace or their habitat don’t occur an Endangered Species at Risk Authorization may not be required for this alternative. <p>• When considering reasonable alternatives to your activity, you must consider at least one alternative that would completely avoid any adverse effects on species at risk;</p> <p>• Identify alternatives that you considered but did not think were reasonable because of biological, technical, social or economic limitations;</p> <p>• Explain why the approach you have chosen is the best alternative.</p> <p>• Alternative approaches to your activity include:</p>	<p>There are not alternative options available that avoid Endangered and Threatened species habitat, except for a “do nothing” option. Mineral aggregate operations can only be located in a road area where the aggregate resource is present. This site is owned by the applicant, is impinged as a high potential mineral aggregate resource area in the Township of Rama Official Plan and has direct access to provincial Highway 12 which is an existing haul route and is designed to facilitate the movement of large quantities of vehicles. The site is located within an area where the Township wants aggregate operations to be located. The Provincial Policy Statement requires “mineral aggregate resources shall be protected for long-term use” and, in many instances, as practically possible shall be made available as close to market as possible. From a natural heritage perspective the site is located outside the provincial and municipal Natural Heritage Systems. Furthermore our experience when dealing with large scale properties there are always Endangered and Threatened species habitat to consider. The habitat identified on this site is habitat that is naturally found in the rural landscape in southern Ontario and can easily be replicated and enhanced on another site to provide better habitat opportunities.</p> <p>For this reason, the AAF has been re-formed to consider two alternatives:</p> <ul style="list-style-type: none"> Alternative 1) Construct Quarry According to Proposed Excavation Limits Alternative 2) Do Nothing <p>Mitigation measures described in the previous AAF have been consolidated under Alternative 1, as they apply to each species considered in the form.</p>		



Environmental Assessments & Approvals

February 28, 2023

AEC18-288

Ministry of the Environment, Conservation and Parks
Species at Risk Branch
40 St. Clair Ave. West
Toronto, ON M4V 1M2

Re: **Response to MECP Review of Information Gathering Form Regarding Blanding's Turtle Survey Program on Part of Lot 11 & 12, Concession 1, Township of Ramara, County of Simcoe**

To Whom It May Concern:

Azimuth Environmental Consulting, Inc. (Azimuth) has previously submitted an Information Gathering Form (IGF) and Avoidance Alternatives Form (AAF) with regard for the vegetation and wildlife survey program undertaken for a proposed mineral aggregate quarry on Part of Lot 11 & 12, Concession 1 in the Township of Ramara, County of Simcoe. The initial IGF and AAF was submitted on January 28, 2022 to which a response was received from the Ministry of the Environment, Conservation, and Parks (MECP) on April 4, 2022 (Shamus Snell, A/ Management Biologist; attached) with comments and requests for clarification regarding the initial submission. Azimuth prepared a comment/response matrix and resubmission of the IGF and AAF that in our opinion, suitably addressed MECP's concerns. A second response from MECP was received on May 30, 2022 (attached) indicating continued concern with the survey program undertaken for Blanding's Turtle, that given Azimuth's identification of marginally suitable habitat on the subject property, an IGF re-submission should occur that either:

- *“Clearly provides evidence of **complete absence** of Blanding's Turtle and their habitat from the subject property; or,*
- *Include mapping of the habitat according to the General Habitat Description for Blanding's Turtle and an assessment of impacts to the habitat.”*

The May 30, 2022 response also indicates that MECP will require a satisfactory re-submission regarding the above to complete its review of the IGF and AAF, as *“it is best practice to complete review of projects in their entirety rather than multiple submissions*



for individuals aspects of a project or specific species.” As included in the IGF submissions, the proponent is seeking to advance approvals for work within breeding/nesting habitat for Bobolink and Eastern Meadowlark on the property, however it is our understanding that MECP will not advance its review until a satisfactory conclusion (demonstrated complete absence or impact assessment) is reached with regard to Blanding’s Turtle.

The purpose of this letter is to provide MECP with an updated summary of the survey program undertaken by Azimuth to screen for Blanding’s Turtle on the subject property, including additional turtle emergence screenings conducted in April-June 2022 with assistance from RiverStone Environmental Solutions Inc. (RiverStone). In combination with surveys completed in 2019 and 2021, it is our opinion that the survey program targeting Blanding’s Turtle conforms with the search effort recommendations of the Survey Protocol for Blanding’s Turtle (*Emydoidea blandingii*) referenced in relevant correspondence with MECP.

1.0 STATUS OF OCCUPATION

MECP’s response to the initial IGF/AAF submission received on March 4, 2022 indicated an occurrence of Blanding’s Turtle [REDACTED]

[REDACTED] The response further indicated “...*a Blanding’s Turtle occurrence has been recorded and protected habitat has been triggered...*”, a reference to the General Habitat Description for the Blanding’s Turtle (*Emydoidea blandingii*)(GHD) which designates Category 2 habitat as the wetland complex that extends up to 2km from an occurrence and 30 metres (m) around suitable wetland/water bodies.

Suitable Category 2 habitat includes a variety of marsh, swamps, ponds, *etc.*, that are typically eutrophic, shallow with soft substrate composed of decomposing materials, and often with emergent vegetation such as water lilies and cattails. Three water bodies characterized as naturalized ponds likely manmade for cattle pasturing purposes are present in the northeast, southeast, and southwest corners of the subject property occupy 0.087 hectares (ha)(MAS2-1a (inclusion)), 0.058ha (MAS2-1c (inclusion)), and 0.108ha (pond on west edge of SWT2-2a) respectively (see Figures 2a-2b; attached). All ponds meet the GHD’s description of suitable habitat and have therefore been treated as such for the purposes of this assessment, however are limited in size and connectivity with other wetlands across the local landscape and therefore provide highly marginal habitat potential for Blanding’s Turtle.



The Blanding's Turtle observation approximately [REDACTED] [REDACTED] which is Azimuth's opinion is a significant barrier to passage given the high traffic volume associated with the highway. MECP's May 30, 2022 response indicates that only highways with complete Jersey barriers along their medians are considered barriers to passage and therefore wetlands on either side of Highway 12 should be considered accessible by the same Blanding's Turtle population. Azimuth disagrees with this assessment, and although acknowledging that in rare circumstances turtle passage may be achievable, near-constant traffic observed on the highway during the daytime would be expected a significant hindrance to turtle movement between wetlands located on the east and west sides of Highway 12.

With regard for the above with respect to marginal habitat suitability on the subject property and limited ability for turtle passage, Azimuth requests that MECP consider a nuanced approach regarding the applicability of the GHD's 2km buffer surrounding occupied wetlands as occupied. It is our opinion that such designation is not appropriate in the context of this assessment and the subject property should not be considered occupied as MECP has suggested, however in the interest of advancing dialogue regarding the application wetlands on the property have been conservatively treated as historically occupied. The sections below provide additional information regarding the survey program undertaken to demonstrate "complete absence" of Blanding's Turtle within the subject property limits.

2.0 SURVEY REPETITION

2.1 Survey Repetition as Recommended by MECP and Survey Protocol

Section 3.5 of the Survey Protocol details the recommended approach to screen for presence/absence of Blanding's Turtle using visual encounter survey techniques, described in the Survey Protocol as "*the most effective method of confirming the presence of this species within suitable habitat*". Where the species has not previously been detected, the Survey Protocol suggests three to five visual encounter surveys, and up to ten surveys may be necessary to avoid false absence when completing basking surveys for Blanding's Turtle.

The Survey Protocol also suggests that at sites where the species has been previously documented, five surveys is insufficient to conclude absence of the species, if present but at a low density or if occupation is not continuous from year-to-year. In these situations the Survey Protocol recommends that "*considerably more effort would be necessary for detection.*" and that "*Consequently, a significant search effort - typically spanning multiple years - would be necessary to conclude that the species no longer occurs at a previously occupied site.*".



The Survey Protocol provides no additional clarification regarding the number of years or number of surveys anticipated to demonstrate “complete absence” of Blanding’s Turtle at a previously occupied site. The Survey Protocol implies that an expanded survey program will be necessary for cryptic species such as Massasauga where a 10-15 year search effort is recommended to confirm extirpation from a given site, however in Azimuth’s experience Blanding’s Turtle are highly detectable due to a tendency to openly bask in suitable habitat under appropriate weather conditions and seasonality, and as such should not be considered a cryptic species.

MECP comments received on March 4, 2022 highlighted the necessity to complete visual encounter surveys across multiple years to meet Survey Protocol requirements. In response, Azimuth and RiverStone conducted ten (10) additional visual encounter screenings during the April-June 2022 period to fulfill the “...typically spanning multiple years...” qualifier referenced in the Survey Protocol. In the IGF/AAF re-submission, Azimuth requested MECP concurrence that should April-June 2022 surveys yield no observation of Blanding’s Turtle, that the survey program should be considered to have suitably demonstrated absence of the species on the subject property. The second MECP response received May 30, 2022 stated “A single years worth of additional surveys as you proposed would be insufficient to confirm absence of Blanding’s Turtle.” No further direction was included in MECP’s response to indicate the number of years or repetition of surveys that would be expected to demonstrate “complete absence”.

2.2 Survey Repetition as Completed by Azimuth and RiverStone

The survey program undertaken to screen for presence/absence of Blanding’s Turtle occurred in 2019, 2021, and 2022 and included a combination of targeted turtle emergence surveys (visual encounter survey method), supported by turtle nesting surveys and incidental surveys during suitable weather conditions. Targeted surveys occurred in 2019 and 2022 only, as 2021 surveys were limited to incidental sweeps. All surveys were undertaken during suitable weather conditions for identification of Blanding’s Turtle as detailed in the Survey Protocol. Incidental sweeps were considered to have occurred under suitable circumstances when weather conditions were consistent with those indicated for visual encounter surveys detailed in Section 3.5 of the Survey Protocol. Nesting surveys were completed during suitable weather conditions and survey timing windows detailed in Section 3.7 of the Survey Protocol. Table 1 (attached) provides a detailed outline of survey dates, durations, weather, and purpose for visual encounter surveys and incidental sweeps completed on the subject property.



As shown in Table 1, turtle emergence surveys, turtle nesting surveys, and incidental sweeps for Blanding's Turtle are summarized as follows:

- Turtle Emergence Surveys (**15 surveys total**)
 - Five (5) surveys in 2019 completed by Azimuth
 - Eight (8) surveys in 2022 completed by Azimuth
 - Two (2) surveys in 2022 completed by RiverStone
- Turtle Nesting Surveys (**3 surveys total**)
 - Three (3) surveys in 2019 completed by Azimuth
- Incidental Turtle Screenings (**10 surveys total**)
 - Eight (8) screenings in 2019 completed by Azimuth
 - Two (2) screenings in 2021 completed by Azimuth

To date, a total of 18 targeted surveys for Blanding's Turtle (2019 and 2022) and 10 additional incidental screenings (2019 and 2021) have been completed on the subject property. As shown in Table 1, no Blanding's Turtle or evidence thereof has been identified during any survey on the property to date. With regard for survey repetition, based on the above it is Azimuth's opinion that 18 turtle emergence surveys across two calendar ("multiple") years, in combination with supporting nesting surveys and incidental surveys, demonstrate "complete absence" of Blanding's Turtle on the subject property to a high level of confidence.

3.0 SURVEY DURATION

3.1 Survey Duration as Recommended by Survey Protocol

The Survey Protocol recommends that in general, search times should be approximately 2-4 hours/person/hectare of suitable habitat, however less search effort is necessary when sites can be easily scanned from shorelines (*i.e.* are not heavily vegetated). As discussed above, marginally suitable wetlands within the subject property are characterized as open ponds with cattails and other emergent macrophytes along pond edges, all of which can be easily scanned from vantage points along shorelines. As such, the Survey Protocol's suggestion of "less search effort" for open sites would apply to marginally suitable ponds identified on the subject property. Azimuth suggests that a search effort of approximately 2 hours/person/hectare would be suitable for screening ponds on the subject property for presence/absence of Blanding's Turtle.

With regard for carrying out a multi-year survey program, the Survey Protocol states "*...a significant search effort - typically spanning multiple years - would be necessary to conclude that the species no longer occurs at a previously occupied site.*" This statement suggests that completion of a "significant search effort" in a manner that "typically"



spans multiple years will adequately assess either presence or “complete absence” of Blanding’s Turtle on a given site. Based on the above, Azimuth suggests that more intensive search efforts across fewer years would be an appropriate strategy for demonstrating presence/absence of Blanding’s Turtle while achieving a multi-year survey program.

Section 3.2 below details the overall duration of targeted surveys undertaken by Azimuth, expressed as the number of accumulated person-hours of search effort undertaken to screen each site per year.

3.2 Survey Duration as Completed by Azimuth and RiverStone

The survey program undertaken to screen for presence/absence of Blanding’s Turtle included turtle emergence surveys (visual encounter surveys), supported by turtle nesting surveys and incidental screenings. The Survey Protocol clarifies that visual encounter surveys are the preferred survey technique for assessing presence/absence of Blanding’s Turtles, therefore the analysis of person-hours discussed below excludes the supporting turtle nesting surveys and incidental screenings. Azimuth requests that MECP acknowledge the added benefit of conducting these surveys however, to provide additional confidence regarding absence of the species within the subject property.

As discussed in Section 1.0 above, ponds with marginally suitable habitat in the northeast, southeast, and southwest corners of the subject property occupy 0.087 hectares (ha), 0.058ha, and 0.108ha respectively (see Figure 2a-2b; attached). The total quantity of marginally suitable habitat for Blanding’s Turtle represents a combined **0.253ha** within the subject property limits.

In 2019 and 2022 a total of 15 turtle emergence surveys (visual encounter surveys) occurred within the property limits. Durations of these targeted visual encounter surveys are listed in Table 1 (attached), noting that the timeframes include only time when surveyor(s) were stationed along pond edges and does not include travel time between individual pond sites.

Based on timelines shown in Table 1 (attached), durations for Blanding’s Turtle visual encounter surveys are summarized as follows:

- **2019 (five visual encounter surveys)**
 - April 25, 2019: 0.75h * 1 surveyor
 - May 7, 2019: 1.5h * 1 surveyor
 - May 8, 2019: 1.5h * 1 surveyor



- May 29, 2019: 0.75h * 1 surveyor
- June 6, 2019: 0.75h * 2 surveyors = 1.25h

TOTAL hours = **6.50h**

TOTAL search area = 0.253ha

TOTAL hours/ha = TOTAL hours/TOTAL search area = **25.69 hours/ha**

- **2022 (10 visual encounter surveys)**

- April 21, 2022: 1.5h * 2 surveyors = 3.0h
- May 9, 2022: 1.5h * 1 surveyor
- May 11, 2022: 1.5h * 1 surveyor
- May 12, 2022: 1.0h * 1 surveyor
- May 24, 2022: 1.0h * 1 surveyor
- June 8, 2022: 1.0h * 1 surveyor
- June 9, 2022: 1.0h * 1 surveyor
- June 10, 2022: 1.0h * 1 surveyor
- June 14, 2022: 2.0h * 1 surveyor
- June 15, 2022: 1.58h * 1 surveyor

TOTAL hours = **14.58h**

TOTAL search area = 0.253ha

TOTAL hours/ha = TOTAL hours/TOTAL search area = **57.63 hours/ha**

The Survey Protocol recommends that in general, search times should be approximately 2-4 hours/person/hectare of suitable habitat. As discussed in Section 3.1 above, given open and accessible conditions along pond shorelines, a recommended survey effort of 2 hours/person/hectare should be considered suitable for completion of screenings within marginally suitable habitat on the subject property.

At survey effort of 2 hours/person/hectare, a typical survey year (*i.e.* completion of five turtle emergence screenings) would require the following search effort:

- TOTAL hours/ha = 2.0 hours/ha * 5 surveys = 10.00 hours/ha
- TOTAL search area = 0.253ha
- TOTAL hours = **2.53h**

In 2019 Azimuth completed 6.50h of targeted visual encounter surveys, a multiple of **2.57x** (6.50/2.53) the minimum required search effort. In 2022 Azimuth and RiverStone completed 14.58h of targeted visual encounter surveys, a multiple of **5.76x** (14.58/2.53) the minimum required search effort.



Based on the above, it is Azimuth’s opinion that turtle emergence survey program undertaken in 2019 and 2022 meets and exceeds the “significant search effort” referred to in the Survey Protocol to demonstrate Blanding’s Turtle absence at an occupied site. The surveys occurred across multiple (*i.e.* two) years, however given the intensive effort undertaken across 2019 and 2022, it is our opinion that the search effort was adequate to demonstrate complete absence of the species to a high level of confidence.

4.0 CONCLUSIONS

With consideration for the turtle emergence survey (visual encounter survey) program, supported by turtle nesting surveys, and incidental screenings described in the sections above, Azimuth concludes the following:

- Although a Blanding’s Turtle record exists [REDACTED] habitat conditions on the subject property are limited (0.253ha combined) and marginal for the species. Highway 12 is also anticipated to significantly limit the ability for Blanding’s Turtle to cross from the east side (where the record occurred) to the west side of the road, although this may be possible in rare circumstances. It is our opinion that an “occupied” designation is not appropriate in the context of this assessment and the subject property should not be considered occupied as MECP has suggested, however in the interest of advancing dialogue regarding the application wetlands on the property have been conservatively treated as historically occupied.
- Intensive turtle emergence survey efforts were completed in 2019 and 2022 at multiples of 2.57x and 5.76x the minimum search efforts (respectively) detailed in the Survey Protocol, demonstrating no evidence of Blanding’s Turtle on the subject property. Turtle emergence surveys therefore occurred at a “significant search effort” spanning “multiple years” referred to in the Survey Protocol as required when screening an occupied site for presence/absence.
- Supporting turtle nesting surveys (3 total) and incidental screenings (10 total) occurred during suitable seasonality and weather conditions in 2019 and 2021, none of which demonstrated evidence of Blanding’s Turtle.

Based on the above, Azimuth concludes that the survey program undertaken for Blanding’s Turtle on the subject property has demonstrated complete absence of the species to a high level of confidence. At this time Azimuth requests that MECP indicate concurrence with the conclusions of our study, and indicate that for the purposes of advancement of the IGF/AAF, the species will be considered absent. Pending MECP’s satisfaction of Azimuth’s conclusions regarding Blanding’s Turtle, we request that remaining species documented in the IGF and AAF be considered with regard for



potential impacts based on the proposed development, including advancement of the approvals process with respect to Bobolink and Eastern Meadowlark habitat documented on the subject property.

Certainly should you have any additional questions or concerns, or wish to discuss further please do not hesitate to contact the undersigned.

Yours truly,
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Dan Stuart, M.Env.Sc.
Ecology Lead

Attached:

MECP Correspondence #1 (March 4, 2022 & May 30, 2022)

Figure 1: Study Area Location

Figures 2a-2b: Environmental Features

Table 1: Blanding's Turtle Survey Log

Dan Stuart

From: Snell, Shamus (MECP) [Shamus.Snell@ontario.ca]
Sent: May-30-22 10:33 AM
To: Dan Stuart
Cc: Mike Jones; skirby@symphonygolf.com
Subject: MECP SARB Review Complete: IGF & AAF - Proposed Mineral Aggregate Quarry
Attachments: NHIC_Make_A_Map_2022_05_18.JPG

Categories: Red Category

Hi Dan,

On further examination of the occurrence record, it appears it was not actually loaded into the Natural Heritage Information System (NHIC) until March 15th, 2019 which is just over a month after you would have received the response to your information request. I also checked the information contained online on NHIC's make-a-map application and confirmed that Blanding's Turtle is listed for that 1km grid square. This highlights the importance of regularly checking information sources for new occurrences as they are uploaded on a daily basis.

I have spoken to the Species at Risk Specialists, in particular our Herpetology Specialist, and there is general agreement that while some major highways like the 400 series or those with complete Jersey barriers in the center (i.e. highway 11 south of Gravenhurst) would act as barriers to movement but most two lane highways such as highway 12 would not be considered barriers to movement. Rather, these highways would be considered areas with increased mortality potential which turtles are still able to cross. This would mean the habitat within the subject property could still be accessed and utilized by Blanding's Turtle. Therefore, any suitable habitat which is defined within the General Habitat Description for Blanding's Turtle would be considered protected habitat and would be considered occupied.

With these points in mind, it means that multiple years of surveys would need to be performed to confirm absence of Blanding's Turtle from the subject property. A single years worth of additional surveys as you proposed would be insufficient to confirm absence of Blanding's Turtle. In order to proceed with the assessment of potential impacts, Species at Risk Branch (SARB) will need to receive an updated Information Gathering Form (IGF) which either:

- clearly provides evidence of **complete absence** of Blanding's Turtle and their habitat from the subject property or;
- include mapping of the habitat according to the General Habitat Description for Blanding's Turtle and an assessment of the impacts to the habitat.

Once SARB receives the additional information, it will then complete its review as it is best practice to complete reviews of projects in their entirety rather than of multiple submissions for individuals aspects of a project or specific species.

Regards,

Shamus Snell
A/ Management Biologist
Species at Risk Branch
Ministry of Environment, Conservation and Parks

Email: shamus.snell@ontario.ca

From: Dan Stuart <dstuart@azimuthenvironmental.com>

Sent: April 19, 2022 10:56 AM

To: Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>

Cc: Mike Jones <Mike@Azimuthenvironmental.Com>; skirby@symphonygolf.com

Subject: RE: MECP SARB Comments: IGF & AAF - Proposed Mineral Aggregate Quarry, Part of Lot 11 & 12, Con 1

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning Shamus,

Please see the attached revised IGF, AAF, and comment matrix for ease of review, in response to comments received from SARB on March 4, 2022 for the proposed mineral aggregate quarry on part of Lot 11 & 12, Con 1, Township of Ramara.

Feel free to add an additional column to the attached matrix if you wish to reply to individual comments directly. Azimuth requests that MECP provide a response to comment #1 in particular, regarding the proposed expanded 2022 survey program for Blanding's Turtle.

We look forward to further discussion.

Regards,

Dan Stuart
Ecology Lead

Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, ON, L4N 9A1
cell: (705) 794-0975
dstuart@azimuthenvironmental.com
www.azimuthenvironmental.com

Providing services in hydrogeology, terrestrial and aquatic ecology & environmental engineering

From: Snell, Shamus (MECP) [<mailto:Shamus.Snell@ontario.ca>]

Sent: March-04-22 8:16 AM

To: Dan Stuart

Cc: Mike Jones; skirby@symphonygolf.com

Subject: MECP SARB Comments: IGF & AAF - Proposed Mineral Aggregate Quarry, Part of Lot 11 & 12, Con 1

Hi Dan,

Below are the Ministry of Environment, Conservation and Parks (MECP) Species at Risk Branch (SARB) comments regarding the Information Gathering Form (IGF) that was submitted for Proposed Mineral Aggregate Quarry. SARB looks forward to receiving an updated IGF addressing the comments and recommendations below.

General Comments

- There is a Blanding's Turtle occurrence [REDACTED]. This occurrence would trigger the habitat protection as defined in the General Habitat Description (GHD) for Blanding's Turtle (attached). Once a Blanding's Turtle occurrence has been recorded and protected habitat has been

triggered, it takes multi-year surveys to confidently demonstrate that Blanding's Turtle are absent from the subject property. Therefore, the single year's worth of surveys which was completed is insufficient to prove absence of Blanding's Turtle and its habitat from the subject property as stated in the Survey Protocol for Blanding's Turtle. Any habitat which is suitable for Blanding's Turtle as defined by the GHD must be mapped and any adverse impacts accounted for in table 4.

- Blanding's Turtle occurrence information: [REDACTED] Comments: Female turtle on road Date: June 28th, 2017
- Please note the specific location of the occurrence must be kept confidential and cannot be included in any reports which may become public or in any way disclosed to a member of the public. It has been provided to Azimuth Environmental to assist with habitat mapping.
- The 2021 Bat Survey Standards Note and related protocols have been attached to this email. The IGF should be cross referenced with the note and protocols to confirm the information presented for bats is still aligned with current direction including considerations for trees of a Diameter at Breast Height (DBH) of 10 cm or more.
- Please examine if the activities associated with operation (i.e. blasting, noise, dust) of this mineral aggregate quarry will have any adverse impacts to Species at Risk.
- Please revise the name of the IGF document to match the proposed title. Further, there are a number of aggregate operations in this area that all include Brechin or Ramara in the title of the project. The proponent may wish to adopt a "common" name for this project to differentiate it from the others.
- Please provide additional information regarding the condition of the abandoned silo and its immediate area which appear to be the remnants of an old barn. In at least one instance, the IGF suggests there is no roof and imagery suggests that it is still standing but that is unclear. Please provide pictures of this area if available especially any which may show the inside of the silo. If such pictures are unavailable, please state if the inside of the silo could be accessed and if it was check for the presence of any nests and guano.

Section 1

- Please revise the primary surveyor's summary of experience to focus on their Species at Risk and Endangered Species Act experience and knowledge.

Table 2

- The survey information provided states that visual encounter surveys were performed with two different intents. Please state the number of stations that were completed for each type of visual encounter survey. In addition, please identify which type of visual encounter survey each station is associated with in attachments 2a and 2b.

Table 3

Bobolink and Eastern Meadowlark

- Please separate Bobolink and Eastern Meadowlark into their own columns so each species can be more closely examined.
- Please state the total number of individuals observed during the surveys for each species. If the specific number is unavailable, please provide an estimate.
- Please state the total number of suspected nest locations for each species.

Barn Swallow

- Barn Swallow are listed as being absent from the subject property when at least one individual was observed during surveys. Please check the box to state "individuals of the species present".

Table 4

Bobolink and Eastern Meadowlark

- Please separate Bobolink and Eastern Meadowlark into their own columns as SARB can only examine impacts to specific species.
- Category 3 habitat for Bobolink and Eastern Meadowlark has not been included or addressed in this table. Category 3 is intended to provide an area for feeding, rearing of young, resting, dispersal and concealment from predators. While this category of habitat can withstand a high level of tolerance to alteration, it is unclear how this habitat will function, if at all, if the overburden is removed. Please include and address the impacts to Category 3 habitat in this table.
- The IGF states the proponent is actively engaged with MECP regarding creation of compensatory habitat near the southwest shoreline of Lake Dalrymple. Please note the creation of habitat intended to be used as overall benefit cannot be created prior to the issuance of an Endangered Species Act authorization. If such habitat is created prior to the issuance of an authorization, it cannot be considered towards the required overall benefit. While not within the scope of this form, please be aware that overall benefit is more than just like for like or one for one replacement of habitat. More information on the concept of overall benefit can be found on our website here: <https://www.ontario.ca/page/endangered-species-act-submission-standards#section-2>
- Information for the proposed overall benefit is intended to be examined in the C-Permit Application Form (CPAF). This form is not intended to be used to examine the proposed actions associated with an authorization under Section 17(2)(c), Overall benefit permit, of the Endangered Species Act. Only actions which are a direct result of the proposed activity (mineral aggregate quarry operation) should be examined in this table. Remove information pertaining to any overall benefit actions.
- Please ensure the information regarding the impacts of the project proposal is contained within the correct column. For example, information regarding the amount of habitat to be removed for Bobolink and Eastern Meadowlark is NOT a positive effect and needs to be contained in the column for “How and to what extent each species or habitat may be ADVERSLY affected”

Figure 3a and Figure 3b

- Please include Category 3 habitat for Bobolink and Eastern Meadowlark.

A number of general comments regarding how to complete an Avoidance and Alternatives Form (AAF) have been provided below. Please consider them and revise the AAF accordingly. Once a revised AAF is provided considering the comments below, SARB will provide relevant content and specific comments regarding the AAF.

- The AAF is intended to describe alternative approaches to the activity that would either lessen or not adversely affect the protected species at risk or habitat. This is more than simply listing the mitigation measures to reduce Section 9 impacts as these are generally standard for each alternative. These alternatives examine ways which the activity or the development footprint (**e.g., alternative locations**) could be modified so that it reduces the impacts of the proposed project on Species at Risk. As an oversimplified example, a proposed crossing over Redside Dace habitat might examine four different alternatives:
 - Alternative 1) Do nothing – In this example the activity would not be performed and would not have any impacts to Species at Risk or their habitat. This alternative is generally used to demonstrate the need for the activity in the “Effectiveness in meeting the main purpose of the activity” column.
 - Alternative 2) Culverts – This example is likely to be the most impactful but may be the preferred option due to the financial limitations of the project.
 - Alternative 3) Bridge with middle support – This alternative would likely have a moderate impact to the habitat when compared to a culvert.

- Alternative 4) Free Span Bridge – The alternative could allow the project to be completed without any impacts to Redside Dace but likely to be too cost prohibitive which could be examined in detail in the “potential limitations” column. However, if the impacts to Redside Dace or their habitat don’t occur an Endangered Species at Risk Authorization may not be required for this alternative.
- When considering reasonable alternatives to your activity, you must:
 - consider at least one alternative that would completely avoid any adverse effects on species at risk;
 - identify alternatives that you considered but did not think were reasonable because of biological, technical, social or economic limitations;
 - explain why the approach you have chosen is the best alternative.
- Alternative approaches to your activity include:
 - changing the location of the activity;
 - using alternative methods, equipment or technical designs;
 - changing the geographic scale, duration and/or frequency of the potential adverse effects.

SARB looks forward to receiving a revised IGF and AAF which address the comments and suggestions made above.

Regards,

Shamus Snell
 A/ Management Biologist
 Species at Risk Branch
 Ministry of Environment, Conservation and Parks
 Email: shamus.snell@ontario.ca

From: Dan Stuart <dstuart@azimuthenvironmental.com>
Sent: January 28, 2022 10:00 AM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: Mike Jones <Mike@Azimuthenvironmental.Com>; skirby@symphonygolf.com
Subject: IGF & AAF - Proposed Mineral Aggregate Quarry, Part of Lot 11 & 12, Concession 1 (Township of Ramara)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning,

Please accept the requested Information Gathering Form and Avoidance Alternatives Form for a potential future mineral aggregate quarry on part of Lot 11 & 12, Concession 1 in the Township of Ramara (County of Simcoe), south of the community of Brechin. Both documents are available through the link below:

<https://www.dropbox.com/sh/rtul5iqfh2k4p79/AABmLQm0X-TlqXMITS4B4k9ea?dl=0>

We kindly request that MECP indicate receipt of the documents. Should you have any questions during review of the forms, please do not hesitate to reach out to me.

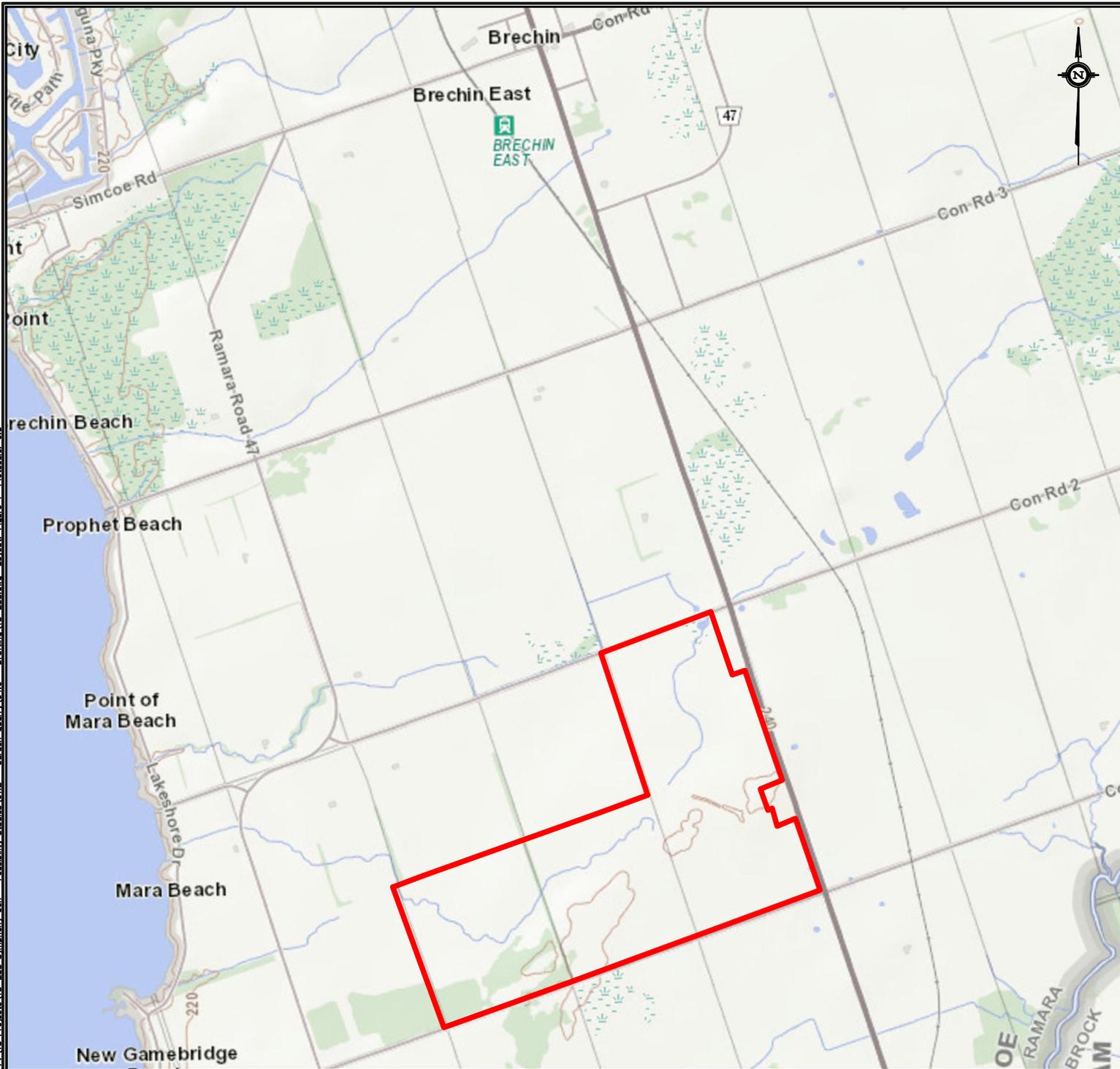
Regards,

Dan Stuart
 Ecology Lead

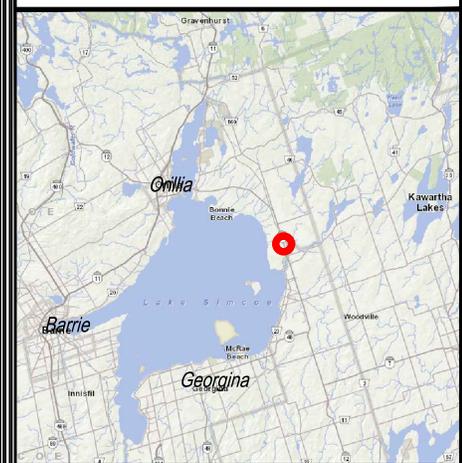
Azimuth Environmental Consulting, Inc
642 Welham Road
Barrie, ON, L4N 9A1
cell: (705) 794-0975
dstuart@azimuthenvironmental.com
www.azimuthenvironmental.com

*Providing services in **hydrogeology, terrestrial and aquatic ecology & environmental engineering***

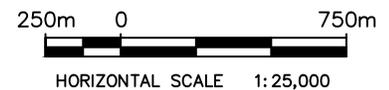
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File: P:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg - Layout: Figure 1 - Plotscale: 0.5



LEGEND:
— *Approx. Property Boundary*



REG MAP

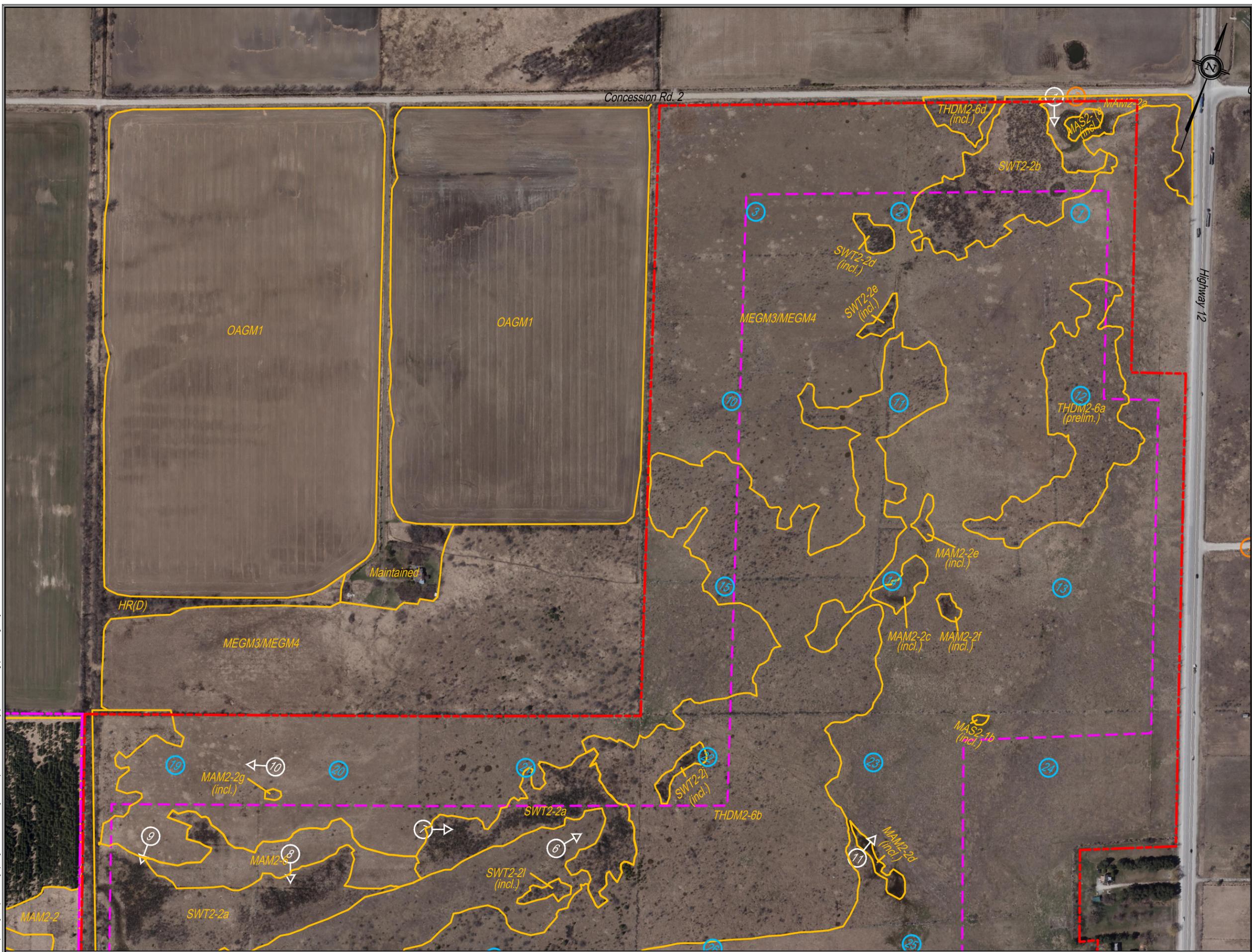


Study Area Location

Carden Quarry,
Brechin, ON

DATE ISSUED: January 2022	Figure No. 1
CREATED BY: JLM	
PROJECT NO.: 18-288	
REFERENCE: MNR	

