NATURAL ENVIRONMENT REPORT
LEVEL 1 & 2 ASSESSMENT
Law Crushed Stone Quarry
Township of Wainfleet
June 2022

RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

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June 16, 2022
RS# 2017-046

Ed. Lamb
Waterford Sand and Gravel Limited
70 Ewart Avenue
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Via email to: elamb@waterfordgroup.ca

SUBJECT: Natural Environment Level 1 and 2 Technical Report
Quarry Expansion to Lands West of Law Crushed Stone Quarry
Township of Wainfleet

RiverStone Environmental Solutions Inc. is pleased to provide you with the attached report. A summary of the key results and recommendations are provided at the beginning of the report. Detailed descriptions of the work completed, and the findings are provided in the subsequent sections.

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

Best regards,

RiverStone Environmental Solutions Inc.

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REPORT SUMMARY

Type of Study Level 1 and 2 Natural Environment Report	**Date** June 16, 2022
Legal Description Part of Lots 6 & 7, Concession 2, Part of Road Allowance Between Lots 5 & 6, Concession 2, in the Township of Wainfleet, Regional Municipality of Niagara	**Application** -Class A, quarry below the water table. - Zoning By-law Amendment (ZBA) and Official Plan Amendment in Township of Wainfleet under the *Planning Act* for the Law Extension Quarry.
Approval Authorities Ministry of Northern Development, Mines, Natural Resources and Forestry Township of Wainfleet	**Proponent** Waterford Sand and Gravel Limited

Report Summary

This Level 1 and 2 Natural Environment Report has been prepared to support an application under the *Aggregate Resources Act* (ARA), consisting of an extension of an existing licence for a Class A, quarry below the water table on Part of Lots 6 & 7, Concession 2, Part of Road Allowance Between Lots 5 & 6, Concession 2, in the Township of Wainfleet. The area to be licensed is 72.3 ha, 51.2 ha of which would be in the extraction area. This report details a comprehensive approach to confirming the presence and absence of natural features of conservation interest that are afforded protection under the ARA and applicable legislation and policies at the municipal, provincial and federal levels. During site investigations and field surveys carried out between 2017 and 2019, it was determined that significant natural features and species of conservation interest occurred on or adjacent to the site. The features include 1) Provincially Significant Wetlands, 2) Habitat of Endangered and Threatened Species, 3) Significant Woodlands, and 4) Significant Wildlife Habitat. Per the requirements of a Level 2 assessment, the potential impacts of the proposed quarry extraction activities on the identified natural features and species of conservation interest were evaluated.

Based on the findings herein, RiverStone has determined that the proposed ARA licence application addresses the applicable policies and legislation, provided that the recommendations contained in **Section 5** are implemented in full. The requested local and regional planning approvals will allow for the proposed extractive land use without compromising the ecological values of the Study Area.

SUMMARIZED RECOMMENDATIONS

Provincially Significant Wetlands

- **Proposed extraction activities shall be setback a minimum of 30 m from the boundary of the PSW as shown on Figure 6. The 30 m setback should be well-marked prior to the onset of site preparation.**
- **The 30 m PSW setback area shall be undisturbed and remain as natural self-sustaining vegetation.**

- **Sediment and erosion control measures shall be employed along the extraction limit to prevent the erosion of unstable soils and the movement of sediment and/or other deleterious substances into the adjacent PSW. These measures shall be in place prior to the onset of site preparation.**
- **Sediment fencing must be constructed of heavy material and solid posts and be properly installed (trenched in) to maintain its integrity during inclement weather events.**
- **Once installed, sediment fencing shall be routinely monitored and maintained.**
- **All stockpiled aggregates shall be stored in a location that will prevent the movement of sediment-laden runoff into the PSW units (and other identified wetlands) and their setbacks.**
- **A detailed groundwater monitoring program has been recommended in the Level 1 and 2 Water Study Report (WSP, 2022), which includes continuous water level measurements using dataloggers at the site groundwater monitoring wells. The water level data will be summarized in an annual monitoring report submitted to the NDMNRF or MECP.**

Habitat for Endangered and Threatened Species

- **No vegetation clearing or site alteration occur in the ecological communities occupied by Spoon-leaved Moss, unless the required approvals under the *ESA* are secured that would permit such activities.**
- **Water balance be maintained to the portions of the lands adjacent to the proposed licence that contain Spoon-leaved Moss.**
- **Prior to site alteration activities occurring within identified Whip-poor-will habitat, obtain necessary ESA authorizations or determine that none are required.**

Significant Woodlands

- **A 30 m protective buffer be placed along the edge of the significant woodland (Figure 5). The buffer is to be left in its current state.**
- **The recommendations offered herein to protect the PSW (Section 5.2) must be implemented in full as they will also serve to protect the significant woodland.**

Significant Wildlife Habitat

- **Proposed extraction area not be located within 30 m of the Onondaga Escarpment Brow (Figure 6). Vegetation within the 30 m setback is to remain as natural self-sustaining vegetation.**
- **The recommendations offered herein to protect significant woodland (Section 5.4) must be implemented in full as they will also serve to protect Eastern Wood-pewee and Wood Thrush breeding and foraging habitat adjacent to the site.**
- **The recommendations offered herein to protect Migratory Birds (Section 5.6) must be implemented in full as they will also serve to protect Eastern Wood-pewee and Wood Thrush.**

Other Natural Features and Functions

- **All necessary removal of natural vegetation (e.g., tree/shrub clearing, fallow fields, etc.) within the proposed quarry extraction area should be completed outside of the primary breeding bird nesting window (i.e., between April 1 and August 31). If limited vegetation removal must occur early during this period (i.e., between April 1-April 15), a nest survey should be conducted by a qualified biologist within 5 days of commencement of vegetation removal activities to identify and locate active nests of bird species (where present) protected by the federal *Migratory Bird Convention Act, 1994* or provincial *Fish and Wildlife Conservation Act, 1997*. If a nest is located or evidence of breeding noted, a mitigation plan should be developed to avoid any potential impacts on birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season.**

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1 BACKGROUND

RiverStone Environmental Solutions Inc. (hereafter, "RiverStone") was retained by Waterford Sand and Gravel Limited. (hereafter, "WSGL") to prepare a Level 1 and 2 Natural Environment Report (NER) to support an application under the *Aggregate Resources Act* (ARA) in the Township of Wainfleet (hereafter, "Township"). The parcel is legally described as Part of Lots 6 & 7, Concession 2, Part of Road Allowance Between Lots 5 & 6, Concession 2, in the Township of Wainfleet, Regional Municipality of Niagara (**Figure 1**). The proposed quarry is herein referred to as the "Law Extension Quarry".

The proposal is for an expansion to a Class A quarry below the water table, with a proposed licensed area of 72.3 ha, 51.2 ha of which would be in the extraction area. This will be an expansion of the existing licence present on lands to the east of Biederman Road. The proposed eastern limit of license extension would be represented by Biederman Road. The license would be further bounded to the south by Highway 3, to the west by Graybiel Road, and on the north by natural heritage features, including portions of a significant feature known as the Wainfleet Bog.

For the purposes of this NER, the following terminology is employed as shown on **Figure 1**:

- **Site** – proposed licence area.
- **Study area** – areas that include the site and adjacent lands (areas within 120 meters of the site).

Where natural heritage features are located beyond the study area for which potential impacts may occur, these features are considered within the impact assessment provided herein.

1.1 Study Purpose

This Level 1 and Level 2 NER has been prepared to address requirements under the ARA and its associated regulation (O. Reg. 244/97) and policy standards. Per s. 7 of O. Reg. 244/97 pursuant to the ARA, licence applications must be made in accordance with the Provincial Standards (i.e., *Aggregate Resources of Ontario: Provincial Standards, Version 1.0*). Per subs. 2.2.3 of the Provincial Standards for Class A licence applications, the application must be supported by an NER, which may be either a Level 1 or Level 2 assessment depending upon the natural features present on or within 120 of the site. Under the ARA, a "site" is defined as "the land or land under water to which a licence or permit or an application therefore relates", which is the term adapted for this NER.