Plotted by: ALU on January 11, 2022 at 12:33pm
 File: P:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg Layout: EIS2a Protocol: 0.5



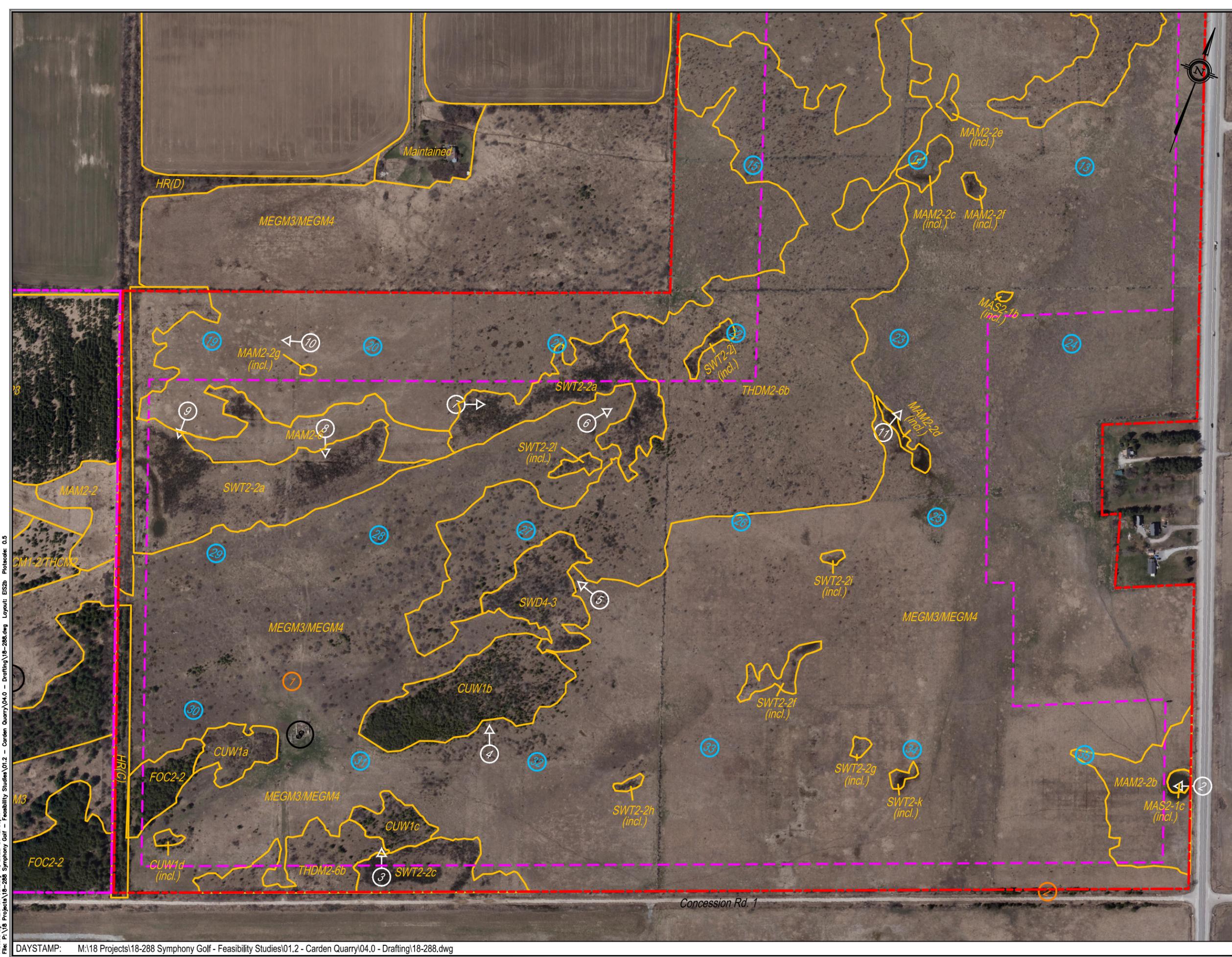
- LEGEND:**
- Approx. Property Boundary
 - Other Lands Owned by Applicant
 - Development Footprint
 - ⊙ Structures
 - ⊕ Dawn Breeding Bird Point Count Station
 - ⊕ Evening Breeding Bird Point Count Station
 - ← ⊕ Amphibian Stations and Direction (white)
 - Vegetation Communities
- FOC2-2 Dry-Fresh White Cedar Coniferous Forest
 - MEGM3 Dry-Fresh Graminoid Meadow
 - MEGM4 Fresh-Moist Graminoid Meadow
 - THDM2-6 Buckthorn Deciduous Shrub Thicket
 - CUW1 Mineral Cultural Woodland
 - SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
 - SWT2-2 Willow Mineral Thicket Swamp
 - MAM2-2 Reed Canary Grass Mineral Meadow Marsh
 - MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh
 - MAS2-1 Cattail Mineral Shallow Marsh
 - OAGM1 Annual Row Crops
 - HR(D) Deciduous Hedgerow
 - HR(C) Coniferous Hedgerow



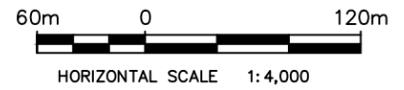
Environmental Features

**Carden Quarry
 Brechin, ON**

DATE ISSUED:	January 2022	Figure No.
CREATED BY:	JLM	2a
PROJECT NO.:	18-288b	
REFERENCE:	Simcoe County Maps	



- LEGEND:**
- Approx. Property Boundary
 - Other Lands Owned by Applicant
 - Development Footprint
 - ⊙ Structures
 - ⊕ Dawn Breeding Bird Point Count Station
 - ⊕ Evening Breeding Bird Point Count Station
 - ⬅ ⊕ Amphibian Stations and Direction (white)
 - Vegetation Communities
- FOC2-2 Dry-Fresh White Cedar Coniferous Forest
 - MEGM3 Dry-Fresh Graminoid Meadow
 - MEGM4 Fresh-Moist Graminoid Meadow
 - THDM2-6 Buckthorn Deciduous Shrub Thicket
 - CUW1 Mineral Cultural Woodland
 - SWD4-3 White Birch-Poplar Mineral Deciduous Swamp
 - SWT2-2 Willow Mineral Thicket Swamp
 - MAM2-2 Reed Canary Grass Mineral Meadow Marsh
 - MAM2-6 Broad-leaved Sedge Mineral Meadow Marsh
 - MAS2-1 Cattail Mineral Shallow Marsh
 - OAGM1 Annual Row Crops
 - HR(D) Deciduous Hedgerow
 - HR(C) Coniferous Hedgerow



Environmental Features

**Carden Quarry
Brechin, ON**

DATE ISSUED:	January 2022	Figure No.
CREATED BY:	JLM	2b
PROJECT NO.:	18-288b	
REFERENCE:	Simcoe County Maps	

Plotted by: ALJ on January 11, 2022 at 12:33pm
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 DAYSTAMP: M:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg

Table 1: Blanding's Turtle Survey Log

Date	Duration	Temperature (°C)	Beaufort	Cloud Cover (%)	Precip	# Surveyors	Description
25-Apr-19	16:00-16:15, 16:30-17:00	12 (min), 17 (max)	1	20	None	1	Turtle Emergence #1 No turtle evidence observed.
07-May-19	12:30-13:00, 13:30-14:00, 15:00-15:30	9 (min), 11 (max)	3	0	None	1	Turtle Emergence #2 No turtle evidence observed
08-May-19	09:15-09:45 10:15-10:45 11:45-12:15	7 (min), 9 (max)	3	0	None	1	Turtle Emergence #3 No turtle evidence observed
29-May-19	16:00-16:15, 16:30-17:00	13 (min), 16 (max)	3	40-100	None	1	Turtle Emergence #4 No turtle evidence observed
29-May-19	19:45-20:30 20:45-21:15	13 (min), 16 (max)	3	40-100	None	1	Turtle Nesting Survey #1 No turtle evidence observed
06-Jun-19	09:00-09:15 09:30-10:00	11 (min), 13 (max)	0-1	0-30	None	2	Turtle Emergence #5 No turtle evidence observed
06-Jun-19	08:00-09:00	11 (min), 13 (max)	0-1	0-30	None	1	Incidental Turtle Screening #1 No turtle evidence observed
12-Jun-19	21:00-21:30 21:30-22:15 22:30-23:00	18	1	40	None	1	Turtle Nesting Survey #2 No turtle evidence observed
19-Jun-19	08:00-15:30	14 (min), 22 (max)	0-1	30	None	1	Incidental Turtle Screening #2 No turtle evidence observed
25-Jun-19	19:45-20:30 20:45-21:15	21 (max), 19 (min)	0	0	None	1	Turtle Nesting Survey #3 No turtle evidence observed

Table 1: Blanding's Turtle Survey Log

Date	Duration	Temperature (°C)	Beaufort	Cloud Cover (%)	Precip	# Surveyors	Description
27-Jun-19	08:00-09:45	18 (min), 21 (max)	1	5	None	1	Incidental Turtle Screening #3 No turtle evidence observed
08-Jul-19	08:30-16:00	20 (min), 25 (max)	1	0	None	1	Incidental Turtle Screening #4 No turtle evidence observed
09-Jul-19	12:30-17:00	27 (max), 21 (min)	2-0	0-5	None	1	Incidental Turtle Screening #5 No turtle evidence observed
10-Jul-19	12:45-17:00	26 (min), 28 (max)	3-1	5-80	None	1	Incidental Turtle Screening #6 No turtle evidence observed
17-Sep-19	09:30-16:30	26	3	0	None	1	Incidental Turtle Screening #7 No turtle evidence observed
18-Sep-19	08:30-15:30	24	3	25	None	1	Incidental Turtle Screening #8 No turtle evidence observed
12-Jul-21	08:30-16:00	24	3	40	None	1	Incidental Turtle Screening #9 No turtle evidence observed
01-Oct-21	08:00-13:00	11 (min), 17 (max)	1	90	None	1	Incidental Turtle Screening #10 No turtle evidence observed
21-Apr-22	09:00-09:30						Turtle Emergence #6
	09:55-10:25 10:45-11:15	5	2	50	None	2	No turtle evidence observed
09-May-22	09:00-09:30						Turtle Emergence #7
	09:45-10:15 10:15-10:45	14	2	10	None	1	No turtle evidence observed

Table 1: Blanding's Turtle Survey Log

Date	Duration	Temperature (°C)	Beaufort	Cloud Cover (%)	Precip	# Surveyors	Description
11-May-22	09:30-10:00 10:15-10:45 11:15-11:45	17 (min), 19 (max)	1	20	None	1	Turtle Emergence #8 One (1) Midland Painted Turtle observed basking in northeast pond
12-May-22	09:00-09:20 09:35-09:55 10:00-10:20	14 (min), 20 (max)	1	0	None	1	Turtle Emergence #9 Two (2) Midland Painted Turtles observed basking in northeast pond Two (2) Midland Painted Turtles observed basking in southwest pond
24-May-22	09:30-09:50 09:55-10:15 10:35-10:55	12 (min), 15 (max)	2-3	50	None	1	Turtle Emergence #10 One (1) Midland Painted Turtle observed basking in northeast pond
08-Jun-22	09:25-09:45 09:50-10:10 10:30-10:50	16 (min), 17 (max)	2	0	None	1	Turtle Emergence #11 Two (2) Midland Painted Turtles observed basking in northeast pond One (1) Midland Painted Turtle observed basking in southwest pond
09-Jun-22	15:25-15:45 16:00-16:20 16:35-16:55	18	2	50	None	1	Turtle Emergence #12 No turtle evidence observed

Date	Duration	Temperature (°C)	Beaufort	Cloud Cover (%)	Precip	# Surveyors	Description
10-Jun-22	10:10-10:30 10:45-11:05 11:20-11:40	18 (min), 19 (max)	2	0	None	1	Turtle Emergence #13 One (1) Midland Painted Turtle observed basking in northeast pond
14-Jun-22	12:45-13:30 13:45-14:25 14:40-15:15	21 (min), 22 (max)	1-2	5	None	1	Turtle Emergence #14 (RiverStone) No turtle evidence observed
15-Jun-22	11:00-11:35 11:50-12:20 12:30-13:00	20 (min), 22 (max)	1-2	15	None	1	Turtle Emergence #15 (RiverStone) No turtle evidence observed

Dan Stuart

From: Eplett, Megan (MECP) [Megan.Eplett@ontario.ca]
Sent: June-15-23 10:51 AM
To: Dan Stuart
Cc: skirby@symphonygolf.com
Subject: RE: IGF & AAF (3rd Submission) - Proposed Mineral Aggregate Quarry, Part of Lot 11 & 12, Con 1

Categories: Red Category

Hello Dan,

Apologies for the lengthy time for my review. Please find below comments pertaining to species at risk and required authorizations for the proposed quarry (Brechin Quarry) located at Part of Lots 11 and 12, Concession 1 in the Township of Ramara, County of Simcoe.

Blanding's Turtle

I understand through discussions with Shamus Snell a Blanding's Turtle record was identified within 1 km of the subject property. Through past discussions, Shamus indicated that to move forward either a C permit application be submitted for the removal of wetland habitat on site or additional surveys be undertaken to aim to demonstrate absence of species use on site.

MECP has reviewed the supplemental information and additional survey results from the 2022 targeted Blanding's Turtle surveys. The level of survey effort undertaken and the results appear to demonstrate with some confidence that Blanding's Turtle individuals are not utilizing the wetland features on site. Therefore the conclusion that Azimuth Environmental has made that it is unlikely the proposed aggregate operation will damage and/ or destroy Blanding's Turtle habitat and that neither sections 9 nor 10 of the ESA will be contravened for Blanding's Turtle, appear reasonable and valid and therefore authorization is not required.

As the project is within movement range of the species and several occurrences have been documented in the larger wetlands to the north and south of the property it is possible that Blanding's Turtles could be moving through the subject lands. As such MECP advises that appropriate mitigation measures be undertaken to ensure no incidental harm or Section 9 impacts (harm/ harass/ kill) occur on site. Mitigation measures could include, fencing to prevent access to work zones, worker awareness and training, and an operating protocol should a turtle be encountered on site.

Little Brown Myotis

MECP understands there are some treed areas and a portion of an FOC community that is within the proposed aggregate extraction boundary. MECP also understands the remnant silo structure was examined for evidence of roosting birds/ bats and no evidence was present to suggest that these species had been using the structure.

It is understood from the information provided in the Table 3 of the IGF related to species at risk bats that it has been determined that the site is unlikely to support a maternity roost functions and therefore the removal of trees on site would not impact species at risk bats, specifically Little Brown Myotis. This conclusion appears reasonable.

As it is extremely difficult to confirm roosting for species at risk bats MECP advises that any tree removals occur outside of March 15 - November 30 of any given year. The extension of the tree

removal window into November is to protect Eastern small-footed Bat which can remain on the landscape longer into the fall.

Butternut and Black Ash

It is noted that these species were searched for on site during vegetation surveys and individuals were not confirmed on site.

Bobolink and Eastern Meadowlark

MECP understands from the information provided in Table 2 of the IGF that Bobolink and Eastern Meadowlark were confirmed breeding on site and their habitat will be impacted by the proposed aggregate operations. As the area of habitat to be removed is greater than 30 ha a 17(2)C permit will be required to move forward.

MECP SARB understands that an Avoidance Alternatives Form has been submitted in support of the permit process for Eastern Meadowlark and Bobolink. In order to advance the project MECP will require a C Permit Application for Eastern Meadowlark and Bobolink. Please include information regarding proposed mitigation measures for Eastern Meadowlark and Bobolink, proposed overall benefit actions and project timelines.

Should you have any questions while completing the C Permit Application Form please feel free to contact me.

Thanks,

Megan

Megan Eplett | Management Biologist | Landscape Species Recovery Section | Species at Risk Branch

Ministry of the Environment, Conservation and Parks | Email: megan.eplett@ontario.ca

From: Dan Stuart <dstuart@azimuthenvironmental.com>

Sent: Friday, March 24, 2023 11:32 AM

To: Eplett, Megan (MECP) <Megan.Eplett@ontario.ca>

Cc: skirby@symphonygolf.com; Species at Risk (MECP) <SAROntario@ontario.ca>

Subject: IGF & AAF (3rd Submission) - Proposed Mineral Aggregate Quarry, Part of Lot 11 & 12, Con 1

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning Megan,

Hope things are well with you and you enjoyed your parental leave.

You may recall our previous discussions and meeting regarding the proposed Brechin Quarry project (Part Lot 11 & 12, Concession 1, Township of Ramara) in December 2020 – at which time we reviewed the project in general and preliminary results of Species at Risk surveys to date.

Since that time we have submitted an IGF/AAF package for the property (January 2022) received by the Acting Management Bio (Shamus Snell), to which comments were received in March 2022. Azimuth re-submitted the IGF/AAF package in April 2022 based on MECP comments, to which a second response was received in May 2022.

The main challenge to moving forward with the submission was (in MECP's view) the need for the application to demonstrate complete absence of Blanding's Turtle (or otherwise assume presence), considering an occurrence of the species has been documented [REDACTED]. Azimuth conducted additional surveys in spring 2022 to strengthen conclusions regarding absence of the species, as referenced in the document available here:

<https://www.dropbox.com/scl/fo/nmu8zae1oepohaep3bhva/h?dl=0&rlkey=wdgkiyrrl2i98da7aq2zkduzq>

The following documents are included within the linked folder:

- IGF 3rd submission (March 24, 2023)
- AAF 3rd submission (March 24, 2023)
- Detailed response letter regarding Blanding's Turtle survey program (also attached to the IGF)
- Comment/response matrix summarizing all correspondence to date related to the IGF/AAF submission process

Please let me know if you have any questions about the attached. We look forward to discussing with you further, and moving forward with the application.

Regards,

Dan Stuart, M.Env.Sc.

Ecology Lead

Azimuth Environmental Consulting, Inc.

642 Welham Road

Barrie, Ontario, L4N 9A1

Office: 705-721-8451 x208

Fax: 705-721-8926

Cell: 705-794-0975

www.azimuthenvironmental.com

Providing services in hydrogeology, terrestrial and aquatic ecology, and arborist assessment

Dan Stuart

From: Wetlands (MNRF) [Wetlands@ontario.ca]
Sent: May-03-23 2:43 PM
To: Dan Stuart
Subject: RE: Wetland Evaluations: Lots 11 & 12, Concession 1, Township of Ramara (Ontario Wetland Evaluation System)

This email is to acknowledge receipt of the wetland evaluation information you have forwarded to the Ministry.

If there is an issue with the integrity of the file, the Ministry will follow-up with you. Otherwise, the information will be included into the provincial wetland data class which can be accessed at <https://geohub.lio.gov.on.ca/datasets/mnrf:wetlands/about>.

From: Dan Stuart <dstuart@azimuthenvironmental.com>
Sent: April 12, 2023 8:41 AM
To: Shirley, Brent (MNRF) <brent.shirley@ontario.ca>
Cc: Wetlands (MNRF) <Wetlands@ontario.ca>
Subject: RE: Wetland Evaluations: Lots 11 & 12, Concession 1, Township of Ramara (Ontario Wetland Evaluation System)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Brent,

Thank you for the information, the reply is much appreciated. Hope things are well with you.

I am copying wetlands@ontario.ca and including the three (3) geospatial files included in my original April 4th email, if by chance it was not already forwarded.

Thanks again,

Dan Stuart, M.Env.Sc.
Ecology Lead

Azimuth Environmental Consulting, Inc.
642 Welham Road
Barrie, Ontario, L4N 9A1
Office: 705-721-8451 x208
Fax: 705-721-8926
Cell: 705-794-0975
www.azimuthenvironmental.com

Providing services in hydrogeology, terrestrial and aquatic ecology, and arborist assessment

From: Shirley, Brent (MNRF) [<mailto:brent.shirley@ontario.ca>]
Sent: April-12-23 8:32 AM
To: Dan Stuart
Subject: RE: Wetland Evaluations: Lots 11 & 12, Concession 1, Township of Ramara (Ontario Wetland Evaluation System)

Good morning Dan,

- Thank you for your recent submission of data using the Ontario Wetland Evaluation System (OWES).
- As you may be aware, in 2022 the ministry consulted on changes to the OWES. A decision was posted December 22, 2022 making changes to the OWES that came into effect on January 1, 2023. These changes can be found on the Environmental Registry of Ontario, under posting number [019-6160](#).
- The changes made to OWES include:
 - changes to how species at risk are scored
 - removal of wetland complexing
 - guidance on how wetlands can be re-evaluated
 - better recognition and reliance on the opinion of trained wetland evaluators
- With these changes, we're happy to provide more information about the new wetland evaluation process and the Ministry of Natural Resources and Forestry's (MNR's) role.
- Trained evaluators can undertake wetland evaluations, re-evaluations and/or mapping updates following the revised versions of OWES. As per the revised manuals, the wetland evaluator must:
 - attest that the wetland evaluation, re-evaluation or mapping update was completed in accordance with the new edition of the OWES manual by signing the wetland evaluation and scoring record
 - send the final evaluation (including associated wetland boundary mapping) to the appropriate planning authority (e.g., municipality)
 - For areas outside of municipal boundaries, please see the applicable OWES manual (Northern or Southern) to determine to whom the evaluation should be sent.
 - submit the final digital wetland boundary mapping and the wetland's status (e.g., significant or not) within 30 days of completing an evaluation to MNR at wetlands@ontario.ca

We encourage you to follow the process detailed above for submission of new wetland data moving forward. Should you have further questions regarding the Ministry's role in wetlands please contact Brent Shirley at brent.shirley@ontario.ca.

Best Regards,

Brent Shirley | District Supervisor (A) | Midhurst District | Ministry of Natural Resources and Forestry (MNR)
 Cell: (705) 718-3145 | Email: brent.shirley@ontario.ca

Learn more at ontario.ca/fishing or ontario.ca/hunting



Please Note:

The government is committed to providing [accessible customer service](#), if you have any accommodation needs, or require communication supports or alternate formats, please let me know. In order to serve you better, please call ahead for an appointment.

From: Dan Stuart <dstuart@azimuthenvironmental.com>

Sent: April 4, 2023 11:05 AM

To: MIDHURSTINFO (MNRF) <MIDHURSTINFO@ontario.ca>

Subject: Wetland Evaluations: Lots 11 & 12, Concession 1, Township of Ramara (Ontario Wetland Evaluation System)

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning,

Please accept wetland geospatial filesets for three (3) separate wetland units located on Lots 11 & 12, Concession 1, Township of Ramara (attached).

Wetlands have been evaluated in accordance with the Ontario Wetland Evaluation System (V4, December 2022) and were completed by a provincially-certified Wetland Evaluator (Dan Stuart, Azimuth Environmental Consulting, Inc.).

In accordance with the OWES system, all three (3) wetland units (Wetland Unit #1, Wetland Unit #2, Wetland Unit #3) were scored as **non-significant**.

Certainly should you have any questions please do not hesitate to get in touch.

Regards,

Dan Stuart, M.Env.Sc.

Ecology Lead

Azimuth Environmental Consulting, Inc.

642 Welham Road

Barrie, Ontario, L4N 9A1

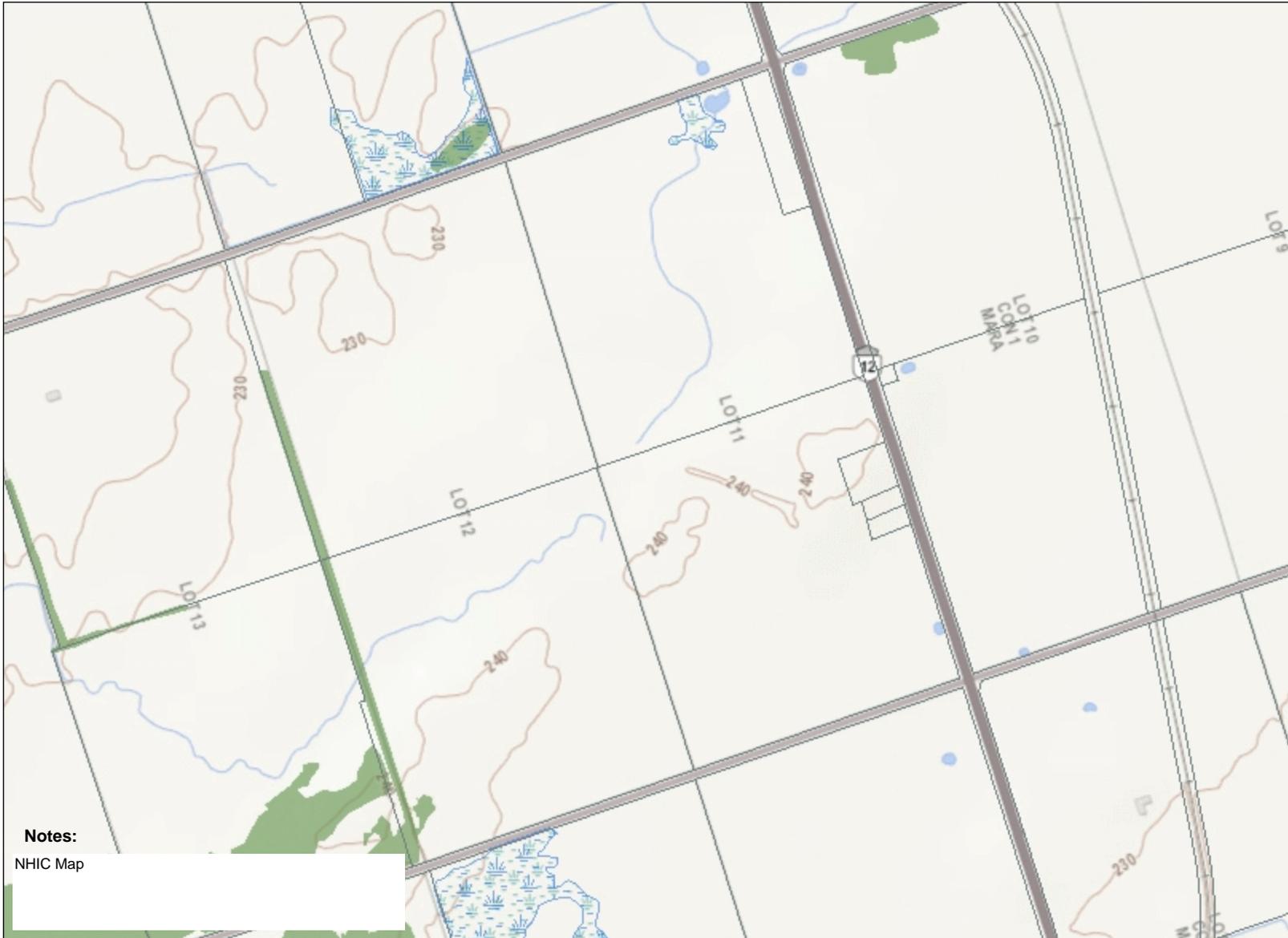
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Fax: 705-721-8926

Cell: 705-794-0975

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Notes:

NHIC Map

Legend

-  Assessment Parcel
- ANSI**
-  Earth Science Provincially Significant/sciences de la terre d'importance provinciale
-  Earth Science Regionally Significant/sciences de la terre d'importance régionale
-  Life Science Provincially Significant/sciences de la vie d'importance provinciale
-  Life Science Regionally Significant/sciences de la vie d'importance régionale
-  Evaluated Wetland
-  Provincially Significant/considérée d'importance provinciale
-  Non-Provincially Significant/non considérée d'importance provinciale
-  Unevaluated Wetland
-  Woodland
-  Conservation Reserve
-  Provincial Park
-  Natural Heritage System



Absence of a feature in the map does not mean they do not exist in this area.

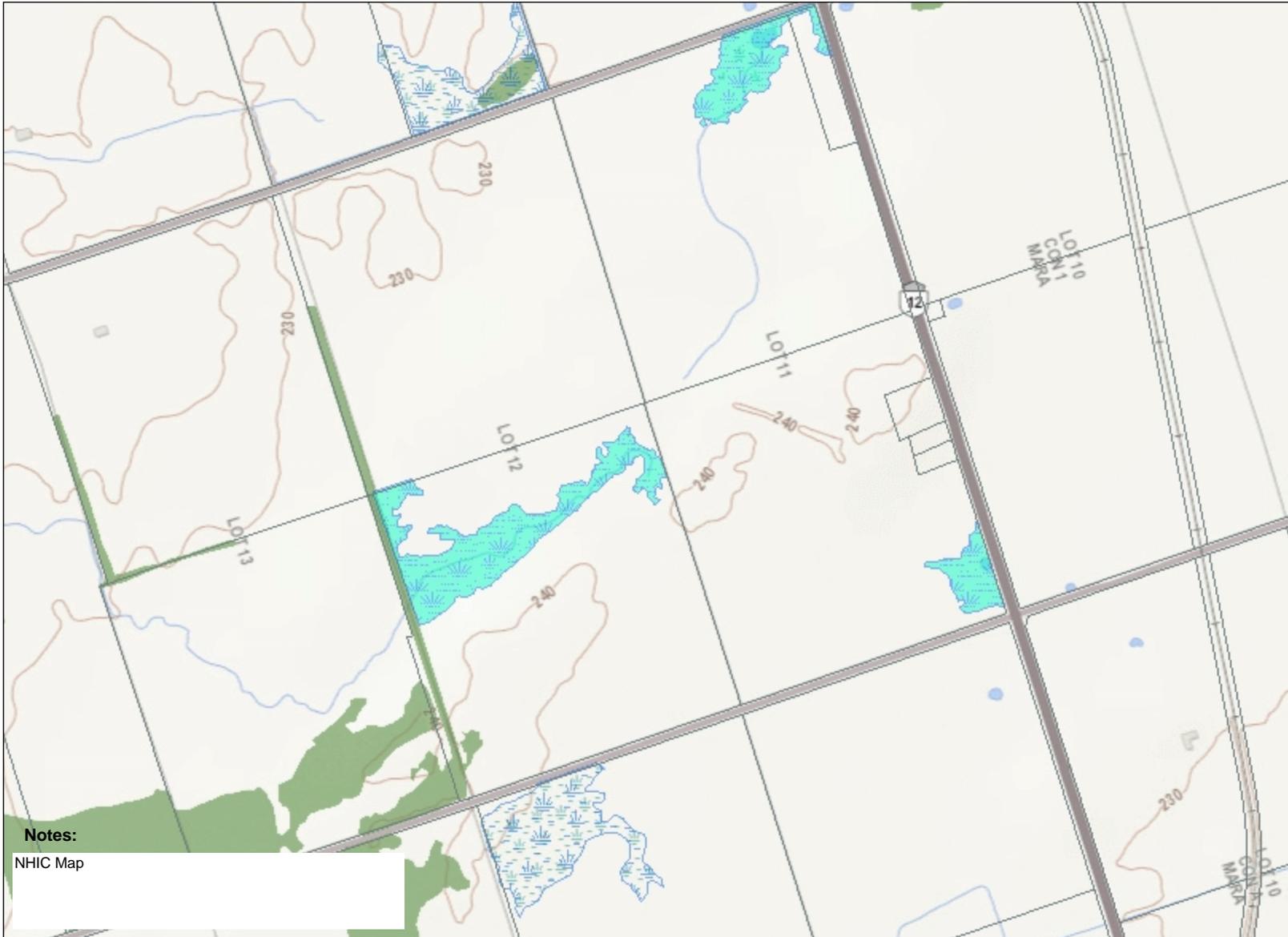
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Legend

-  Assessment Parcel
-  ANSI
-  Earth Science Provincially Significant/sciences de la terre d'importance provinciale
-  Earth Science Regionally Significant/sciences de la terre d'importance régionale
-  Life Science Provincially Significant/sciences de la vie d'importance provinciale
-  Life Science Regionally Significant/sciences de la vie d'importance régionale
-  Evaluated Wetland
-  Provincially Significant/considérée d'importance provinciale
-  Non-Provincially Significant/non considérée d'importance provinciale
-  Unevaluated Wetland
-  Woodland
-  Conservation Reserve
-  Provincial Park
-  Natural Heritage System

Notes:

NHIC Map



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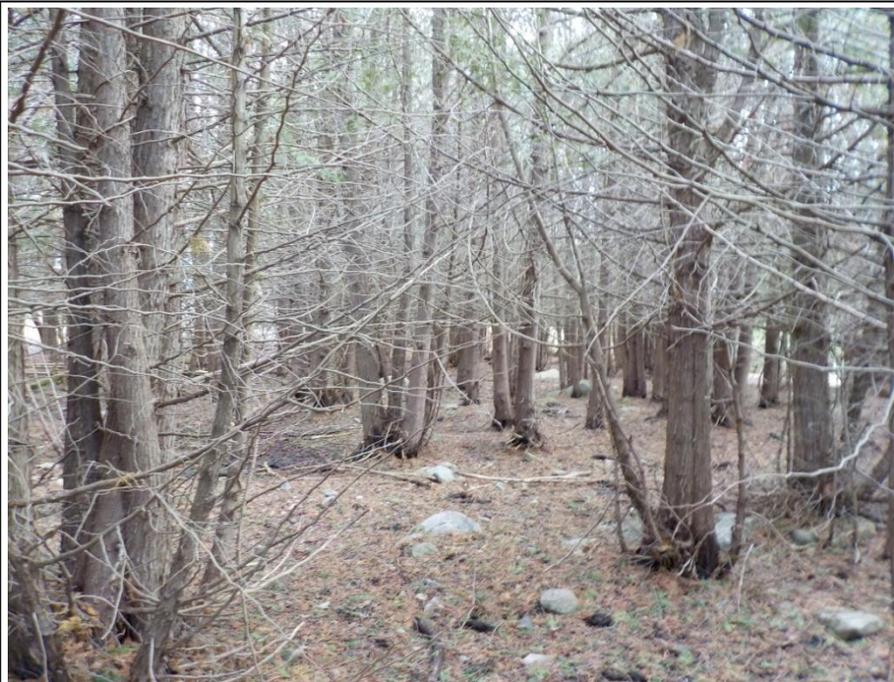


APPENDIX E

Photographic Record



**Photo 1: View of FOC2-2 polygon from north edge facing south
– April 25, 2019**



**Photo 2: Typical understory/ground cover conditions within
FOC2-2 polygon – April 25, 2019**



**Photo 3: View of SWD4-3 polygon from south edge facing north
– April 25, 2019**



**Photo 4: Typical understory/ground cover conditions within
SWD4-3 polygon (minor standing water) – April 25, 2019**



Photo 5: Understory/ground cover conditions within SWD4-3 polygon in summer (no standing water) – July 10, 2019



Photo 6: Overview of SWT2-2a polygon facing east during flooded early spring conditions – April 29, 2019



**Photo 7: SWT2-2a typical thicket interior composition
– May 29, 2019**



**Photo 8: Overview of MAS2-1d (incl.; adjacent to former rail
berm) inclusion within SWT2-2a polygon – September 18, 2019**



Photo 9: Transition area between SWT2-2a and MAM2-6 from west edge facing east – September 18, 2019



Photo 10: MAM2-6 overview from north edge of polygon facing south – May 29, 2019



**Photo 11: MAM2-6 typical ground layer composition
– May 29, 2019**



**Photo 12: MAM2-2a overview from north edge of polygon facing
south – July 9, 2019**



**Photo 13: MAM2-2a typical ground layer composition
– July 9, 2019**



**Photo 14: SWT2-2b overview from northwest edge of polygon
facing southeast – July 9, 2019**



**Photo 15: SWT2-2b typical thicket interior composition
– July 9, 2019**



**Photo 16: MAS2-1a inclusion (within SWT2-2b polygon) from
east edge facing west – July 9, 2019**



Photo 17: Overview of SWT2-2c polygon from west edge facing east – July 10, 2019



Photo 18: Typical interior composition within SWT2-2c polygon, including minor area dominated by cattails – July 10, 2019



Photo 19: Overview of CUW1a polygon from south edge facing north – April 25, 2019



Photo 20: Overview of CUW1b polygon from south edge facing east – April 25, 2019



Photo 21: Overview of CUW1b polygon from north edge facing south – April 25, 2019



Photo 22: Typical understory/ground cover conditions within CUW1b polygon – April 25, 2019



Photo 23: Overview of CUW1c polygon from west edge facing east – July 10, 2019



Photo 24: Typical sparse thicket composition of THDM2-6a showing dominating Common Buckthorn – July 10, 2019



Photo 25: Typical ground cover composition within THDM2-6a polygon – July 10, 2019

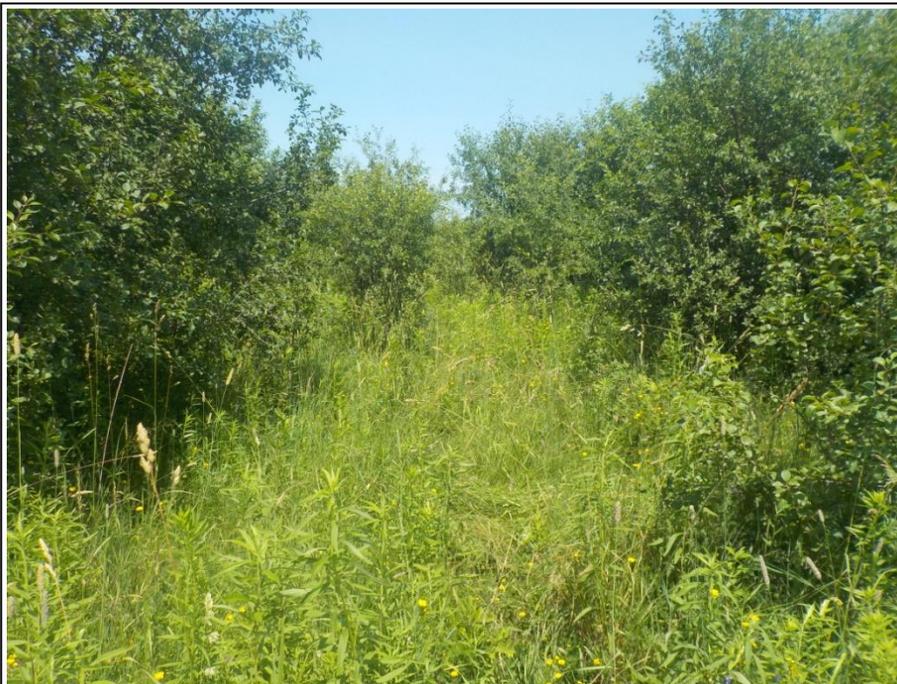


Photo 26: Typical sparse thicket composition of THDM2-6b showing dominating Common Buckthorn – July 10, 2019



Photo 27: Typical ground cover composition within THDM2-6b polygon – July 10, 2019



Photo 28: Overview of CUW1c polygon from west edge facing east – July 10, 2019



Photo 29: Overview of MEGM3/MEGM4a polygon in southeast portion of property facing north – July 8, 2019



Photo 30: SWT2-2g (inclusion) within MEGM3/MEGM4a polygon in southeast portion of the property – July 8, 2019



Photo 31: Overview of MEGM3/MEGM4a polygon in central-east portion of property facing south – July 8, 2019



Photo 32: Typical ground cover composition within MEGM3/MEGM4a polygon – July 8, 2019



Photo 33: Shrubby Cinquefoil shrub in northwest portion of property within MEGM3/MEGM4a – July 8, 2019



Photo 34: Portion of MEGM3/MEGM4a polygon with shallower soils, east of SWD4-3 polygon facing west – July 8, 2019



Photo 35: Portion of MEGM3/MEGM4a polygon with shallower soils, south of FOC2-2 polygon facing east – April 25, 2019



Photo 36: Abandoned silo and remains of former structure located east of CUW1a polygon – February 11, 2019



Photo 37: Vacant shed structure associated with former rural air strip – February 4, 2019



Photo 38: Typical view of interior conditions within CUP3b feature – February 4, 2019



Photo 39: Overview of MAM2-2h and MEGM3/MEGM4b from top of rail berm, facing west – April 25, 2019



Photo 40: Typical view of interior conditions within FOC2-2 west of rail berm – July 13, 2023



Photo 41: MEGM4 in southeast portion of lands west of rail berm, facing northwest toward CUP3-2 – July 13, 2023



Photo 42: View of transition between MEGM4 and adjacent THDM2-6h within Parcel B – July 13, 2023



Photo 43: Typical interior conditions within CUP3-2, with dense understory of Common Buckthorn – July 13, 2023

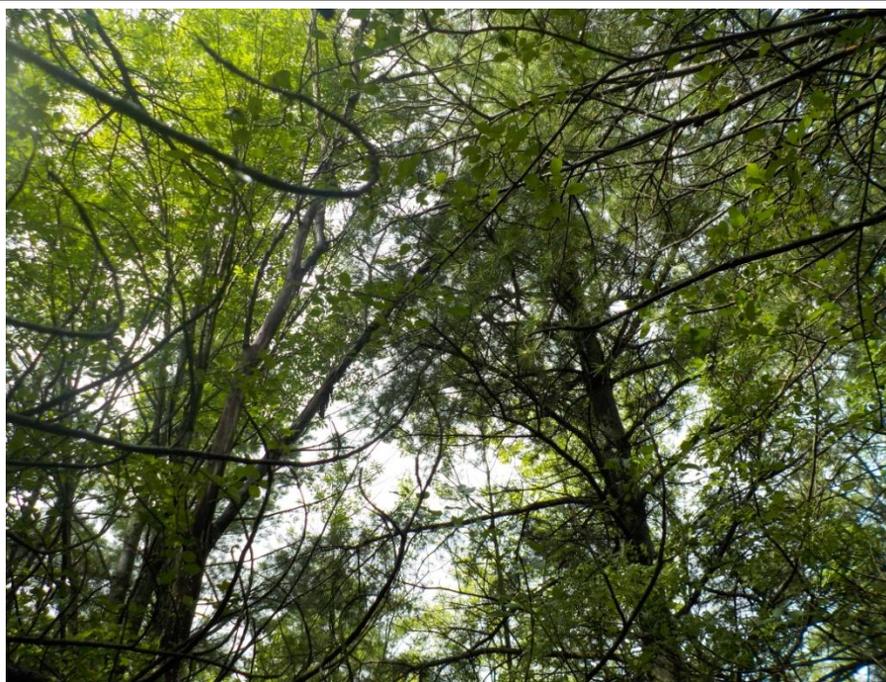


Photo 44: Typical canopy composition within CUP3-2 unit B – July 13, 2023



Photo 45: Overview of former air strip (MEGM3/MEGM4b) west of rail berm – July 13, 2023



Photo 46: Early successional woodland cover within CUP3a plantation feature – July 13, 2023



Photo 47: Ground cover composition within CUP3a polygon, partially within Natural Restoration Plan area – July 13, 2023



Photo 48: THDM2-6f (incl.) demarking boundary along rail berm, facing south from east side – July 13, 2023



APPENDIX F

OWES Evaluations



Environmental Assessments & Approvals

March 10, 2023

AEC 18-288

Township of Ramara
2297 Hwy 12, PO Box 130
Brechin, ON L0K 1B0

County of Simcoe
1110 Highway 26
Midhurst, ON L9X 1N6

Re: **Wetland Evaluation of Lot 11 & 12, Concession 1, Ramara Wetland #1
(Township of Ramara) according to the Ontario Wetland Evaluation System**

To Whom It May Concern:

Azimuth Environmental Consulting, Inc. (Azimuth) was retained by Lagoon City Limited Partnership to undertake a wetland evaluation of Lot 11 & 12, Concession 1, Ramara Wetland #1 in accordance with the Ontario Wetland Evaluation System (OWES) methodology outlined in the OWES Southern Manual 4th Edition (December 2022). The evaluation was undertaken by Dan Stuart, Ecology Lead at Azimuth (Certified Wetland Evaluator) based on a detailed background review and series of field surveys undertaken in 2019-2022.

The results of the OWES Evaluation determined that the wetland is **not significant** in accordance with provincial criteria. As required by the OWES Southern Manual 4th Edition, a final digital wetland boundary and confirmation of wetland status as non-significant will be submitted to the Ministry of Natural Resources and Forestry within 30 days.

Certainly should you have any additional questions or concerns, or wish to discuss further please do not hesitate to contact the undersigned.

Yours truly,
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Dan Stuart, M.Env.Sc.
Ecology Lead, OWES Evaluator

Attached:

Wetland Evaluation Data and Scoring Record (Lot 11 & 12, Concession 1, Ramara Wetland #1)
Figures 1-4, Table 1, Appendix A-B

WETLAND EVALUATION DATA
AND SCORING RECORD

Wetland Name: Lot 11 & 12, Concession 1, Ramara Wetland #1

Geographic Location (municipality, lot/concession, etc):

Township of Ramara, Lot 12 Concession 1

Map / Photo Locational Reference (e.g., latitude/longitude, NTS map, UTM):

UTM 17T 645098 m E 4930495 m N (Lat 44.513192, Long -79.174403)

Eco-District: 6E-6

Wetland Size (hectares): 5.99

Attached:

Figure 1: Study Area Location

Figure 2: Wetland Location

Figure 3: Vegetation Forms

Figure 4: Interspersion

Table 1: Site Investigation Record

Appendix A: Wetland Data Summary Form

Appendix B: Species Rarity Background Sources

Vegetation Form	FA
h	0
c	0
dh	0
dc	0
ts	0.78
ls	0
ds	0
gc	0
m	0
ne	0.22
be	0
re	0
ff	0
f	0
su	0
u	0

1.0 BIOLOGICAL COMPONENT

1.1 PRODUCTIVITY

1.1.1 Growing Degree-Days/Soils (max: 30 pts)

Refer to page 36 of manual for further explanation.

1. Determine the correct GDD value for your wetland (use Figure 5).
2. Circle the appropriate GDD value from the evaluation table below.
3. Determine the Fractional Area (FA) of the wetland for each soil type.
4. Multiply the fractional area of each soil type by the applicable score-factor in the evaluation table.
5. Sum the scores for each soil type to obtain the final score (maximum score is 30 points).

Growing Degree-Days	Clay-Loam	Silt-Marl	Lime-stone	Sand	Humic-Mesic	Fibric	Granite
	<2800	15	13	11	9	8	7
2800-3200	18	15	13	11	9	8	7
3200-3600	22	18	15	13	11	9	7
3600-4000	26	21	18	15	13	10	8
>4000	30	25	20	18	15	12	8

Soil Type	FA of wetland in soil type	Enter appropriate score-factor from above table		
Clay/Loam	1.0	x	22	= 22
Silt/Marl:	0	x	0	= 0
Limestone:	0	x	0	= 0
Sand:	0	x	0	= 0
Humic/Mesic:	0	x	0	= 0
Fibric:	0	x	0	= 0
Granite:	0	x	0	= 0
Total	1.0		22	22

GDD/Soils Score (maximum 30 points) 22

1.1.2 Wetland Type

(Fractional Areas = area of wetland type/total wetland area)

	Fractional Area		Score
Bog	0	x 3 =	0
Fen	0	x 6 =	0
Swamp	0.78	x 8 =	6.24
Marsh	0.22	x 15 =	3.3
Total	1	- =	9.54

Wetland Type Score (maximum 15 points) 10

1.1.3 Site Type

(Fractional Area = area of site type/total wetland area)

	Fractional Area		Score
Isolated	0	x 1 =	0
Palustrine (permanent or intermittent flow)	1.0	x 2 =	2
Riverine	0	x 4 =	0
Riverine (at rivermouth)	0	x 5 =	0
Lacustrine (at rivermouth)	0	x 5 =	0
Lacustrine (with barrier beach)	0	x 3 =	0
Lacustrine (exposed to lake)	0	x 2 =	0
Total	1.0	- =	2

Site Type Score (maximum 5 points) 2

1.2 BIODIVERSITY

1.2.1 Number of Wetland Types

(Check only one)

	One	=	9 points
X	Two	=	13
	Three	=	20
	Four	=	30

Number of Wetland Types Score
(maximum 30 points) 13

1.2.2. Vegetation Communities

Use the data sheet provided in Appendix 4 to record and score vegetation communities (the completed form must be attached to this data record)

Scoring (circle only one option for each of the columns below):

Total # of communities with 1-3 forms	Total # of communities with 4-5 forms	Total # of communities with 6 or more forms
1 = 1.5 pts	1 = 2 pts	1 = 3 pts
2 = 2.5	2 = 3.5	2 = 5
3 = 3.5	3 = 5	3 = 7
4 = 4.5	4 = 6.5	4 = 9
5 = 5	5 = 7.5	5 = 10.5
6 = 5.5	6 = 8.5	6 = 12
7 = 6	7 = 9.5	7 = 13.5
8 = 6.5	8 = 10.5	8 = 15
9 = 7	9 = 11.5	9 = 16.5
10 = 7.5	10 = 12.5	10 = 18
11 = 8	11 = 13	11 = 19
+ 0.5 for each additional community = <u>4.5</u>	+ 0.5 for each additional community = <u>0</u>	+ 1.0 for each additional community = <u>0</u>

Vegetation Communities Score
(maximum 45 points) 5

Appendix 4 Data Sheet Attached

1.2.3 Diversity of Surrounding Habitat

Check all appropriate items. Only habitat within 1.5 km of the wetland boundary and at least 0.5 ha in size are to be scored.

X	row crop
X	pasture
X	abandoned agricultural land
X	deciduous forest
X	coniferous forest
X	mixed forest*
	abandoned pits and quarries
	open lake or deep river
	fence rows with deep cover, or shelterbelts
	terrain appreciably undulating, hilly or with ravines
X	creek flood plain

* "Mixed forest" is defined as either 25% coniferous trees distributed singly or in clumps in deciduous forest, or 25% deciduous trees distributed singly or in clumps in coniferous forest. Note that Forest Resource Inventory (FRI) maps can be misleading since 25% conifer within a unit could be entirely concentrated around a lake.

Score 1 point for each feature checked, up to a maximum of 7 points.

Diversity of Surrounding Habitat Score
(maximum 7 points) 7

1.2.4 Proximity to Other Wetlands

Check highest appropriate category. (Note: if the wetland is lacustrine, score option #1 at 8 points).

✓		Points
X	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river within 1.5 km	8
	Hydrologically connected by surface water to other wetlands (same dominant wetland type) within 0.5 km	8
	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river from 1.5 to 4 km away	5
	Hydrologically connected by surface water to other wetlands (same dominant wetland type) from 0.5 to 1.5 km away	5
	Within 0.75 km of other wetlands (different dominant wetland type) or open water body, but not hydrologically connected by surface water	5
	Within 1 km of other wetlands, but not hydrologically connected by surface water	2
	No wetland within 1 km	0

Name and distance (from wetland) of wetlands/waterbodies scored above:

Marsh-dominated wetlands located downstream within 1.5 km of wetland via McNabb Drain

Proximity to other Wetlands Score
(maximum 8 points) 8

1.2.5 Interspersion

Number of Intersections = 88

✓	Number of Intersections (Check one only)	Points
	26 or less	= 3
	27 to 40	= 6
	41 to 60	= 9
	61 to 80	= 12
✓	81 to 100	= 15
	101 to 125	= 18
	126 to 150	= 21
	151 to 175	= 24
	176 to 200	= 27
	>200	= 30

Interspersion Score (maximum 30 points) 15

See attached Wetland Interspersion map.
(Figure 4)

1.2.6 Open Water Types

NOTE: this attribute is only to be scored for permanently flooded open water within the wetland (adjacent lakes do not count). Check one option only.

✓	Open Water Type	Characteristic	Points
✓	Type 1	Open water occupies < 5 % of wetland area	= 8
	Type 2	Open water occupies 5-25% of wetland (occurring in central area)	= 8
	Type 3	Open water occupies 5-25% (occurring in various-sized ponds, dense patches of vegetation or vegetation in diffuse stands)	= 14
	Type 4	Open water occupies 26-75% of wetland (occurring in a central area)	= 20
	Type 5	Open water occupies 26-75% of wetlands (small ponds and embayments are common)	= 30
	Type 6	Open water occupies 76%-95% of wetland (occurring in large central area; vegetation is peripheral)	= 8
	Type 7	Open water occupies 76-95% of wetland (vegetation in patches or diffuse open stands)	= 14
	Type 8	Open water occupies more than 95% of wetland area	= 3
	No open water		= 0

Open Water Type Score (maximum 30 points) 8

1.3 SIZE (BIOLOGICAL COMPONENT)

Total Size of Wetland = 5.99 ha

Sum of scores from Biodiversity Subcomponent

1.2.1
 + 1.2.2
 + 1.2.3
 + 1.2.4
 + 1.2.5
 + 1.2.6

 56

Circle the appropriate score from the table below.

		Total Score for Biodiversity Subcomponent									
		<37	37-47	48-60	61-72	73-84	85-96	97-108	109-120	121-132	>132
Wetland size (ha)	<20 ha	1	5	7	8	9	17	25	34	43	50
	20-40	5	7	8	9	10	19	28	37	46	50
	41-60	6	8	9	10	11	21	31	40	49	50
	61-80	7	9	10	11	13	23	34	43	50	50
	81-100	8	10	11	13	15	25	37	46	50	50
	101-120	9	11	13	15	18	28	40	49	50	50
	121-140	10	13	15	17	21	31	43	50	50	50
	141-160	11	15	17	19	23	34	46	50	50	50
	161-180	13	17	19	21	25	37	49	50	50	50
	181-200	15	19	21	23	28	40	50	50	50	50
	201-400	17	21	23	25	31	43	50	50	50	50
	401-600	19	23	25	28	34	46	50	50	50	50
	601-800	21	25	28	31	37	49	50	50	50	50
	801-1000	23	28	31	34	40	50	50	50	50	50
	1001-1200	25	31	34	37	43	50	50	50	50	50
	1201-1400	28	34	37	40	46	50	50	50	50	50
1401-1600	31	37	40	43	49	50	50	50	50	50	
1601-1800	34	40	43	46	50	50	50	50	50	50	
1801-2000	37	43	47	49	50	50	50	50	50	50	
>2000	40	46	50	50	50	50	50	50	50	50	

Size Score (Biological Component)

(maximum 50 points) 7

2.0 SOCIAL COMPONENT

2.1 ECONOMICALLY VALUABLE PRODUCTS

2.1.1 Wood Products

Check the option that best reflects the total area (ha) of forested wetland (i.e., areas where the dominant vegetation form is h or c). Note that this is the area of all the forested vegetation communities, not total wetland size. Do not include areas where harvest is not permitted. Check only one option.

Area of wetland used for scoring 2.1.1: 0

X	< 5 ha	= 0 pts
	5 - 25 ha	= 3
	26 - 50 ha	= 6
	51 - 100 ha	= 9
	101 - 200 ha	= 12
	> 200 ha	= 18

Source of information:

Environmental Impact Study (EIS)
prepared by Azimuth Environmental
Consulting, Inc. (Azimuth)

Wood Products Score (maximum 18 points) 0

2.1.2 Wild Rice

Check only one.

	Present (min. size 0.5 ha)	= 6 pts
X	Absent	= 0
	Harvest not permitted	= 0

Source of information:

EIS prepared by Azimuth

Wild Rice Score (maximum 6 points) 0

2.1.3 Commercial Baitfish

Check only one.

	Present	= 12 pts
	Absent	= 0
X	Fishing not permitted	= 0

Source of information:

Consultation with property owner.

Commercial Fish Score (maximum 12 points) 0

2.1.4 Furbearers

Only species recognized as furbearers under the Fish & Wildlife Conservation Act may be scored here. Score 3 points for each furbearer species listed, up to a maximum of 12 points. Score 0 points if trapping is prohibited.

	Name of furbearer	Source of information
1.	Coyote	EIS prepared by Azimuth
2.	Red Fox	" " " "
3.	Red Squirrel	" " " "
4.	Raccoon	" " " "
5.	-	-
6.	-	-

Furbearer Score (maximum 12 points) 12

2.2 RECREATIONAL ACTIVITIES

Sources of information and reasons for scoring a wetland under high or moderate use below, must be included below.

Circle one score for each of the activities listed. Score is cumulative – add score for hunting, nature enjoyment and fishing together for final score.

Intensity of Use	Type of Wetland-Associated Use		
	Hunting	Nature Enjoyment/ Ecosystem Study	Fishing
High	40 points	40 points	40 points
Moderate	20	20	20
Low	8	8	8
Not Possible/ No evidence	0	0	0

Sources of information (include evidence/criteria forming basis for score and any relevant reference used to obtain that information):

Hunting: Private property - public access not permitted.
No evidence of hunting/trapping within wetland,
as observed by Azimuth during EIS data
collection.

Nature: Private property - public access not permitted.
No evidence of nature studies/appreciation
within wetland based on consultation with
the property owner.

Fishing: Private property - public access not permitted.
No evidence of fishing within the wetland based
on consultation with the property owner,
and as observed by Azimuth/RiverStone
Environmental Solutions Inc. (RiverStone) during
EIS data collection.

Recreational Activities Score
(maximum 80 points) 0

2.3 LANDSCAPE AESTHETICS

2.3.1 Distinctness

Check only one.

X	Clearly Distinct	= 3 pts
	Indistinct	= 0

Landscape Distinctness Score

(maximum 3 points) 3

2.3.2 Absence of Human Disturbance

Check only one.

	Human disturbances absent or nearly so	= 7 pts
	One or several localized disturbances	= 4
X	Moderate disturbance; localized water pollution	= 2
	Wetland intact but impairment of ecosystem quality intense in some areas	= 1
	Extreme ecological degradation, or water pollution severe and widespread	= 0

Details regarding type, extent and location of disturbance scored:

The entire property has been managed as cattle pasture as recently as 2019. Evidence of disturbance to the ground layer is minor to moderate, but widespread within the wetland.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Absence of Human Disturbance Score

(maximum 7 points) 2

2.4 EDUCATION AND PUBLIC AWARENESS

2.4.1 Educational Uses

Check highest appropriate category.

	Frequent	= 20 pts
	Infrequent	= 12
X	No visits	= 0

Details regarding the type and frequency of education uses scored above:

Private property with no public access - no documented educational uses.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Educational Uses Score (maximum 20 points) 0

2.4.2 Facilities and Programs

Check all appropriate options, score highest category checked.

	Staffed interpretation centre	= 8 pts
	No interpretation centre or staff, but a system of self-guiding trails or brochures available	= 4
	Facilities such as maintained paths (e.g., woodchips), boardwalks, boat launches or observation towers, but no brochures or other interpretation	= 2
X	No facilities or programs	= 0

Additional Notes/Comments:

Private property with no public access - no documented educational uses.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Facilities and Programs Score
(maximum 8 points) 0

2.4.3 Research and Studies

Check all that apply; score highest category checked.

	Long term research has been done	= 12 pts
	Research papers published in refereed scientific journal or as a thesis	= 10
	One or more (non-research) reports have been written on some aspect of the wetland's flora, fauna, hydrology, etc.	= 5
X	No research or reports	= 0

List of reports, publications, research studies etc. scored above:

EIS, Hydrogeological Evaluation, Geotechnical studies, etc. are in progress for the property, however per OWES guidelines such reports are not considered under this category.

No other reports, publications, research studies, etc., exist for the property according to consultation with the property owner.

Research and Studies Score

(maximum 12 points) 0

2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT

Name of Settlement: Beaverton

Distance of wetland from settlement: 7.8 Km

Population of settlement: 2822 (Source: Statistics Canada)

Circle only the highest score applicable

Distance of wetland to settlement	population >10,000	population 2,500-10,000	population <2,500 or cottage community
	within or adjoining settlement	40 points	26 points
0.5 to 10 km from settlement	26	<u>16</u>	10
10 to 60 km from settlement	12	8	4
>60 km from nearest settlement	5	2	0

Proximity to Human Settlement Score

(maximum 40 points) 16

2.6 OWNERSHIP

FA of wetland held by or held under a legal contract by a conservation body (as defined by the <i>Conservation Land Act</i>) for wetland protection	<u>0</u> x 10 = <u>0</u>
FA of wetland occurring in provincially or nationally protected areas (e.g., parks and conservation reserves)	<u>0</u> x 10 = <u>0</u>
FA of wetland area in Crown/public ownership, not as above	<u>0</u> x 8 = <u>0</u>
FA of wetland area in private ownership, not as above	<u>1</u> x 4 = <u>4</u>

Source of information:

Consultation with property owner.

Ownership Score (maximum 10 points) 4

2.7 SIZE (SOCIAL COMPONENT)

Total Size of Wetland = 5.99 ha Sum of scores from Subcomponents 2.1, 2.2, and 2.5 = 33

Circle the appropriate score from the table below.

Total for Size Dependent Social Features										
	<31	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	>150
<2 ha	1	2	4	8	10	12	14	14	14	15
2-4	1	2	4	8	12	13	14	14	15	16
5-8	2	2	5	9	13	14	15	15	16	16
9-12	3	3	6	10	14	15	15	16	17	17
13-17	3	4	7	10	14	15	16	16	17	17
18-28	4	5	8	11	15	16	16	17	17	18
29-37	5	7	10	13	16	17	18	18	19	19
38-49	5	7	10	13	16	17	18	18	19	20
50-62	5	8	11	14	17	17	18	19	20	20
63-81	5	8	11	15	17	18	19	20	20	20
82-105	6	9	11	15	18	18	19	20	20	20
106-137	6	9	12	16	18	19	20	20	20	20
138-178	6	9	13	16	18	19	20	20	20	20
179-233	6	9	13	16	18	20	20	20	20	20
234-302	7	9	13	16	18	20	20	20	20	20
303-393	7	9	14	17	18	20	20	20	20	20
394-511	7	10	14	17	18	20	20	20	20	20
512-665	7	10	14	17	18	20	20	20	20	20
666-863	7	10	14	17	19	20	20	20	20	20
864-1123	8	12	15	17	19	20	20	20	20	20
1124-1460	8	12	15	17	19	20	20	20	20	20
1461-1898	8	13	15	18	19	20	20	20	20	20
1899-2467	8	14	16	18	20	20	20	20	20	20
>2467	8	14	16	18	20	20	20	20	20	20

Total Size Score (Social Component) 2

2.8 ABORIGINAL VALUES AND CULTURAL HERITAGE

Either or both Aboriginal or Cultural Values may be scored. However, the maximum score permitted for 2.8 is 30 points.

Full documentation of sources must be attached to the data record.

2.8.1 Aboriginal Values

Significant	=	30 pts
Not Significant	=	0
X Unknown	=	0

Additional Comments/Notes:

No known Aboriginal Values associated with the property, as confirmed via consultation with the property owner.

2.8.2 Cultural Heritage

Significant	=	30 pts
Not Significant	=	0
X Unknown	=	0

Additional Comments/Notes:

No known Cultural Heritage Values associated with the property, as confirmed via consultation with the property owner.

Aboriginal Values/Cultural Heritage Score
(maximum 30 points) 0

3.0 HYDROLOGICAL COMPONENT

3.1 FLOOD ATTENUATION

Check one of the following options.

- If wetland is a coastal wetland, \Rightarrow score 0 points for this section.
- If wetland is entirely isolated in site type, \Rightarrow score 100 points automatically.
- Wetland not as above – proceed through 'steps' A through F below.

- (A) Total wetland area = 5.99 ha
- (B) Size of wetland's catchment = 166.0 ha
- (C) Size of other detention areas in catchment = 5.82 ha
- (D) Total area of upstream detention areas = $\{A + C\} =$ 11.81 ha
- (E) Upstream Detention Factor = $\{(A/D) \times 2\} =$ 1.0 (maximum 1.0)
- (F) Attenuation Factor = $\{(A/B) \times 10\} =$ 0.36 (maximum 1.0)
- Flood Attenuation Final Score = $\{(E + F) / 2\} \times 100 =$ 68.0

Flood Attenuation Score (maximum 100 points) 68

3.2 WATER QUALITY IMPROVEMENT

3.2.1 Short Term Water Quality Improvement

Step 1: Determination of maximum initial score

<input type="checkbox"/>	Wetland on one of the 5 defined large lakes or 5 major rivers (Go to Step 5A)
<input checked="" type="checkbox"/>	All other wetlands (Go through Steps 2, 3, 4, and 5B)

Step 2: Determination of Watershed Improvement Factor (WIF)

Calculation of WIF is based on the fractional area (FA) of each site type that makes up the total area of the wetland.

(FA = area of site type/total area of wetland)

FA of isolated wetland	=	0	x 0.5 =	0
FA of riverine wetland	=	0	x 1.0 =	0
FA of palustrine wetland with no inflow	=	1	x 0.7 =	0.7
FA of palustrine wetland with inflows	=	0	x 1.0 =	0
FA of lacustrine on lake shoreline	=	0	x 0.2 =	0
FA of lacustrine at lake inflow or outflow	=	0	x 1.0 =	0

Sum (WIF cannot exceed 1.0) 0.7

Step 3: Determination of Catchment Land Use Factor (LUF)

(Choose the first category that fits upstream land use in the catchment.)

<input checked="" type="checkbox"/>	Over 50% agricultural and/or urban	=	1.0
<input type="checkbox"/>	Between 30 and 50% agricultural and/or urban	=	0.8
<input type="checkbox"/>	Over 50% forested or other natural vegetation	=	0.6

LUF (maximum 1.0) 1.0

Step 4: Determination of Pollutant Uptake Factor (PUF)

Calculation of PUF is based on the fractional area (FA) of each vegetation type that makes up the total area of the wetland. Base assessment on the dominant vegetation form for each community except where dead trees or shrubs dominate. In that case base assessment on the dominant live vegetation type.

(FA = area of vegetation type/total area of wetland)

FA of wetland with live trees, shrubs, herbs or mosses (c, h, ts, ls, gc, m)	<u>0.78</u> = x	0.75 =	<u>0.59</u>
FA of wetland with emergent, submergent or floating vegetation (re, be, ne, su, f, ff)	<u>0.22</u> = x	1.0 =	<u>0.22</u>
FA of wetland with little or no vegetation (u)	<u>0</u> = x	0.5 =	<u>0</u>

Sum (PUF cannot exceed 1.0) 0.81

Step 5: Calculation of final score

<input type="checkbox"/>	Wetland on defined 5 major lakes or 5 major rivers	0
<input checked="" type="checkbox"/>	All other wetlands – calculate as follows	
	Initial score	60
	Watershed Improvement Factor (WIF)	<u>0.7</u>
	Land Use Factor (LUF)	<u>1.0</u>
	Pollutant Uptake Factor (PUF)	<u>0.81</u>
	Final score: 60 x WIF x LUF x PUF =	<u>34.02</u>

Short Term Water Quality Improvement Score (maximum 60 points) <u>34</u>

3.2.2 Long Term Nutrient Trap

Step 1:

<input type="checkbox"/>	Wetland on defined 5 major lakes or 5 major rivers = 0 points
<input checked="" type="checkbox"/>	All other wetlands (Proceed to Step 2)

Step 2: Choose only one of the following settings that best describes the wetland being evaluated

<input type="checkbox"/>	Wetland located in a river mouth	= 10 pts
<input type="checkbox"/>	Wetland is a bog, fen, or swamp with more than 50% of the wetland being covered with organic soil	= 10
<input checked="" type="checkbox"/>	Wetland is a bog, fen, or swamp with less than 50% of the wetland being covered with organic soil	= 3
<input type="checkbox"/>	Wetland is a marsh with more than 50% of the wetland covered with organic soil	= 3
<input type="checkbox"/>	None of the above	= 0

Long Term Nutrient Trap Score (maximum 10 points) <u>3</u>

3.2.3 Groundwater Discharge

Circle the characteristics that best describe the wetland being evaluated and then sum the scores. If the sum exceeds 30 points, assign the maximum score of 30). Note: for wetland type, wetland type scored does not have to be the dominant type in the wetland.

		Potential for Discharge		
		None to Little	Some	High
Wetland Characteristics	Wetland type	Bog = 0	Swamp/Marsh = 2	Fen = 5
	Topography	Flat/rolling = 0	Hilly = 2	Steep = 5
	Wetland area:	Large (>50%) = 0	Moderate (5-50%) = 2	Small (<5%) = 5
	Upslope catchment area			
	Lagg development	None found = 0	Minor = 2	Extensive = 5
	Seeps	None = 0	≤ 3 seeps = 2	> 3 seeps = 5
	Surface marl deposits	None = 0	≤ 3 sites = 2	> 3 sites = 5
	Iron precipitates	None = 0	≤ 3 sites = 2	> 3 sites = 5
	Located within 1 km of a major aquifer	N/A = 0	N/A = 0	Yes = 10 No = 0

Additional Comments/Notes:

Groundwater Discharge Score
(maximum 30 points) 2

3.3 CARBON SINK

Check only one of the following:

	Bog, fen or swamp with more than 50% coverage by organic soil	= 5 pts
	Bog, fen or swamp with between 10 to 50% coverage by organic soil	= 2
	Marsh with more than 50% coverage by organic soil	= 3
X	Wetlands not in one of the above categories	= 0

Source of information:

EIS prepared by Azimuth

Carbon Sink Score
(maximum 5 points) 0

3.4 SHORELINE EROSION CONTROL

From the wetland vegetation map determine the dominant vegetative type within the erosion zone for lacustrine and riverine site type areas only. Score according to the factors listed below.

Step 1:

X	Wetland entirely isolated or palustrine	= 0 pts
	Any part of the wetland is riverine or lacustrine	= Go to step 2

Step 2: Choose the one characteristic that best describes the shoreline vegetation (see page 109 for description of "shoreline".)

—	Trees and shrubs	= 15 pts
—	Emergent vegetation	= 8
—	Submergent vegetation	= 6
—	Other shoreline vegetation	= 3
—	No vegetation	= 0

Shoreline Erosion Control Score
(maximum 15 points) 0

3.5 GROUNDWATER RECHARGE

3.5.1 Site Type

Wetland > 50% lacustrine (by area) or located on one of the five major rivers	=	0 pts	
Wetland not as above. Calculate final score as follows:			
■ FA of isolated or palustrine wetland	=	10	x 50 = 50
■ FA of riverine wetland	=	0	x 20 = 0
■ FA of lacustrine wetland (not dominant site type)	=	0	x 0 = 0

Groundwater Recharge/Wetland Site Type Score
(maximum 50 points) 50

3.5.2 Soil Recharge Potential

Circle only one choice that **best** describes the soils in **the area surrounding the wetland** being evaluated (the soils within the wetland are not scored here).

Dominant Wetland Type	Group A, B, C (sands, gravels, loams)	Group D (clays, substrates in high water tables, shallow substrates over impervious materials such as bedrock)
	Lacustrine or major river	0
Isolated	10	5
Palustrine	7	(4)
Riverine (not on a major river)	5	2

Groundwater Recharge/Wetland Soil Recharge Potential Score (maximum 10 points) 4

4.0 SPECIAL FEATURES

COMPONENT

4.1 RARITY

4.1.1 Wetland Types

Ecodistrict	Rarity within the Landscape (4.1.1.1)	Rarity of Wetland Type (4.1.1.2)			
		Marsh	Swamp	Fen	Bog
6E-1	60	40	0	80	80
6E-2	60	40	0	80	80
6E-4	60	40	0	80	80
6E-5	20	40	0	80	80
6E-6	40	20	0	80	80
6E-7	60	10	0	80	80
6E-8	20	20	0	80	80
6E-9	0	20	0	80	80
6E-10	20	0	20	80	80
6E-11	0	30	0	80	80
6E-12	0	30	0	60	80
6E-13	60	10	0	80	80
6E-14	40	20	0	40	80
6E-15	40	0	0	80	80
6E-16	60	20	0	80	60
6E-17	40	10	0	30	80
7E-1	60	0	60	80	80
7E-2	60	0	0	80	80
7E-3	60	00	0	80	80
7E-4	80	0	0	80	80
7E-5	60	20	0	80	80
7E-6	80	30	0	80	80

4.1.1.1 Rarity within the Landscape

Choose appropriate score from 2nd column above.

Score (maximum 80 points) 40

4.1.1.2 Rarity of Wetland Type

Score is cumulative, based on presence/absence. Circle all appropriate scores from above table and sum.

Score (maximum 80 points) 20

4.1.2 Species

4.1.2.1 Provincially Significant Animal Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
Western Chorus Frog	<i>Pseudacris triseriata</i>	Calling	Apr 2019	Azimuth EIS
Midland Painted Turtle	<i>Chrysemys picta</i> ssp. <i>marginata</i>	Basking	Spring 2022	Azimuth EIS
Bobolink	<i>Dolichonyx oryzivorus</i>	Foraging	June 2019	Azimuth EIS
Eastern Meadowlark	<i>Sturnella magna</i>	Foraging	June 2019	Azimuth EIS

Additional Notes/Comments:

All NHIC-tracked species are treated as Provincially Significant.

Note: Previous MNRF correspondence confirmed Monarch (observed) is not scored as property does not occur in migratory concentration area.

One species = 50 pts	9 species = 140 pts	17 species = 160 pts
2 species = 80	10 species = 143	18 species = 162
3 species = 95	11 species = 146	19 species = 164
4 species = 105	12 species = 149	20 species = 166
5 species = 115	13 species = 152	21 species = 168
6 species = 125	14 species = 154	22 species = 170
7 species = 130	15 species = 156	23 species = 172
8 species = 135	16 species = 158	24 species = 174
		25 species = 176

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Animal Species

(no maximum) 105

4.1.2.2 Provincially Significant Plant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
<i>None</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>

Additional Notes/Comments:

None documented during field studies associated with EIS prepared by Azimuth. A detailed plant inventory was completed on June 19, July 9, July 10, September 17, and September 18, 2019.

One species = 50 pts	9 species = 140 pts	17 species = 160 pts
2 species = 80	10 species = 143	18 species = 162
3 species = 95	11 species = 146	19 species = 164
4 species = 105	12 species = 149	20 species = 166
5 species = 115	13 species = 152	21 species = 168
6 species = 125	14 species = 154	22 species = 170
7 species = 130	15 species = 156	23 species = 172
8 species = 135	16 species = 158	24 species = 174
		25 species = 176

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Plant Species
(no maximum) 0

4.1.2.3 Regionally Significant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
None observed	N/A	N/A	N/A	N/A

One species = 20 pts	4 species = 45 pts	7 species = 58 pts
2 species = 30	5 species = 50	8 species = 61
3 species = 40	6 species = 55	9 species = 64
		10 species = 67

For each significant species over 10 in wetland, add 1 point.

Riley (1989) list referenced.

Regionally Significant Species Score
(no maximum score) 0

wetland species based on Riley (1989)

4.1.2.4 Locally Significant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
No local list	N/A	N/A	N/A	N/A

One species = 10 pts	4 species = 31 pts	7 species = 43 pts
2 species = 17	5 species = 38	8 species = 45
3 species = 24	6 species = 41	9 species = 47
		10 species = 49

For each significant species over 10 in wetland, add 1 point.

Riley (1989) functions as plant variety list for Simcoe County, considered above.

Locally Significant Species Score
(no maximum score) 0

No local list for Township of Ramara

4.2 SIGNIFICANT FEATURES AND HABITATS

4.2.1 Colonial Waterbirds

Record all available information. Score the highest applicable category. Include additional information as possible (e.g., nest locations, etc).

Activity	Species	Info Source	Points
Currently nesting	None	EIS surveys	= 50
Known to have nested within the past 5 years	None	EIS surveys	= 25
Active feeding area (great blue heron excluded)	None	EIS surveys	= 15
None known	None	EIS surveys	= 0

Additional Notes/Comments:

EIS survey program included six (6) waterfowl stopover/staging and colonial waterbird surveys on April 25, April 29, May 7, May 8, May 29, and June 6, 2019. Three (3) down breeding bird surveys were completed June 6, June 19, and June 27, 2019. Three (3) evening " " " " " " June 12, July 9, July 10, 2019.

Colonial Waterbird Nesting Score
(maximum 50 points) 0

4.2.2 Winter Cover for Wildlife

Score highest appropriate category. Include rationale/sources of information.

	Provincially significant	= 100 pts
	Significant in Ecoregion	= 50
	Significant in Ecodistrict	= 25
	Locally significant	= 10
X	Little or poor winter cover	= 0

Species/habitat/vegetation community scored (e.g., winter deer cover in hemlock swamp, S3 and S4b):

Per Azimuth EIS, overall poor opportunities for winter cover as wetland consists of non-treed vegetation forms.

Source of information:

MNRF records show Deer Wintering Area (Stratum 2) along Lake Simcoe shoreline approx. 2.3 km northwest of wetland at its closest point. Simcoe OP and Ramara OP do not illustrate habitat.

Winter Cover for Wildlife Score
(maximum 100 points) 0

4.2.3 Waterfowl Staging and/or Moulting Areas

Check highest level of significance for both staging and moulting; add scores for staging and for moulting together for final score. However, maximum score for evaluation under this section is 150 points.

	Staging	Moulting
Nationally/internationally significant	= 150 pts	= 150 pts
Provincially significant	= 100	= 100
Significant in the Ecoregion	= 50	= 50
Significant in Ecodistrict	= 25	= 25
Known to occur	= 10	= 10
Not possible/Unknown	= 0	= 0

Species/habitat/vegetation community scored (e.g., approx 20 mallards in W3):

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. Total of nine (9) Green-winged Teal observed in wetland in 2019.

Source of information:

ES - six (6) waterfowl stopover/staging surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Waterfowl Staging/Moulting Score
(maximum 150 points) 10

4.2.4 Waterfowl Breeding

Check highest level of significance.

	Nationally/internationally significant = 150 pts
	Provincially significant = 100
	Significant in the Ecoregion = 50
	Significant in Ecodistrict = 25
X	Habitat Suitable = 10
	Habitat not suitable = 0

Species/habitat/vegetation community scored (e.g., mallard in W3):

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. Total of three (3) Mallards observed (1 breeding pair, 1 nesting female) observed in wetland.

Source of information:

ES - six (6) waterfowl nesting surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Waterfowl Breeding Score
(maximum 150 points) 10

4.2.5 Migratory Passerine, Shorebird or Raptor Stopover Area

Check highest level of significance.

	Nationally / internationally significant = 150 pts
	Provincially significant = 100
	Significant in Ecoregion = 50
	Significant in Ecodistrict = 25
	Known to occur = 10
X	Not possible / Unknown = 0

Species/habitat/vegetation community scored:

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. Listed shorebird species not identified.