Per MNRF's Natural Environment Report Standards policy document (No. A.R. 2.01.07; OMNR 2006), the purpose of a Level 1 NER is to describe the existing natural environmental conditions on and within 120 m of the site, and to determine whether any of the following features are present:

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

- Fish Habitat

When any of the above listed features are identified during the Level 1 assessment, a Level 2 NER is required to assess the potential for negative impacts on the identified feature(s) of significance. If potential impacts are identified, then the Level 2 assessment should provide recommendations for appropriate preventative, mitigative, and remedial measures. As certain features of significance noted above have been documented on the site, this NER will satisfy the requirements for both a Level 1 and Level 2 assessment.

In addition to satisfying the requirements for Level 1 and 2 assessments under the ARA, this report is intended to be submitted to the Township of Wainfleet and the Regional Municipality of Niagara as part of a complete application package for a Zoning By-Law Amendment and Official Plan Amendment. Therefore, this report also includes an assessment, to the extent needed for a planning application, of whether the activities proposed address relevant natural heritage policies contained in the Township's Official Plan (OP; January 2016 Consolidation), Niagara Region OP (2014 consolidation), and other applicable legislation and policies including the 2020 Provincial Policy Statement (PPS) and *Endangered Species Act* (ESA) (see **Section 2.2**).

2 APPROACH AND METHODS

2.1 Personnel and Qualifications

This NER draws on the results of site investigations and field surveys carried out by RiverStone between 2017 and 2019 to assess the WSGL crushed stone quarry expansion licence application. Curriculum vitae for primary RiverStone staff are provided in **Appendix 1**.

2.2 Applicable Environmental Legislation and Policy

As described in **Section 1.1**, the primary policies directing this assessment are the ARA and municipal OP's. In accordance with the ARA, the application is considered a Class A licence, which is defined as a quarry extracting greater than 20,000 tonnes per year below the water table. To assess whether the application satisfies other relevant municipal, provincial, and federal requirements with respect to the natural environment, the following policies (e.g., statutes, regulations, plans, guidance documents, etc.) were considered applicable during both the field investigations and the impact analysis:

- Township of Wainfleet Official Plan (January 2016 Consolidation)
- Niagara Region Official Plan (Consolidated 2014)
- Growth Plan for the Greater Golden Horseshoe, 2020
- Provincial *Aggregate Resources Act* (ARA), R.S.O. 1990, c. A.8, including:
    - Ontario Regulation 244/97: General
    - Natural Environment Report Standards (August 2020)
- *Provincial Policy Statement*, 2020, pursuant to the *Planning Act*, R.S.O. 1990, c. P.13, including:
    - Significant Wildlife Habitat Technical Guide (OMNR 2000a)
    - Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005 (OMNR 2010)
    - Significant Wildlife Habitat Technical Guide (OMNR 2000b)

  - Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (OMNRF 2015c)
  - Significant Wildlife Habitat Mitigation Support Tool (OMNRF 2014).
- Provincial *Endangered Species Act* (ESA), S.O. 2007, c. 6, including:
  - Ontario Regulation 230/08: Species at Risk in Ontario List
  - Ontario Regulation 242/08 – General (i.e. "Exemption Regulation")
- Federal *Fisheries Act*, R.S.C. 1985, c. F-14, amended on 2019-08-28 including:
  - *Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations*, S.O.R/2013-191
  - Fish and Fish Habitat Protection Policy Statement (August 2019)
- Federal *Species at Risk Act*, S.C. 2002, c. 29.
- Federal *Migratory Birds Convention Act*, S.C. 1994, c. 22, including:
  - Migratory Birds Regulations, C.R.C., c. 1035

2.3 Information Sources Used to Assess Site Conditions

Information pertaining to the natural features and functions of the site and adjacent lands was obtained from the following sources:

- **Township of Wainfleet Official Plan** (January 2016 Consolidation) policy related to aggregate and the natural environment and natural heritage feature mapping within and adjacent to the site, including:
  - Section 3.6 – Extractive Industry Area
  - Section 3.7 – Possible Extractive Industrial Area
  - Section 3.8 – Mineral Aggregate Resource Areas and Natural Gas Resource Areas
  - Section 4.0 – Environmental Management
  - Schedule A – Municipal Structure
  - Schedule B – Land Use Township
  - Schedule E – Natural Environmental Features
  - Schedule F – Mineral Aggregate Resource Areas and Natural Gas Resource Areas
- **Niagara Region Official Plan** (Consolidated 2014) policy related to aggregate and the natural environment and natural heritage feature mapping within and adjacent to the site, including:
  - Chapter 6 – Resources
  - Chapter 7 – Natural Environment
  - Chapter 13 – Site Specific Policies
  - Schedule A – Land Use
  - Schedule C – Core Natural Heritage

- **Niagara Peninsula Authority (NPCA) Interactive Mapping** to identify potential features of conservation interest within and adjacent to the site (accessed January 21, 2021 at https://gis-npca-camaps.opendata.arcgis.com).
- **MNRF Natural Areas Mapping and Natural Heritage Information Centre (NHIC) database** regarding information on occurrences of species at risk (SAR), provincially tracked species, and natural heritage features near the site (squares: 17PH4049, 17PH3949, 17PH3849, 17PH3749, 17PH4050, 17PH3950, 17PH3850, 17PH3750, 17PH4051, 17PH3951, 17PH3851, 17PH3751: accessed January 21, 2021, at: http://www.giscoeapp.lrc.gov.on.ca/web/MNR/NHLUPS/NaturalHeritage/Viewer/Viewer.htm
- **Species at Risk range maps** (accessed at: http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/246809.html).
- **Ontario Breeding Bird Atlas (OBBA) database and the Atlas of the Breeding Birds of Ontario, 2001–2005** (Cadman et al. 2007) regarding birds that were documented to be breeding near the site between 2001–2005 (squares: 17PH35, 17PH34; accessed at: http://www.birdsontario.org/atlas/squareinfo.jsp).
- **Ontario Reptile and Amphibian Atlas** database regarding reptile and amphibian records near the site (squares: 17PH35, 17PH34; accessed January 21, 2021, at: https://www.ontarionature.org/oraa/maps/).
- **Ontario Butterfly Atlas** database regarding butterflies recorded near the site (square: 17MJ94; accessed January 21, 2021, at: http://www.ontarioinsects.org/atlas).
- **Atlas of the Mammals of Ontario** (Dobbyn 1994) regarding mammals recorded near the site.
- **Aquatic Species at Risk Maps** mapping generated by Fisheries and Oceans Canada (accessed January 21, 2021 at: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html
- **Great Lakes Conservation Blueprint for Terrestrial Biodiversity, Volume 2** (Henson and Brodribb (2005) regarding terrestrial biodiversity within Ecodistrict 7E-5 (Niagara).
- **Great Lakes Conservation Blueprint for Aquatic Biodiversity, Volume 2** (Phair et al. (2005) regarding aquatic biodiversity within tertiary watershed 2HA (Niagara).
- **DFO Guidance on works relating to municipal drains (Kavanagh et al 2017) and OMAFRA AgMap tool for municipal drain identification.**
- **Physiography of Southern Ontario** (Chapman and Putnam 2007) for information pertaining to the physiography and soils within and adjacent to the site.
- **Digital Ontario Base Maps** (OBMs; 1:10,000)
- **Land Information Ontario (LIO)** for provincial mapping of natural heritage features.
- **Historical and Current Aerial Photographs** of the site and Study Area.
- **Site investigations** by RiverStone staff (see **Section 2.4**)

In addition to the above information sources, RiverStone also reviewed the following technical reports and incorporated their results into this NER as appropriate:

- **Subwatersheds Study**

- **Level 2 Hydrogeological Study Report (WSP 2022)**
- **Site Plans (MHBC, March 2022)**

Additional information was obtained from the following:

- Site meetings held with MNRF on April 18, 2017, May 30, 2018;
- Correspondence with MNRF staff through 2017 and 2018 relating to field studies, wetland status, PSW boundaries and SAR;
- Meeting with MNRF staff on October 22, 2018.
- Teleconference with MECP June 2, 2021

2.4 Site Investigations

The background biophysical information gathered as outlined in **Section 2.3** helped direct field data collection activities associated with multiple site investigations carried out by Riverstone staff. **Table 1** outlines the on-site surveys completed by RiverStone.