Source of information:

ES - six (6) waterfowl stopover/staging surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Passerine, Shorebird or Raptor Stopover Score
(maximum 100 points) 0

4.2.6 Fish Habitat

4.2.6.1 Spawning and Nursery Habitat

Area Factors for Low Marsh, High Marsh and Swamp Communities.

No. of ha of Fish Habitat	Area Factor
< 0.5 ha	0.1
0.5 – 4.9	0.2
5.0 – 9.9	0.4
10.0 – 14.9	0.6
15.0 – 19.9	0.8
20.0 +	1.0

Step 1:

Fish habitat is not present within the wetland

Go to Step 7, Score 0 points

Fish habitat is present within the wetland

Go to Step 2

Step 2: Choose only one option

Significance of the spawning and nursery habitat within the wetland is known

Go to Step 3

Significance of the spawning and nursery habitat within the wetland is not known

Go through Steps 4, 5 and 6

Step 3: Select the highest appropriate category below, attach documentation:

Significant in Ecoregion

Go to Step 7, Score 100 points

Significant in Ecodistrict

Go to Step 7, Score 50 points

Locally Significant Habitat (5.0+ ha)

Go to Step 7, Score 25 points

Locally Significant Habitat (<5.0 ha)

Go to Step 7, Score 15 points

Source of information:

Natural Heritage Information Centre, Fisheries and Oceans Canada mapping

Step 4: Low Marsh = the 'permanent' marsh area, from the existing water line out to the outer boundary of the wetland.

Low marsh not present

Go to Step 5

Low marsh present

Continue through Step 4, scoring as noted below

Scoring of Low Marsh:

1. Check the appropriate **Vegetation Group** (see Appendix 7) for each Low Marsh community. (Based on the one most clearly dominant plant species of the dominant form in each Low Marsh vegetation community.)
2. Sum the areas (ha) of the vegetation communities assigned to each **Vegetation Group**.
3. Use these areas to assign an **Area Factor** (from Table 7) for each checked **Vegetation Group**.
4. Multiply the **Area Factor** by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for Low Marsh**.

Scoring for Presence of Key Vegetation Groups – Low Marsh						
Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
1	Tallgrass	-	-	-	6	0
2	Shortgrass-Sedge	-	-	-	11	0
3	Cattail-Bulrush-Burreed	X	0.11	0.1	5	0.06
4	Arrowhead-Pickerelweed	-	-	-	5	0
5	Duckweed	-	-	-	2	0
6	Smartweed-Waterwillow	-	-	-	6	0
7	Waterlily-Lotus	-	-	-	11	0
8	Waterweed-Watercress	-	-	-	9	0
9	Ribongrass	-	-	-	10	0
10	Coontail-Naiad-Watermilfoil	-	-	-	13	0
11	Narrowleaf Pondweed	-	-	-	5	0
12	Broadleaf Pondweed	-	-	-	8	0
Total Score for Low Marsh (maximum 75 points)						0

Continue to Step 5

Step 5: High Marsh = the 'seasonal' marsh area, from the water line to the inland boundary of marsh wetland type. This is essentially what is commonly referred to as a wet meadow, in that there is insufficient standing water to provide fisheries habitat except during flood or high water conditions.

	High marsh not present	Go to Step 6
X	High marsh present	Continue through Step 5, scoring as noted below

Scoring of High Marsh:

1. Check the appropriate **Vegetation Group** (see Appendix 7) for each High Marsh community. (Based on the one most clearly dominant plant species of the dominant form in each High Marsh vegetation community.)
2. Sum the areas (ha) of the vegetation communities assigned to each **Vegetation Group**.
3. Use these areas to assign an **Area Factor** (from Table 7) for each checked **Vegetation Group**.
4. Multiply the **Area Factor** by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for High Marsh**.

Scoring for Presence of Key Vegetation Groups – High Marsh						
Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
1	Tallgrass	—	—	—	6	0
2	Shortgrass-Sedge	X	1.21	0.2	11	2.66
3	Cattail-Bulrush-Burreed	—	—	—	5	0
4	Arrowhead-Pickerelweed	—	—	—	5	0
Total Score for High Marsh (maximum 25 points)						3

Continue to Step 6

Step 6:

	Swamp containing fish habitat not present	Go to Step 7
X	Swamp containing fish habitat present	Continue through Step 6, scoring as follows

Scoring of Swamp:

1. Determine the total area (ha) of seasonally flooded swamp communities within the wetland containing fish habitat and record below.
2. Determine the total area (ha) of permanently flooded swamp communities within the wetland containing fish habitat and record below.
3. Use these areas to assign an **Area Factor** (from Table 7).
4. Multiply the Area Factor by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for Swamp**.

Scoring Swamps for Fish Habitat (Seasonally flooded; Permanently flooded)					
Swamp Containing Fish Habitat	Present (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
Seasonally Flooded Swamp	X	4.67	0.2	10	9.34
Permanently Flooded Swamp	—	—	—	10	0
Total Score for Swamp (maximum 20 points)					9

Continue to Step 7

Step 7: CALCULATION OF FINAL SCORE

NOTE: Scores for Steps 4, 5 and 6 are only recorded if Steps 1 and 3 have not been scored.

- | | |
|---|------------|
| A. Score from Step 1 (fish habitat not present) | = <u>0</u> |
| B. Score from Step 3 (significance known) | = <u>0</u> |
| C. Score from Step 4 (Low Marsh) | = <u>0</u> |
| D. Score from Step 5 (High Marsh) | = <u>3</u> |
| E. Score from Step 6 (Swamp) | = <u>9</u> |

Calculation of Final Score for Spawning and Nursery Habitat = A or B or Sum of C, D, and E

Score for Spawning and Nursery Habitat (maximum 100 points) <u>12</u>
--

4.2.6.2 Migration and Staging Habitat

Step 1:

<input checked="" type="checkbox"/>	Staging or Migration Habitat is not present in the wetland	Go to Step 4, Score 0 points
<input type="checkbox"/>	Staging or Migration Habitat is present in the wetland, significance of the habitat is known	Go to Step 2
<input type="checkbox"/>	Staging or Migration Habitat is present in the wetland, significance of the habitat is not known	Go to Step 3

Step 2: Select the highest appropriate category below. Ensure that documentation is attached to the data record.

<input type="checkbox"/>	Significant in Ecoregion	Score 25 points in Step 4
<input type="checkbox"/>	Significant in Ecodistrict	Score 15 points in Step 4
<input type="checkbox"/>	Locally Significant	Score 10 points in Step 4
<input type="checkbox"/>	Fish staging and/or migration habitat present, but not as above	Score 5 points in Step 4

Source of information:

Aquatic /fish habitat assessment completed by RiverStone.

Step 3: Select the highest appropriate category below based on presence of the designated site type (i.e. does not have to be the dominant site type). Refer to Site Types recorded earlier (section 1.1.3). Attach documentation.

<input type="checkbox"/>	Wetland is riverine at rivermouth or lacustrine at rivermouth	Score 25 points in Step 4
<input type="checkbox"/>	Wetland is riverine, within 0.75 km of rivermouth	Score 15 points in Step 4
<input type="checkbox"/>	Wetland is lacustrine, within 0.75 km of rivermouth	Score 10 points in Step 4
<input type="checkbox"/>	Fish staging and/or migration habitat present, but not as above	Score 5 points in Step 4

Step 4: Enter a score from only one of the three above Steps.

Score for Staging and Migration Habitat (maximum 25 points) <u>0</u>

4.3 ECOSYSTEM AGE

	Fractional Area		Score
Bog	= 0	x 25 =	0
Fen, on deeper soils; floating mats or marl	= 0	x 20 =	0
Fen, on limestone rock	= 0	x 5 =	0
Swamp	= 0.78	x 3 =	2.34
Marsh	= 0.22	x 0 =	0
Total		=	

Ecosystem Age Score (maximum 25 points) 2

4.4 GREAT LAKES COASTAL WETLANDS

Choose one only.

-	Wetland < 10 ha	=	10 pts
-	Wetland 10-50 ha	=	25
-	Wetland 51-100 ha	=	50
-	Wetland > 100 ha	=	75

Not a coastal wetland (note: Lake Simcoe not defined as one of the Great Lakes)

Great Lakes Coastal Wetland Score
(maximum 75 points) 0

GENERAL INFORMATION

Wetland Evaluator(s)

Name: Daniel Stuart Affiliation: Azimuth Environmental Consulting, Inc.

Signature: [Handwritten Signature]

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: _____ Affiliation: _____

Signature: _____

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: _____ Affiliation: _____

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Name: _____ Affiliation: _____

Signature: _____

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Date(s) wetland visited (in field): 2019: 17 visits (Feb-Sep), 2021: 5 visits (Jan-Feb, Jul, Oct), 2022: 10 visits (Apr-Jun)

Date evaluation completed: March 2023 - see attached Table 1

Estimated time devoted to completing the field survey in person hours: 185 hours (wetlands #1-3)
- includes adjacent lands / remainder of property

Southern OWES 4

Weather Conditions

- i) at time of field work: Various - always appropriate for survey type per provincial protocols.
- ii) summer conditions in general: 2019 - Hot/dry, 2021 - Hot/Wet, 2022 - Average / Dry

WETLAND EVALUATION SCORING
RECORD

WETLAND NAME: Lot 11 & 12, Concession 1, Ramara Wetland #1

1.0 BIOLOGICAL COMPONENT

(below)
22 1.1 PRODUCTIVITY
 1.1.1 Growing Degree-Days/Soils
10 1.1.2 Wetland Type
2 1.1.3 Site Type

(34)

(below)
13 1.2 BIODIVERSITY
 1.2.1 Number of Wetland Types
5 1.2.2 Vegetation Communities
7 1.2.3 Diversity of Surrounding Habitat
8 1.2.4 Proximity to Other Wetlands
15 1.2.5 Interspersion
8 1.2.6 Open Water Type

(56)

(7) 1.3 SIZE (Biological Component)

97

TOTAL (Biological Component)

2.0 SOCIAL COMPONENT

<u>(below)</u>	2.1 ECONOMICALLY VALUABLE PRODUCTS
<u>0</u>	2.1.1 Wood Products
<u>0</u>	2.1.2 Wild Rice
<u>0</u>	2.1.3 Commercial Baitfish
<u>12</u>	2.1.4 Furbearers
<u>(12)</u>	Total for Economically Valuable Products
<u>(0)</u>	2.2 RECREATIONAL ACTIVITIES
<u>(below)</u>	2.3 LANDSCAPE AESTHETICS
<u>3</u>	2.3.1 Distinctness
<u>2</u>	2.3.2 Absence of Human Disturbance
<u>(5)</u>	Total for Landscape Aesthetics
<u>(below)</u>	2.4 EDUCATION AND PUBLIC AWARENESS
<u>0</u>	2.4.1 Educational Uses
<u>0</u>	2.4.2 Facilities and Programs
<u>0</u>	2.4.3 Research and Studies
<u>(0)</u>	Total for Education and Public Awareness
<u>(16)</u>	2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT
<u>(4)</u>	2.6 OWNERSHIP
<u>(2)</u>	2.7 SIZE (Social Component)
<u>(below)</u>	2.8 ABORIGINAL VALUES AND CULTURAL HERITAGE
<u>0</u>	2.8.1 Aboriginal Values
<u>0</u>	2.8.2 Cultural Heritage
<u>39</u>	TOTAL (Social Component)

3.0 HYDROLOGICAL COMPONENT

<u>(68)</u>	3.1 FLOOD ATTENUATION
<u>(below)</u>	3.2 WATER QUALITY IMPROVEMENT
<u>34</u>	3.2.1 Short Term Water Quality Improvement
<u>3</u>	3.2.2 Long Term Nutrient Trap
<u>2</u>	3.2.3 Groundwater Discharge
<u>(39)</u>	Total for Water Quality Improvement
<u>0</u>	3.3 CARBON SINK
<u>0</u>	3.4 SHORELINE EROSION CONTROL
<u>(below)</u>	3.5 GROUNDWATER RECHARGE
<u>50</u>	3.5.1 Site Type
<u>4</u>	3.5.2 Soil Recharge Potential
<u>(54)</u>	Total for Groundwater Recharge
<u>1161</u>	TOTAL (Hydrological Component)

4.0 SPECIAL FEATURES COMPONENT

4.1 RARITY

<u>40</u>	4.1.1 Wetlands
<u>20</u>	4.1.1.1 Rarity within the Landscape
	4.1.1.2 Rarity of Wetland Type

(60) Total for Wetland Rarity

<u>105</u>	4.1.2 Species
<u>0</u>	4.1.2.1 Provincially Significant Animals
<u>0</u>	4.1.2.2 Provincially Significant Plants
<u>0</u>	4.1.2.3 Regionally Significant Species
<u>0</u>	4.1.2.4 Locally Significant Species

(105) Total for Species Rarity

4.2 SIGNIFICANT FEATURES AND HABITATS

<u>0</u>	4.2.1 Colonial Waterbirds
<u>0</u>	4.2.2 Winter Cover for Wildlife
<u>10</u>	4.2.3 Waterfowl Staging and/or Moulting Areas
<u>10</u>	4.2.4 Waterfowl Breeding
<u>0</u>	4.2.5 Migratory Passerine, Shorebird or Raptor Stopover Area
<u>(below)</u>	4.2.6 Fish Habitat
<u>12</u>	4.2.6.1 Spawning and Nursery Habitat
<u>0</u>	4.2.6.2 Migration and Staging Habitat

(32) Total for Significant Features and Habitats

(2) 4.3 ECOSYSTEM AGE

(0) 4.4 GREAT LAKES COASTAL WETLANDS

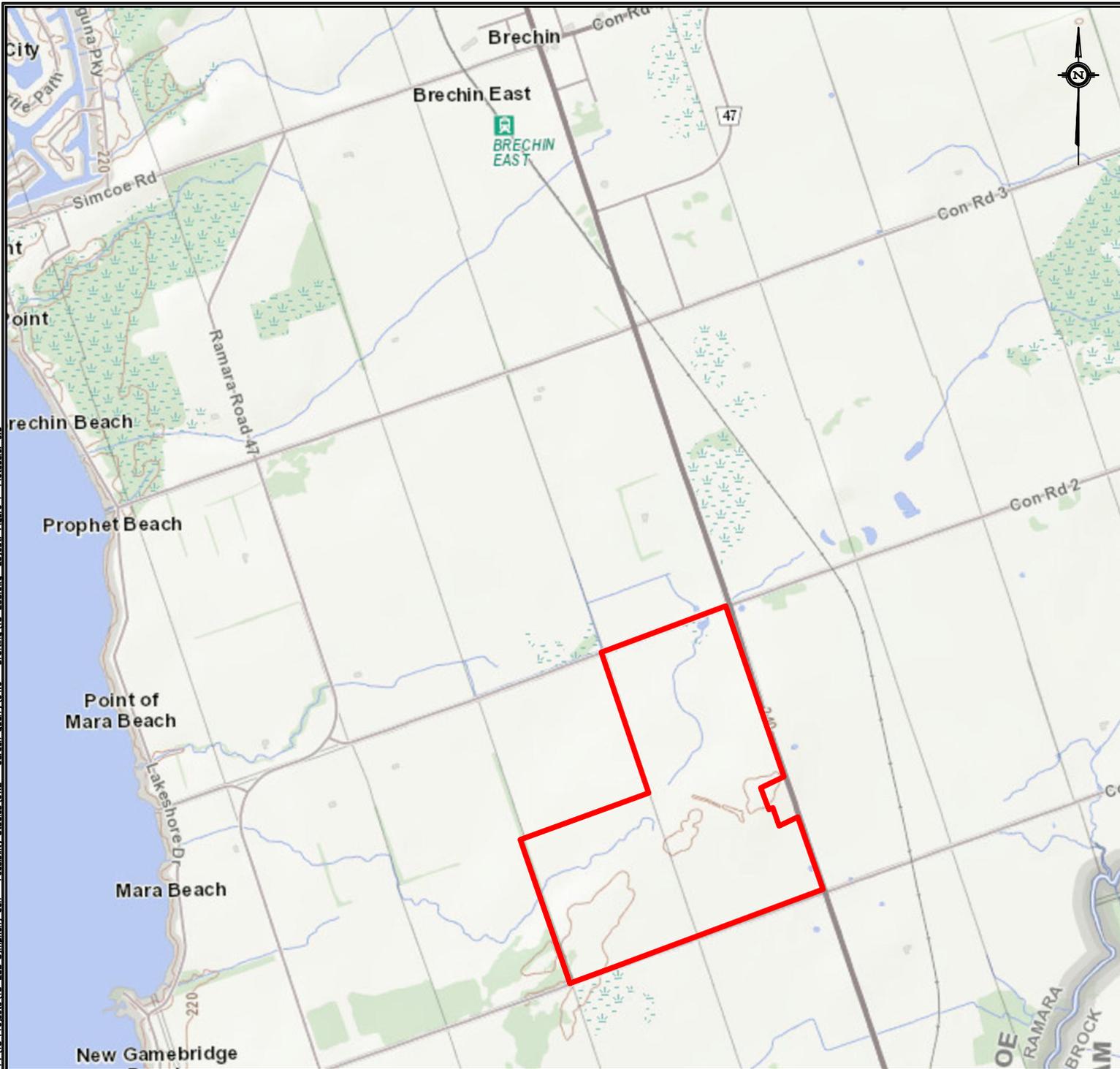
199 TOTAL FOR SPECIAL FEATURES COMPONENT (*not to exceed 250*)

SUMMARY OF EVALUATION RESULT

Wetland Lot 11 & 12, Concession 1, Ramara Wetland #1

<u>97</u>	1.0 TOTAL FOR BIOLOGICAL COMPONENT	Non-PSW (<200)
<u>39</u>	2.0 TOTAL FOR SOCIAL COMPONENT	
<u>161</u>	3.0 TOTAL FOR HYDROLOGICAL COMPONENT	
<u>199</u>	4.0 TOTAL FOR SPECIAL FEATURES COMPONENT	Non-PSW (<200)
<u>496</u>	TOTAL WETLAND SCORE	Non-PSW (<600)

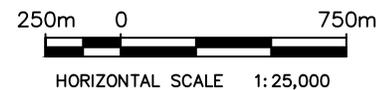
Printed by: ALU on December 3, 2021 at 4:06pm
File: P:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg - Layout: Figure 1 - Plotscale: 0.5



LEGEND:
— *Approx. Property Boundary*



REG MAP



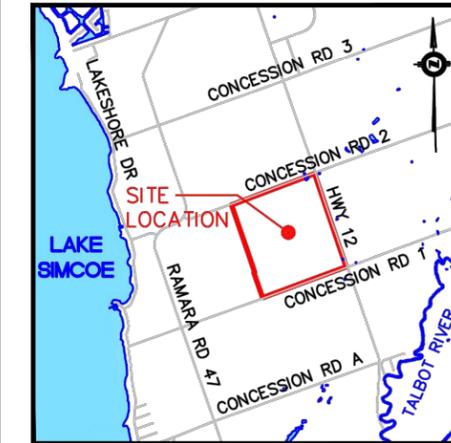
Study Area Location

Carden Quarry,
Brechin, ON

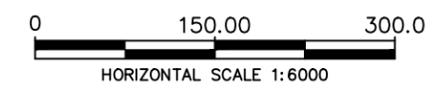
DATE ISSUED: December 2021	Figure No. 1
CREATED BY: JLM	
PROJECT NO.: 18-288	
REFERENCE: MNR	

LEGEND:

- - - APPROX. PROPERTY BOUNDARY
- - - ADJACENT LANDS OWNED BY APPLICANT
- EXISTING WATERCOURSE (ONTARIO MNR, 2020)
- WETLAND UNIT (AEC DELINEATED, OCT. 5 2021)
- WETLAND CATCHMENT



LOCATION PLAN

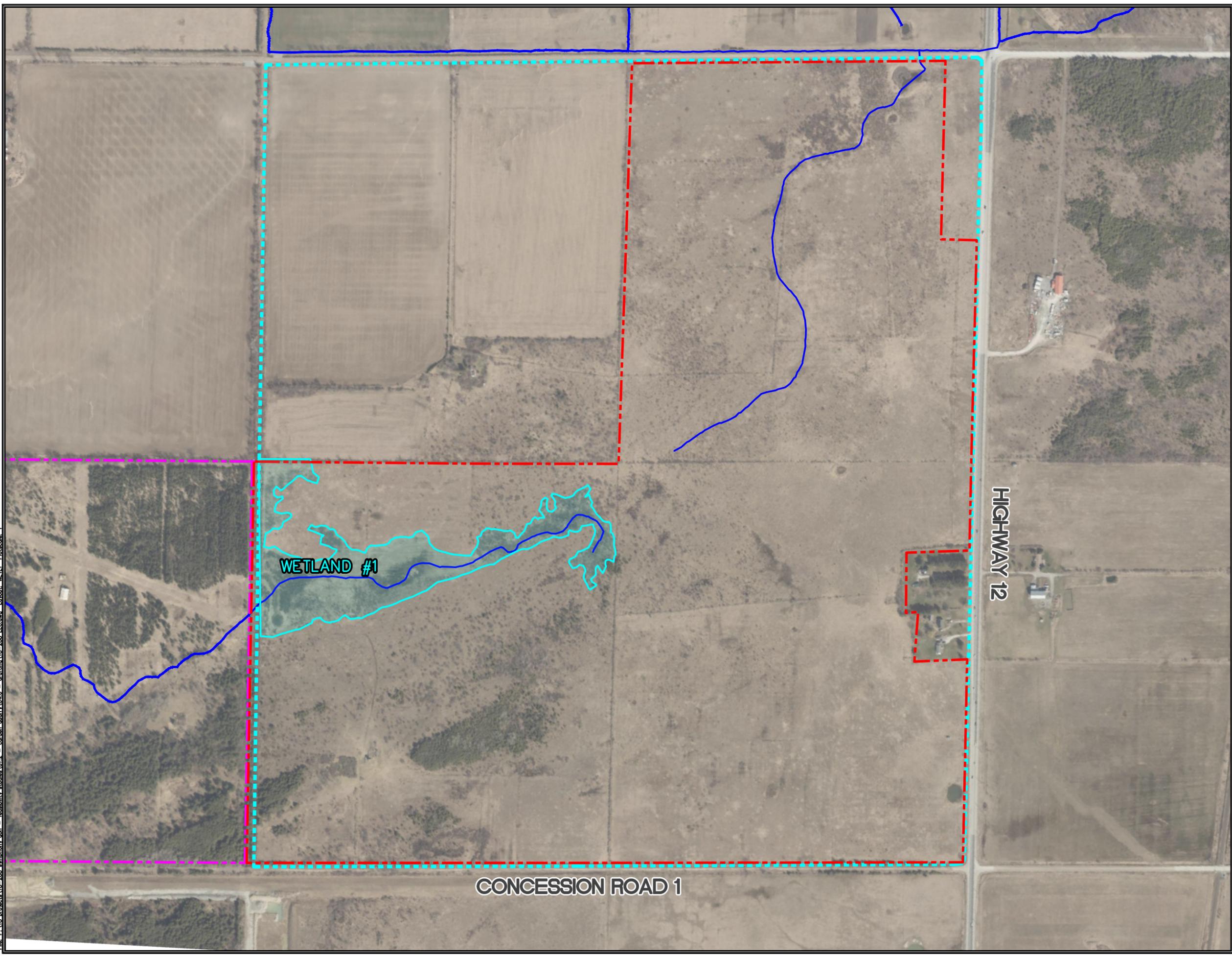


**WETLAND UNIT LOCATION
RAMARA WETLAND #1**

**LOTS 11 & 12, CONCESSION 1
BRECHIN, ON**

DATE ISSUED: FEBRUARY 2023	Figure No.
CREATED BY: A.L.	2
PROJECT NO.: 18-288	
REFERENCE: SIMCOE COUNTY	

Plotted by: ALU on February 14, 2023 at 8:17am
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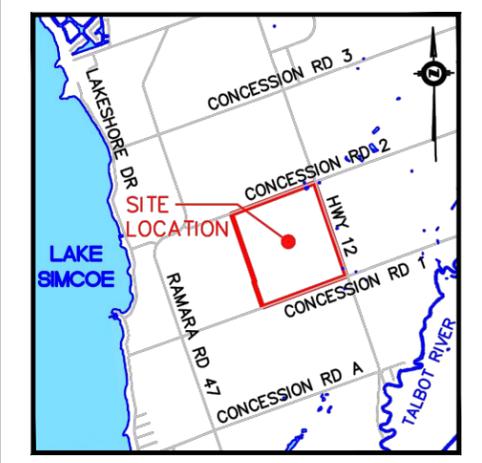


- LEGEND:**
- - - APPROX. PROPERTY BOUNDARY
 - - - ADJACENT LANDS OWNED BY APPLICANT
 - EXISTING WATERCOURSE (ONTARIO MNR, 2020)

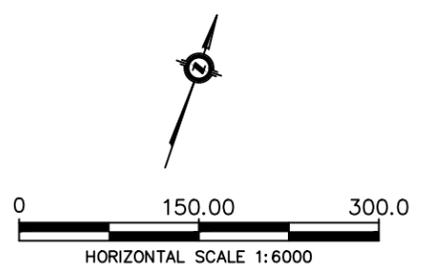
ELC WETLAND COMMUNITIES:

- S: SWAMP
- M: MARSH
- h: DECIDUOUS TREES
- ts: TALL SHRUBS
- ne: NARROW-LEAVED EMERGENTS
- gc: GROUNDCOVER (HERBS)
- re: ROBUST EMERGENTS
- u: UNVEGETATED

*DENOTES DOMINANT VEGETATION FORM



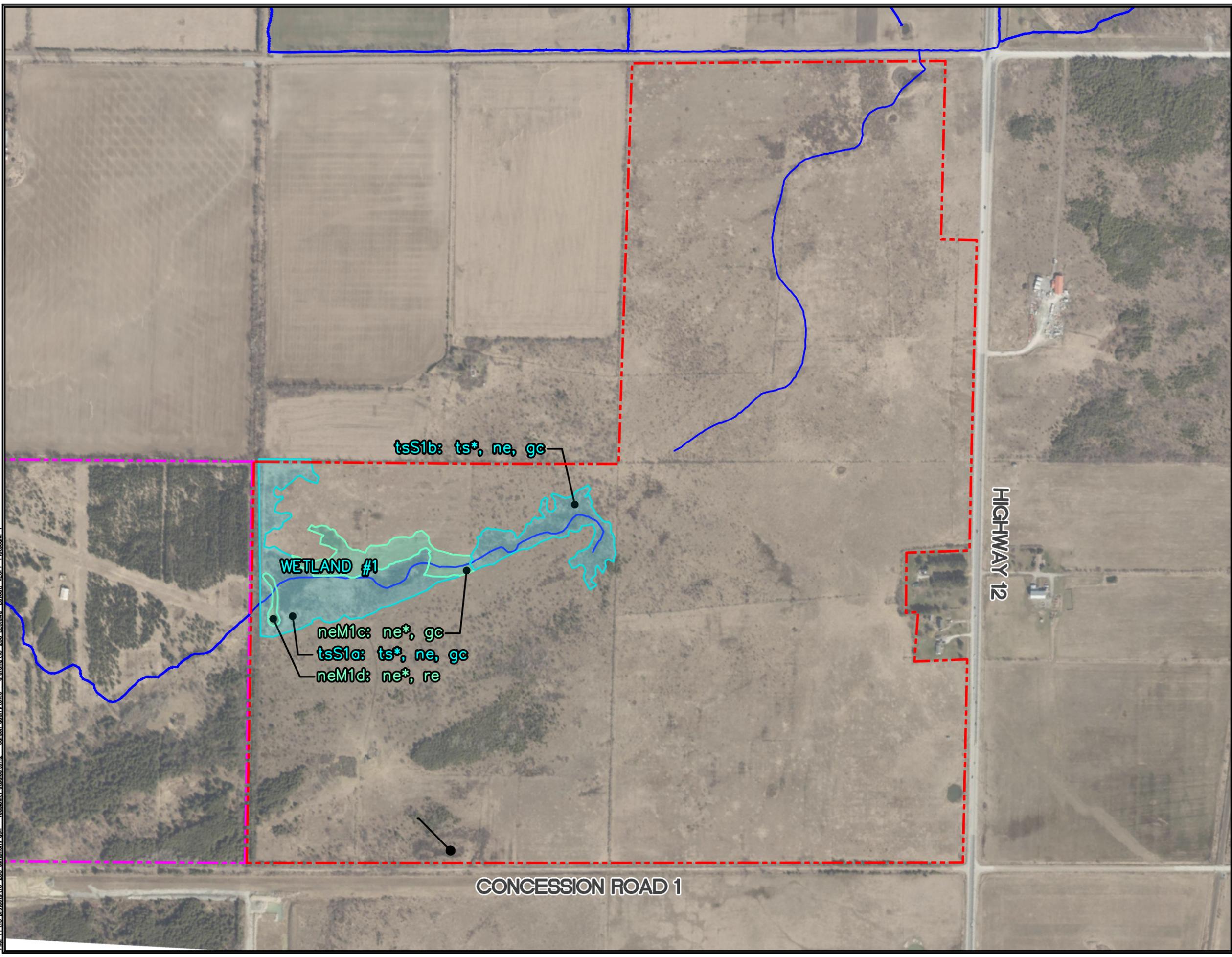
LOCATION PLAN



**VEGETATION FORMS
WETLAND UNIT #1**

**LOTS 11 & 12, CONCESSION 1
BRECHIN, ON**

DATE ISSUED:	FEBRUARY 2023	Figure No.
CREATED BY:	A.L.	3
PROJECT NO.:	18-288	
REFERENCE:	SIMCOE COUNTY	



tsS1b: ts*, ne, gc

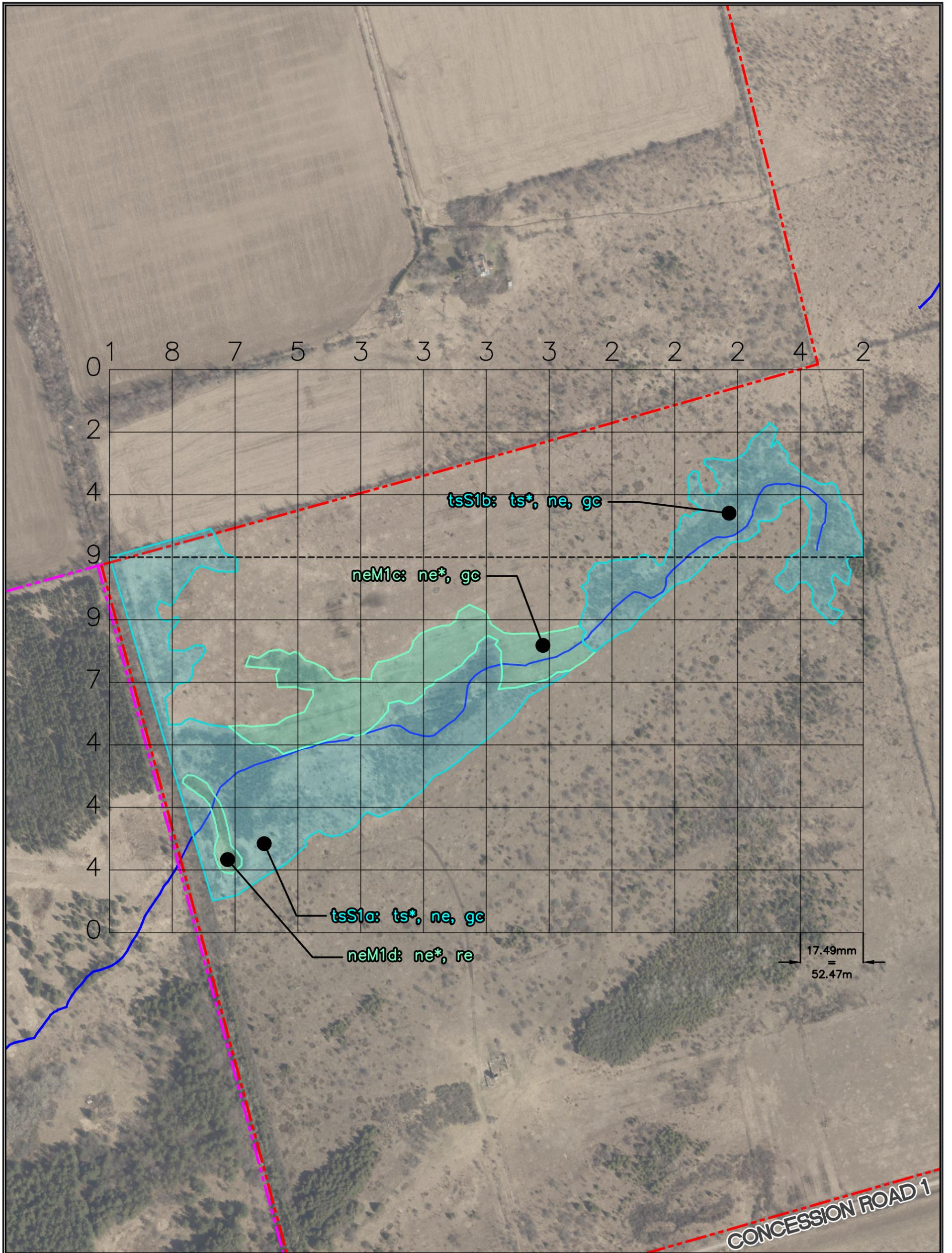
WETLAND #1

neM1c: ne*, gc
tsS1a: ts*, ne, gc
neM1d: ne*, re

CONCESSION ROAD 1

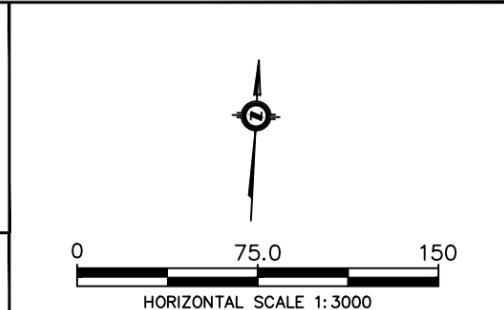
HIGHWAY 12

Plotted by: ALJ on February 14, 2023 at 8:17am
 File: P:\18_projects\18-288_simcoe_eof - feasibility_studies\01.2 - eodm_aumr\04.0 - draft\18-288_ELC.dwg Layout: VCFE1_PlotScale_1



- LEGEND:**
- - - APPROX. PROPERTY BOUNDARY
 - - - ADJACENT LANDS OWNED BY APPLICANT
 - EXISTING WATERCOURSE (ONTARIO MNR, 2020)
 - - - LINE 'A'

- ELC WETLAND COMMUNITIES:**
- A: SWAMP
 - M: MARSH
 - h: DECIDUOUS TREES
 - ts: TALL SHRUBS
 - ne: NARROW-LEAVED EMERGENTS
 - gc: GROUNDCOVER (HERBS)
 - re: ROBUST EMERGENTS
 - u: UNVEGETATED
- *DENOTES DOMINANT VEGETATION FORM



INTERSPERSION
WETLAND UNIT #1

LOTS 11 & 12, CONCESSION 1
BRECHIN, ON

DATE ISSUED: FEBRUARY 2023	Figure No.
CREATED BY: A.L.	4
PROJECT NO.: 18-288	
REFERENCE: SIMCOE COUNTY	

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
04-Feb-19	08:00-17:30	6	2	100	None, Snowpack 10-25 cm	Site Reconnaissance Survey Raptor Wintering #1
11-Feb-19	08:00-15:30	-8	3	50	None, Snowpack 20-40 cm	Site Reconnaissance Survey Raptor Wintering #2
25-Apr-19	16:00-22:15	12 (min), 17 (max)	1	20	None	Bat Snag Assessment Turtle Emergence #1 Waterfowl Stopover/Nesting #1 Amphibian Breeding #1
29-Apr-19	08:00-14:00	3 (min), 7 (max)	3	40-100 (hazy, thin)	None	Bat Snag Assessment Watercourse Assessment #1 Waterfowl Stopover/Nesting #2
07-May-19	12:30-15:30	9 (min), 11 (max)	3	0	None	Turtle Emergence #2 Waterfowl Stopover/Nesting #3 Reptile Observations (Incidental)
08-May-19	09:15-12:15	7 (min), 9 (max)	3	0	None	Turtle Emergence #3 Waterfowl Stopover/Nesting #4

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
29-May-19	16:15-23:15	13 (min), 16 (max)	3	40-100	None	Turtle Emergence #4 Turtle Nesting Survey #1 Waterfowl Stopover/Nesting #5 Watercourse Assessment #2 Amphibian Breeding #2 Reptile Observations (Incidental)
06-Jun-19	06:00-10:00	11 (min), 13 (max)	0-1	0-30	None	Turtle Emergence #5 Waterfowl Stopover/Nesting #7 Dawn Breeding Birds #1 Reptile Observations (Incidental)
12-Jun-19	21:00-23:00	18	1	40	None (moon vis)	Evening Breeding Birds #1 Turtle Nesting Survey #2
19-Jun-19	06:00-15:30	14 (min), 22 (max)	0-1	30	None	Dawn Breeding Birds #2 Late Spring/Early Summer Veg Reptile Observations (Incidental)
25-Jun-19	21:00-23:15	21 (max), 19 (min)	0	0	None	Amphibian Breeding #3 Turtle Nesting Survey #3

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
27-Jun-19	06:00-09:45	18 (min), 21 (max)	1	5	None	Dawn Breeding Birds #3 Reptile Observations (Incidental)
08-Jul-19	08:30-16:00	20 (min), 25 (max)	1	0	None	Early Summer Vegetation Reptile Observations (Incidental)
09-Jul-19	12:30-22:30	27 (max), 21 (min)	2-0	0-5	None	Early Summer Vegetation Evening Breeding Birds #2 Reptile Observations (Incidental)
10-Jul-19	12:45-22:45	26 (min), 28 (max)	3-1	5-80	None	Early Summer Vegetation Evening Breeding Birds #3 Reptile Observations (Incidental)
17-Sep-19	09:30-16:30	26	3	0	None	Late Summer Vegetation Reptile Observations (Incidental)
18-Sep-19	08:30-15:30	24	3	25	None	Late Summer Vegetation Reptile Observations (Incidental)
20-Jan-21	12:50-15:20	-9	1-2	100	V. light flurries	Raptor Wintering #3
17-Feb-21	11:15-14:00	-7	0	100	V. light flurries	Raptor Wintering #4
26-Feb-21	13:15-15:45	2	1	5	None	Raptor Wintering #5
12-Jul-21	08:30-16:00	24	3	40	None	Woodland/Wetland Staking Exercise (LSRCA) Reptile Observations (Incidental)

Table 1: Site Investigation Record**Lots 11 and 12, Concession 1, Ramara Wetlands**

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
						Wetland Supplementary Data Collection
01-Oct-21	08:00-13:00	11 (min), 17 (max)	1	90	None	Reptile Observations (Incidental)
21-Apr-22	09:30-11:05	5	2	50	None	Turtle Emergence #6
09-May-22	09:00-10:50	14	2	10	None	Turtle Emergence #7
11-May-22	09:25-10:45	17 (min), 19 (max)	1	20	None	Turtle Emergence #8
12-May-22	09:00-10:20	14 (min), 20 (max)	1	0	None	Turtle Emergence #9
24-May-22	09:35-11:00	12 (min), 15 (max)	2-3	50	None	Turtle Emergence #10
08-Jun-22	09:25-10:50	16 (min), 17 (max)	2	0	None	Turtle Emergence #11
09-Jun-22	15:20-16:55	18	2	50	None	Turtle Emergence #12
11-Jun-22	10:10-11:40	18 (min), 19 (max)	2	0	None	Turtle Emergence #13
14-Jun-22	12:45-15:15	21 (min), 22 (max)	1-2	5	None	Turtle Emergence #14
15-Jun-22	11:00-13:00	20 (min), 22 (max)	1-2	10-15	None	Turtle Emergence #15

*Time(s) indicate duration of survey undertaken for entire property, including lands adjacent to evaluated wetland(s).

Appendix A: Wetland Data Summary Form: Lot 11 & 12 Concession 1 Ramara Wetland #1
 Azimuth Environmental Consulting, Inc.

Wetland ID	Unit Code (Figure 3)	Dominant Form		# Forms	Dominant Species	Area (ha)	Open Water			Open Water (ha)	Soil (ha)	Site Type	Fish Habitat			
		Form	Forms				Low (ha)	High (Est.)	Mean (Est.)				% Fish Habitat	Area (ha)	Habitat Type	Key Veg Group
1	tsS1a	ts	ts*, ne, gc	3	<i>Salix petiolaris, Cornus stolonifera, Salix bebbiana, Salix discolor</i>	3.17	1.84%	1.84%	1.84%	0.11	5.88	Palustrine	100%	3.17	SF	N/A
	tsS1b	ts	ts*, ne, gc	3	<i>Salix petiolaris, Cornus stolonifera, Salix bebbiana, Salix discolor</i>	1.50	--	--	--	--	--	--	100%	1.50	SF	N/A
	neM1c	ne	ne*, gc	2	<i>Scirpus atrovirens, Carex vulpinoidea, Symphyotrichum lanceolatum, Agrostis stolonifera</i>	1.21	--	--	--	--	--	--	100%	1.21	HM	Shortgrass-Sedge
	neM1d	ne	ne*, re	2	<i>Typha spp., Phalaris arundinacea, Juncus spp., Scirpus atrovirens</i>	0.11	--	--	--	--	--	--	100%	0.11	LM	Cattail-Bulrush-Burreed
TOTAL AREA						5.99										

* Indicates dominant form



Appendix B: Species Rarity Background Sources

Azimuth Environmental Consulting, Inc.

- Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC; MNRF, 2023);
- Atlas of the Breeding Birds of Ontario (OBBA; Cadman *et al.*, 2007);
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2020);
- MECP's Species at Risk Ontario list (MECP, 2023);
- iNaturalist (NHIC) Rare Species of Ontario (iNaturalist, 2023);
- Ontario Butterfly Atlas (2023);
- Government of Canada's Species at Risk Public Registry;
- Atlas of the Mammals of Ontario (Dobbyn, 1994);
- Aquatic Resource Area (ARA) Interactive Mapping (MNRF, 2019);
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Mapping (2022);
- RiverStone Environmental Solutions (Bev Wicks, Mike Francis); personal communications regarding aquatic studies toward Environmental Impact Study report.

Azimuth's Environmental Impact Study report in regards to the subject property remains in progress, with anticipated completion date spring 2023.

References:

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds.). 2007. Atlas of the Breeding Birds of Ontario (OBBA). 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologies, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706pp.

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

Government of Canada. 2023. List of Wildlife Species at Risk. Available at: (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>). Accessed February 2023.

iNaturalist. 2023. (NHIC) Rare Species of Ontario. Available at: (<https://www.inaturalist.org/projects/nhic-rare-species-of-ontario>). Accessed February 2023.

Ministry of the Environment, Conservation and Parks (MECP). 2023. Species at Risk. Available at: (<https://www.ontario.ca/page/species-risk>). Accessed February 2023.

Ministry of Natural Resources and Forestry (MNRF). 2019. Aquatic Resource Area (ARA) Line Segment interactive mapping. Available at: (<https://geohub.lio.gov.on.ca/datasets/aquatic-resource-area-line-segment/explore>). Accessed February 2023.



Ministry of Natural Resources and Forestry (MNRF). 2023. Natural Heritage Information Centre (NHIC) internet web page. Government of Ontario, Ministry of Natural Resources (<https://www.ontario.ca/page/natural-heritage-information-centre>). Accessed February 2023.

Ontario Butterfly Atlas. 2023. (<https://www.ontarioinsects.org/atlas/>). Accessed February 2023.

Ontario Nature. 2020. Ontario Reptile and Amphibian Atlas Program Available at: (<https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/>). Accessed February 2023.



Environmental Assessments & Approvals

March 10, 2023

AEC 18-288

Township of Ramara
2297 Hwy 12, PO Box 130
Brechin, ON L0K 1B0

County of Simcoe
1110 Highway 26
Midhurst, ON L9X 1N6

Re: **Wetland Evaluation of Lot 11 & 12, Concession 1, Ramara Wetland #2
(Township of Ramara) according to the Ontario Wetland Evaluation System**

To Whom It May Concern:

Azimuth Environmental Consulting, Inc. (Azimuth) was retained by Lagoon City Limited Partnership to undertake a wetland evaluation of Lot 11 & 12, Concession 1, Ramara Wetland #2 in accordance with the Ontario Wetland Evaluation System (OWES) methodology outlined in the OWES Southern Manual 4th Edition (December 2022). The evaluation was undertaken by Dan Stuart, Ecology Lead at Azimuth (Certified Wetland Evaluator) based on a detailed background review and series of field surveys undertaken in 2019-2022.

The results of the OWES Evaluation determined that the wetland is **not significant** in accordance with provincial criteria. As required by the OWES Southern Manual 4th Edition, a final digital wetland boundary and confirmation of wetland status as non-significant will be submitted to the Ministry of Natural Resources and Forestry within 30 days.

Certainly should you have any additional questions or concerns, or wish to discuss further please do not hesitate to contact the undersigned.

Yours truly,
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Dan Stuart, M.Env.Sc.
Ecology Lead, OWES Evaluator

Attached:

Wetland Evaluation Data and Scoring Record (Lot 11 & 12, Concession 1, Ramara Wetland #2)
Figures 1-4, Table 1, Appendix A-B

WETLAND EVALUATION DATA
AND SCORING RECORD

Wetland Name: Lot 11 & 12, Concession 1, Ramara Wetland #2

Geographic Location (municipality, lot/concession, etc):

Township of Ramara, Lot 11 Concession 1

Map / Photo Locational Reference (e.g., latitude/longitude, NTS map, UTM):

UTM 17T 645601 m E 4931554 m N (Lat 44.522616, Long -79.167786)

Eco-District: CE-6

Wetland Size (hectares): 2.71

Attached:

Figure 1: Study Area Location

Figure 2: Wetland Location

Figure 3: Vegetation Forms

Figure 4: Interspersion

Table 1: Site Investigation Record

Appendix A: Wetland Data Summary Form

Appendix B: Species Rarity Background Sources

Vegetation Form	FA
h	0
c	0
dh	0
dc	0
ts	0.70
ls	0
ds	0
gc	0
m	0
ne	0.26
be	0
re	0.04
ff	0
f	0
su	0
u	0

1.0 BIOLOGICAL COMPONENT

1.1 PRODUCTIVITY

1.1.1 Growing Degree-Days/Soils (max: 30 pts)

Refer to page 36 of manual for further explanation.

1. Determine the correct GDD value for your wetland (use Figure 5).
2. Circle the appropriate GDD value from the evaluation table below.
3. Determine the Fractional Area (FA) of the wetland for each soil type.
4. Multiply the fractional area of each soil type by the applicable score-factor in the evaluation table.
5. Sum the scores for each soil type to obtain the final score (maximum score is 30 points).

Growing Degree-Days	Clay-Loam	Silt-Marl	Limestone	Sand	Humic-Mesic	Fibric	Granite
	<2800	15	13	11	9	8	7
2800-3200	18	15	13	11	9	8	7
3200-3600	22	18	15	13	11	9	7
3600-4000	26	21	18	15	13	10	8
>4000	30	25	20	18	15	12	8

Soil Type	FA of wetland in soil type	Enter appropriate score-factor from above table		
Clay/Loam	1.0	x	22	= 22
Silt/Marl:	0	x	0	= 0
Limestone:	0	x	0	= 0
Sand:	0	x	0	= 0
Humic/Mesic:	0	x	0	= 0
Fibric:	0	x	0	= 0
Granite:	0	x	0	= 0
Total	1.0		22	22

GDD/Soils Score (maximum 30 points) 22

1.1.2 Wetland Type

(Fractional Areas = area of wetland type/total wetland area)

	Fractional Area		Score
Bog	0	x 3 =	0
Fen	0	x 6 =	0
Swamp	0.70	x 8 =	5.6
Marsh	0.30	x 15 =	4.5
Total	1.0	- =	10.1

Wetland Type Score (maximum 15 points) 10

1.1.3 Site Type

(Fractional Area = area of site type/total wetland area)

	Fractional Area		Score
Isolated	0	x 1 =	0
Palustrine (permanent or intermittent flow)	1.0	x 2 =	2
Riverine	0	x 4 =	0
Riverine (at rivermouth)	0	x 5 =	0
Lacustrine (at rivermouth)	0	x 5 =	0
Lacustrine (with barrier beach)	0	x 3 =	0
Lacustrine (exposed to lake)	0	x 2 =	0
Total	1.0	- =	2

Site Type Score (maximum 5 points) 2

1.2 BIODIVERSITY

1.2.1 Number of Wetland Types

(Check only one)

	One	=	9 points
X	Two	=	13
	Three	=	20
	Four	=	30

Number of Wetland Types Score
(maximum 30 points) 13

1.2.2. Vegetation Communities

Use the data sheet provided in Appendix 4 to record and score vegetation communities (the completed form must be attached to this data record)

Scoring (circle only one option for each of the columns below):

Total # of communities with 1-3 forms	Total # of communities with 4-5 forms	Total # of communities with 6 or more forms
1 = 1.5 pts	1 = 2 pts	1 = 3 pts
2 = 2.5	2 = 3.5	2 = 5
3 = 3.5	3 = 5	3 = 7
4 = 4.5	4 = 6.5	4 = 9
5 = 5	5 = 7.5	5 = 10.5
6 = 5.5	6 = 8.5	6 = 12
7 = 6	7 = 9.5	7 = 13.5
8 = 6.5	8 = 10.5	8 = 15
9 = 7	9 = 11.5	9 = 16.5
10 = 7.5	10 = 12.5	10 = 18
11 = 8	11 = 13	11 = 19
+ 0.5 for each additional community = <u>3.5</u>	+ 0.5 for each additional community = <u>0</u>	+ 1.0 for each additional community = <u>0</u>

Vegetation Communities Score
(maximum 45 points) 3

1.2.3 Diversity of Surrounding Habitat

Check all appropriate items. Only habitat within 1.5 km of the wetland boundary and at least 0.5 ha in size are to be scored.

X	row crop
X	pasture
X	abandoned agricultural land
X	deciduous forest
X	coniferous forest
X	mixed forest*
	abandoned pits and quarries
	open lake or deep river
	fence rows with deep cover, or shelterbelts
	terrain appreciably undulating, hilly or with ravines
X	creek flood plain

* "Mixed forest" is defined as either 25% coniferous trees distributed singly or in clumps in deciduous forest, or 25% deciduous trees distributed singly or in clumps in coniferous forest. Note that Forest Resource Inventory (FRI) maps can be misleading since 25% conifer within a unit could be entirely concentrated around a lake.

Score 1 point for each feature checked, up to a maximum of 7 points.

Diversity of Surrounding Habitat Score
(maximum 7 points) 7

1.2.4 Proximity to Other Wetlands

Check highest appropriate category. (Note: if the wetland is lacustrine, score option #1 at 8 points).

✓		Points
X	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river within 1.5 km	8
	Hydrologically connected by surface water to other wetlands (same dominant wetland type) within 0.5 km	8
	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river from 1.5 to 4 km away	5
	Hydrologically connected by surface water to other wetlands (same dominant wetland type) from 0.5 to 1.5 km away	5
	Within 0.75 km of other wetlands (different dominant wetland type) or open water body, but not hydrologically connected by surface water	5
	Within 1 km of other wetlands, but not hydrologically connected by surface water	2
	No wetland within 1 km	0

Name and distance (from wetland) of wetlands/waterbodies scored above:

Marsh-dominated wetlands located downstream + upstream within 1.5 km of wetland via Menabb Drain

Proximity to other Wetlands Score
(maximum 8 points) 8

1.2.5 Interspersion

Number of Intersections = 68

✓	Number of Intersections (Check one only)	Points
	26 or less	= 3
	27 to 40	= 6
	41 to 60	= 9
✓	61 to 80	= 12
	81 to 100	= 15
	101 to 125	= 18
	126 to 150	= 21
	151 to 175	= 24
	176 to 200	= 27
	>200	= 30

Interspersion Score (maximum 30 points) 12

1.2.6 Open Water Types

NOTE: *this attribute is only to be scored for permanently flooded open water within the wetland (adjacent lakes do not count). Check one option only.*

✓	Open Water Type	Characteristic	Points
✓	Type 1	Open water occupies < 5 % of wetland area	= 8
	Type 2	Open water occupies 5-25% of wetland (occurring in central area)	= 8
	Type 3	Open water occupies 5-25% (occurring in various-sized ponds, dense patches of vegetation or vegetation in diffuse stands)	= 14
	Type 4	Open water occupies 26-75% of wetland (occurring in a central area)	= 20
	Type 5	Open water occupies 26-75% of wetlands (small ponds and embayments are common)	= 30
	Type 6	Open water occupies 76%-95% of wetland (occurring in large central area; vegetation is peripheral)	= 8
	Type 7	Open water occupies 76-95% of wetland (vegetation in patches or diffuse open stands)	= 14
	Type 8	Open water occupies more than 95% of wetland area	= 3
	No open water		= 0

Open Water Type Score (maximum 30 points) 8

1.3 SIZE (BIOLOGICAL COMPONENT)

Total Size of Wetland = 2.71 ha

Sum of scores from Biodiversity Subcomponent

- 1.2.1
- + 1.2.2
- + 1.2.3
- + 1.2.4
- + 1.2.5
- + 1.2.6

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Circle the appropriate score from the table below.

		Total Score for Biodiversity Subcomponent									
		<37	37-47	48-60	61-72	73-84	85-96	97-108	109-120	121-132	>132
Wetland size (ha)	<20 ha	1	5	7	8	9	17	25	34	43	50
	20-40	5	7	8	9	10	19	28	37	46	50
	41-60	6	8	9	10	11	21	31	40	49	50
	61-80	7	9	10	11	13	23	34	43	50	50
	81-100	8	10	11	13	15	25	37	46	50	50
	101-120	9	11	13	15	18	28	40	49	50	50
	121-140	10	13	15	17	21	31	43	50	50	50
	141-160	11	15	17	19	23	34	46	50	50	50
	161-180	13	17	19	21	25	37	49	50	50	50
	181-200	15	19	21	23	28	40	50	50	50	50
	201-400	17	21	23	25	31	43	50	50	50	50
	401-600	19	23	25	28	34	46	50	50	50	50
	601-800	21	25	28	31	37	49	50	50	50	50
	801-1000	23	28	31	34	40	50	50	50	50	50
	1001-1200	25	31	34	37	43	50	50	50	50	50
	1201-1400	28	34	37	40	46	50	50	50	50	50
	1401-1600	31	37	40	43	49	50	50	50	50	50
1601-1800	34	40	43	46	50	50	50	50	50	50	
1801-2000	37	43	47	49	50	50	50	50	50	50	
>2000	40	46	50	50	50	50	50	50	50	50	

Size Score (Biological Component)

(maximum 50 points) 7

2.0 SOCIAL COMPONENT

2.1 ECONOMICALLY VALUABLE PRODUCTS

2.1.1 Wood Products

Check the option that best reflects the total area (ha) of forested wetland (i.e., areas where the dominant vegetation form is h or c). Note that this is the area of all the forested vegetation communities, not total wetland size. Do not include areas where harvest is not permitted. Check only one option.

Area of wetland used for scoring 2.1.1: 0

<input checked="" type="checkbox"/>	< 5 ha	= 0 pts
<input type="checkbox"/>	5 - 25 ha	= 3
<input type="checkbox"/>	26 - 50 ha	= 6
<input type="checkbox"/>	51 - 100 ha	= 9
<input type="checkbox"/>	101 - 200 ha	= 12
<input type="checkbox"/>	> 200 ha	= 18

Source of information:

Environmental Impact Study (EIS)
prepared by Azimuth Environmental
Consulting, Inc. (Azimuth)

Wood Products Score (maximum 18 points) 0

2.1.2 Wild Rice

Check only one.

<input type="checkbox"/>	Present (min. size 0.5 ha)	= 6 pts
<input checked="" type="checkbox"/>	Absent	= 0
<input type="checkbox"/>	Harvest not permitted	= 0

Source of information:

EIS prepared by Azimuth

Wild Rice Score (maximum 6 points) 0

2.1.3 Commercial Baitfish

Check only one.

	Present	= 12 pts
	Absent	= 0
X	Fishing not permitted	= 0

Source of information:

Consultation with property owner.

Commercial Fish Score (maximum 12 points) 0

2.1.4 Furbearers

Only species recognized as furbearers under the Fish & Wildlife Conservation Act may be scored here. Score 3 points for each furbearer species listed, up to a maximum of 12 points. Score 0 points if trapping is prohibited.

	Name of furbearer	Source of information
1.	Coyote	EIS prepared by Azimuth
2.	Red Fox	" " " "
3.	Red Squirrel	" " " "
4.	Raccoon	" " " "
5.	-	-
6.	-	-

Furbearer Score (maximum 12 points) 12

2.2 RECREATIONAL ACTIVITIES

Sources of information and reasons for scoring a wetland under high or moderate use below, must be included below.

Circle one score for each of the activities listed. Score is cumulative – add score for hunting, nature enjoyment and fishing together for final score.

		Type of Wetland-Associated Use		
		Hunting	Nature Enjoyment/ Ecosystem Study	Fishing
Intensity of Use	High	40 points	40 points	40 points
	Moderate	20	20	20
	Low	8	8	8
	Not Possible/ No evidence	0	0	0

Sources of information (include evidence/criteria forming basis for score and any relevant reference used to obtain that information):

Hunting: Private property - public access not permitted. No evidence of hunting/trapping within wetland, as observed by Azimuth during EIS data collection.

Nature: Private property - public access not permitted. No evidence of nature studies/appreciation within wetland based on consultation with the property owner.

Fishing: Private property - public access not permitted. No evidence of fishing within the wetland based on consultation with the property owner, and as observed by Azimuth / RiverStone Environmental Solutions Inc. (RiverStone) during EIS data collection.

Recreational Activities Score
(maximum 80 points) 0

2.3 LANDSCAPE AESTHETICS

2.3.1 Distinctness

Check only one.

X	Clearly Distinct	= 3 pts
	Indistinct	= 0

Landscape Distinctness Score
(maximum 3 points) 3

2.3.2 Absence of Human Disturbance

Check only one.

	Human disturbances absent or nearly so	= 7 pts
	One or several localized disturbances	= 4
X	Moderate disturbance; localized water pollution	= 2
	Wetland intact but impairment of ecosystem quality intense in some areas	= 1
	Extreme ecological degradation, or water pollution severe and widespread	= 0

Details regarding type, extent and location of disturbance scored:

The entire property has been managed as cattle pasture as recently as 2019. Evidence of disturbance to the ground layer is minor to moderate, but widespread within the wetland.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Absence of Human Disturbance Score
(maximum 7 points) 2

2.4 EDUCATION AND PUBLIC AWARENESS

2.4.1 Educational Uses

Check highest appropriate category.

	Frequent	= 20 pts
	Infrequent	= 12
X	No visits	= 0

Details regarding the type and frequency of education uses scored above:

Private property with no public access - no documented educational uses.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Educational Uses Score (maximum 20 points) 0

2.4.2 Facilities and Programs

Check all appropriate options, score highest category checked.

	Staffed interpretation centre	= 8 pts
	No interpretation centre or staff, but a system of self-guiding trails or brochures available	= 4
	Facilities such as maintained paths (e.g., woodchips), boardwalks, boat launches or observation towers, but no brochures or other interpretation	= 2
X	No facilities or programs	= 0

Additional Notes/Comments:

Private property with no public access - no documented educational uses.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Facilities and Programs Score
(maximum 8 points) 0

2.4.3 Research and Studies

Check all that apply; score highest category checked.

	Long term research has been done	= 12 pts
	Research papers published in refereed scientific journal or as a thesis	= 10
	One or more (non-research) reports have been written on some aspect of the wetland's flora, fauna, hydrology, etc.	= 5
X	No research or reports	= 0

List of reports, publications, research studies etc. scored above:

EIS, Hydrogeological Evaluation, Geotechnical studies, etc. are in progress for the property, however per OWES guidelines such reports are not considered under this category.

No other reports, publications, research studies, etc., exist for the property according to consultation with the property owner.

Research and Studies Score

(maximum 12 points) 0

2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT

Name of Settlement: Beaverton

Distance of wetland from settlement: 8.8 km

Population of settlement: 2822 (Source: Statistics Canada)

Circle only the highest score applicable

Distance of wetland to settlement	population >10,000	population 2,500-10,000	population <2,500 or cottage community
	within or adjoining settlement	40 points	26 points
0.5 to 10 km from settlement	26	<u>16</u>	10
10 to 60 km from settlement	12	8	4
>60 km from nearest settlement	5	2	0

Proximity to Human Settlement Score

(maximum 40 points) 16

2.6 OWNERSHIP

FA of wetland held by or held under a legal contract by a conservation body (as defined by the <i>Conservation Land Act</i>) for wetland protection	<u>0</u> x 10 = <u>0</u>
FA of wetland occurring in provincially or nationally protected areas (e.g., parks and conservation reserves)	<u>0</u> x 10 = <u>0</u>
FA of wetland area in Crown/public ownership, not as above	<u>0</u> x 8 = <u>0</u>
FA of wetland area in private ownership, not as above	<u>1</u> x 4 = <u>4</u>

Source of information:

Consultation with property owner.

Ownership Score (maximum 10 points) 4

2.7 SIZE (SOCIAL COMPONENT)

Total Size of Wetland = 2.71 ha Sum of scores from Subcomponents 2.1, 2.2, and 2.5 = 33

Circle the appropriate score from the table below.

Total for Size Dependent Social Features										
	<31	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	>150
<2 ha	1	2	4	8	10	12	14	14	14	15
2-4	1	2	4	8	12	13	14	14	15	16
5-8	2	2	5	9	13	14	15	15	16	16
9-12	3	3	6	10	14	15	15	16	17	17
13-17	3	4	7	10	14	15	16	16	17	17
18-28	4	5	8	11	15	16	16	17	17	18
29-37	5	7	10	13	16	17	18	18	19	19
38-49	5	7	10	13	16	17	18	18	19	20
50-62	5	8	11	14	17	17	18	19	20	20
63-81	5	8	11	15	17	18	19	20	20	20
82-105	6	9	11	15	18	18	19	20	20	20
106-137	6	9	12	16	18	19	20	20	20	20
138-178	6	9	13	16	18	19	20	20	20	20
179-233	6	9	13	16	18	20	20	20	20	20
234-302	7	9	13	16	18	20	20	20	20	20
303-393	7	9	14	17	18	20	20	20	20	20
394-511	7	10	14	17	18	20	20	20	20	20
512-665	7	10	14	17	18	20	20	20	20	20
666-863	7	10	14	17	19	20	20	20	20	20
864-1123	8	12	15	17	19	20	20	20	20	20
1124-1460	8	12	15	17	19	20	20	20	20	20
1461-1898	8	13	15	18	19	20	20	20	20	20
1899-2467	8	14	16	18	20	20	20	20	20	20
>2467	8	14	16	18	20	20	20	20	20	20

Total Size Score (Social Component) 2

2.8 ABORIGINAL VALUES AND CULTURAL HERITAGE

Either or both Aboriginal or Cultural Values may be scored. However, the maximum score permitted for 2.8 is 30 points.

Full documentation of sources must be attached to the data record.

2.8.1 Aboriginal Values

Significant	=	30 pts
Not Significant	=	0
X Unknown	=	0

Additional Comments/Notes:

No known Aboriginal Values associated with the property, as confirmed via consultation with the property owner.

2.8.2 Cultural Heritage

Significant	=	30 pts
Not Significant	=	0
X Unknown	=	0

Additional Comments/Notes:

No known Cultural Heritage Values associated with the property, as confirmed via consultation with the property owner.

Aboriginal Values/Cultural Heritage Score (maximum 30 points) <u>0</u>

3.0 HYDROLOGICAL COMPONENT

3.1 FLOOD ATTENUATION

Check one of the following options.

- If wetland is a coastal wetland, \Rightarrow score 0 points for this section.
- If wetland is entirely isolated in site type, \Rightarrow score 100 points automatically.
- Wetland not as above – proceed through 'steps' A through F below.

- (A) Total wetland area = 2.71 ha
- (B) Size of wetland's catchment = 166.0 ha
- (C) Size of other detention areas in catchment = 9.10 ha
- (D) Total area of upstream detention areas = {A + C} = 11.81 ha
- (E) Upstream Detention Factor = {(A/D) x 2} = 0.46 (maximum 1.0)
- (F) Attenuation Factor = {(A/B) x 10} = 0.16 (maximum 1.0)
- Flood Attenuation Final Score = {(E + F) / 2} x 100 = 31

Flood Attenuation Score (maximum 100 points) 31

3.2 WATER QUALITY IMPROVEMENT

3.2.1 Short Term Water Quality Improvement

Step 1: Determination of maximum initial score

	Wetland on one of the 5 defined large lakes or 5 major rivers (Go to Step 5A)
X	All other wetlands (Go through Steps 2, 3, 4, and 5B)

Step 2: Determination of Watershed Improvement Factor (WIF)

Calculation of WIF is based on the fractional area (FA) of each site type that makes up the total area of the wetland.

(FA = area of site type/total area of wetland)

FA of isolated wetland	=	0	x 0.5 =	0
FA of riverine wetland	=	0	x 1.0 =	0
FA of palustrine wetland with no inflow	=	0	x 0.7 =	0
FA of palustrine wetland with inflows	=	1	x 1.0 =	1.0
FA of lacustrine on lake shoreline	=	0	x 0.2 =	0
FA of lacustrine at lake inflow or outflow	=	0	x 1.0 =	0

Sum (WIF cannot exceed 1.0) 1.0

Step 3: Determination of Catchment Land Use Factor (LUF)

(Choose the first category that fits upstream land use in the catchment.)

X	Over 50% agricultural and/or urban	=	1.0
	Between 30 and 50% agricultural and/or urban	=	0.8
	Over 50% forested or other natural vegetation	=	0.6

LUF (maximum 1.0) 1.0

Step 4: Determination of Pollutant Uptake Factor (PUF)

Calculation of PUF is based on the fractional area (FA) of each vegetation type that makes up the total area of the wetland. Base assessment on the dominant vegetation form for each community except where dead trees or shrubs dominate. In that case base assessment on the dominant live vegetation type.

(FA = area of vegetation type/total area of wetland)

FA of wetland with live trees, shrubs, herbs or mosses (c, h, ts, ls, gc, m)	= x	0.75 =	0.525
FA of wetland with emergent, submergent or floating vegetation (re, be, ne, su, f, ff)	= x	1.0 =	0.30
FA of wetland with little or no vegetation (u)	= x	0.5 =	0

Sum (PUF cannot exceed 1.0) 0.825

Step 5: Calculation of final score

<input type="checkbox"/>	Wetland on defined 5 major lakes or 5 major rivers	0
<input checked="" type="checkbox"/>	All other wetlands – calculate as follows	
	Initial score	60
	Watershed Improvement Factor (WIF)	$\frac{1.0}{1.0}$
	Land Use Factor (LUF)	$\frac{1.0}{0.825}$
	Pollutant Uptake Factor (PUF)	
	Final score: $60 \times \text{WIF} \times \text{LUF} \times \text{PUF} =$	<u>49.5</u>

Short Term Water Quality Improvement Score (maximum 60 points) <u>49</u>

3.2.2 Long Term Nutrient Trap

Step 1:

<input type="checkbox"/>	Wetland on defined 5 major lakes or 5 major rivers = 0 points
<input checked="" type="checkbox"/>	All other wetlands (Proceed to Step 2)

Step 2: Choose only one of the following settings that best describes the wetland being evaluated

<input type="checkbox"/>	Wetland located in a river mouth	= 10 pts
<input type="checkbox"/>	Wetland is a bog, fen, or swamp with more than 50% of the wetland being covered with organic soil	= 10
<input checked="" type="checkbox"/>	Wetland is a bog, fen, or swamp with less than 50% of the wetland being covered with organic soil	= 3
<input type="checkbox"/>	Wetland is a marsh with more than 50% of the wetland covered with organic soil	= 3
<input type="checkbox"/>	None of the above	= 0

Long Term Nutrient Trap Score (maximum 10 points) <u>3</u>

3.2.3 Groundwater Discharge

Circle the characteristics that best describe the wetland being evaluated and then sum the scores. If the sum exceeds 30 points, assign the maximum score of 30). Note: for wetland type, wetland type scored does not have to be the dominant type in the wetland.

		Potential for Discharge		
		None to Little	Some	High
Wetland Characteristics	Wetland type	Bog = 0	Swamp/Marsh = 2	Fen = 5
	Topography	Flat/rolling = 0	Hilly = 2	Steep = 5
	Wetland area:	Large (>50%) = 0	Moderate (5-50%) = 2	Small (<5%) = 5
	Upslope catchment area			
	Lagg development	None found = 0	Minor = 2	Extensive = 5
	Seeps	None = 0	≤ 3 seeps = 2	> 3 seeps = 5
	Surface marl deposits	None = 0	≤ 3 sites = 2	> 3 sites = 5
	Iron precipitates	None = 0	≤ 3 sites = 2	> 3 sites = 5
	Located within 1 km of a major aquifer	N/A = 0	N/A = 0	Yes = 10 No = 0

Additional Comments/Notes:

Groundwater Discharge Score (maximum 30 points) <u>2</u>

3.3 CARBON SINK

Check only one of the following:

	Bog, fen or swamp with more than 50% coverage by organic soil	= 5 pts
	Bog, fen or swamp with between 10 to 50% coverage by organic soil	= 2
	Marsh with more than 50% coverage by organic soil	= 3
X	Wetlands not in one of the above categories	= 0

Source of information:

EIS prepared by Azimuth

Carbon Sink Score
(maximum 5 points) 0

3.4 SHORELINE EROSION CONTROL

From the wetland vegetation map determine the dominant vegetatio type within the erosion zone for lacustrine and riverine site type areas only. Score according to the factors listed below.

Step 1:

X	Wetland entirely isolated or palustrine	= 0 pts
	Any part of the wetland is riverine or lacustrine	= Go to step 2

Step 2: Choose the one characteristic that best describes the shoreline vegetation (see page 109 for description of "shoreline".)

	Trees and shrubs	= 15 pts
	Emergent vegetation	= 8
	Submergent vegetation	= 6
	Other shoreline vegetation	= 3
	No vegetation	= 0

Shoreline Erosion Control Score
(maximum 15 points) 0

3.5 GROUNDWATER RECHARGE

3.5.1 Site Type

Wetland > 50% lacustrine (by area) or located on one of the five major rivers		= 0 pts	
Wetland not as above. Calculate final score as follows:			
■ FA of isolated or palustrine wetland	= 10	x 50 =	50
■ FA of riverine wetland	= 0	x 20 =	0
■ FA of lacustrine wetland (not dominant site type)	= 0	x 0 =	0

Groundwater Recharge/Wetland Site Type Score
(maximum 50 points) 50

3.5.2 Soil Recharge Potential

Circle only one choice that **best** describes the soils in **the area surrounding the wetland** being evaluated (the soils within the wetland are not scored here).

Dominant Wetland Type	Group A, B, C (sands, gravels, loams)	Group D (clays, substrates in high water tables, shallow substrates over impervious materials such as bedrock)
	Lacustrine or major river	0
Isolated	10	5
Palustrine	7	(4)
Riverine (not on a major river)	5	2

Groundwater Recharge/Wetland Soil Recharge Potential Score (maximum 10 points) 4

4.0 SPECIAL FEATURES

COMPONENT

4.1 RARITY

4.1.1 Wetland Types

Ecodistrict	Rarity within the Landscape (4.1.1.1)	Rarity of Wetland Type (4.1.1.2)			
		Marsh	Swamp	Fen	Bog
6E-1	60	40	0	80	80
6E-2	60	40	0	80	80
6E-4	60	40	0	80	80
6E-5	20	40	0	80	80
6E-6	40	20	0	80	80
6E-7	60	10	0	80	80
6E-8	20	20	0	80	80
6E-9	0	20	0	80	80
6E-10	20	0	20	80	80
6E-11	0	30	0	80	80
6E-12	0	30	0	60	80
6E-13	60	10	0	80	80
6E-14	40	20	0	40	80
6E-15	40	0	0	80	80
6E-16	60	20	0	80	60
6E-17	40	10	0	30	80
7E-1	60	0	60	80	80
7E-2	60	0	0	80	80
7E-3	60	00	0	80	80
7E-4	80	0	0	80	80
7E-5	60	20	0	80	80
7E-6	80	30	0	80	80

4.1.1.1 Rarity within the Landscape

Choose appropriate score from 2nd column above.

Score (maximum 80 points) 40

4.1.1.2 Rarity of Wetland Type

Score is cumulative, based on presence/absence. Circle all appropriate scores from above table and sum.

Score (maximum 80 points) 20

4.1.2 Species

4.1.2.1 Provincially Significant Animal Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
Western Chorus Frog	<i>Pseudacris triseriata</i>	Calling	Apr 2019	Azimuth EIS
Midland Painted Turtle	<i>Chrysemys picta</i> ssp. <i>marginata</i>	Basking	Spring 2022	Azimuth EIS
Chimney/Meadow Crayfish	<i>Fullerianambarus</i> <i>boldions</i> or <i>Cambarus diogenes</i>	Burrow	June 2019	Azimuth EIS

Additional Notes/Comments:

All NHIC-tracked species are listed as Provincially Significant.

One species = 50 pts	9 species = 140 pts	17 species = 160 pts
2 species = 80	10 species = 143	18 species = 162
3 species = 95	11 species = 146	19 species = 164
4 species = 105	12 species = 149	20 species = 166
5 species = 115	13 species = 152	21 species = 168
6 species = 125	14 species = 154	22 species = 170
7 species = 130	15 species = 156	23 species = 172
8 species = 135	16 species = 158	24 species = 174
		25 species = 176

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Animal Species
(no maximum) 75

4.1.2.2 Provincially Significant Plant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
None observed	NIA	NIA	NIA	NIA

Additional Notes/Comments:

None documented during field studies associated with EIS prepared by Azimuth. A detailed plant inventory was completed on June 17, July 9, July 10, September 17, and September 18, 2019.

One species = 50 pts	9 species = 140 pts	17 species = 160 pts
2 species = 80	10 species = 143	18 species = 162
3 species = 95	11 species = 146	19 species = 164
4 species = 105	12 species = 149	20 species = 166
5 species = 115	13 species = 152	21 species = 168
6 species = 125	14 species = 154	22 species = 170
7 species = 130	15 species = 156	23 species = 172
8 species = 135	16 species = 158	24 species = 174
		25 species = 176

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Plant Species
(no maximum) 0

4.1.2.3 Regionally Significant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
Downy Willowherb	<i>Epilobium strictum</i>	Plant	Spring 2019	Azimuth EIS

One species = 20 pts	4 species = 45 pts	7 species = 58 pts
2 species = 30	5 species = 50	8 species = 61
3 species = 40	6 species = 55	9 species = 64
		10 species = 67

For each significant species over 10 in wetland, add 1 point.

Kiley (1989) list reference d.

Regionally Significant Species Score
(no maximum score) 20

wetland species based on Kiley (1989)

4.1.2.4 Locally Significant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
No local list	N/A	N/A	N/A	N/A

One species = 10 pts	4 species = 31 pts	7 species = 43 pts
2 species = 17	5 species = 38	8 species = 45
3 species = 24	6 species = 41	9 species = 47
		10 species = 49

For each significant species over 10 in wetland, add 1 point.

Kiley (1989) functions as plant rarity list for Simcoe County, considered above.

Locally Significant Species Score
(no maximum score) 0

No local list for Township of Ramara.

4.2 SIGNIFICANT FEATURES AND HABITATS

4.2.1 Colonial Waterbirds

Record all available information. Score the highest applicable category. Include additional information as possible (e.g., nest locations, etc).

Activity	Species	Info Source	Points
Currently nesting	None	EIS surveys	= 50
Known to have nested within the past 5 years	None	EIS surveys	= 25
Active feeding area (great blue heron excluded)	None	EIS surveys	= 15
None known	None	EIS surveys	= 0

Additional Notes/Comments:

EIS survey program included six (6) waterfowl stopover/staging and colonial waterbird surveys on April 25, April 29, May 7, May 8, May 29, and June 6, 2019. Three (3) dawn breeding bird surveys were completed June 6, June 19, and June 27, 2019. Three (3) evening " " " " " " June 12, July 9, July 10, 2019.

Colonial Waterbird Nesting Score
(maximum 50 points) 0

4.2.2 Winter Cover for Wildlife

Score highest appropriate category. Include rationale/sources of information.

	Provincially significant	= 100 pts
	Significant in Ecoregion	= 50
	Significant in Ecodistrict	= 25
	Locally significant	= 10
X	Little or poor winter cover	= 0

Species/habitat/vegetation community scored (e.g., winter deer cover in hemlock swamp, S3 and S4b):

Per Azimuth EIS, overall poor opportunities for winter cover as wetland consists of non-treed vegetation forms.

Source of information:

MNRF records show Deer Wintering Area (Stratum 2) along Lake Simcoe shoreline approx. 2.3 km northwest of wetland at its closest point. Simcoe OP and Ramara OP do not illustrate habitat.

Winter Cover for Wildlife Score
(maximum 100 points) 0

4.2.3 Waterfowl Staging and/or Moulting Areas

Check highest level of significance for both staging and moulting; add scores for staging and for moulting together for final score. However, maximum score for evaluation under this section is 150 points.

	Staging	Moulting
Nationally/internationally significant	= 150 pts	= 150 pts
Provincially significant	= 100	= 100
Significant in the Ecoregion	= 50	= 50
Significant in Ecodistrict	= 25	= 25
Known to occur	= 10	= 10
Not possible/Unknown	= 0	= 0

Species/habitat/vegetation community scored (e.g., approx 20 mallards in W3):

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. No staging or moulting waterfowl observed.

Source of information:

EIS - six (6) waterfowl stopover/staging surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Waterfowl Staging/Moulting Score
(maximum 150 points) 0

4.2.4 Waterfowl Breeding

Check highest level of significance.