Table 1. Site visits and primary tasks.

Date	Primary Task(s)	RiverStone Staff	Weather Conditions	Time of Task(s)
March 28, 2017	General Site Reconnaissance	T. Knight, K. Trimble	n/a	0.5 hr.
April 9, 2017	General Site Reconnaissance, Anuran Calling Survey #1, Incidental Wildlife and Plant Observations	T. Knight, J. Gale	Air Temperature 10°C; Beaufort Wind 0; Cloud Cover 0%; No Precipitation.	1.0 hr. (Site Recon.); 1.75 hr. (Anurans)
April 10, 2017	Snake Emergence Survey, Incidental Wildlife and Plant Observations	T. Knight	Air Temperature 20-22°C; Beaufort Wind 1-3; Cloud Cover 50%; No Precipitation.	5.5 hr.
April 18, 2017	MNRF site meeting	T. Knight		3.0 hrs
April 20, 2017	Spoon-leaved Moss Survey, Incidental Wildlife and Plant Observations	T. Knight	Air Temperature 7°C; Beaufort Wind 2-3; Cloud Cover 100%; Light Precipitation	3.25 hr.
April 23, 2017	Snake Emergence Survey, Spoon-leaved Moss Survey, Bat Maternal Roosting Site Assessment, Incidental Wildlife and Plant Observations	T. Knight	Air Temperature 11-16°C; Beaufort Wind 1; Cloud Cover 0%; No Precipitation.	1.5 hr. (Moss) 5.75 hr. (Snakes and Moss)
May 8, 2017	Spring Vascular Plant Survey, Spoon-leaved Moss Survey, Bat Maternal Roosting Site	T. Knight	Air Temperature 9-13°C; Beaufort Wind 0-2;	6.5 hr.

Date	Primary Task(s)	RiverStone Staff	Weather Conditions	Time of Task(s)
	Assessment, Incidental Wildlife and Plant Observations		Cloud Cover 0-20%; No Precipitation.	
May 15, 2017	Anuran Calling Survey #2, Incidental Wildlife and Plant Observations	T. Knight, J. Gale	Air Temperature 10-11°C; Beaufort Wind 0; Cloud Cover 0%; No Precipitation.	1.5 hr.
June 1, 2017	Breeding Bird Survey #1, Snake Visual Encounter Survey, Incidental Wildlife and Plant Observations	T. Knight	Air Temperature 11-21°C; Beaufort Wind 0-3; Cloud Cover 0-30%; No Precipitation.	4.0 hr. (Birds); 3.5 hr. (Snakes)
June 8, 2017	Anuran Calling Survey #3, Nightjar Survey, Incidental Wildlife Observations	T. Knight, J. Gale	Air Temperature 15°C; Beaufort Wind 0; Cloud Cover 0%; No Precipitation.	2.0 hr.
June 14, 2017	Breeding Bird Survey #2, Swallow Nesting Survey (existing quarry along western rock face), Ecological Land Classification, Vascular Plant Survey, Incidental Wildlife Observations	T. Knight	Air Temperature 13-24°C; Beaufort Wind 0-2; Cloud Cover 0-20%; No Precipitation.	3.75 hr (Breeding Birds), 1.0 hr (Swallow Nests); 2.25 hr. (ELC/Vascular Plants)
June 21, 2017	Snake Visual Encounter Survey, Ecological Land Classification, Vascular Plant Survey, Incidental Wildlife Observations	T. Knight	Air Temperature 19-23°C; Beaufort Wind 1-2; Cloud Cover 10-20%; No Precipitation.	2.75 hr. (Snakes), 4.5 hr. (ELC/Vascular Plants)
June 27, 2017	Breeding Bird Survey #3, Ecological Land Classification, Vascular Plant Survey, Incidental Wildlife Observations	T. Knight	Air Temperature 13-16°C; Beaufort Wind 0-2; Cloud Cover 50-100%; Light Precipitation (no precipitation during bird survey).	3.75 hr. (Breeding Birds), 2.5 hr. (ELC/Vascular Plants)
July 25, 2017	Snake Visual Encounter Survey, Ecological Land Classification, Vascular Plant Survey, Incidental Wildlife Observations	T. Knight	Air Temperature 19-22°C; Beaufort Wind 1-2; Cloud Cover 80-100% (with consistent sunny periods); No Precipitation.	3.0 hr. (Snakes), 2.0 hr. (ELC/Vascular Plants)
August 10, 2017	Ecological Land Classification, Vascular Plant Survey, Incidental Wildlife Observations	T. Knight	Air Temperature 22-27°C; Beaufort Wind 1-2; Cloud Cover 0-30%; No Precipitation.	5.25 hr.
September 14, 2017	Ecological Land Classification, Vascular Plant Survey, Incidental Wildlife Observations	T. Knight	Air Temperature 20-24°C; Beaufort Wind 1-2; Cloud Cover 100-20%; No Precipitation.	4.5 hr.

Date	Primary Task(s)	RiverStone Staff	Weather Conditions	Time of Task(s)
April 26, 2018	Snake emergence survey 1, Ecological Land Classification	L. Wilson	Air Temperature 10°C; Beaufort Wind 3; Cloud Cover <5%; No Precipitation. Lots of rain in 48 hours prior	5.0 hr.
May 2, 2018	Snake emergence survey 2, Ecological Land Classification	L. Wilson	Air Temperature 23-26°C; Beaufort Wind 3; Cloud Cover 10%; No Precipitation.	5.0 hr.
May 6, 2018	Snake emergence survey 3, Ecological Land Classification	L. Wilson	Air Temperature 22-27°C; Beaufort Wind 1-2; Cloud Cover 0-30%; No Precipitation.	4.0 hr.
May 7, 2018	Snake emergence survey 4, Ecological Land Classification	L. Wilson, K. Trimble	Air Temperature 22°C; Beaufort Wind 1-2; Cloud Cover 0%; No Precipitation.	6.0 hr.
May 24, 2018	Whip-Poor-Will Survey 1, Ecological Land Classification, snake emergence survey, spoon-leaved moss survey	L. Wilson, W. Barbour	Air Temperature 26°C; Beaufort Wind 1-2; Cloud Cover 0-30%; No Precipitation.	7.5 hr.
May 30, 2018	Meeting with MNRF, Whip-Poor-Will Survey 2	L. Wilson, K. Trimble	Air Temperature 28°C; Beaufort Wind 1; Cloud Cover 90%; No Precipitation.	5.0 hr. MNRF meeting 4.0 hr. WPW surveys
June 28, 2018	Whip-Poor-Will Survey 3	W. Barbour	Air Temperature 20°C; Beaufort Wind 1-2; Cloud Cover 0-30%; No Precipitation.	1.0 hr.
May 17, 2019	Whip-Poor-Will Survey 1	W. Barbour	Air Temperature 21°C	1.0 hr
June 17, 2019	Whip-Poor-Will Survey 2	W. Barbour	Air Temperature 22°C;	1.0 hr
November 7, 2019	Bat snag survey	C. Mann	Air Temperature 2°C; Beaufort Wind 0-2; Cloud Cover 100%; Light rain with heavy periods throughout day.	6.0 hr.
September 25, 2020	Ecological Land Classification, Vascular Plant Survey, Incidental Wildlife Observations	C. Mann	Air Temperature 19°C; Beaufort Wind 1-2; Cloud Cover 0%; No Precipitation.	4.5 h

Evidence for the presence of a species (or use of an area by a species) was determined from visual and/or auditory documentation (e.g., song, call) and/or observation of nests, tracks, burrows, browse,

skins, and scats (where applicable). Natural features of conservation interest (e.g., SAR habitat, etc.) were digitized and delineated in the field with a high accuracy GPS. Features of interest were photographed, and all information collected was catalogued for future reference. Representative photographs detailing on-site conditions are provided in **Appendix 3**.