	Nationally/internationally significant	= 150 pts
	Provincially significant	= 100
	Significant in the Ecoregion	= 50
	Significant in Ecodistrict	= 25
X	Habitat Suitable	= 10
	Habitat not suitable	= 0

Species/habitat/vegetation community scored (e.g., mallard in W3):

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. No waterfowl breeding/nesting observed.

Source of information:

EIS - six (6) waterfowl nesting surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Waterfowl Breeding Score
(maximum 150 points) 10

4.2.5 Migratory Passerine, Shorebird or Raptor Stopover Area

Check highest level of significance.

	Nationally / internationally significant	= 150 pts
	Provincially significant	= 100
	Significant in Ecoregion	= 50
	Significant in Ecodistrict	= 25
	Known to occur	= 10
X	Not possible / Unknown	= 0

Species/habitat/vegetation community scored:

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. Listed shorebird species not identified.

Source of information:

EIS - six (6) waterfowl stopover/staging surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Passerine, Shorebird or Raptor Stopover Score
(maximum 100 points) 0

4.2.6 Fish Habitat

4.2.6.1 Spawning and Nursery Habitat

Area Factors for Low Marsh, High Marsh and Swamp Communities.

No. of ha of Fish Habitat	Area Factor
< 0.5 ha	0.1
0.5 – 4.9	0.2
5.0 – 9.9	0.4
10.0 – 14.9	0.6
15.0 – 19.9	0.8
20.0 +	1.0

Step 1:

- | | | |
|---|--|------------------------------|
| | Fish habitat is not present within the wetland | Go to Step 7, Score 0 points |
| X | Fish habitat is present within the wetland | Go to Step 2 |

Step 2: Choose only one option

- | | | |
|---|--|-----------------------------|
| | Significance of the spawning and nursery habitat within the wetland is known | Go to Step 3 |
| X | Significance of the spawning and nursery habitat within the wetland is not known | Go through Steps 4, 5 and 6 |

Step 3: Select the highest appropriate category below, attach documentation:

- | | |
|---------------------------------------|--------------------------------|
| Significant in Ecoregion | Go to Step 7, Score 100 points |
| Significant in Ecodistrict | Go to Step 7, Score 50 points |
| Locally Significant Habitat (5.0+ ha) | Go to Step 7, Score 25 points |
| Locally Significant Habitat (<5.0 ha) | Go to Step 7, Score 15 points |

Source of information:

Natural Heritage Information Centre, Fisheries and Oceans Canada mapping

Step 4: Low Marsh = the 'permanent' marsh area, from the existing water line out to the outer boundary of the wetland.

- | | | |
|---|-----------------------|---|
| | Low marsh not present | Go to Step 5 |
| X | Low marsh present | Continue through Step 4, scoring as noted below |

Scoring of Low Marsh:

1. Check the appropriate **Vegetation Group** (see Appendix 7) for each Low Marsh community. (Based on the one most clearly dominant plant species of the dominant form in each Low Marsh vegetation community.)
2. Sum the areas (ha) of the vegetation communities assigned to each **Vegetation Group**.
3. Use these areas to assign an **Area Factor** (from Table 7) for each checked **Vegetation Group**.
4. Multiply the **Area Factor** by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for Low Marsh**.

Scoring for Presence of Key Vegetation Groups – Low Marsh						
Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
1	Tallgrass	—	—	—	6	0
2	Shortgrass-Sedge	—	—	—	11	0
3	Cattail-Bulrush-Burreed	X	0.10	0.1	5	0.05
4	Arrowhead-Pickerelweed	—	—	—	5	0
5	Duckweed	—	—	—	2	0
6	Smartweed-Waterwillow	—	—	—	6	0
7	Waterlily-Lotus	—	—	—	11	0
8	Waterweed-Watercress	—	—	—	9	0
9	Ribbongrass	—	—	—	10	0
10	Coontail-Naiad-Watermilfoil	—	—	—	13	0
11	Narrowleaf Pondweed	—	—	—	5	0
12	Broadleaf Pondweed	—	—	—	8	0
Total Score for Low Marsh (maximum 75 points)						0

Continue to Step 5

Step 5: High Marsh = the 'seasonal' marsh area, from the water line to the inland boundary of marsh wetland type. This is essentially what is commonly referred to as a wet meadow, in that there is insufficient standing water to provide fisheries habitat except during flood or high water conditions.

	High marsh not present	Go to Step 6
X	High marsh present	Continue through Step 5, scoring as noted below

Scoring of High Marsh:

1. Check the appropriate **Vegetation Group** (see Appendix 7) for each High Marsh community. (Based on the one most clearly dominant plant species of the dominant form in each High Marsh vegetation community.)
2. Sum the areas (ha) of the vegetation communities assigned to each **Vegetation Group**.
3. Use these areas to assign an **Area Factor** (from Table 7) for each checked **Vegetation Group**.
4. Multiply the **Area Factor** by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for High Marsh**.

Scoring for Presence of Key Vegetation Groups – High Marsh						
Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
1	Tallgrass	—	—	—	6	0
2	Shortgrass-Sedge	X	0.72	0.2	11	1.58
3	Cattail-Bulrush-Burreed	—	—	—	5	0
4	Arrowhead-Pickerelweed	—	—	—	5	0
Total Score for High Marsh (maximum 25 points)						2

Continue to Step 6

Step 6:

	Swamp containing fish habitat not present	Go to Step 7
X	Swamp containing fish habitat present	Continue through Step 6, scoring as follows

Scoring of Swamp:

1. Determine the total area (ha) of seasonally flooded swamp communities within the wetland containing fish habitat and record below.
2. Determine the total area (ha) of permanently flooded swamp communities within the wetland containing fish habitat and record below.
3. Use these areas to assign an **Area Factor** (from Table 7).
4. Multiply the Area Factor by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for Swamp**.

Scoring Swamps for Fish Habitat (Seasonally flooded; Permanently flooded)					
Swamp Containing Fish Habitat	Present (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
Seasonally Flooded Swamp	X	1.89	0.2	10	3.78
Permanently Flooded Swamp	—	—	—	10	0
Total Score for Swamp (maximum 20 points)					4

Continue to Step 7

Step 7: CALCULATION OF FINAL SCORE

NOTE: Scores for Steps 4, 5 and 6 are only recorded if Steps 1 and 3 have not been scored.

- | | |
|---|------------|
| A. Score from Step 1 (fish habitat not present) | = <u>0</u> |
| B. Score from Step 3 (significance known) | = <u>0</u> |
| C. Score from Step 4 (Low Marsh) | = <u>0</u> |
| D. Score from Step 5 (High Marsh) | = <u>2</u> |
| E. Score from Step 6 (Swamp) | = <u>4</u> |

Calculation of Final Score for Spawning and Nursery Habitat = A or B or Sum of C, D, and E

Score for Spawning and Nursery Habitat (maximum 100 points) <u>6</u>

4.2.6.2 Migration and Staging Habitat

Step 1:

<input checked="" type="checkbox"/>	Staging or Migration Habitat is not present in the wetland	Go to Step 4, Score 0 points
<input type="checkbox"/>	Staging or Migration Habitat is present in the wetland, significance of the habitat is known	Go to Step 2
<input type="checkbox"/>	Staging or Migration Habitat is present in the wetland, significance of the habitat is not known	Go to Step 3

Step 2: Select the highest appropriate category below. Ensure that documentation is attached to the data record.

<input type="checkbox"/>	Significant in Ecoregion	Score 25 points in Step 4
<input type="checkbox"/>	Significant in Ecodistrict	Score 15 points in Step 4
<input type="checkbox"/>	Locally Significant	Score 10 points in Step 4
<input type="checkbox"/>	Fish staging and/or migration habitat present, but not as above	Score 5 points in Step 4

Source of information:

Aquatic / fish habitat assessment completed by RiverStone

Step 3: Select the highest appropriate category below based on presence of the designated site type (i.e. does not have to be the dominant site type). Refer to Site Types recorded earlier (section 1.1.3). Attach documentation.

<input type="checkbox"/>	Wetland is riverine at rivermouth or lacustrine at rivermouth	Score 25 points in Step 4
<input type="checkbox"/>	Wetland is riverine, within 0.75 km of rivermouth	Score 15 points in Step 4
<input type="checkbox"/>	Wetland is lacustrine, within 0.75 km of rivermouth	Score 10 points in Step 4
<input type="checkbox"/>	Fish staging and/or migration habitat present, but not as above	Score 5 points in Step 4

Step 4: Enter a score from only one of the three above Steps.

Score for Staging and Migration Habitat (maximum 25 points) <u>0</u>

4.3 ECOSYSTEM AGE

	Fractional Area		Score
Bog =	0	x 25 =	0
Fen, on deeper soils; floating mats or marl =	0	x 20 =	0
Fen, on limestone rock =	0	x 5 =	0
Swamp =	0.7	x 3 =	2.1
Marsh =	0.3	x 0 =	0
Total	1.0	=	2.1

Ecosystem Age Score (maximum 25 points) 2

4.4 GREAT LAKES COASTAL WETLANDS

Choose one only.

Wetland < 10 ha	=	10 pts
Wetland 10-50 ha	=	25
Wetland 51-100 ha	=	50
Wetland > 100 ha	=	75

Not a coastal wetland (Note: Lake Simcoe not defined as one of the Great Lakes)

Great Lakes Coastal Wetland Score
(maximum 75 points) 0

GENERAL INFORMATION

Wetland Evaluator(s)

Name: Daniel Stuart Affiliation: Azimuth Environmental Consulting, Inc.

Signature: [Handwritten Signature]

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: Affiliation:

Signature:

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: Affiliation:

Signature:

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: Affiliation:

Signature:

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: Affiliation:

Signature:

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Date(s) wetland visited (in field): 2019: 17 visits (Feb-Sep), 2021: 5 visits (Jan-Feb, Jul, Oct), 2022: 10 visits (Apr-Jun)

Date evaluation completed: March 2023 - see attached Table 1

Estimated time devoted to completing the field survey in person hours: 185 hours (wetlands #1-3) - includes adjacent lands/remainder of property

Weather Conditions

- i) at time of field work: various - always appropriate for survey type per provincial protocols
- ii) summer conditions in general: 2019 - Hot/dry, 2021 - Hot/wet, 2022 - Average/Dry

WETLAND EVALUATION SCORING RECORD

WETLAND NAME: Lot 11 & 12, Concession 1, Ramara Wetland #2

1.0 BIOLOGICAL COMPONENT

(below)

22

10

2

(34)

1.1 PRODUCTIVITY

1.1.1 Growing Degree-Days/Soils

1.1.2 Wetland Type

1.1.3 Site Type

(below)

13

3

7

8

12

8

(51)

1.2 BIODIVERSITY

1.2.1 Number of Wetland Types

1.2.2 Vegetation Communities

1.2.3 Diversity of Surrounding Habitat

1.2.4 Proximity to Other Wetlands

1.2.5 Interspersion

1.2.6 Open Water Type

(7)

1.3 SIZE (Biological Component)

92

TOTAL (Biological Component)

2.0 SOCIAL COMPONENT

(below)	2.1	ECONOMICALLY VALUABLE PRODUCTS
<u>0</u>	2.1.1	Wood Products
<u>0</u>	2.1.2	Wild Rice
<u>0</u>	2.1.3	Commerical Baitfish
<u>12</u>	2.1.4	Furbearers
<u>(12)</u>		Total for Economically Valuable Products
<u>(0)</u>	2.2	RECREATIONAL ACTIVITIES
(below)	2.3	LANDSCAPE AESTHETICS
<u>3</u>	2.3.1	Distinctness
<u>2</u>	2.3.2	Absence of Human Disturbance
<u>(5)</u>		Total for Landscape Aesthetics
(below)	2.4	EDUCATION AND PUBLIC AWARENESS
<u>0</u>	2.4.1	Educational Uses
<u>0</u>	2.4.2	Facilities and Programs
<u>0</u>	2.4.3	Research and Studies
<u>(0)</u>		Total for Education and Public Awareness
<u>(16)</u>	2.5	PROXIMITY TO AREAS OF HUMAN SETTLEMENT
<u>(4)</u>	2.6	OWNERSHIP
<u>(2)</u>	2.7	SIZE (Social Component)
(below)	2.8	ABORIGINAL VALUES AND CULTURAL HERITAGE
<u>0</u>	2.8.1	Aboriginal Values
<u>0</u>	2.8.2	Cultural Heritage
<u>39</u>		TOTAL (Social Component)

3.0 HYDROLOGICAL COMPONENT

<u>(31)</u>	3.1 FLOOD ATTENUATION
<u>(below)</u>	3.2 WATER QUALITY IMPROVEMENT
<u>50</u>	3.2.1 Short Term Water Quality Improvement
<u>3</u>	3.2.2 Long Term Nutrient Trap
<u>2</u>	3.2.3 Groundwater Discharge
<u>(55)</u>	Total for Water Quality Improvement
<u>(0)</u>	3.3 CARBON SINK
<u>(0)</u>	3.4 SHORELINE EROSION CONTROL
<u>(below)</u>	3.5 GROUNDWATER RECHARGE
<u>50</u>	3.5.1 Site Type
<u>4</u>	3.5.2 Soil Recharge Potential
<u>(54)</u>	Total for Groundwater Recharge
<u>140</u>	TOTAL (Hydrological Component)

4.0 SPECIAL FEATURES COMPONENT

4.1 RARITY

<u>40</u>	4.1.1 Wetlands
<u>20</u>	4.1.1.1 Rarity within the Landscape
	4.1.1.2 Rarity of Wetland Type

(60) Total for Wetland Rarity

<u>95</u>	4.1.2 Species
<u>0</u>	4.1.2.1 Provincially Significant Animals
<u>20</u>	4.1.2.2 Provincially Significant Plants
<u>0</u>	4.1.2.3 Regionally Significant Species
	4.1.2.4 Locally Significant Species

(115) Total for Species Rarity

4.2 SIGNIFICANT FEATURES AND HABITATS

<u>0</u>	4.2.1 Colonial Waterbirds
<u>0</u>	4.2.2 Winter Cover for Wildlife
<u>0</u>	4.2.3 Waterfowl Staging and/or Moulting Areas
<u>10</u>	4.2.4 Waterfowl Breeding
<u>0</u>	4.2.5 Migratory Passerine, Shorebird or Raptor Stopover Area
<u>(below)</u>	4.2.6 Fish Habitat
<u>6</u>	4.2.6.1 Spawning and Nursery Habitat
<u>0</u>	4.2.6.2 Migration and Staging Habitat

(16) Total for Significant Features and Habitats

2 4.3 ECOSYSTEM AGE

0 4.4 GREAT LAKES COASTAL WETLANDS

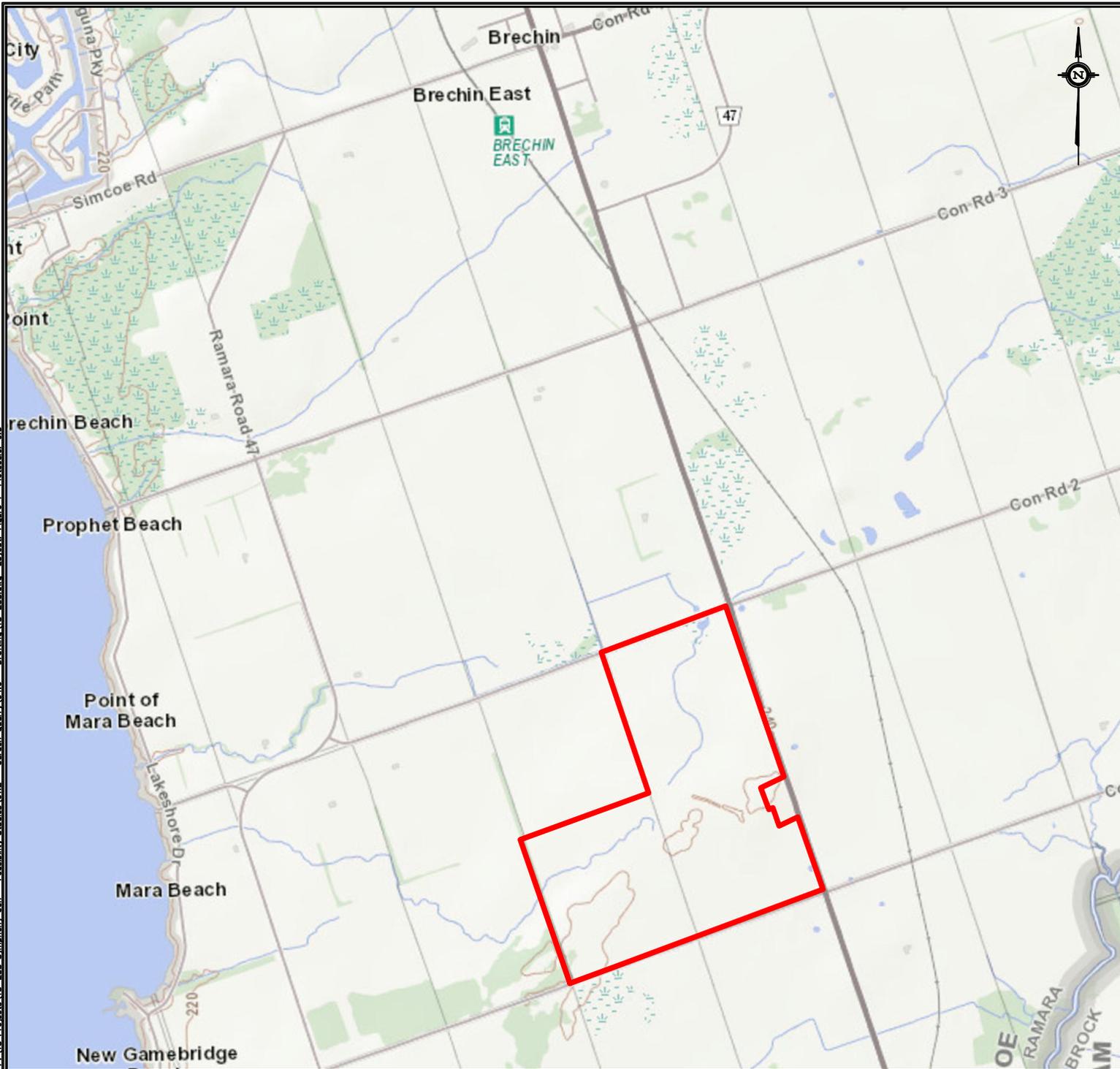
1193 TOTAL FOR SPECIAL FEATURES COMPONENT (*not to exceed 250*)

SUMMARY OF EVALUATION RESULT

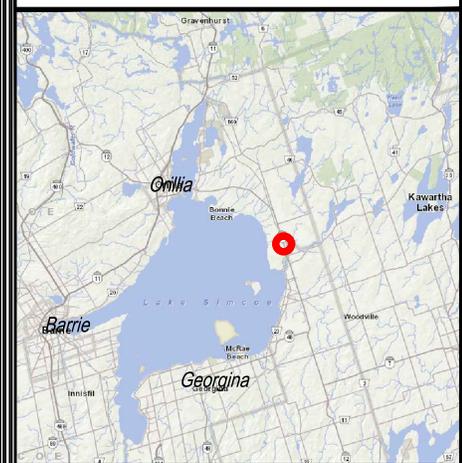
Wetland Lot 11 & 12, Concession 1, Ramara Wetland #2

<u>92</u>	1.0 TOTAL FOR BIOLOGICAL COMPONENT Non-PSW (<200)
<u>39</u>	2.0 TOTAL FOR SOCIAL COMPONENT
<u>140</u>	3.0 TOTAL FOR HYDROLOGICAL COMPONENT
<u>193</u>	4.0 TOTAL FOR SPECIAL FEATURES COMPONENT Non-PSW (<200)
<u>457</u>	TOTAL WETLAND SCORE Non-PSW (<600)

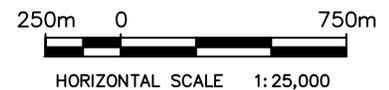
Printed by: ALU on December 3, 2021 at 4:06pm
File: P:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg - Layout: Figure 1 - Plotscale: 0.5



LEGEND:
— *Approx. Property Boundary*



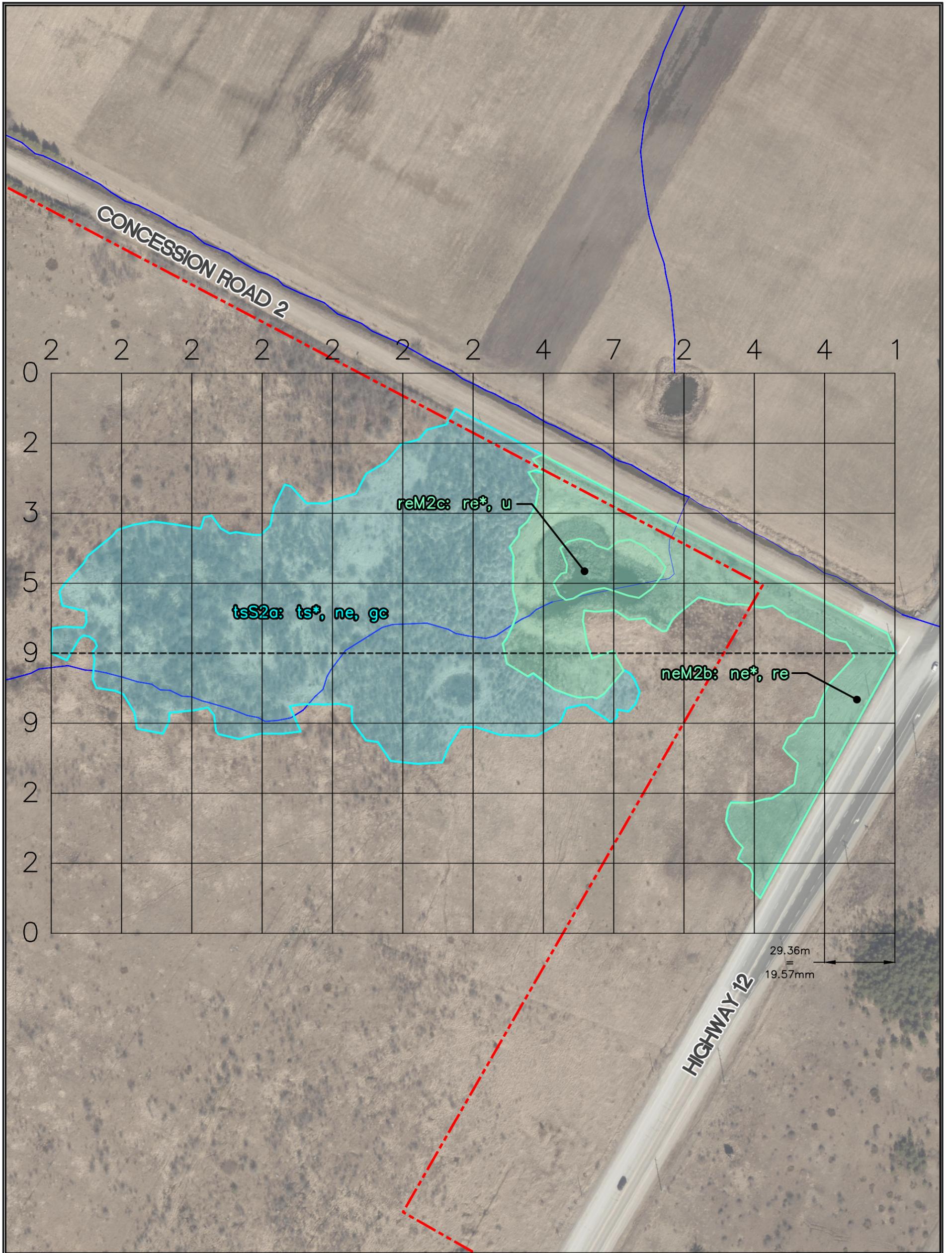
REG MAP



Study Area Location

Carden Quarry,
Brechin, ON

DATE ISSUED: December 2021	Figure No.
CREATED BY: JLM	1
PROJECT NO.: 18-288	
REFERENCE: MNR	



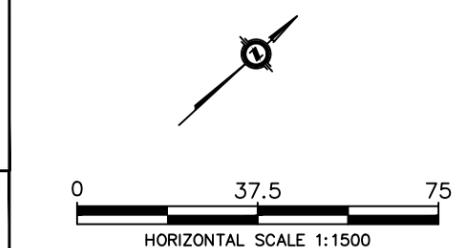
LEGEND:

	APPROX. PROPERTY BOUNDARY
	ADJACENT LANDS OWNED BY APPLICANT
	EXISTING WATERCOURSE (ONTARIO MNR, 2020)
	LINE 'A'

ELC WETLAND COMMUNITIES:

	A:	SWAMP
	M:	MARSH
	h:	DECIDUOUS TREES
	ts:	TALL SHRUBS
	ne:	NARROW-LEAVED EMERGENTS
	gc:	GROUNDCOVER (HERBS)
	re:	ROBUST EMERGENTS
	u:	UNVEGETATED

*DENOTES DOMINANT VEGETATION FORM



**INTERSPERSION
WETLAND UNIT #2**

LOTS 11 & 12, CONCESSION 1
BRECHIN, ON

DATE ISSUED: FEBRUARY 2023	Figure No. 4
CREATED BY: A.L.	
PROJECT NO.: 18-288	
REFERENCE: SIMCOE COUNTY	

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
04-Feb-19	08:00-17:30	6	2	100	None, Snowpack 10-25 cm	Site Reconnaissance Survey Raptor Wintering #1
11-Feb-19	08:00-15:30	-8	3	50	None, Snowpack 20-40 cm	Site Reconnaissance Survey Raptor Wintering #2
25-Apr-19	16:00-22:15	12 (min), 17 (max)	1	20	None	Bat Snag Assessment Turtle Emergence #1 Waterfowl Stopover/Nesting #1 Amphibian Breeding #1
29-Apr-19	08:00-14:00	3 (min), 7 (max)	3	40-100 (hazy, thin)	None	Bat Snag Assessment Watercourse Assessment #1 Waterfowl Stopover/Nesting #2
07-May-19	12:30-15:30	9 (min), 11 (max)	3	0	None	Turtle Emergence #2 Waterfowl Stopover/Nesting #3 Reptile Observations (Incidental)
08-May-19	09:15-12:15	7 (min), 9 (max)	3	0	None	Turtle Emergence #3 Waterfowl Stopover/Nesting #4

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
29-May-19	16:15-23:15	13 (min), 16 (max)	3	40-100	None	Turtle Emergence #4 Turtle Nesting Survey #1 Waterfowl Stopover/Nesting #5 Watercourse Assessment #2 Amphibian Breeding #2 Reptile Observations (Incidental)
06-Jun-19	06:00-10:00	11 (min), 13 (max)	0-1	0-30	None	Turtle Emergence #5 Waterfowl Stopover/Nesting #7 Dawn Breeding Birds #1 Reptile Observations (Incidental)
12-Jun-19	21:00-23:00	18	1	40	None (moon vis)	Evening Breeding Birds #1 Turtle Nesting Survey #2
19-Jun-19	06:00-15:30	14 (min), 22 (max)	0-1	30	None	Dawn Breeding Birds #2 Late Spring/Early Summer Veg Reptile Observations (Incidental)
25-Jun-19	21:00-23:15	21 (max), 19 (min)	0	0	None	Amphibian Breeding #3 Turtle Nesting Survey #3

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
27-Jun-19	06:00-09:45	18 (min), 21 (max)	1	5	None	Dawn Breeding Birds #3 Reptile Observations (Incidental)
08-Jul-19	08:30-16:00	20 (min), 25 (max)	1	0	None	Early Summer Vegetation Reptile Observations (Incidental)
09-Jul-19	12:30-22:30	27 (max), 21 (min)	2-0	0-5	None	Early Summer Vegetation Evening Breeding Birds #2 Reptile Observations (Incidental)
10-Jul-19	12:45-22:45	26 (min), 28 (max)	3-1	5-80	None	Early Summer Vegetation Evening Breeding Birds #3 Reptile Observations (Incidental)
17-Sep-19	09:30-16:30	26	3	0	None	Late Summer Vegetation Reptile Observations (Incidental)
18-Sep-19	08:30-15:30	24	3	25	None	Late Summer Vegetation Reptile Observations (Incidental)
20-Jan-21	12:50-15:20	-9	1-2	100	V. light flurries	Raptor Wintering #3
17-Feb-21	11:15-14:00	-7	0	100	V. light flurries	Raptor Wintering #4
26-Feb-21	13:15-15:45	2	1	5	None	Raptor Wintering #5
12-Jul-21	08:30-16:00	24	3	40	None	Woodland/Wetland Staking Exercise (LSRCA) Reptile Observations (Incidental)

Table 1: Site Investigation Record**Lots 11 and 12, Concession 1, Ramara Wetlands**

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
						Wetland Supplementary Data Collection
01-Oct-21	08:00-13:00	11 (min), 17 (max)	1	90	None	Reptile Observations (Incidental)
21-Apr-22	09:30-11:05	5	2	50	None	Turtle Emergence #6
09-May-22	09:00-10:50	14	2	10	None	Turtle Emergence #7
11-May-22	09:25-10:45	17 (min), 19 (max)	1	20	None	Turtle Emergence #8
12-May-22	09:00-10:20	14 (min), 20 (max)	1	0	None	Turtle Emergence #9
24-May-22	09:35-11:00	12 (min), 15 (max)	2-3	50	None	Turtle Emergence #10
08-Jun-22	09:25-10:50	16 (min), 17 (max)	2	0	None	Turtle Emergence #11
09-Jun-22	15:20-16:55	18	2	50	None	Turtle Emergence #12
11-Jun-22	10:10-11:40	18 (min), 19 (max)	2	0	None	Turtle Emergence #13
14-Jun-22	12:45-15:15	21 (min), 22 (max)	1-2	5	None	Turtle Emergence #14
15-Jun-22	11:00-13:00	20 (min), 22 (max)	1-2	10-15	None	Turtle Emergence #15

*Time(s) indicate duration of survey undertaken for entire property, including lands adjacent to evaluated wetland(s).

Appendix A: Wetland Data Summary Form: Lot 11 & 12 Concession 1 Ramara Wetland #2
 Azimuth Environmental Consulting, Inc.

Wetland Unit(s)	Unit Code (Figure 3)	Dominant Form	Forms	# Forms	Dominant Species	Area (ha)	Open Water			Open Water (ha)	Soil (ha)	Site Type	Fish Habitat			
							Low (ha)	High (Est.)	Mean (Est.)				% Fish Habitat	Area (ha)	Habitat Type	Key Veg Group
	2 ts52a	ts	ts*, ne, gc	3	<i>Salix petiolaris, Cornus stolonifera, Salix eriocephala, Rhamnus cathartica</i>	1.89	3.69%	3.69%	3.69%	0.10	2.61	Palustrine	100%	1.89	SF	N/A
	neM2b	ne	ne*, re	2	<i>Phalaris arundinacea, Juncus compressa, Typha angustifolia, Festuca spp.</i>	0.72	--	--	--	--	--	--	100%	0.72	HM	Shortgrass-Sedge
	reM2c	re	re*, u	2	<i>Typha spp., Phalaris arundinacea</i>	0.10	--	--	--	--	--	--	100%	0.10	LM	Cattail-Bulrush-Burreed
TOTAL AREA						2.71										

* Indicates dominant form



Appendix B: Species Rarity Background Sources

Azimuth Environmental Consulting, Inc.

- Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC; MNRF, 2023);
- Atlas of the Breeding Birds of Ontario (OBBA; Cadman *et al.*, 2007);
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2020);
- MECP's Species at Risk Ontario list (MECP, 2023);
- iNaturalist (NHIC) Rare Species of Ontario (iNaturalist, 2023);
- Ontario Butterfly Atlas (2023);
- Government of Canada's Species at Risk Public Registry;
- Atlas of the Mammals of Ontario (Dobbyn, 1994);
- Aquatic Resource Area (ARA) Interactive Mapping (MNRF, 2019);
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Mapping (2022);
- RiverStone Environmental Solutions (Bev Wicks, Mike Francis); personal communications regarding aquatic studies toward Environmental Impact Study report.

Azimuth's Environmental Impact Study report in regards to the subject property remains in progress, with anticipated completion date spring 2023.

References:

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds.). 2007. Atlas of the Breeding Birds of Ontario (OBBA). 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologies, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706pp.

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

Government of Canada. 2023. List of Wildlife Species at Risk. Available at: (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>). Accessed February 2023.

iNaturalist. 2023. (NHIC) Rare Species of Ontario. Available at: (<https://www.inaturalist.org/projects/nhic-rare-species-of-ontario>). Accessed February 2023.

Ministry of the Environment, Conservation and Parks (MECP). 2023. Species at Risk. Available at: (<https://www.ontario.ca/page/species-risk>). Accessed February 2023.

Ministry of Natural Resources and Forestry (MNRF). 2019. Aquatic Resource Area (ARA) Line Segment interactive mapping. Available at: (<https://geohub.lio.gov.on.ca/datasets/aquatic-resource-area-line-segment/explore>). Accessed February 2023.



Ministry of Natural Resources and Forestry (MNRF). 2023. Natural Heritage Information Centre (NHIC) internet web page. Government of Ontario, Ministry of Natural Resources (<https://www.ontario.ca/page/natural-heritage-information-centre>). Accessed February 2023.

Ontario Butterfly Atlas. 2023. (<https://www.ontarioinsects.org/atlas/>). Accessed February 2023.

Ontario Nature. 2020. Ontario Reptile and Amphibian Atlas Program Available at: (<https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/>). Accessed February 2023.



Environmental Assessments & Approvals

March 10, 2023

AEC 18-288

Township of Ramara
2297 Hwy 12, PO Box 130
Brechin, ON L0K 1B0

County of Simcoe
1110 Highway 26
Midhurst, ON L9X 1N6

Re: **Wetland Evaluation of Lot 11 & 12, Concession 1, Ramara Wetland #3
(Township of Ramara) according to the Ontario Wetland Evaluation System**

To Whom It May Concern:

Azimuth Environmental Consulting, Inc. (Azimuth) was retained by Lagoon City Limited Partnership to undertake a wetland evaluation of Lot 11 & 12, Concession 1, Ramara Wetland #3 in accordance with the Ontario Wetland Evaluation System (OWES) methodology outlined in the OWES Southern Manual 4th Edition (December 2022). The evaluation was undertaken by Dan Stuart, Ecology Lead at Azimuth (Certified Wetland Evaluator) based on a detailed background review and series of field surveys undertaken in 2019-2022.

The results of the OWES Evaluation determined that the wetland is **not significant** in accordance with provincial criteria. As required by the OWES Southern Manual 4th Edition, a final digital wetland boundary and confirmation of wetland status as non-significant will be submitted to the Ministry of Natural Resources and Forestry within 30 days.

Certainly should you have any additional questions or concerns, or wish to discuss further please do not hesitate to contact the undersigned.

Yours truly,
AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Dan Stuart, M.Env.Sc.
Ecology Lead, OWES Evaluator

Attached:

Wetland Evaluation Data and Scoring Record (Lot 11 & 12, Concession 1, Ramara Wetland #3)
Figures 1-4, Table 1, Appendix A-B

WETLAND EVALUATION DATA
AND SCORING RECORD

Wetland Name: Lot 11 & 12, Concession 1, Ramara Wetland #3

Geographic Location (municipality, lot/concession, etc):

Township of Ramara, Lot 11 Concession 1

Map / Photo Locational Reference (e.g., latitude/longitude, NTS map, UTM):

UTM 17T 646088 mE 4930451 mN (Lat 44.512593, Long -79.161973)

Eco-District: GE-6

Wetland Size (hectares): 1.36*

* Wetland <2ha, but evaluated under OWES due to presence of habitat for NHIC-tracked (Provincially Significant) animal species.

Attached:

Figure 1: Study Area Location

Figure 2: Wetland Location

Figure 3: Vegetation Forms

Figure 4: Interspersion

Table 1: Site Investigation Record

Appendix A: Wetland Data Summary Form

Appendix B: Species Rarity Background Sources.

Vegetation Form	FA
h	0
c	0
dh	0
dc	0
ts	0
ls	0
ds	0
gc	0
m	0
ne	0.93
be	0
re	0.07
ff	0
f	0
su	0
u	0

1.0 BIOLOGICAL COMPONENT

1.1 PRODUCTIVITY

1.1.1 Growing Degree-Days/Soils (max: 30 pts)

Refer to page 36 of manual for further explanation.

1. Determine the correct GDD value for your wetland (use Figure 5).
2. Circle the appropriate GDD value from the evaluation table below.
3. Determine the Fractional Area (FA) of the wetland for each soil type.
4. Multiply the fractional area of each soil type by the applicable score-factor in the evaluation table.
5. Sum the scores for each soil type to obtain the final score (maximum score is 30 points).

Growing Degree-Days	Clay-Loam	Silt-Marl	Limestone	Sand	Humic-Mesic	Fibric	Granite
	<2800	15	13	11	9	8	7
2800-3200	18	15	13	11	9	8	7
3200-3600	22	18	15	13	11	9	7
3600-4000	26	21	18	15	13	10	8
>4000	30	25	20	18	15	12	8

Soil Type	FA of wetland in soil type	Enter appropriate score-factor from above table		
Clay/Loam	1.0	x	22	= 22
Silt/Marl:	0	x	-	= 0
Limestone:	0	x	-	= 0
Sand:	0	x	-	= 0
Humic/Mesic:	0	x	-	= 0
Fibric:	0	x	-	= 0
Granite:	0	x	-	= 0
Total				

GDD/Soils Score (maximum 30 points) 22

1.1.2 Wetland Type

(Fractional Areas = area of wetland type/total wetland area)

	Fractional Area		Score
Bog	0	x 3 =	0
Fen	0	x 6 =	0
Swamp	0	x 8 =	0
Marsh	1.0	x 15 =	15
Total	1.0	- =	15

Wetland Type Score (maximum 15 points) 15

1.1.3 Site Type

(Fractional Area = area of site type/total wetland area)

	Fractional Area		Score
Isolated	0	x 1 =	0
Palustrine (permanent or intermittent flow)	1.0	x 2 =	2
Riverine	0	x 4 =	0
Riverine (at rivermouth)	0	x 5 =	0
Lacustrine (at rivermouth)	0	x 5 =	0
Lacustrine (with barrier beach)	0	x 3 =	0
Lacustrine (exposed to lake)	0	x 2 =	0
Total	0	- =	2

Site Type Score (maximum 5 points) 2

1.2 BIODIVERSITY

1.2.1 Number of Wetland Types

(Check only one)

<input checked="" type="checkbox"/>	One	=	9 points
<input type="checkbox"/>	Two	=	13
<input type="checkbox"/>	Three	=	20
<input type="checkbox"/>	Four	=	30

Number of Wetland Types Score
(maximum 30 points) 9

1.2.2. Vegetation Communities

Use the data sheet provided in Appendix 4 to record and score vegetation communities (the completed form must be attached to this data record)

Scoring (circle only one option for each of the columns below):

Total # of communities with 1-3 forms	Total # of communities with 4-5 forms	Total # of communities with 6 or more forms
1 = 1.5 pts	1 = 2 pts	1 = 3 pts
2 = 2.5	2 = 3.5	2 = 5
3 = 3.5	3 = 5	3 = 7
4 = 4.5	4 = 6.5	4 = 9
5 = 5	5 = 7.5	5 = 10.5
6 = 5.5	6 = 8.5	6 = 12
7 = 6	7 = 9.5	7 = 13.5
8 = 6.5	8 = 10.5	8 = 15
9 = 7	9 = 11.5	9 = 16.5
10 = 7.5	10 = 12.5	10 = 18
11 = 8	11 = 13	11 = 19
+ 0.5 for each additional community = <u>2.5</u>	+ 0.5 for each additional community = <u>0</u>	+ 1.0 for each additional community = <u>0</u>

Vegetation Communities Score
(maximum 45 points) 3

1.2.3 Diversity of Surrounding Habitat

Check all appropriate items. Only habitat within 1.5 km of the wetland boundary and at least 0.5 ha in size are to be scored.