On-site assessments were completed over multiple years on lands owned by Waterford Sand and Gravel. During this time, proactive interpretation of field data was used to refine the location and extent of the proposed licence and extraction limits. As a result of these refinements, survey stations often became located outside of the formally defined study area presented on **Figure 1**. Overall, the level of effort expended during the site investigations and field surveys was considered appropriate to document the natural features and functions with recognized conservation status occurring within and adjacent to the site.

2.4.1 Terrain, Drainage, and Soils

The geophysical setting of the site and adjacent lands was determined via a review of topographic mapping, soils mapping for Niagara Region, surficial geological mapping, and aerial photographs. Drainage direction and the presence or absence of surface water features was determined based on a review of background information sources (e.g., Ontario Base Maps, Agricultural Information Atlas, see **Figure 3**), on-site observations, and review of the hydrogeologic assessment which includes surface catchment analysis (WSP 2022).

2.4.2 Habitat-based Approach

RiverStone's primary approach to site assessment is habitat-based. This means that our field investigations first focus on evaluating the potential for features within an area of interest to function as habitat for species considered potentially present, rather than searching for live specimens. An area is considered potential habitat if it satisfies a number of criteria, usually specific to a species, but occasionally characteristic of a broader group (e.g., several turtles of conservation interest use sandy shorelines for nesting, numerous fish species use areas of aquatic vegetation for nursery habitat). Physical attributes of a site that can be used as indicators of its potential to function as habitat for a species include structural characteristics (e.g., physical dimensions of rock fragments or trees, water depth), ecological community (e.g., meadow marsh, rock barren, coldwater stream), and structural connectivity to other habitat features required by the species. Species-specific habitat preferences and/or affinities are determined from status reports produced by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Cadman et al. (2007), published and unpublished documents, and direct experience.

In instances where habitat features are such that either (i) a species presence cannot be easily determined through an assessment of habitat feature alone, or (ii) habitat features are such that they suggest a species may be present in an area where development is proposed and impacts are likely, RiverStone adds an additional level of rigor to our work by completing further species-specific assessments in accordance with applicable standard methods and protocols.

2.4.3 Vegetation Community Characterization and Vascular Plant Inventory

Vegetation communities occurring within the study area were delineated according to Ecological Land Classification (ELC) community tables (Lee et al. 1998). ELC defines ecological units or communities based on bedrock, climate (temperature, precipitation), physiography (soils, slope, aspect), and corresponding vegetation. Use of the system permits biologists and other land managers to use a

common language to describe vegetation communities, which in turn facilitates the identification of communities likely to support features or functions of conservation interest. The ELC system is an organizational framework that can be applied at different scales. The ecological units most useful for site-specific evaluations are ecosites and vegetation types (also known as eco-elements). Vegetation types are the finest level of resolution in the ELC system and are recurring patterns found in the plant species assemblages that are associated with a particular ecosite (Lee et al. 1998).

The boundaries of wetland communities identified via ELC were delineated in the field in accordance with the "50% wetland vegetation rule" specified by the Ontario Wetland Evaluation System (OWES). The boundaries of all treed communities (i.e., forests, cultural woodlands) where they abut open areas (e.g., agricultural fields, etc.) were delineated in the field based on the dripline. Where a treed community is also a wetland (i.e., treed swamp), the greater of the dripline or OWES wetland boundary is used to define the feature extent.

A vascular plant survey consisting of a comprehensive area search ("wandering transects") was principally centred within areas of the site and adjacent lands (contingent upon access) with naturally occurring (i.e., non-planted) vegetation. Particular effort was paid to areas with the greatest potential to support vascular plants that are designated Species at Risk and/or provincially rare, and or regionally significant species. Nomenclature and common names for the recorded vascular plant species are generally consistent with the southern Ontario Vascular Plant Species List (Bradley 2013).

During wandering transects completed as part of the vascular plant surveys, patches of Spoon-leaved Moss (*Bryoandersonia illecebra*), an endangered species, was documented in the study area. Given the observation of this species, RiverStone completed targeted surveys for Spoon-leaved Moss on April 20, April 23, and May 8, 2017 in areas of potential habitat.

2.4.4 Anuran Calling Surveys

Calling anuran surveys were conducted in 2017 in accordance with the Marsh Monitoring Program for Surveying Amphibians (Bird Studies Canada 2009). This protocol involves the completion of three (3) surveys, once per month between April and June, from approximately 30 minutes after sunset until midnight. Appropriate weather conditions include no or very light precipitation and wind speed ≤3 on the Beaufort wind scale. As the site is located within the southern region (south of the 43rd parallel), each of the three (3) surveys should occur during the first half of the month (i.e., April 1-15, May 1-15, and June 1-15). A total of six (6) anuran calling stations were established and situated systematically to cover potentially significant anuran breeding habitats, particularly those that could occur within or adjacent to proposed areas of extraction or disturbance (**Figure 4**). Each station was surveyed for a minimum duration of three (3) minutes. Anurans were also recorded incidentally during other field activities on-site.

2.4.5 Breeding Bird Surveys

Three (3) rounds of breeding bird surveys were conducted in 2017 in accordance with the Ontario Breeding Bird Atlas (OBBA) protocol (Bird Studies Canada et al. 2001). Surveys were conducted based on the appropriate season (May 24–July 10), time of day (between dawn and 5 hours after dawn), and weather conditions (no rain, wind speed ≤3 on the Beaufort Wind Scale). A total of twelve (12) breeding bird stations were established and situated systematically to cover potentially significant bird habitats, particularly those that could occur adjacent to proposed areas of extraction or disturbance (**Figure 4**). Each station was surveyed for a minimum duration of 10 minutes. Birds were also recorded

incidentally in transit between stations during the breeding bird survey, and incidentally during other field activities on-site.

The OBBA provides four breeding categories to accompany each observation:

> ***Observed:*** Species observed during its breeding season (no evidence of breeding).
>
> ***Possible Breeding:*** Includes any of the following observation types: 1) species observed in its breeding season in suitable nesting habitat, and 2) singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat.
>
> ***Probable Breeding:*** Includes any of the following observation types: 1) pair observed in their breeding season in suitable nesting habitat, 2) permanent territory presumed through registration of territorial song on at least 2 (two) days, a week or more apart, at the same place, 3) courtship or display between a male and a female or 2 (two) males, including courtship feeding or copulation, 4) visiting probable nest site, 5) agitated behaviour or anxiety calls of an adult, 6) brood patch on adult female or cloacal protuberance on adult male, and 7) nest-building or excavation of nest hole.
>
> ***Confirmed Breeding:*** Includes any of the following observation types: 1) distraction display or injury feigning, 2) used nest or egg shell found (occupied or laid within the period of the study), 3) recently fledged young or downy young, including young incapable of sustained flight, 4) adults leaving or entering nest site in circumstances indicating occupied nest, 5) adult carrying faecal sac, 6) adult carrying food for young, 7) nest containing eggs, and 8) nest with young seen or heard.

2.4.6 Nightjar Surveys

Nightjar surveys were conducted between 2017 and 2019 in accordance with the *Survey Protocol for Eastern Whip-poor-will (Caprimulgus vociferous) and Common Nighthawk (Chordeiles minor)* (MNRF 2015). This protocol requires the completion of two (2) evening surveys (preferably within different lunar cycles) 30 minutes after sunset until moonset during periods when the moon is at least 90% illuminated. Each station is surveyed for at least three (3) minutes and only under appropriate weather conditions (i.e., temperature >10°C, no precipitation, little to no cloud cover, wind speed ≤3 on the Beaufort wind scale). A total of 5 (five) survey locations were established by RiverStone through the study area to ensure that potential habitats that could support these species were appropriately surveyed (**Figure 4**). A single survey was completed in 2017 due to the timing of RiverStone's work on this project. Dates of nightjar surveys are provided in **Table 1**.

2.4.7 Bat Maternal Roosting Habitat Surveys

Targeted surveys for bats focused on identifying the presence of maternal roosting habitat. Surveys followed the protocols outlined in OMNRF (2017). Vegetation mapping using Ecological Land Classification (ELC) was used to guide the completion of on-site surveys (Phase 1). Detailed surveys of snag/cavity trees were conducted during leaf off conditions within the CUT2 and SWT communities to the south of the Onondanga Escarpment Brow (**Figure 4**) where tree removal is proposed (Phase 2). Acoustic surveys were not completed within the surveyed area as no suitable clusters of snags were documented (Protocol Step 3).

2.4.8 Snakes

While incidental observations of snakes were recorded during the site investigations, targeted visual encounter surveys to determine presence and absence or snakes were completed in the spring of 2017 and 2018 (**Table 1**). The goal of these surveys was to identify locations snakes may be using for overwintering (i.e., hibernacula. These surveys are designed to target snakes in the early season when vegetative cover is minimal and thermal conditions result in snakes coming out of congregation areas where they would have overwintered. During this period, surveys focus on observations of snakes coming in and out of overwintering sites to bask. Visual encounter surveys were completed during the spring of 2017 (April 10, April 23, June 1) and spring of 2018 (April 26, May 2, May 6, May 7, May 24) in an effort to identify hibernacula within the study area. Surveys were completed when air temperatures were between 10-25^{o}C between 0900-1700h on days with less than 50% cloud cover and low winds (i.e., less than 24 kph) (OMNRF 2016).

2.5 Identification of Significant Natural Features

"Features of conservation interest" represent natural heritage features and habitats that have recognized status within the relevant planning jurisdiction in which a development or site alteration activity is proposed. For the purposes of the proposed ARA licence applications considered herein, natural heritage features and habitats considered to be "of conservation interest" include those identified per ARA policies (see **Section 1.1**). The appropriate process for identifying such features is outlined below.

2.5.1 Significant Wetlands

The term "Significant Wetland" is defined by the province as follows:

> *A significant wetland is an area identified as provincially significant by the Ministry of Natural Resources (MNR) using evaluation procedures established by the Province, as amended from time to time.*

The presence or absence of Significant Wetlands within the study was ascertained via an information request submitted to MNRF Guelph District (see **Appendix 2**), and by reviewing relevant background information sources (per **Section 2.1**). As described in **Section 2.4.3**, RiverStone delineated the boundaries of all wetlands identified within the study area (whether Significant or not) in accordance with the "50% wetland vegetation rule" per OWES. The north portion of the study area has been classified as PSW. As part of completing the onsite assessment associated with preparing the report, the boundary of the PSW and status of other wetlands in the study area were reviewed and refined through a site meeting and mapping exercise with MNRF (**Figure 2**); additional details pertaining to the PSW refinement is provided in **Section 3.7.1**.

2.5.2 Habitat of Endangered and Threatened Species

With respect to definitions provided under Ontario's *Endangered Species Act*, "Habitat of Endangered and Threatened Species" is defined as follows:

> *(a) with respect to a species of animal, plant or other organism for which a regulation made under clause 56 (1) (a) is in force, the area prescribed by that regulation as the habitat of the species, or*

> *(b) with respect to any other species of animal, plant or other organism, an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding,*

The presence or absence of Endangered and Threatened species habitat was ascertained via assembly and review of relevant background information sources (per **Section 2.3**) and the results of targeted and habitat-based assessments on-site (per **Section 3**). Technical details pertaining to the assessment of the habitat of Endangered and Threatened species is provided in **Appendix 4**.

2.5.3 Significant Areas of Natural and Scientific Interest (ANSIs)

The term "significant area of natural and scientific interest" is defined as follows:

> *A significant ANSI is an area identified as 'provincially' significant by NDMNRF.*
>
> *ANSIs are ranked by the NDMNRF as being of either provincial or regional significance. For the purposes of the Natural Environment report, significant ANSIs include only those ANSIs identified as provincially significant.*

The presence or absence of significant ANSI's within the site and adjacent lands was ascertained via an information request submitted to NDMNRF Guelph District (see **Appendix 2**), and by reviewing relevant background information sources (per **Section 2.1**).

2.5.4 Significant Woodlands

The term "significant woodland" is generally defined by the province as follows:

> *A 'significant' woodland is an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history.*

The presence or absence of significant woodlands was ascertained via assembly and review of relevant background information sources (per **Section 2.3**), the results of targeted and habitat-based assessments on-site (per **Section 3**) and review of policy designations.

2.5.5 Significant Valleylands

The term "significant valleyland" is generally defined by the province as follows:

> *A 'significant valleyland'' is a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year that is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system.*

The presence or absence of significant valleylands was ascertained via assembly and review of relevant background information sources (per **Section 2.3**) and the results of targeted and habitat-based assessments on-site (per **Section 3**).

2.5.6 Significant Wildlife Habitat

The term “significant wildlife habitat” is generally defined by the province as follows:

> *‘Significant’ wildlife habitat is that which is ecologically important in terms of features, functions, representation or amount, contributing to the quality and diversity of an identifiable geographic area or natural heritage system.*

As outlined in the SWH Technical Guide (OMNR 2000a) and supporting Ecoregion Criteria Schedules (OMNRF 2015a, 2015b, 2015c), SWH is composed of four principal components:

1. Seasonal Concentration Areas of Animals;
2. Rare Vegetation Communities or Specialized Habitats;
3. Habitat of Species of Conservation Concern; and
4. Animal Movement Corridors.

The process for identifying SWH is outlined in s. 9.2.3 of the *Natural Heritage Reference Manual* (OMNR 2010). **Step 1** requires the answers to two questions:

A. Does the development proposed involve a trigger for significant wildlife habitat; and
B. Has any confirmed significant wildlife habitat been identified.

Triggers for significant wildlife habitat (question A) are outlined in s.9 of the Natural Heritage Reference Manual (OMNR 2010) and include:

- Creation of more than three (3) lots through either consent or plan of subdivision;
- Changes in land use, not including the creation of a lot, that require approval under the Planning Act;
- Shoreline consent along a large inland lake, small inland lake or large river that is within 120 m along the shoreline of an existing lot of record or lot described in an application for subdivision or consent; and,
- Construction for recreational uses (e.g., golf courses, serviced playing fields, serviced campgrounds, and ski hills) that require large-scale modification of terrain, vegetation or both.

If the development proposed involves a trigger (question A), the assessment of SWH proceeds to **Step 2**.

Confirmed SWH (question B) are areas that have been identified in existing planning documents (e.g., Official Plans) or by the MNRF. Where confirmed SWH is present, and the development proposed does not involve a trigger (question A), the assessment of SWH proceeds to **Step 4**.

Step 2 of the SWH assessment involves undertaking a more thorough analysis of features, functions, and habitats within the site and adjacent lands via Ecological Land Classification (see **Section 2.4.3**). The list of ELC codes generated for the site and study area is compared to those codes considered candidate SWH in the relevant Ecoregion Criterion Schedule (i.e., 5E, 6E, or 7E) in step 3. Where a positive match between an ELC Ecosite and candidate SWH exists, the area is considered candidate SWH.

Two options are available for candidate SWH: 1) the area may be protected without further study, or 2) the area may be evaluated to ascertain whether confirmed SWH is present. Evaluation may involve generating more detailed maps of vegetation cover or conducting surveys of the wildlife population within the candidate SWH including reproductive, feeding, and movement patterns. If the area is confirmed SWH, the final step in the process is the completion of an impact assessment to demonstrate that no negative impacts to the confirmed SWH or its function will occur. The impact assessment process is assisted by SWH Mitigation Support Tool (OMNRF 2014).