X	row crop
X	pasture
X	abandoned agricultural land
X	deciduous forest
X	coniferous forest
X	mixed forest*
	abandoned pits and quarries
	open lake or deep river
	fence rows with deep cover, or shelterbelts
	terrain appreciably undulating, hilly or with ravines
X	creek flood plain

* "Mixed forest" is defined as either 25% coniferous trees distributed singly or in clumps in deciduous forest, or 25% deciduous trees distributed singly or in clumps in coniferous forest. Note that Forest Resource Inventory (FRI) maps can be misleading since 25% conifer within a unit could be entirely concentrated around a lake.

Score 1 point for each feature checked, up to a maximum of 7 points.

Diversity of Surrounding Habitat Score (maximum 7 points) <u>7</u>

1.2.4 Proximity to Other Wetlands

Check highest appropriate category. (Note: if the wetland is lacustrine, score option #1 at 8 points).

✓		Points
X	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river within 1.5 km	8
	Hydrologically connected by surface water to other wetlands (same dominant wetland type) within 0.5 km	8
	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river from 1.5 to 4 km away	5
	Hydrologically connected by surface water to other wetlands (same dominant wetland type) from 0.5 to 1.5 km away	5
	Within 0.75 km of other wetlands (different dominant wetland type) or open water body, but not hydrologically connected by surface water	5
	Within 1 km of other wetlands, but not hydrologically connected by surface water	2
	No wetland within 1 km	0

Name and distance (from wetland) of wetlands/waterbodies scored above:

Swamp-dominated wetlands located downstream within 1.5 km of wetland via McNabb Drain and Hwy 12 roadside ditches

Proximity to other Wetlands Score (maximum 8 points) <u>8</u>
--

1.2.5 Interspersion

Number of Intersections = 63

✓	Number of Intersections (Check one only)	Points
	26 or less	= 3
	27 to 40	= 6
	41 to 60	= 9
✓	61 to 80	= 12
	81 to 100	= 15
	101 to 125	= 18
	126 to 150	= 21
	151 to 175	= 24
	176 to 200	= 27
	>200	= 30

Interspersion Score (maximum 30 points) 12

1.2.6 Open Water Types

NOTE: *this attribute is only to be scored for permanently flooded open water within the wetland (adjacent lakes do not count). Check one option only.*

✓	Open Water Type	Characteristic	Points
	Type 1	Open water occupies < 5 % of wetland area	= 8
✓	Type 2	Open water occupies 5-25% of wetland (occurring in central area)	= 8
	Type 3	Open water occupies 5-25% (occurring in various-sized ponds, dense patches of vegetation or vegetation in diffuse stands)	= 14
	Type 4	Open water occupies 26-75% of wetland (occurring in a central area)	= 20
	Type 5	Open water occupies 26-75% of wetlands (small ponds and embayments are common)	= 30
	Type 6	Open water occupies 76%-95% of wetland (occurring in large central area; vegetation is peripheral)	= 8
	Type 7	Open water occupies 76-95% of wetland (vegetation in patches or diffuse open stands)	= 14
	Type 8	Open water occupies more than 95% of wetland area	= 3
	No open water		= 0

Open Water Type Score (maximum 30 points) 8

1.3 SIZE (BIOLOGICAL COMPONENT)

Total Size of Wetland = 1.36 ha

Sum of scores from Biodiversity Subcomponent

1.2.1
 + 1.2.2
 + 1.2.3
 + 1.2.4
 + 1.2.5
 + 1.2.6

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Circle the appropriate score from the table below.

		Total Score for Biodiversity Subcomponent									
		<37	37-47	48-60	61-72	73-84	85-96	97-108	109-120	121-132	>132
Wetland size (ha)	<20 ha	1	5	7	8	9	17	25	34	43	50
	20-40	5	7	8	9	10	19	28	37	46	50
	41-60	6	8	9	10	11	21	31	40	49	50
	61-80	7	9	10	11	13	23	34	43	50	50
	81-100	8	10	11	13	15	25	37	46	50	50
	101-120	9	11	13	15	18	28	40	49	50	50
	121-140	10	13	15	17	21	31	43	50	50	50
	141-160	11	15	17	19	23	34	46	50	50	50
	161-180	13	17	19	21	25	37	49	50	50	50
	181-200	15	19	21	23	28	40	50	50	50	50
	201-400	17	21	23	25	31	43	50	50	50	50
	401-600	19	23	25	28	34	46	50	50	50	50
	601-800	21	25	28	31	37	49	50	50	50	50
	801-1000	23	28	31	34	40	50	50	50	50	50
	1001-1200	25	31	34	37	43	50	50	50	50	50
	1201-1400	28	34	37	40	46	50	50	50	50	50
	1401-1600	31	37	40	43	49	50	50	50	50	50
	1601-1800	34	40	43	46	50	50	50	50	50	50
	1801-2000	37	43	47	49	50	50	50	50	50	50
>2000	40	46	50	50	50	50	50	50	50	50	

Size Score (Biological Component)
 (maximum 50 points) 5

2.0 SOCIAL COMPONENT

2.1 ECONOMICALLY VALUABLE PRODUCTS

2.1.1 Wood Products

Check the option that best reflects the total area (ha) of forested wetland (i.e., areas where the dominant vegetation form is h or c). Note that this is the area of all the forested vegetation communities, not total wetland size. Do not include areas where harvest is not permitted. Check only one option.

Area of wetland used for scoring 2.1.1: 0

<input checked="" type="checkbox"/>	< 5 ha	= 0 pts
<input type="checkbox"/>	5 - 25 ha	= 3
<input type="checkbox"/>	26 - 50 ha	= 6
<input type="checkbox"/>	51 - 100 ha	= 9
<input type="checkbox"/>	101 - 200 ha	= 12
<input type="checkbox"/>	> 200 ha	= 18

Source of information:
Environmental Impact Study (EIS)
prepared by Azimuth Environmental
Consulting, Inc. (Azimuth)

Wood Products Score (maximum 18 points) 0

2.1.2 Wild Rice

Check only one.

<input type="checkbox"/>	Present (min. size 0.5 ha)	= 6 pts
<input checked="" type="checkbox"/>	Absent	= 0
<input type="checkbox"/>	Harvest not permitted	= 0

Source of information:
EIS prepared by Azimuth

Wild Rice Score (maximum 6 points) 0

2.1.3 Commercial Baitfish

Check only one.

	Present	= 12 pts
	Absent	= 0
X	Fishing not permitted	= 0

Source of information:

Consultation with property owner.

Commercial Fish Score (maximum 12 points) 0

2.1.4 Furbearers

Only species recognized as furbearers under the Fish & Wildlife Conservation Act may be scored here. Score 3 points for each furbearer species listed, up to a maximum of 12 points. Score 0 points if trapping is prohibited.

	Name of furbearer	Source of information
1.	Coyote	EIS prepared by Azimuth
2.	Red Fox	" " " "
3.	Red Squirrel	" " " "
4.	Raccoon	" " " "
5.	-	-
6.	-	-

Furbearer Score (maximum 12 points) 12

2.2 RECREATIONAL ACTIVITIES

Sources of information and reasons for scoring a wetland under high or moderate use below, must be included below.

Circle one score for each of the activities listed. Score is cumulative – add score for hunting, nature enjoyment and fishing together for final score.

		Type of Wetland-Associated Use		
		Hunting	Nature Enjoyment/ Ecosystem Study	Fishing
Intensity of Use	High	40 points	40 points	40 points
	Moderate	20	20	20
	Low	8	8	8
	Not Possible/ No evidence	0	0	0

Sources of information (include evidence/criteria forming basis for score and any relevant reference used to obtain that information):

Hunting: Private property - public access not permitted.
No evidence of hunting/trapping within wetland, as observed by Azimuth during EIS data collection.

Nature: Private property - public access not permitted.
No evidence of nature studies/appreciation within wetland based on consultation with the property owner.

Fishing: Private property - public access not permitted.
No evidence of fishing within the wetland based on consultation with the property owner, and as observed by Azimuth / River Stone Environmental Solutions Inc. (River Stone) during EIS data collection.

Recreational Activities Score
(maximum 80 points) 0

2.3 LANDSCAPE AESTHETICS

2.3.1 Distinctness

Check only one.

X	Clearly Distinct	= 3 pts
	Indistinct	= 0

Landscape Distinctness Score
(maximum 3 points) 3

2.3.2 Absence of Human Disturbance

Check only one.

	Human disturbances absent or nearly so	= 7 pts
	One or several localized disturbances	= 4
X	Moderate disturbance; localized water pollution	= 2
	Wetland intact but impairment of ecosystem quality intense in some areas	= 1
	Extreme ecological degradation, or water pollution severe and widespread	= 0

Details regarding type, extent and location of disturbance scored:

The entire property has been managed as cattle pasture as recently as 2019. Evidence of disturbance to the ground layer is minor to moderate, but widespread within the wetland.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Absence of Human Disturbance Score
(maximum 7 points) 2

2.4 EDUCATION AND PUBLIC AWARENESS

2.4.1 Educational Uses

Check highest appropriate category.

	Frequent	= 20 pts
	Infrequent	= 12
X	No visits	= 0

Details regarding the type and frequency of education uses scored above:

Private property with no public access - no documented educational uses.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Educational Uses Score (maximum 20 points) 0

2.4.2 Facilities and Programs

Check all appropriate options, score highest category checked.

	Staffed interpretation centre	= 8 pts
	No interpretation centre or staff, but a system of self-guiding trails or brochures available	= 4
	Facilities such as maintained paths (e.g., woodchips), boardwalks, boat launches or observation towers, but no brochures or other interpretation	= 2
X	No facilities or programs	= 0

Additional Notes/Comments:

Private property with no public access - no documented educational uses.

Source of information:

EIS prepared by Azimuth and consultation with the property owner.

Facilities and Programs Score
(maximum 8 points) 0

2.4.3 Research and Studies

Check all that apply; score highest category checked.

	Long term research has been done	= 12 pts
	Research papers published in refereed scientific journal or as a thesis	= 10
	One or more (non-research) reports have been written on some aspect of the wetland's flora, fauna, hydrology, etc.	= 5
X	No research or reports	= 0

List of reports, publications, research studies etc. scored above:

EIS, Hydrogeological Evaluation, Geotechnical studies, etc. are in progress for the property, however per OWES guidelines such reports are not considered under this category.

No other reports, publications, research studies, etc., exist for the property according to consultation with the property owner.

Research and Studies Score

(maximum 12 points) 0

2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT

Name of Settlement: Beaverdam

Distance of wetland from settlement: 7.8 km

Population of settlement: 2822 (Source: Statistics Canada)

Circle only the highest score applicable

Distance of wetland to settlement	population >10,000	population 2,500-10,000	population <2,500 or cottage community
	within or adjoining settlement	40 points	26 points
0.5 to 10 km from settlement	26	<u>16</u>	10
10 to 60 km from settlement	12	8	4
>60 km from nearest settlement	5	2	0

Proximity to Human Settlement Score

(maximum 40 points) 16

2.6 OWNERSHIP

FA of wetland held by or held under a legal contract by a conservation body (as defined by the <i>Conservation Land Act</i>) for wetland protection	<u>0</u> x 10 = <u>0</u>
FA of wetland occurring in provincially or nationally protected areas (e.g., parks and conservation reserves)	<u>0</u> x 10 = <u>0</u>
FA of wetland area in Crown/public ownership, not as above	<u>0</u> x 8 = <u>0</u>
FA of wetland area in private ownership, not as above	<u>1</u> x 4 = <u>4</u>

Source of information:

Consultation with property owner.

Ownership Score (maximum 10 points) 4

2.7 SIZE (SOCIAL COMPONENT)

Total Size of Wetland = ~~2.17~~ ^{1.36} ha Sum of scores from Subcomponents 2.1, 2.2, and 2.5 = 33

Circle the appropriate score from the table below.

Total for Size Dependent Social Features										
	<31	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	>150
<2 ha	1	2	4	8	10	12	14	14	14	15
2-4	1	2	4	8	12	13	14	14	15	16
5-8	2	2	5	9	13	14	15	15	16	16
9-12	3	3	6	10	14	15	15	16	17	17
13-17	3	4	7	10	14	15	16	16	17	17
18-28	4	5	8	11	15	16	16	17	17	18
29-37	5	7	10	13	16	17	18	18	19	19
38-49	5	7	10	13	16	17	18	18	19	20
50-62	5	8	11	14	17	17	18	19	20	20
63-81	5	8	11	15	17	18	19	20	20	20
82-105	6	9	11	15	18	18	19	20	20	20
106-137	6	9	12	16	18	19	20	20	20	20
138-178	6	9	13	16	18	19	20	20	20	20
179-233	6	9	13	16	18	20	20	20	20	20
234-302	7	9	13	16	18	20	20	20	20	20
303-393	7	9	14	17	18	20	20	20	20	20
394-511	7	10	14	17	18	20	20	20	20	20
512-665	7	10	14	17	18	20	20	20	20	20
666-863	7	10	14	17	19	20	20	20	20	20
864-1123	8	12	15	17	19	20	20	20	20	20
1124-1460	8	12	15	17	19	20	20	20	20	20
1461-1898	8	13	15	18	19	20	20	20	20	20
1899-2467	8	14	16	18	20	20	20	20	20	20
>2467	8	14	16	18	20	20	20	20	20	20

Total Size Score (Social Component) 2

2.8 ABORIGINAL VALUES AND CULTURAL HERITAGE

Either or both Aboriginal or Cultural Values may be scored. However, the maximum score permitted for 2.8 is 30 points.

Full documentation of sources must be attached to the data record.

2.8.1 Aboriginal Values

Significant	= 30 pts
Not Significant	= 0
X Unknown	= 0

Additional Comments/Notes:

No known Aboriginal Values associated with the property, as confirmed via consultation with the property owner.

2.8.2 Cultural Heritage

Significant	= 30 pts
Not Significant	= 0
X Unknown	= 0

Additional Comments/Notes:

No known Cultural Heritage Values associated with the property, as confirmed via consultation with the property owner.

Aboriginal Values/Cultural Heritage Score (maximum 30 points) <u>0</u>

3.0 HYDROLOGICAL COMPONENT

3.1 FLOOD ATTENUATION

Check one of the following options.

- If wetland is a coastal wetland, \Rightarrow score 0 points for this section.
- If wetland is entirely isolated in site type, \Rightarrow score 100 points automatically.
- Wetland not as above – proceed through 'steps' A through F below.

- (A) Total wetland area = 1.36 ha
- (B) Size of wetland's catchment = 166.0 ha
- (C) Size of other detention areas in catchment = 10.45 ha
- (D) Total area of upstream detention areas = $\{A + C\} =$ 11.81 ha
- (E) Upstream Detention Factor = $\{(A/D) \times 2\} =$ 0.23 (maximum 1.0)
- (F) Attenuation Factor = $\{(A/B) \times 10\} =$ 0.082 (maximum 1.0)
- Flood Attenuation Final Score = $\{(E + F) / 2\} \times 100 =$ 15.61

Flood Attenuation Score (maximum 100 points) 16

3.2 WATER QUALITY IMPROVEMENT

3.2.1 Short Term Water Quality Improvement

Step 1: Determination of maximum initial score

	Wetland on one of the 5 defined large lakes or 5 major rivers (Go to Step 5A)
X	All other wetlands (Go through Steps 2, 3, 4, and 5B)

Step 2: Determination of Watershed Improvement Factor (WIF)

Calculation of WIF is based on the fractional area (FA) of each site type that makes up the total area of the wetland.

(FA = area of site type/total area of wetland)

FA of isolated wetland	=	0	x 0.5 =	0
FA of riverine wetland	=	0	x 1.0 =	0
FA of palustrine wetland with no inflow	=	1.0	x 0.7 =	0.7
FA of palustrine wetland with inflows	=	0	x 1.0 =	0
FA of lacustrine on lake shoreline	=	0	x 0.2 =	0
FA of lacustrine at lake inflow or outflow	=	0	x 1.0 =	0

Sum (WIF cannot exceed 1.0) 0.7

Step 3: Determination of Catchment Land Use Factor (LUF)

(Choose the first category that fits upstream land use in the catchment.)

X	Over 50% agricultural and/or urban	=	1.0
	Between 30 and 50% agricultural and/or urban	=	0.8
	Over 50% forested or other natural vegetation	=	0.6

LUF (maximum 1.0) 1.0

Step 4: Determination of Pollutant Uptake Factor (PUF)

Calculation of PUF is based on the fractional area (FA) of each vegetation type that makes up the total area of the wetland. Base assessment on the dominant vegetation form for each community except where dead trees or shrubs dominate. In that case base assessment on the dominant live vegetation type.

(FA = area of vegetation type/total area of wetland)

FA of wetland with live trees, shrubs, herbs or mosses (c, h, ts, ls, gc, m)	0 = x 0.75 =	0
FA of wetland with emergent, submergent or floating vegetation (re, be, ne, su, f, ff)	1.0 = x 1.0 =	1.0
FA of wetland with little or no vegetation (u)	0 = x 0.5 =	0

Sum (PUF cannot exceed 1.0) 1.0

Step 5: Calculation of final score

<input type="checkbox"/>	Wetland on defined 5 major lakes or 5 major rivers	0
<input checked="" type="checkbox"/>	All other wetlands – calculate as follows	
	Initial score	60
	Watershed Improvement Factor (WIF)	<u>0.7</u>
	Land Use Factor (LUF)	<u>1.0</u>
	Pollutant Uptake Factor (PUF)	<u>1.0</u>
	Final score: 60 x WIF x LUF x PUF =	<u>42</u>

Short Term Water Quality Improvement Score (maximum 60 points) <u>42</u>

3.2.2 Long Term Nutrient Trap

Step 1:

<input type="checkbox"/>	Wetland on defined 5 major lakes or 5 major rivers = 0 points
<input checked="" type="checkbox"/>	All other wetlands (Proceed to Step 2)

Step 2: Choose only one of the following settings that best describes the wetland being evaluated

<input type="checkbox"/>	Wetland located in a river mouth	= 10 pts
<input type="checkbox"/>	Wetland is a bog, fen, or swamp with more than 50% of the wetland being covered with organic soil	= 10
<input type="checkbox"/>	Wetland is a bog, fen, or swamp with less than 50% of the wetland being covered with organic soil	= 3
<input type="checkbox"/>	Wetland is a marsh with more than 50% of the wetland covered with organic soil	= 3
<input checked="" type="checkbox"/>	None of the above	= 0

Long Term Nutrient Trap Score (maximum 10 points) <u>0</u>

3.2.3 Groundwater Discharge

Circle the characteristics that best describe the wetland being evaluated and then sum the scores. If the sum exceeds 30 points, assign the maximum score of 30). Note: for wetland type, wetland type scored does not have to be the dominant type in the wetland.

Potential for Discharge				
	None to Little	Some	High	
Wetland Characteristics	Wetland type	Bog = 0	Swamp/Marsh = 2	Fen = 5
	Topography	Flat/rolling = 0	Hilly = 2	Steep = 5
	Wetland area:	Large (>50%) = 0	Moderate (5-50%) = 2	Small (<5%) = 5
	Upslope catchment area			
	Lagg development	None found = 0	Minor = 2	Extensive = 5
	Seeps	None = 0	≤ 3 seeps = 2	> 3 seeps = 5
	Surface marl deposits	None = 0	≤ 3 sites = 2	> 3 sites = 5
	Iron precipitates	None = 0	≤ 3 sites = 2	> 3 sites = 5
	Located within 1 km of a major aquifer	N/A = 0	N/A = 0	Yes = 10 No = 0

Additional Comments/Notes:

Groundwater Discharge Score
(maximum 30 points) 2

3.3 CARBON SINK

Check only one of the following:

	Bog, fen or swamp with more than 50% coverage by organic soil	= 5 pts
	Bog, fen or swamp with between 10 to 50% coverage by organic soil	= 2
	Marsh with more than 50% coverage by organic soil	= 3
X	Wetlands not in one of the above categories	= 0

Source of information:

EIS prepared by Azimuth

Carbon Sink Score

(maximum 5 points) 0

3.4 SHORELINE EROSION

CONTROL

From the wetland vegetation map determine the dominant vegetatio type within the erosion zone for lacustrine and riverine site type areas only. Score according to the factors listed below.

Step 1:

X	Wetland entirely isolated or palustrine	= 0 pts
	Any part of the wetland is riverine or lacustrine	= Go to step 2

Step 2: Choose the one characteristic that best describes the shoreline vegetation (see page 109 for description of "shoreline".)

	Trees and shrubs	= 15 pts
	Emergent vegetation	= 8
	Submergent vegetation	= 6
	Other shoreline vegetation	= 3
	No vegetation	= 0

Shoreline Erosion Control Score

(maximum 15 points) 0

3.5 GROUNDWATER RECHARGE

3.5.1 Site Type

Wetland > 50% lacustrine (by area) or located on one of the five major rivers		= 0 pts	
Wetland not as above. Calculate final score as follows:			
■ FA of isolated or palustrine wetland	= 1.0	x 50 =	50
■ FA of riverine wetland	= 0	x 20 =	-
■ FA of lacustrine wetland (not dominant site type)	= 0	x 0 =	-

Groundwater Recharge/Wetland Site Type Score
(maximum 50 points) 50

3.5.2 Soil Recharge Potential

Circle only one choice that **best** describes the soils in **the area surrounding the wetland** being evaluated (the soils within the wetland are not scored here).

Dominant Wetland Type	Group A, B, C (sands, gravels, loams)	Group D (clays, substrates in high water tables, shallow substrates over impervious materials such as bedrock)
	Lacustrine or major river	0
Isolated	10	5
Palustrine	7	(4)
Riverine (not on a major river)	5	2

Groundwater Recharge/Wetland Soil Recharge Potential Score (maximum 10 points) 4

4.0 SPECIAL FEATURES

COMPONENT

4.1 RARITY

4.1.1 Wetland Types

Ecodistrict	Rarity within the Landscape (4.1.1.1)	Rarity of Wetland Type (4.1.1.2)			
		Marsh	Swamp	Fen	Bog
6E-1	60	40	0	80	80
6E-2	60	40	0	80	80
6E-4	60	40	0	80	80
6E-5	20	40	0	80	80
6E-6	40	20	0	80	80
6E-7	60	10	0	80	80
6E-8	20	20	0	80	80
6E-9	0	20	0	80	80
6E-10	20	0	20	80	80
6E-11	0	30	0	80	80
6E-12	0	30	0	60	80
6E-13	60	10	0	80	80
6E-14	40	20	0	40	80
6E-15	40	0	0	80	80
6E-16	60	20	0	80	60
6E-17	40	10	0	30	80
7E-1	60	0	60	80	80
7E-2	60	0	0	80	80
7E-3	60	00	0	80	80
7E-4	80	0	0	80	80
7E-5	60	20	0	80	80
7E-6	80	30	0	80	80

4.1.1.1 Rarity within the Landscape

Choose appropriate score from 2nd column above.

Score (maximum 80 points) 40

4.1.1.2 Rarity of Wetland Type

Score is cumulative, based on presence/absence. Circle all appropriate scores from above table and sum.

Score (maximum 80 points) 20

4.1.2 Species

4.1.2.1 Provincially Significant Animal Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
Western Chorus Frog	<i>Pseudacris triseriata</i>	calling	Apr 2019	Azimuth EIS
Bobolink	<i>Dolichonyx oryzivorus</i>	foraging	June 2019	Azimuth EIS
Eastern Meadowlark	<i>Sturnella magna</i>	foraging	June 2019	Azimuth EIS
Chimney/Meadow Crayfish	<i>Palaemonetes pugio</i> or <i>Cambarus diogenes</i>	Burrow	June 2019	Azimuth EIS

Additional Notes/Comments:

All NHIC-tracked species are listed as Provincially Significant.

One species = 50 pts	9 species = 140 pts	17 species = 160 pts
2 species = 80	10 species = 143	18 species = 162
3 species = 95	11 species = 146	19 species = 164
4 species = 105	12 species = 149	20 species = 166
5 species = 115	13 species = 152	21 species = 168
6 species = 125	14 species = 154	22 species = 170
7 species = 130	15 species = 156	23 species = 172
8 species = 135	16 species = 158	24 species = 174
		25 species = 176

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Animal Species
(no maximum) 105

4.1.2.2 Provincially Significant Plant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
None observed	N/A	N/A	N/A	N/A

Additional Notes/Comments:

None documented during field studies associated with EIS prepared by Azimuth. A detailed plant inventory was completed on June 19, July 9, July 10, September 17, and September 18, 2019.

One species = 50 pts	9 species = 140 pts	17 species = 160 pts
2 species = 80	10 species = 143	18 species = 162
3 species = 95	11 species = 146	19 species = 164
4 species = 105	12 species = 149	20 species = 166
5 species = 115	13 species = 152	21 species = 168
6 species = 125	14 species = 154	22 species = 170
7 species = 130	15 species = 156	23 species = 172
8 species = 135	16 species = 158	24 species = 174
		25 species = 176

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Plant Species
(no maximum) 10

4.1.2.3 Regionally Significant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
None observed	N/A	N/A	N/A	N/A

One species = 20 pts	4 species = 45 pts	7 species = 58 pts
2 species = 30	5 species = 50	8 species = 61
3 species = 40	6 species = 55	9 species = 64
		10 species = 67

For each significant species over 10 in wetland, add 1 point.

Regionally Significant Species Score
(no maximum score) 0

Wetland species based on Riley (1989)

4.1.2.4 Locally Significant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
No local list	N/A	N/A	N/A	N/A

One species = 10 pts	4 species = 31 pts	7 species = 43 pts
2 species = 17	5 species = 38	8 species = 45
3 species = 24	6 species = 41	9 species = 47
		10 species = 49

For each significant species over 10 in wetland, add 1 point.

Riley (1989) functions as plant rarity list for Simcoe County, considered above.

Locally Significant Species Score
(no maximum score) 0

No local list for Township of Ramara.

4.2 SIGNIFICANT FEATURES

AND HABITATS

4.2.1 Colonial Waterbirds

Record all available information. Score the highest applicable category. Include additional information as possible (e.g., nest locations, etc).

Activity	Species	Info Source	Points
Currently nesting	None	EIS surveys	= 50
Known to have nested within the past 5 years	None	EIS surveys	= 25
Active feeding area (great blue heron excluded)	None	EIS surveys	= 15
None known	None	EIS surveys	= 0

Additional Notes/Comments:

EIS survey program included six (6) waterfowl stopover/staging and colonial waterbird surveys on April 25, April 29, May 7, May 8, May 29, and June 6, 2019. Three (3) dawn breeding bird surveys were completed June 6, June 19, and June 27, 2019. Three (3) evening " " " " " " June 12, July 9, July 10, 2019.

Colonial Waterbird Nesting Score
(maximum 50 points) 0

4.2.2 Winter Cover for Wildlife

Score highest appropriate category. Include rationale/sources of information.

	Provincially significant	= 100 pts
	Significant in Ecoregion	= 50
	Significant in Ecodistrict	= 25
	Locally significant	= 10
X	Little or poor winter cover	= 0

Species/habitat/vegetation community scored (e.g., winter deer cover in hemlock swamp, S3 and S4b):

Per Azimuth EIS, overall poor opportunities for winter cover as wetland consists of non-treed vegetation forms.

Source of information:

MNRF records show Deer Wintering Area (Stratum 2) along Lake Simcoe shoreline approx. 3.2 km northwest of wetland at its closest point. Simcoe OP and Ramara OP do not illustrate habitat.

Winter Cover for Wildlife Score
(maximum 100 points) 0

4.2.3 Waterfowl Staging and/or Moulting Areas

Check highest level of significance for both staging and moulting; add scores for staging and for moulting together for final score. However, maximum score for evaluation under this section is 150 points.

	Staging	Moulting
Nationally/internationally significant	= 150 pts	= 150 pts
Provincially significant	= 100	= 100
Significant in the Ecoregion	= 50	= 50
Significant in Ecodistrict	= 25	= 25
Known to occur	= 10	= 10
Not possible/Unknown	= (0)	= (0)

Species/habitat/vegetation community scored (e.g., approx 20 mallards in W3):

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. No staging or moulting waterfowl observed.

Source of information:

EIS - six (6) waterfowl stopover/staging surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Waterfowl Staging/Moulting Score (maximum 150 points) <u>0</u>

4.2.4 Waterfowl Breeding

Check highest level of significance.

	Nationally/internationally significant = 150 pts
	Provincially significant = 100
	Significant in the Ecoregion = 50
	Significant in Ecodistrict = 25
X	Habitat Suitable = 10
	Habitat not suitable = 0

Species/habitat/vegetation community scored (e.g., mallard in W3):

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. No waterfowl breeding/nesting observed.

Source of information:

EIS - six (6) waterfowl nesting surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Waterfowl Breeding Score (maximum 150 points) <u>10</u>
--

4.2.5 Migratory Passerine, Shorebird or Raptor Stopover Area

Check highest level of significance.

	Nationally / internationally significant = 150 pts
	Provincially significant = 100
	Significant in Ecoregion = 50
	Significant in Ecodistrict = 25
	Known to occur = 10
X	Not possible / Unknown = 0

Species/habitat/vegetation community scored:

Does not meet criteria for significance outlined in Ecoregion 6E Criteria Schedules. Listed shorebird species not identified.

Source of information:

EIS - six (6) waterfowl stopover/staging surveys (Apr 25, Apr 29, May 7, May 8, May 29, June 6, 2019)

Passerine, Shorebird or Raptor Stopover Score (maximum 100 points) <u>0</u>
--

4.2.6 Fish Habitat

4.2.6.1 Spawning and Nursery Habitat

Area Factors for Low Marsh, High Marsh and Swamp Communities.

No. of ha of Fish Habitat	Area Factor
< 0.5 ha	0.1
0.5 – 4.9	0.2
5.0 – 9.9	0.4
10.0 – 14.9	0.6
15.0 – 19.9	0.8
20.0 +	1.0

Step 1:

- Fish habitat is not present within the wetland Go to Step 7, Score 0 points
- Fish habitat is present within the wetland Go to Step 2

Step 2: *Choose only one option*

- Significance of the spawning and nursery habitat within the wetland is known Go to Step 3
- Significance of the spawning and nursery habitat within the wetland is not known Go through Steps 4, 5 and 6

Step 3: *Select the highest appropriate category below, attach documentation:*

- Significant in Ecoregion Go to Step 7, Score 100 points
- Significant in Ecodistrict Go to Step 7, Score 50 points
- Locally Significant Habitat (5.0+ ha) Go to Step 7, Score 25 points
- Locally Significant Habitat (<5.0 ha) Go to Step 7, Score 15 points

Source of information:

Natural Heritage Information Centre, Fisheries and Oceans Canada mapping.

Step 4: Low Marsh = the 'permanent' marsh area, from the existing water line out to the outer boundary of the wetland.

- Low marsh not present Go to Step 5
- Low marsh present Continue through Step 4, scoring as noted below

Scoring of Low Marsh:

1. Check the appropriate **Vegetation Group** (see Appendix 7) for each Low Marsh community. (Based on the one most clearly dominant plant species of the dominant form in each Low Marsh vegetation community.)
2. Sum the areas (ha) of the vegetation communities assigned to each **Vegetation Group**.
3. Use these areas to assign an **Area Factor** (from Table 7) for each checked **Vegetation Group**.
4. Multiply the **Area Factor** by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for Low Marsh**.

Scoring for Presence of Key Vegetation Groups – Low Marsh

Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
1	Tallgrass	-	-	-	6	0
2	Shortgrass-Sedge	-	-	-	11	0
3	Cattail-Bulrush-Burreed	X	0.10	0.1	5	0.05
4	Arrowhead-Pickerelweed	-	-	-	5	0
5	Duckweed	-	-	-	2	0
6	Smartweed-Waterwillow	-	-	-	6	0
7	Waterlily-Lotus	-	-	-	11	0
8	Waterweed-Watercress	-	-	-	9	0
9	Ribongrass	-	-	-	10	0
10	Coontail-Naiad-Watermilfoil	-	-	-	13	0
11	Narrowleaf Pondweed	-	-	-	5	0
12	Broadleaf Pondweed	-	-	-	8	0
Total Score for Low Marsh (maximum 75 points)						0

Continue to Step 5

Step 5: High Marsh = the 'seasonal' marsh area, from the water line to the inland boundary of marsh wetland type. This is essentially what is commonly referred to as a wet meadow, in that there is insufficient standing water to provide fisheries habitat except during flood or high water conditions.

High marsh not present

Go to Step 6

High marsh present

Continue through Step 5, scoring as noted below

Scoring of High Marsh:

1. Check the appropriate **Vegetation Group** (see Appendix 7) for each High Marsh community. (Based on the one most clearly dominant plant species of the dominant form in each High Marsh vegetation community.)
2. Sum the areas (ha) of the vegetation communities assigned to each **Vegetation Group**.
3. Use these areas to assign an **Area Factor** (from Table 7) for each checked **Vegetation Group**.
4. Multiply the **Area Factor** by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for High Marsh**.

Scoring for Presence of Key Vegetation Groups – High Marsh

Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
1	Tallgrass	—	—	—	6	0
2	Shortgrass-Sedge	X	1.26	0.2	11	2.77
3	Cattail-Bulrush-Burreed	—	—	—	5	0
4	Arrowhead-Pickerelweed	—	—	—	5	0
Total Score for High Marsh (maximum 25 points)						3

Continue to Step 6

Step 6:

X

Swamp containing fish habitat not present

Go to Step 7

Swamp containing fish habitat present

Continue through Step 6, scoring as follows

Scoring of Swamp:

1. Determine the total area (ha) of seasonally flooded swamp communities within the wetland containing fish habitat and record below.
2. Determine the total area (ha) of permanently flooded swamp communities within the wetland containing fish habitat and record below.
3. Use these areas to assign an **Area Factor** (from Table 7).
4. Multiply the Area Factor by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for Swamp**.

Scoring Swamps for Fish Habitat (Seasonally flooded; Permanently flooded)					
Swamp Containing Fish Habitat	Present (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
Seasonally Flooded Swamp				10	
Permanently Flooded Swamp				10	
Total Score for Swamp (maximum 20 points)					

Continue to Step 7

Step 7: CALCULATION OF FINAL SCORE

NOTE: Scores for Steps 4, 5 and 6 are only recorded if Steps 1 and 3 have not been scored.

- A. Score from Step 1 (fish habitat not present) = 0
- B. Score from Step 3 (significance known) = 0
- C. Score from Step 4 (Low Marsh) = 0
- D. Score from Step 5 (High Marsh) = 3
- E. Score from Step 6 (Swamp) = 0

Calculation of Final Score for Spawning and Nursery Habitat = A or B or Sum of C, D, and E

Score for Spawning and Nursery Habitat (maximum 100 points) <u>3</u>

4.2.6.2 Migration and Staging Habitat

Step 1:

<input checked="" type="checkbox"/>	Staging or Migration Habitat is not present in the wetland	Go to Step 4, Score 0 points
<input type="checkbox"/>	Staging or Migration Habitat is present in the wetland, significance of the habitat is known	Go to Step 2
<input type="checkbox"/>	Staging or Migration Habitat is present in the wetland, significance of the habitat is not known	Go to Step 3

Step 2: Select the highest appropriate category below. Ensure that documentation is attached to the data record.

<input type="checkbox"/>	Significant in Ecoregion	Score 25 points in Step 4
<input type="checkbox"/>	Significant in Ecodistrict	Score 15 points in Step 4
<input type="checkbox"/>	Locally Significant	Score 10 points in Step 4
<input type="checkbox"/>	Fish staging and/or migration habitat present, but not as above	Score 5 points in Step 4

Source of information:

Aquatic / fish habitat assessment completed by RiverStone

Step 3: Select the highest appropriate category below based on presence of the designated site type (i.e. does not have to be the dominant site type). Refer to Site Types recorded earlier (section 1.1.3). Attach documentation.

<input type="checkbox"/>	Wetland is riverine at rivermouth or lacustrine at rivermouth	Score 25 points in Step 4
<input type="checkbox"/>	Wetland is riverine, within 0.75 km of rivermouth	Score 15 points in Step 4
<input type="checkbox"/>	Wetland is lacustrine, within 0.75 km of rivermouth	Score 10 points in Step 4
<input type="checkbox"/>	Fish staging and/or migration habitat present, but not as above	Score 5 points in Step 4

Step 4: Enter a score from only one of the three above Steps.

Score for Staging and Migration Habitat (maximum 25 points) <u>0</u>

4.3 ECOSYSTEM AGE

	Fractional Area		Score
Bog =	0	x 25 =	0
Fen, on deeper soils; floating mats or marl =	0	x 20 =	0
Fen, on limestone rock =	0	x 5 =	0
Swamp =	0	x 3 =	0
Marsh =	1.0	x 0 =	0
Total		=	0

Ecosystem Age Score (maximum 25 points) 0

4.4 GREAT LAKES COASTAL WETLANDS

Choose one only.

Wetland < 10 ha	=	10 pts
Wetland 10-50 ha	=	25
Wetland 51-100 ha	=	50
Wetland > 100 ha	=	75

Not a coastal wetland (Note: Lake Simcoe not defined as one of the Great Lakes)

Great Lakes Coastal Wetland Score
(maximum 75 points) 0

GENERAL INFORMATION

Wetland Evaluator(s)

Name: Daniel Stuart Affiliation: Azimuth Environmental Consulting, Inc.