The results of our assessment are provided in **Appendix 5** with further details in **Section 3.7.6**. Where targeted on-site assessments were required to evaluate SWH, survey methods are outlined in **Section 2.4**.

2.5.7 Fish Habitat

MNRF's Natural Environment Report Standards policy document (No. A.R. 2.01.07; OMNR 2006) defines "Fish Habitat" as follows:

> *Section 34 of the federal* Fisheries Act *defines 'fish habitat' as 'spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes'.*

The presence or absence of fish habitat was ascertained via assembly and review of relevant background information sources (per **Section 2.3**).

3 BIOPHYSICAL FEATURES AND FUNCTIONS

3.1 Landscape Setting and Physiography

The site is situated within the Haldimand Clay Plain physiographic region (Chapman and Putnam 2007). The Haldimand Clay Plain extends from the Niagara Escarpment to Lake Erie and cover 1350 square miles around the western part of Lake Ontario, an area of ~190 miles. The area was once submerged by Lake Warren and soils consists generally of stratified clay with the exception of some areas of till in north portion.

The site occurs within Ecodistrict 7E-5 (Niagara), this ecodistrict extends approximately from Port Dover and Brantford in the west, beyond the Lake Erie shoreline in the south, the Canadian – U.S. border in the east and follows along the top of the Niagara Escarpment in the north. Several towns and rural communities are contained within Ecodistrict 7E-5, including Caledonia, Hagersville, Port Colborne, Crystal Beach, Fort Erie, Niagara Falls, and Smithville. Two-thirds of the ecodistrict consists of agricultural lands (238 234 ha) with an additional 32 247 ha consisting of pasture, or old fields no longer in production. Twenty-two percent of the ecodistrict contains natural cover, consisting of deciduous forest, wetland, and swamp.

The landscape including and surrounding the site and study area (i.e., within a few kilometres) is consistent with the overall character of Ecodistrict 7E-5, containing mostly agricultural land-uses punctuated by wetlands and deciduous forest. There is a history of aggregate extraction in the area, and an active quarry is located immediately east of the study area. The nearest community to the site is Port Colborne which is ~3.3 km east of the study area to the cities edge.

3.2 Bedrock and Surficial Geology

As described in the accompanying report by WSP (2022), the regional area is underlain by Silurian and Devonian age limestone, dolostone, gypsum, shale and sandstone. The Onondaga Escarpment is the dominant physiographic feature in the area. The buried Onondaga Escarpment, a bedrock scarp roughly parallel to Lake Erie, was formed by differently erosion of the harder dolostone of the Bertie Formation and the softer underlying Salina Formation.

The surficial physiography of the upper Biederman Drain #1 area is predominately clay and muck associated with the Wainfleet Bog and contains up to 25 m of clay overburden separating the bog from the underlying bedrock aquifer (NPCA 2010).

3.3 Topography

The general topography (i.e., 5 m contours) of the site is shown on **Figure 3**, with a more refined topography (i.e., 1 m contours) of the site provided on the Site Plans (MHBC, March 2022). Overall, the site is relatively flat, ranging from 186 masl within the southeastern portion of the study area to 177 masl in the northern portion, below the Onondaga Escarpment. A small height of land is present in south-central portion of the site, situated within a cultural meadow community amongst the broader agricultural lands. The Onondago Escarpment represents the only prominent topographic feature within the study area.

3.4 Drainage, Surface Water, and Hydrogeologic Conditions

The Wainfleet Bog is present to the north of the study area, bounded on its south edge by the Onondaga Escarpment, and underlain by approximately 25 m of low permeability clay. Previous studies have indicated that the existing quarry has minimal effect on the bog due to the aquitard function of the clay. The Biederman Drain however, is draining the surficial water above the clay (WSP 2022).

The proposed quarry extension occupies approximately 35 ha (less than 2%) of the Biederman Drain watershed. The drain has a relatively flat profile and consistent physiography for most of its 7km length, and is intermittent with pockets of standing water between storm events. Biederman Drain #1, South Branch is approximately 10 km^2 and originates just northeast of the site and flows east-northeast according to the Central Welland Watershed Plan (NPCA 2010). The Biederman Drain branch nearest the site is listed by NPCA as Class E. Surface runoff in the southeastern portion of the extension lands drains to the Eagle Marsh Drain which flows south to Lake Erie southwest of the City of Port Colborne. A small area in the southwestern corner of the Site drains to Mill Race Creek which flows north to the Welland River.

A small agricultural swale is mapped by NPCA in the northern portion of the extraction area, discharging north toward the Onondaga Escarpment. This feature flows only during the spring freshet or during major storm events, is discontinuous and doesn't have a direct connection to the Biederman Drain. Based on air photo interpretation it drains to several isolated wet pockets northeast of the site, but likely contributes ultimately to Biederman Drain. It is part of the Biederman Drain surface water catchment on the site that was included in the analyses done by WSP (2022).

3.5 Vegetation

3.5.1 Vegetation Communities and Dominant Flora

Natural vegetation communities within the site were characterized on several dates between March 2017 and November 2019 and are delineated herein through a combination of aerial photograph interpretation and detailed field investigations. Vegetation community mapping is provided on **Figure 4**, with a total species list in **Appendix 6**. A general summary of the vegetation communities present within the site is provided below.

The site is dominated by agricultural fields planted with winter wheat in 2018 and soya beans in 2019 with several upland and lowland vegetation communities located in the north and southeast portions of the subject lands. The large majority of the naturally vegetated communities have been historically cleared with young or second growth communities present. The north extent of the study area consists of wetland community along the fringe of the Wainfleet Bog.

Mineral Cultural Meadow - CUM1

Several cultural meadows occur within the eastern portion of the study area. These communities are dominated by Common Yarrow (*Achillea millefolium*), Kentucky Bluegrass (*Poa pratensis*), Common Timothy (*Phleum pretense*), Meadow Hawkweed (*Hieracium caespitosum*), New England Aster (*Symphyotrichum novae-angliae*), Common Teasel (*Dipsacus fullonum*), Wild Carrot (*Daucus carota*), Redtop Bentgrass (*Agrostis gigantea*), Troublesome Sedge (*Carex molesta*), and European Buckthorn (*Rhamnus cathartica*).

Bedrock Cultural Thicket – CUT2

This community is located adjacent to agricultural lands in the eastern portion of the site. These areas have been historically cleared, with the north portion having grown back into a very dense thicket of hawthorn (*Crataegus sp.*), rose (*Rosa sp.*), and Green Ash (*Fraxinus pennsylvanica*) in the overstory. An area of cultural meadow with exposed bedrock is located in the northwest corner. These inclusions are remnant of historic vegetation removal. In the south portion, Eastern Red Cedar (*Juniperus virginiana*) is dominant. Additional species observed in this community include, Norway Spruce (*Picea abies*), Dotted Hawthorn (*Crataegus punctata*), Fleshy Hawthorn (*Crataegus succulenta*), Grey Dogwood (*Cornus racemosa*), European Buckthorn, Multiflora Rose (*Rosa multiflora*), Virginia Creeper (*Parthenocissus quinquefolia*), Kentucky Bluegrass, Eastern Tall Goldenrod (*Solidago altissima ssp. altissima*), Common Timothy, New England Aster, Common Teasel, Redtop Bentgrass, Hairy White Oldfield Aster (*Symphyotrichum pilosum var. pilosum*), White Meadow-sweet (*Spiraea alba*), and Devil's Beggarticks (*Bidens frondosa*).

Mineral Swamp Thicket – SWT

Mineral thicket community is located in two (2) locations in the study area. The largest community is located in the southeast corner and consists of mostly dead Green Ash and American Elm (*Ulmus americana*) with dense shrub cover of Crack Willow (*Salix fragilis*), Peach-leaf Willow (*Salix amygdaloides*), Sandbar Willow (*Salix interior*), Bebb's Willow (*Salix bebbiana*), Mapleleaf Viburnum (*Viburnum acerifolium*), and European Buckthorn. One additional community is located amongst cultural thicket communities in the northern portion of the study area. Additional species observed in the SWT communities include: Black Chokeberry (*Aronia melonocarpa*), Northern

Rough-stemmed Goldenrod (*Solidago rugosa ssp. rugosa*), Floating Manna Grass (*Glyceria septentrionalis*), Fowl Mana Grass (*Glyceria stiata var. striata*), Blunt Spikerush (*Eleocharis obtuse*), Purple Loosestrife (*Lythrum salicaria*), Narrowleaf Cattail (*Typha angustifolia*), Softstem Bulrush (*Schoenoplectus tabernaemantani*), White Meadow-sweet, Sensitive Fern (*Onoclea sensibilis*), Rough Avens (*Geum laciniatum var. laciniatum*), Yellow-fruited Sedge (*Carex annectens*), Fox Sedge (*Carex vulpinoidea*), Field Horsetail (*Equisetum arvense*), Dudley's Rush (*Juncus dudleyi*), Hop Sedge (*Carex lupulina*), Crested Sedge (*Carex cristatella*) and Northern Dewberry (*Rubus flagellaris*).

Deciduous Forest – FOD

One small, isolated pocket of deciduous forest is located in the northeast portion of the study area, disconnected from the larger forest community to the northwest. Canopy species present include Trembling Aspen (*Populus tremuloides*), American Elm, Black Walnut (*Juglans nigra*), Eastern Cottonwood (*Populus deltoides ssp. deltoides*), Manitoba Maple (*Acer negundo*), Sugar Maple (*Acer saccharum*), American Beech (*Fagus grandifolia*), Swamp Pin Oak (*Quercus palustris*), Bitternut Hickory (*Carya cordiformis*), and Basswood (*Tilia americana*). Shrub and ground cover plants observed in this community include: European Buckthorn, Nannyberry (*Viburnum lentago*), Northern Spicebush (*Lindera benzoin*), Choke Cherry (*Prunus virginiana var. virginiana*), Grey Dogwood, Eastern Poison Ivy (*Toxicodendron radicans ssp. rydbergii*), Blackseed Plantain (*Plantago regelii*), Calico Aster (*Symphyotrichum lateriflorum var. lateriflorum*), Virginia Creeper (*Parthenocissus quinquefolia*), Eastern Tall Goldenrod, Graceful Sedge (*Carex gracillima*), Virginia Smartweed (*Persicaria virginiana*), and Canada Avens (*Geum canadense*).

Carbonate Talus Slope – TAS1

This community is represented by the linear escarpment edge within the northern portion of the study area. Vegetation is sparse, as the community is primarily composed of exposed bedrock and loose talus. Species are represented by a combination of those found within the adjacent FOD to the north and CUT to the south.

Annual Row Crop (Soya Bean, Corn, Wheat etc., Plowed) – OAGM1

Plowed fields located in the study area were planted with a crop rotation of Winter Wheat and Soya Beans during the various years that site visits occurred. It is assumed that a rotation of crops will continue to be planted on the fields for the foreseeable future until quarry operations are initiated.

3.5.2 Vascular Plants

A total of two hundred and twenty-nine (229) vascular plant species were recorded during the fieldwork. All of the vascular plants recorded were within the study area. As described in **Section 2.4.3**, efforts to record vascular plants were directed towards areas with a higher likelihood of impact/disturbance associated with the proposed quarry extraction activities; the far north portion of the study area, beyond the Onondaga Escarpment Brow was inventoried at a less intensive rate. A list of vascular plant species documented by RiverStone is provided in **Appendix 6**.

No vascular plants designated as species at risk (either provincially or federally), or provincially rare species (i.e., S1, S2, S3), were recorded. Seven regionally rare plants were observed including; Black Walnut (*Juglans nigra*), Kidney-leaved White Violet (*Viola renifolia*), Meadow Horsetail (*Equisetum*

pratense), One-seeded Burr Cucumber (*Sicyos angulatus*), Skunk Currant (*Ribes glandulosum*), Trailing Arbutus (*Epigaea repens*), and Virginia Creeper (*Parthenocissus quinquefolia*).

3.6 Wildlife

Appendix 7 contains a list of the wildlife species documented by RiverStone within the study area during either targeted surveys (e.g., breeding bird surveys, etc.) and/or incidentally in 2017, 2018 and 2019. Surveys documented a total of seven (7) amphibian species, seventy-six (76) bird species (including migrants), five (5) mammal species, and one (1) reptile species. The results of RiverStone's targeted wildlife surveys are provided below.

3.6.1 Anurans

RiverStone completed anuran calling surveys on April 9, May 15, and June 8, 2017. The established anuran calling survey stations are shown on **Figure 4**. The full results of RiverStone's anuran calling surveys are found in an attached **Appendix 8**. A general summary of the identified anuran communities is provided below.

A total of five (5) anuran species were recorded during anuran calling surveys. The pond inclusion communities located in the northeast corner of the study area (Station 1) was the only station that contain three (3) or more species of calling anurans to meet the Significant Wildlife Habitat criteria discussed in **Section 3.7.6**. Western Chorus Frog (*Pseudacris triseriata*), Wood Frog (*Rana sylvantica*), American Toad (*Anaxyrus americanus*) and Northern Leopard Frog (*Rana pipiens*) were all heard during breeding surveys at this station during the first visit. Spring Peeper (*Pseudacris crucifer*) and Western Chorus Frog were heard at Stations 4, 5 and 6 during the first visit. The second visit had only Gray Tree Frog (*Hyla versicolor*) calling at Stations 3, 4, 5 and 6 and the third visit had Gray Tree Frog calling at Stations 1 and 4 and American Toad calling at Station 3. No calls were heard at Station 2 during any of the surveys. Western Chorus Frog was noted at Stations 1, 4, 5 and 6 during the first visit.

3.6.2 Breeding Birds

Breeding bird surveys based on the OBBA were undertaken on June 1st, 14th and 27, 2017. The full results of these surveys are provided in **Appendix 9**. In addition to the bird species recorded during the breeding surveys, **Appendix 6** provides a list of all bird species recorded within the study area (i.e., including incidental observations and observations of migrants) in 2017, 2018, and 2019.

A total of fifty-four (54) bird species were recorded during the breeding bird surveys. The assemblage and abundance of birds recorded during the OBBA surveys generally reflects the prevailing structure and composition of on-site vegetation communities (per **Figure 4**). Bird species that breed and forage in deciduous forests were commonly encountered at stations situated within these habitats, including Red-eyed Vireo (*Vireo olivaceus*), American Robin (*Turdus migratorius*), Black-capped Chickadee (*Poecile atricapillus*), Blue Jay (*Cyanocitta cristata*), and Ovenbird (*Seiurus aurocapilla*). Edges of the forest/treed swamp communities and/or areas with a greater abundance of woody understory vegetation contained species such as Common Yellowthroat (*Geothlypis trichas*), Song Sparrow (*Melospiza melodia*), House Wren (*Troglodytes aedon*), and Indigo Bunting (*Passerina cyanea*). The open areas of the agricultural fields, cultural communities and thicket edges along these features and small marsh inclusions contained a variety of different species (given the mixture of habitat types present), including Yellow Warbler (*Setophaga petechia)*, Willow Flycatcher (*Empidonax traillii*), Gray Catbird (*Dumetella carolinensis*), and Common Grackle (*Quiscalus quiscula*).

Eleven (11) significant bird species were recorded during the OBBA surveys and incidental observation including: 1) four (4) listed provincially as Threatened birds, 2) three (3) listed provincially as Special Concern birds, and 3) six (6) listed as "areas sensitive" in the Significant Wildlife Technical guide (OMNR 2000).