Signature: [Signature]

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: _____ Affiliation: _____

Signature: _____

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

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Name: _____ Affiliation: _____

Signature: _____

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Date(s) wetland visited (in field): 2019: 17 visits (Feb-Sep), 2021: 5 visits (Jan-Feb, Jul, Oct), 2022: 10 visits (Apr-Jun)

Date evaluation completed: March 2023 - see attached Table 1

Estimated time devoted to completing the field survey in person hours: 185 hours (wetlands #1-3)
- includes adjacent lands / remainder of property

Southern OWES 4

Weather Conditions

- i) at time of field work: various - always appropriate for survey type per provincial protocols
- ii) summer conditions in general: 2019 - Hot/dry, 2021 - Hot/wet, 2022 - Average/Dry

WETLAND EVALUATION SCORING
RECORD

WETLAND NAME: Lot 11 & 12 Concession 1, Ramara Wetland #3

1.0 BIOLOGICAL COMPONENT

(below)
22
15
2

1.1 PRODUCTIVITY
1.1.1 Growing Degree-Days/Soils
1.1.2 Wetland Type
1.1.3 Site Type

(39)

(below)
9
3
7
8
12
8

1.2 BIODIVERSITY
1.2.1 Number of Wetland Types
1.2.2 Vegetation Communities
1.2.3 Diversity of Surrounding Habitat
1.2.4 Proximity to Other Wetlands
1.2.5 Interspersion
1.2.6 Open Water Type

(47)

(5)

1.3 SIZE (Biological Component)

91

TOTAL (Biological Component)

2.0 SOCIAL COMPONENT

<u>(below)</u>	2.1 ECONOMICALLY VALUABLE PRODUCTS
<u>0</u>	2.1.1 Wood Products
<u>0</u>	2.1.2 Wild Rice
<u>0</u>	2.1.3 Commerical Baitfish
<u>12</u>	2.1.4 Furbearers
<u>(12)</u>	Total for Economically Valuable Products
<u>0</u>	2.2 RECREATIONAL ACTIVITIES
<u>(below)</u>	2.3 LANDSCAPE AESTHETICS
<u>3</u>	2.3.1 Distinctness
<u>2</u>	2.3.2 Absence of Human Disturbance
<u>(5)</u>	Total for Landscape Aesthetics
<u>(below)</u>	2.4 EDUCATION AND PUBLIC AWARENESS
<u>0</u>	2.4.1 Educational Uses
<u>0</u>	2.4.2 Facilities and Programs
<u>0</u>	2.4.3 Research and Studies
<u>(0)</u>	Total for Education and Public Awareness
<u>(16)</u>	2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT
<u>(4)</u>	2.6 OWNERSHIP
<u>(2)</u>	2.7 SIZE (Social Component)
<u>(below)</u>	2.8 ABORIGINAL VALUES AND CULTURAL HERITAGE
<u>0</u>	2.8.1 Aboriginal Values
<u>0</u>	2.8.2 Cultural Heritage
<u>139</u>	TOTAL (Social Component)

3.0 HYDROLOGICAL COMPONENT

<u>16</u>	3.1 FLOOD ATTENUATION
(below)	3.2 WATER QUALITY IMPROVEMENT
<u>42</u>	3.2.1 Short Term Water Quality Improvement
<u>0</u>	3.2.2 Long Term Nutrient Trap
<u>2</u>	3.2.3 Groundwater Discharge
<u>44</u>	Total for Water Quality Improvement
<u>0</u>	3.3 CARBON SINK
<u>0</u>	3.4 SHORELINE EROSION CONTROL
(below)	3.5 GROUNDWATER RECHARGE
<u>50</u>	3.5.1 Site Type
<u>4</u>	3.5.2 Soil Recharge Potential
<u>54</u>	Total for Groundwater Recharge
<u>114</u>	TOTAL (Hydrological Component)

4.0 SPECIAL FEATURES COMPONENT

4.1 RARITY

<u>40</u>	4.1.1 Wetlands
<u>20</u>	4.1.1.1 Rarity within the Landscape
	4.1.1.2 Rarity of Wetland Type
<u>(60)</u>	Total for Wetland Rarity

<u>105</u>	4.1.2 Species
<u>0</u>	4.1.2.1 Provincially Significant Animals
<u>0</u>	4.1.2.2 Provincially Significant Plants
<u>0</u>	4.1.2.3 Regionally Significant Species
<u>0</u>	4.1.2.4 Locally Significant Species
<u>(105)</u>	Total for Species Rarity

4.2 SIGNIFICANT FEATURES AND HABITATS

<u>0</u>	4.2.1 Colonial Waterbirds
<u>0</u>	4.2.2 Winter Cover for Wildlife
<u>0</u>	4.2.3 Waterfowl Staging and/or Moulting Areas
<u>10</u>	4.2.4 Waterfowl Breeding
<u>0</u>	4.2.5 Migratory Passerine, Shorebird or Raptor Stopover Area
<u>(below)</u>	4.2.6 Fish Habitat
<u>3</u>	4.2.6.1 Spawning and Nursery Habitat
<u>0</u>	4.2.6.2 Migration and Staging Habitat
<u>(13)</u>	Total for Significant Features and Habitats

<u>(0)</u>	4.3 ECOSYSTEM AGE
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<u>(0)</u>	4.4 GREAT LAKES COASTAL WETLANDS
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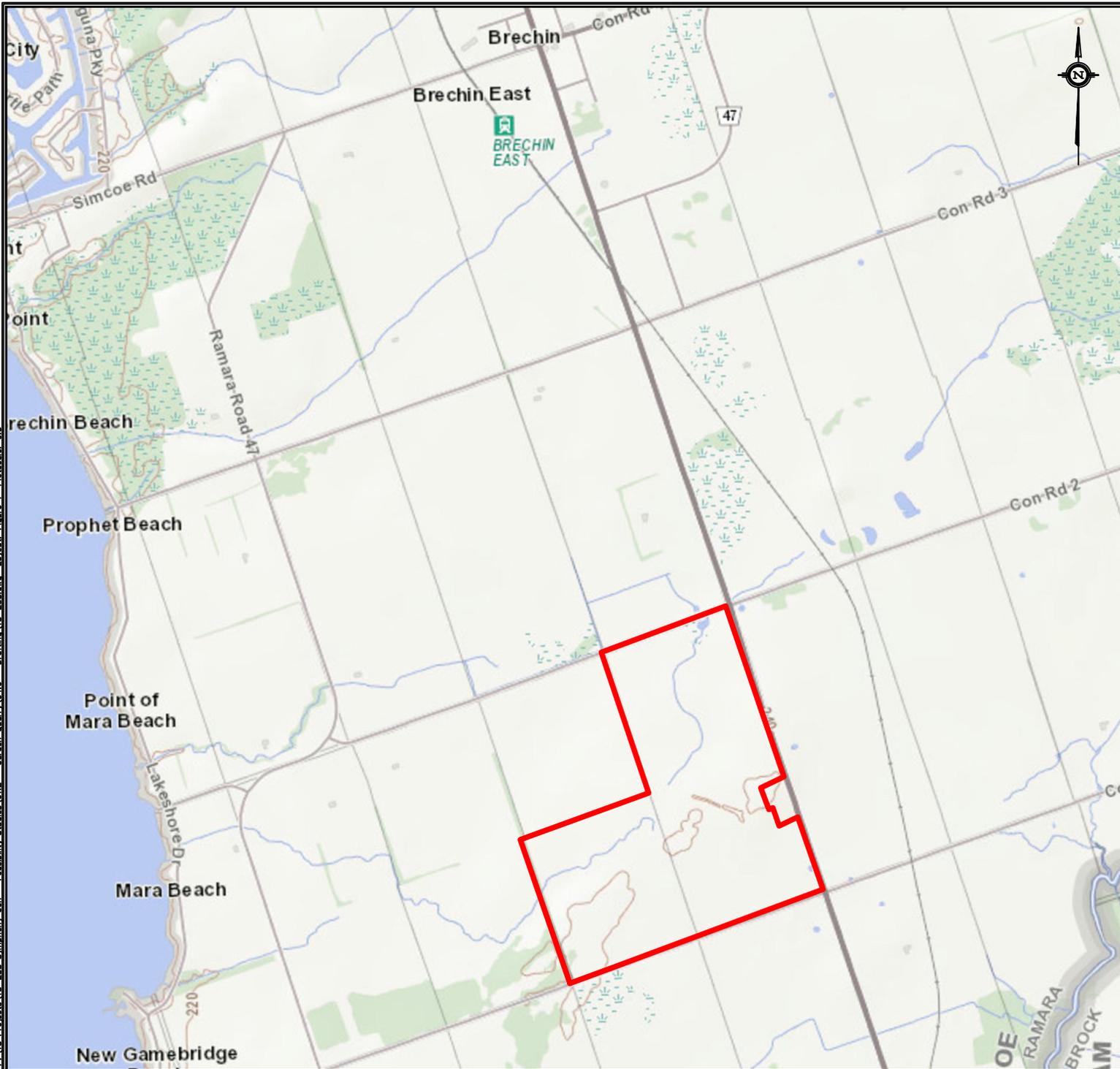
<u>178</u>	TOTAL FOR SPECIAL FEATURES COMPONENT (not to exceed 250)
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SUMMARY OF EVALUATION RESULT

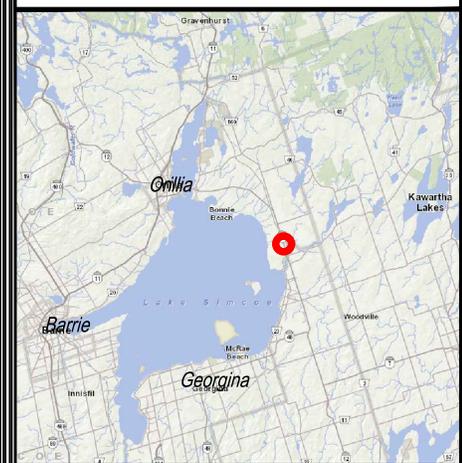
Wetland Lot 11 & 12 Concession 1, Ramara Wetland #3

<u>91</u>	1.0 TOTAL FOR BIOLOGICAL COMPONENT	Non-PSW (<200)
<u>39</u>	2.0 TOTAL FOR SOCIAL COMPONENT	
<u>114</u>	3.0 TOTAL FOR HYDROLOGICAL COMPONENT	
<u>178</u>	4.0 TOTAL FOR SPECIAL FEATURES COMPONENT	Non-PSW (<200)
<u>422</u>	TOTAL WETLAND SCORE	Non-PSW (<600)

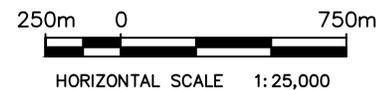
Printed by: ALU on December 3, 2021 at 4:06pm
File: P:\18 Projects\18-288 Symphony Golf - Feasibility Studies\01.2 - Carden Quarry\04.0 - Drafting\18-288.dwg - Layout: Figure 1 - Plotscale: 0.5



LEGEND:
— *Approx. Property Boundary*



REG MAP



Study Area Location

Carden Quarry,
Brechin, ON

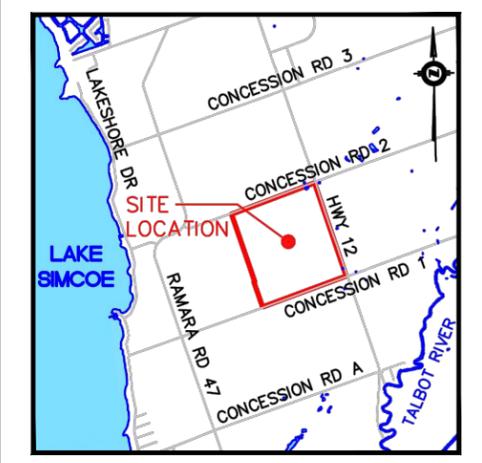
DATE ISSUED: December 2021	Figure No. 1
CREATED BY: JLM	
PROJECT NO.: 18-288	
REFERENCE: MNR	

- LEGEND:**
- - - APPROX. PROPERTY BOUNDARY
 - - - ADJACENT LANDS OWNED BY APPLICANT
 - EXISTING WATERCOURSE (ONTARIO MNR, 2020)

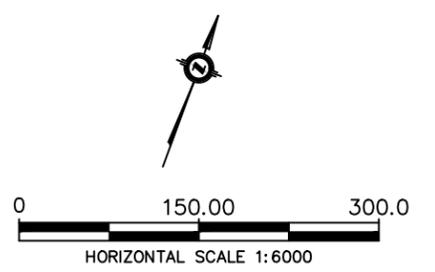
ELC WETLAND COMMUNITIES:

- S: SWAMP
- M: MARSH
- h: DECIDUOUS TREES
- ts: TALL SHRUBS
- ne: NARROW-LEAVED EMERGENTS
- gc: GROUNDCOVER (HERBS)
- re: ROBUST EMERGENTS
- u: UNVEGETATED

*DENOTES DOMINANT VEGETATION FORM



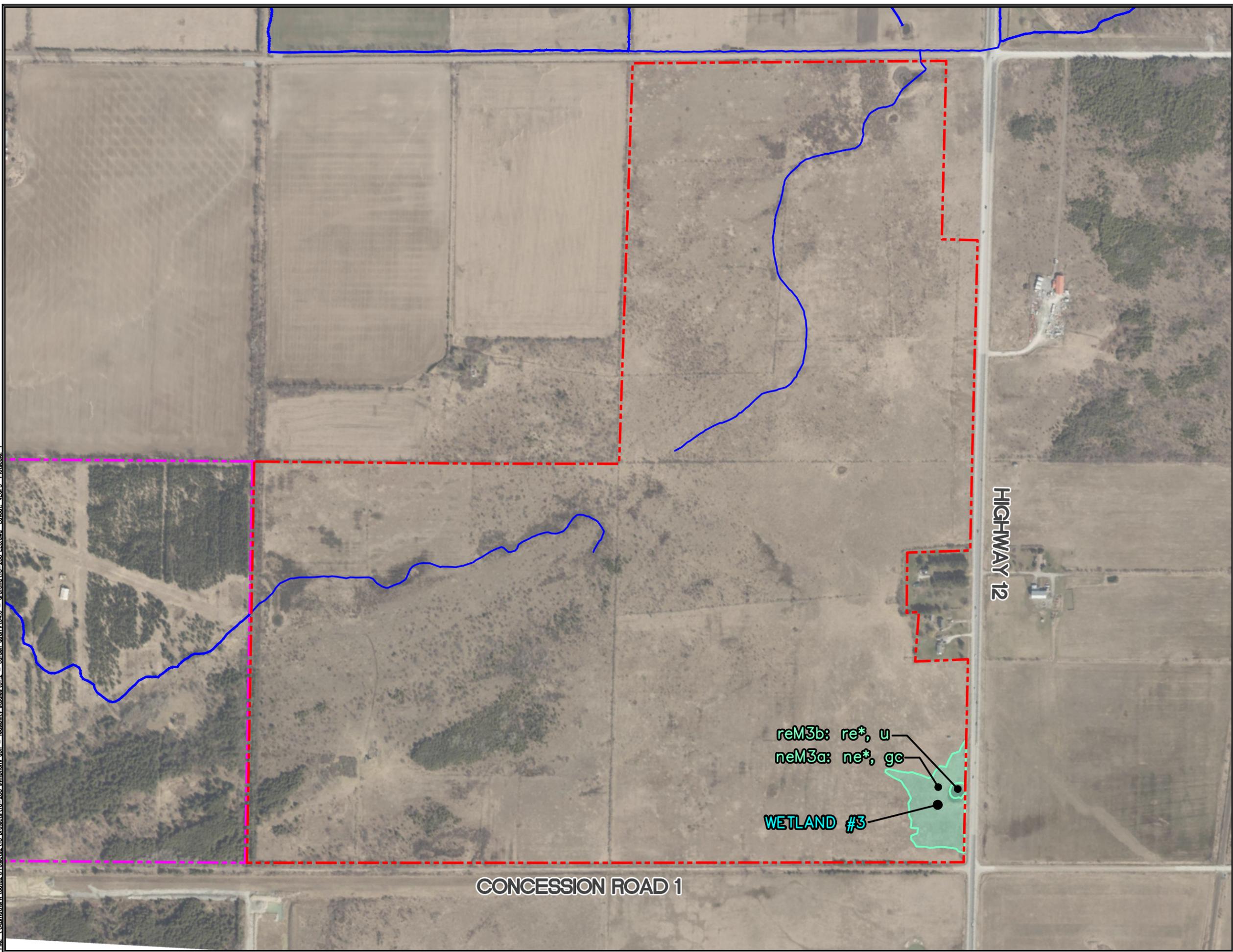
LOCATION PLAN



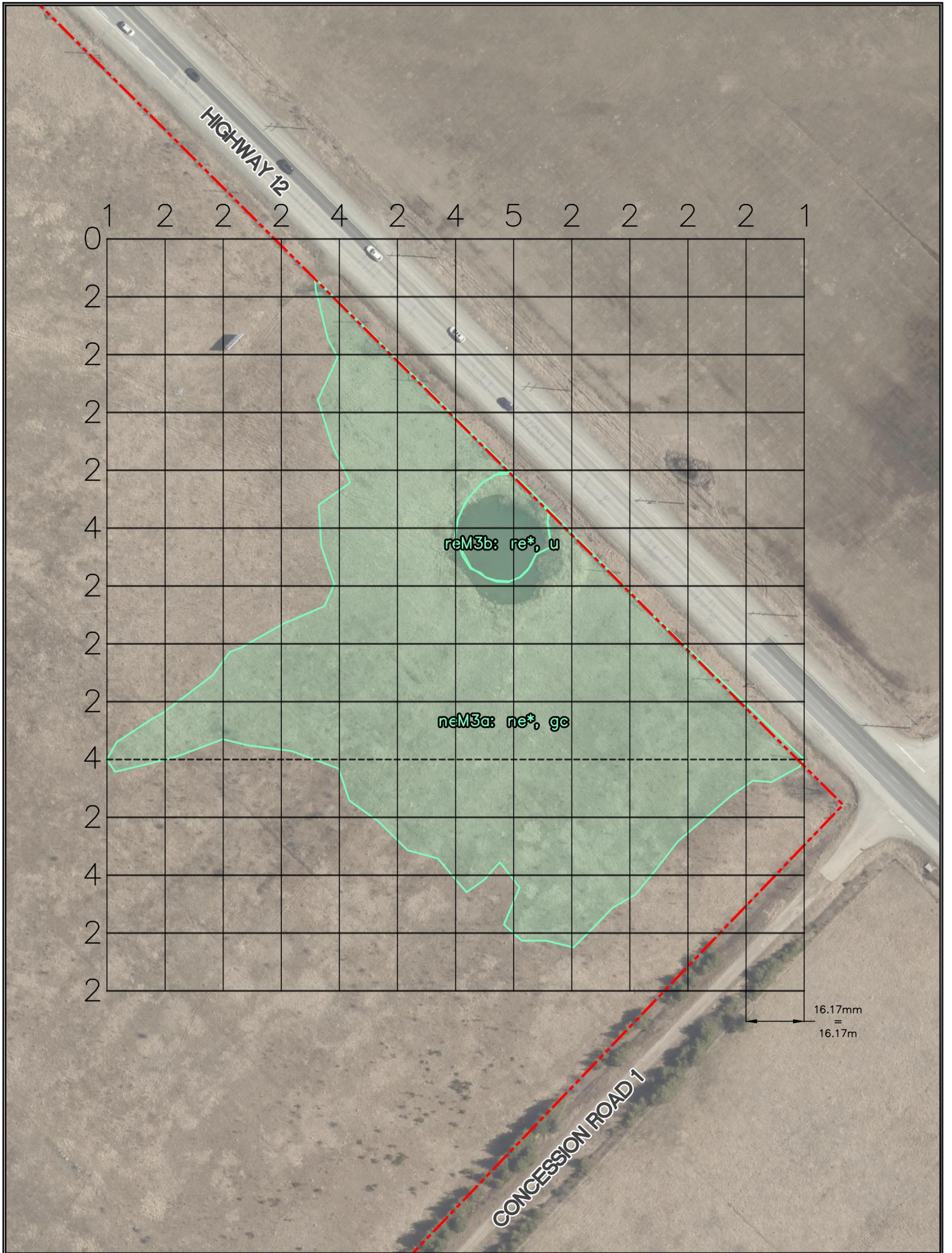
**VEGETATION FORMS
RAMARA WETLAND #3**

**LOTS 11 & 12, CONCESSION 1
BRECHIN, ON**

DATE ISSUED:	FEBRUARY 2023	Figure No.
CREATED BY:	A.L.	3
PROJECT NO.:	18-288	
REFERENCE:	SIMCOE COUNTY	



Plotted by: ALU on February 17, 2023, at 1:24pm
 File: \s:\projects\18-288\ramara_wetland\18-288_elc.dwg - s:\projects\18-288\ramara_wetland\18-288_elc.dwg - s:\projects\18-288\ramara_wetland\18-288_elc.dwg - s:\projects\18-288\ramara_wetland\18-288_elc.dwg



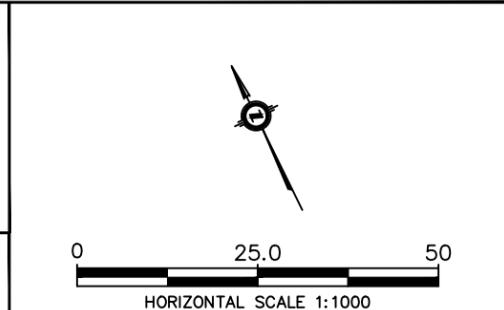
LEGEND:

- - - APPROX. PROPERTY BOUNDARY
- - - ADJACENT LANDS OWNED BY APPLICANT
- EXISTING WATERCOURSE (ONTARIO MNR, 2020)
- - - LINE 'A'

ELC WETLAND COMMUNITIES:

	A:	SWAMP
	M:	MARSH
	h:	DECIDUOUS TREES
	ts:	TALL SHRUBS
	ne:	NARROW-LEAVED EMERGENTS
	gc:	GROUNDCOVER (HERBS)
	re:	ROBUST EMERGENTS
	u:	UNVEGETATED

*DENOTES DOMINANT VEGETATION FORM



INTERSPERSION
RAMARA WETLAND #3

CARDEN QUARRY
BRECHIN, ON

DATE ISSUED: FEBRUARY 2023	Figure No.
CREATED BY: A.L.	4
PROJECT NO.: 18-288	
REFERENCE: SIMCOE COUNTY	

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
04-Feb-19	08:00-17:30	6	2	100	None, Snowpack 10-25 cm	Site Reconnaissance Survey Raptor Wintering #1
11-Feb-19	08:00-15:30	-8	3	50	None, Snowpack 20-40 cm	Site Reconnaissance Survey Raptor Wintering #2
25-Apr-19	16:00-22:15	12 (min), 17 (max)	1	20	None	Bat Snag Assessment Turtle Emergence #1 Waterfowl Stopover/Nesting #1 Amphibian Breeding #1
29-Apr-19	08:00-14:00	3 (min), 7 (max)	3	40-100 (hazy, thin)	None	Bat Snag Assessment Watercourse Assessment #1 Waterfowl Stopover/Nesting #2
07-May-19	12:30-15:30	9 (min), 11 (max)	3	0	None	Turtle Emergence #2 Waterfowl Stopover/Nesting #3 Reptile Observations (Incidental)
08-May-19	09:15-12:15	7 (min), 9 (max)	3	0	None	Turtle Emergence #3 Waterfowl Stopover/Nesting #4

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
29-May-19	16:15-23:15	13 (min), 16 (max)	3	40-100	None	Turtle Emergence #4 Turtle Nesting Survey #1 Waterfowl Stopover/Nesting #5 Watercourse Assessment #2 Amphibian Breeding #2 Reptile Observations (Incidental)
06-Jun-19	06:00-10:00	11 (min), 13 (max)	0-1	0-30	None	Turtle Emergence #5 Waterfowl Stopover/Nesting #7 Dawn Breeding Birds #1 Reptile Observations (Incidental)
12-Jun-19	21:00-23:00	18	1	40	None (moon vis)	Evening Breeding Birds #1 Turtle Nesting Survey #2
19-Jun-19	06:00-15:30	14 (min), 22 (max)	0-1	30	None	Dawn Breeding Birds #2 Late Spring/Early Summer Veg Reptile Observations (Incidental)
25-Jun-19	21:00-23:15	21 (max), 19 (min)	0	0	None	Amphibian Breeding #3 Turtle Nesting Survey #3

Table 1: Site Investigation Record

Lots 11 and 12, Concession 1, Ramara Wetlands

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
27-Jun-19	06:00-09:45	18 (min), 21 (max)	1	5	None	Dawn Breeding Birds #3 Reptile Observations (Incidental)
08-Jul-19	08:30-16:00	20 (min), 25 (max)	1	0	None	Early Summer Vegetation Reptile Observations (Incidental)
09-Jul-19	12:30-22:30	27 (max), 21 (min)	2-0	0-5	None	Early Summer Vegetation Evening Breeding Birds #2 Reptile Observations (Incidental)
10-Jul-19	12:45-22:45	26 (min), 28 (max)	3-1	5-80	None	Early Summer Vegetation Evening Breeding Birds #3 Reptile Observations (Incidental)
17-Sep-19	09:30-16:30	26	3	0	None	Late Summer Vegetation Reptile Observations (Incidental)
18-Sep-19	08:30-15:30	24	3	25	None	Late Summer Vegetation Reptile Observations (Incidental)
20-Jan-21	12:50-15:20	-9	1-2	100	V. light flurries	Raptor Wintering #3
17-Feb-21	11:15-14:00	-7	0	100	V. light flurries	Raptor Wintering #4
26-Feb-21	13:15-15:45	2	1	5	None	Raptor Wintering #5
12-Jul-21	08:30-16:00	24	3	40	None	Woodland/Wetland Staking Exercise (LSRCA) Reptile Observations (Incidental)

Table 1: Site Investigation Record**Lots 11 and 12, Concession 1, Ramara Wetlands**

Date	Time(s)*	Temperature (°C)	Beaufort	Cloud Cover (%)	Precipitation	Description
						Wetland Supplementary Data Collection
01-Oct-21	08:00-13:00	11 (min), 17 (max)	1	90	None	Reptile Observations (Incidental)
21-Apr-22	09:30-11:05	5	2	50	None	Turtle Emergence #6
09-May-22	09:00-10:50	14	2	10	None	Turtle Emergence #7
11-May-22	09:25-10:45	17 (min), 19 (max)	1	20	None	Turtle Emergence #8
12-May-22	09:00-10:20	14 (min), 20 (max)	1	0	None	Turtle Emergence #9
24-May-22	09:35-11:00	12 (min), 15 (max)	2-3	50	None	Turtle Emergence #10
08-Jun-22	09:25-10:50	16 (min), 17 (max)	2	0	None	Turtle Emergence #11
09-Jun-22	15:20-16:55	18	2	50	None	Turtle Emergence #12
11-Jun-22	10:10-11:40	18 (min), 19 (max)	2	0	None	Turtle Emergence #13
14-Jun-22	12:45-15:15	21 (min), 22 (max)	1-2	5	None	Turtle Emergence #14
15-Jun-22	11:00-13:00	20 (min), 22 (max)	1-2	10-15	None	Turtle Emergence #15

*Time(s) indicate duration of survey undertaken for entire property, including lands adjacent to evaluated wetland(s).

Appendix A: Wetland Data Summary Form: Lot 11 & 12 Concession 1 Ramara Wetland #3
 Azimuth Environmental Consulting, Inc.

Wetland Unit(s)	Unit Code (Figure 3)	Dominant Form	Forms	# Forms	Dominant Species	Area (ha)	Open Water			Open Water (ha)	Soil (ha)	Site Type	Fish Habitat			
							Low (ha)	High (Est.)	Mean (Est.)				% Fish Habitat	Area (ha)	Habitat Type	Key Veg Group
	3 neM3a	ne	ne*, re		<i>Salix petiolaris, Rhamnus cathartica, Fraxinus pennsylvanica, Cornus stolonifera</i>	1.26	7.35%	7.35%	7.35%	0.10	1.26	Palustrine	100%	1.26	HM	Shortgrass-Sedge
	reM3b	re	re*, u		<i>Typha spp., Phalaris arundinacea</i>	0.10	--	--	--	--	--	--	100%	0.10	LM	Cattail-Bulrush-Burreed
TOTAL AREA						1.36										

* Indicates dominant form



Appendix B: Species Rarity Background Sources

Azimuth Environmental Consulting, Inc.

- Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC; MNRF, 2023);
- Atlas of the Breeding Birds of Ontario (OBBA; Cadman *et al.*, 2007);
- Ontario Reptile and Amphibian Atlas (Ontario Nature, 2020);
- MECP's Species at Risk Ontario list (MECP, 2023);
- iNaturalist (NHIC) Rare Species of Ontario (iNaturalist, 2023);
- Ontario Butterfly Atlas (2023);
- Government of Canada's Species at Risk Public Registry;
- Atlas of the Mammals of Ontario (Dobbyn, 1994);
- Aquatic Resource Area (ARA) Interactive Mapping (MNRF, 2019);
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Mapping (2022);
- RiverStone Environmental Solutions (Bev Wicks, Mike Francis); personal communications regarding aquatic studies toward Environmental Impact Study report.

Azimuth's Environmental Impact Study report in regards to the subject property remains in progress, with anticipated completion date spring 2023.

References:

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds.). 2007. Atlas of the Breeding Birds of Ontario (OBBA). 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologies, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, xxii + 706pp.

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

Government of Canada. 2023. List of Wildlife Species at Risk. Available at: (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>). Accessed February 2023.

iNaturalist. 2023. (NHIC) Rare Species of Ontario. Available at: (<https://www.inaturalist.org/projects/nhic-rare-species-of-ontario>). Accessed February 2023.

Ministry of the Environment, Conservation and Parks (MECP). 2023. Species at Risk. Available at: (<https://www.ontario.ca/page/species-risk>). Accessed February 2023.

Ministry of Natural Resources and Forestry (MNRF). 2019. Aquatic Resource Area (ARA) Line Segment interactive mapping. Available at: (<https://geohub.lio.gov.on.ca/datasets/aquatic-resource-area-line-segment/explore>). Accessed February 2023.



Ministry of Natural Resources and Forestry (MNRF). 2023. Natural Heritage Information Centre (NHIC) internet web page. Government of Ontario, Ministry of Natural Resources (<https://www.ontario.ca/page/natural-heritage-information-centre>). Accessed February 2023.

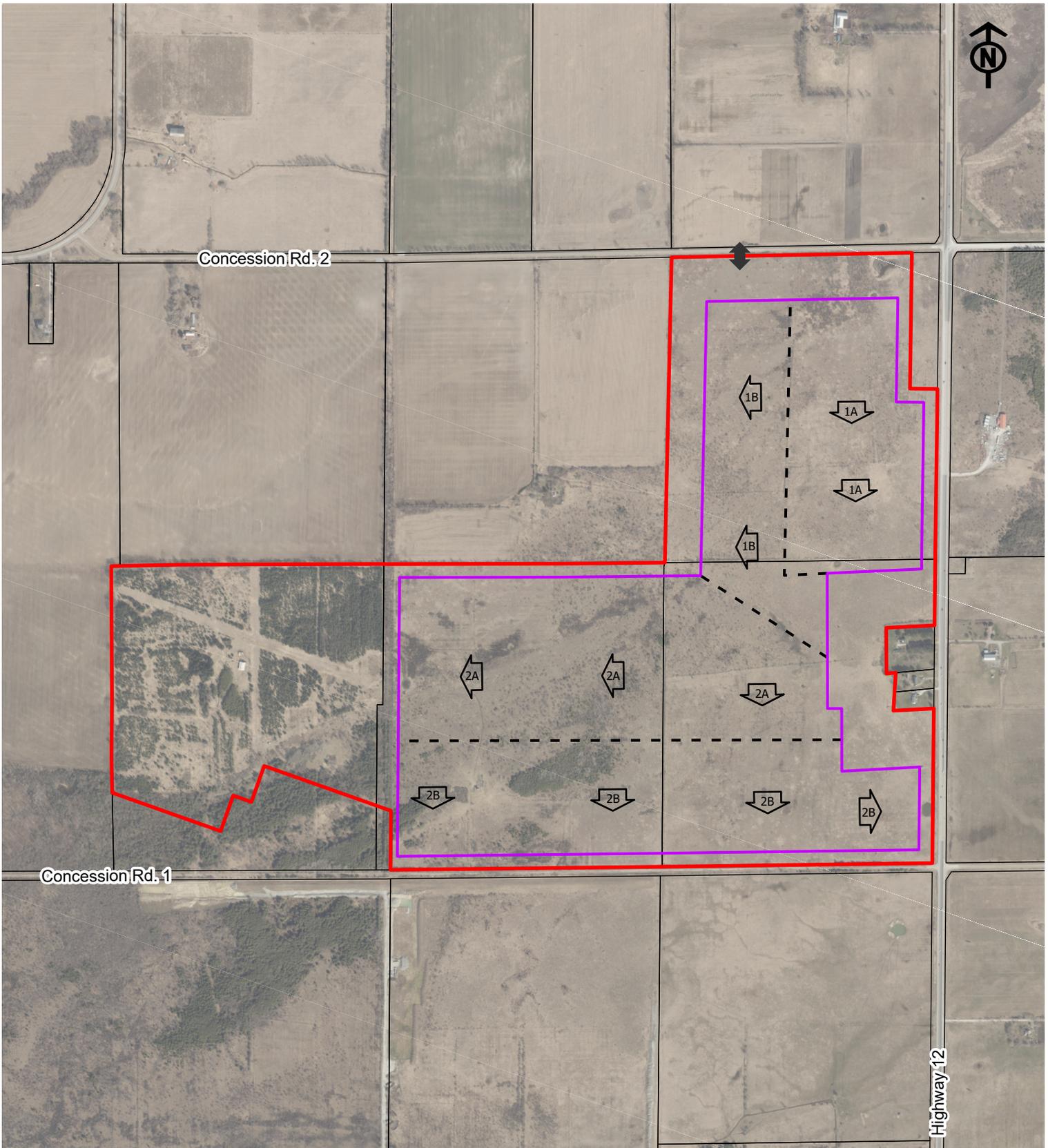
Ontario Butterfly Atlas. 2023. (<https://www.ontarioinsects.org/atlas/>). Accessed February 2023.

Ontario Nature. 2020. Ontario Reptile and Amphibian Atlas Program Available at: (<https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/>). Accessed February 2023.



APPENDIX G

Simplified Operation Schematic



BRECHIN QUARRY SIMPLIFIED OPERATION SCHEMATIC

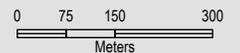
Proposed Brechin Quarry
 Part of Lots 11&12, Concession 1
 Township of Ramara
 County of Simcoe

LEGEND

- Subject Lands and Proposed Licence Boundary
- Proposed Limit of Extraction
- Phasing Area
- Proposed Entrance / Exit
- Parcel Fabric

DATE December 2023

SOURCES
 2022 Ortho Photography County of Simcoe GIS



12135B - Planning Report Figures



APPENDIX H

Curriculum Vitae



DANIEL STUART

M.Env.Sc., B.Sc. (Hons.)

Ecology Lead/Partner

PROFILE

2022 - Present	Ecology Lead/Partner, Azimuth Environmental Consulting, Inc.
2021 - 2022	Ecology Lead, Azimuth Environmental Consulting, Inc.
2019 - 2021	M.Env.Sc., University of Toronto, Conservation and Biodiversity
2015 - 2021	Terrestrial Ecologist, Azimuth Environmental Consulting, Inc.
2015 - 2017	President, Tallgrass Ontario (Director 2014 - 2023)
2014 - 2016	Geographic Information Systems Certificate, Mohawk College
2013 - 2014	Botanist, LGL Limited
2011 - 2013	Terrestrial Ecologist, M.K. Ince and Associates Ltd.
2010 - 2011	Field Biologist, LGL Limited
2010	Small Mammal Field Technician, University of Guelph
2006 - 2010	B.Sc. (Hons.), University of Guelph, Ecology

EXPERIENCE

2022 – 2023 Ecology Lead/Partner, Azimuth Environmental Consulting, Inc.

2021 – 2022 Ecology Lead, Azimuth Environmental Consulting, Inc.

2015 – 2021 Terrestrial Ecologist, Azimuth Environmental Consulting, Inc.

- Ecology team leadership, including task coordination and internal technical review of environmental survey programs and reporting deliverables.
- Project management duties including proposal and budget development, agency and client consultation, design and implementation of field programs, and synthesis of technical environmental reports (Class Environmental Assessments, Environmental Impact Studies, Natural Heritage Evaluations, *etc.*).
- Extensive experience in the identification of vascular plants and plant communities, and identification of wildlife including mammals, avifauna, and herpetiles.
- Recognized Expert Witness (Ecology) by Ontario Land Tribunal (formerly OMB/LPAT), including delivery of expert testimony to the tribunal. Engagement in community and municipal council meetings as an environmental representative, addressing environmental concerns and considerations in a public forum.
- Review and evaluation of construction site plans, stormwater management design, landscape design, restoration planting plans, channel realignment drawings, and erosion & sediment control plans based on ecological principles and applicable environmental policies.
- Terrestrial ecology lead for vegetation restoration/compensation of forest and wetland communities, Species at Risk mitigation and Overall Benefit for Bobolink/Eastern Meadowlark, Butternut, and wildlife passage analysis at the Highway 407 East Phase 2 project; principal contributor to Environmental Management Plans and large-scale Vegetation Restoration Plans, successfully developed and implemented as a component of this project.
- Coordination of environmental time and materials for major infrastructure (provincial highway) bids, including presentation of constraints and opportunities to provincial governmental agencies.



2013 – 2014 Botanist, LGL Limited

- Proposal, records review, site investigation, and reporting duties for the municipal Class EA process. Preparation of Terrestrial Ecosystem Reports focusing on floral and faunal expertise.
- Participated in extensive monitoring program to identify Bobolink, Eastern Meadowlark, bat species, and regionally rare vascular plant species at the Highway 407 East Phase 2 provincial highway project.
- Assistant arborist duties including identification, cataloguing, and assessment of street trees.
- Vascular plant community inventories for wetland restoration in eastern British Columbia.

2011 – 2013 Terrestrial Ecologist, M.K. Ince and Associates Ltd.

- Designed and conducted field studies to characterize natural heritage features and significant wildlife habitat for renewable energy approvals.
- Prepared Records Review, Site Investigation, Evaluation of Significance, Environmental Impact Study, Species at Risk, Water Body Assessment, and Water Body Impact Assessment reports toward renewable energy approvals.
- Developed proficiency in identification of flora and fauna (particularly vascular plants, avifauna, herpetiles, and mammals), air photo interpretation, research and methodological design, and report/proposal writing.
- Participated in public consultation meetings for the renewable energy approvals process as a representative environmental specialist.

2010 – 2011 Field Biologist, LGL Limited

- Participated in implementation of mitigation, ecological monitoring, and restoration measures for tallgrass prairie communities at the Detroit River International Crossing.
- Transect crew member at Former Camp Ipperwash; performed identification of numerous floral and faunal Species at Risk in all seasons.

2010 Small Mammal Field Technician, University of Guelph

- Live trapping of various small mammal species in the Algonquin Park interior, involving mark/recapture and DNA collection from live specimens.

PROFESSIONAL AFFILIATIONS, CERTIFICATION & TRAINING

- | | |
|--|----------------|
| • Recognized Expert Witness in Ecology (LPAT) | April 2019 |
| • MTO RAQS - Natural Sciences (Key Personnel) | January 2019 |
| • Certified Inspector of Sediment and Erosion Control | February 2018 |
| • Ontario Reptile & Amphibian Survey Course | May 2017 |
| • Certified Butternut Health Assessor, MNRF | July 2015 |
| • Tallgrass Ontario, Director 2014-2023 (President 2015-2017) | September 2014 |
| • Standard First Aid – Level C CPR/AED (Renewed 2021) | July 2013 |
| • Southern Ontario Ecological Land Classification Training, MNRF | July 2012 |
| • Ontario Wetland Evaluation System Certification, MNRF | July 2012 |
| • Field Botanists of Ontario, Member | April 2011 |