3.6.3 Nightjars

Nightjar surveys were completed during the evenings in three (3) consecutive years. In 2017, one (1) survey was completed on June 8, in 2018, three (3) surveys were completed on May 24, May 30 and June 28 and in 2019 two (2) surveys were completed on May 17 and June 17. The stations associated with the nightjar survey is shown on **Figure 4**. During the 2017 surveys, Whip-poor-will were recorded at Station 2; this species was also heard calling beyond the study area during this year. During the 2018 surveys Whip-poor-will were heard at Station 2 on May 24 and 30 and at Station 3 on May 30 and during the June 28 survey at Station 2. During the 2019 survey Whip-poor-will were once again heard at Stations 2 and 3 on May 17 and on June 17. Based on the habitat and calling heard during targeted surveys, the likelihood that this species currently breeds within the study area is high.

3.6.4 Bats

Specific snags/cavity tree surveys were completed during leaf off conditions within the study area north of the Onondaga Escarpment on November 7, 2019. The majority of the surveyed area has tree cover that is very young in age with trees that meet potential bat habitat criteria being infrequent and scattered throughout the north portion of the surveyed area. The largest density of snags/cavity trees that were confined to the southeast corner of the surveyed area within the swamp thicket community. Even then these clusters of snags/cavity trees only provide marginal habitat potential due to their later stages of decline. RiverStone did not complete acoustic monitoring surveys within the study area due to the low abundance of snags within the area surveyed and proposed impact area.

3.6.5 Snakes

RiverStone staff completed visual encounter surveys for snakes on April 10, April 23, June 1, 2017 and April 26, May 2, May 6, May 7, May 24, 2018. These surveys targeted the north portion of the study area in the vicinity of the Onondaga Escarpment and anthropogenic communities (**Figure 4**). Weather conditions during the 2017 and 2018 surveys were completed during optimum conditions with temperature ranging from 9-26ºC with 0-50% clouds and a Beaufort of 1-3 over the course of the surveys.

Eastern Garter Snakes (*Thamnophis sirtalis sirtalis*) were observed basking during surveys on April 10 and 23 (2017), and April 26, May 2, and May 6 (2018). A single Dekay's Brownsnake (*Storeria dekayi*) was also observed during the May 6, 2018 survey. Results of these surveys suggest that there is a high likelihood that a snake hibernaculum is present in the north portion of the study area in the vicinity of the Onondaga Escarpment.

3.7 Natural Features of Conservation Interest

Based on the biophysical information collected during background information gathering (per **Section 2.3**) and the multiple site investigations completed by RiverStone between 2017 and 2019 (per **Section 2.4**), **Table 2** below summarizes the status of natural features of conservation interest within the site, and study area:

Table 2. Status of Natural Features of Conservation Interest within the site and study area.

Features of Conservation Interest	Status of Natural Feature of Conservation Interest within the site	Status of Natural Feature of Conservation Interest within the study area.
Significant Wetlands	*Absent.* See **Section 3.7.1**.	*Present*. See **Section 3.7.1**.
Habitat of Endangered and Threatened Species	*Present*. See **Section 3.7.2**.	*Present*. See **Section 3.7.2**.
Significant Areas of Natural and Scientific Interest (ANSI)	*Absent*. See **Section 3.7.3**.	*Absent*. See **Section 3.7.3**.
Significant Woodlands	*Absent*. See **Section 3.7.4**.	*Present*. See **Section 3.7.4**.
Significant Valleylands	*Absent*. See **Section 3.7.5**.	*Absent.* See **Section 3.7.5**.
Significant Wildlife Habitat	*Absent*. See **Section 3.7.6**.	*Present*. See **Section 3.7.6**.
Fish Habitat	*Absent*. See **Section 3.7.7**.	*Absent* See **Section 3.7.7**.

[1] - Shaded rows denote features of conservation interest present within the site and study area

3.7.1 Provincially Significant Wetlands

As per the results of RiverStone's background screening, the Provincially Significant Wainfleet Bog Wetland Complex is located off-site in the northern portion of the study area and extends onto lands to the north (**Figure 2**). RiverStone staff met with MNRF representatives on the site on May 30, 2018 to review the boundary of the PSW in the Wainfleet Bog, as well as the status of other wetland features in the study area. The Wainfleet Bog boundary was subsequently adjusted by MNRF to the north of the Onondaga Escarpment, outside of the proposed extraction limit. A small, isolated wetland patch in the southeast corner of the site was deemed unlikely to meet OWES requirements for significance, and is located at a distance that would preclude complexing with the Wainfleet Bog PSW (i.e., greater than 750 m). This feature was deemed to remain as "unevaluated" through discussion with MNRF (see **Appendix 2**). Similarly, two small swamp thicket (SWT) inclusions are situated within the northern portion of the site and the study area. The proposed extraction limit would result in removal of one of these features; however, this small inclusion within the broader cultural community (CUT2) does not meet the general minimum size threshold for inclusion into an existing evaluated wetland (*i.e.*, <0.5 ha). Updated boundaries of the Provincially Significant Wainfleet Bog Wetland Complex were mapped with MNRF using the "50% wetland vegetation rule" as stipulated by the Ontario Wetland Evaluation System (OWES). The updated boundaries of the PSW, as approved by MNRF, are provided on **Figure 2**.

3.7.2 Habitat of Endangered and Threatened Species

The results of RiverStone's desktop, habitat-based, and targeted assessments for endangered and threatened species and their habitat are provided in **Appendix 4**. A preliminary screening of background biophysical information identified several species with a potential to be present within the site or study area based on existing records and/or range maps. This initial list of endangered and threatened species was refined to those species that have the potential to occur within the site and/or Study Area or were confirmed to be present based on the on-site assessments and field surveys.

Per the results of **Appendix 4**, a total of two (2) endangered and threatened species have the potential to be present within the site or study area. Two territories of Eastern Whip-poor-will (*Caprimulgus vociferus*) were identified in the northern portion of the site (**Figure 5**). Additionally, several patches

of Spoon-leaved Moss (*Bryoandersonia illecebra*) were identified in the northwestern and south eastern portion of the study area. An impact assessment is provided for these species in **Section 5.3**.

3.7.3 Significant Areas of Natural and Scientific Interest

Based on our review of data available from Land Information Ontario (LIO), there are no Areas of Natural and Scientific Interest (ANSI) within the site or study area.

3.7.4 Significant Woodlands

Per Schedule C of the Region's OP, the forest/swamp complex located in the northern portion of the study area has been mapped as part of the Environmental Protection Area (EPA). The EPA associated with the study area appears to correspond with the mapped PSW (**Figure 2**), which includes treed wetland communities. The treed portion of the PSW that is associated with the study area is larger than 10 ha and would likely meet the definition of a significant woodland under the Region's OP; the extent of this feature is mapped on **Figure 5**. In reviewing the vegetation communities within the study area, portions of the study area adjacent to the woodland were best described as thicket communities. The significant woodland mapped on **Figure 5** only includes those communities identified as forest by RiverStone. No forest communities were identified within the site. Potential impacts to significant woodlands are discussed further in **Section 5**.

3.7.5 Significant Valleylands

Based on a review of the Region and Township Official Plans, no significant valleylands are present within the site or study area. During RiverStone's onsite review, no topographic features associated with a valleyland were identified. Based on this, no significant valleylands are present within the site or study area.

3.7.6 Significant Wildlife Habitat

The results of RiverStone's desktop, habitat-based, and targeted assessments of potential features and communities that could function as Significant Wildlife Habitat (SWH) is provided in **Appendix 5**. Based on the results of these assessments, a total of three (3) communities or features with the potential to be classified as SWH were identified in the study area; these are outlined below.

1) Seasonal Concentration Areas of Animals
    - Reptile Hibernaculum
2) Habitat of Species of Conservation Concern
    - Shrub/Early Successional Bird Breeding Habitat
    - Special Concern and Rare Wildlife Species

A total of three (3) Special Concern species have the potential to be impacted by the proposed extraction activities within the site:

1) Eastern Wood-pewee (*Contopus virens*)
2) Wood Thrush (*Hylocichla mustelina*)
3) Monarch (*Danaus plexippus*)

An impact assessment is provided for each identified SWH feature and Special Concern species in **Section 5.5**.

3.7.7 Fish Habitat

No watercourses, surface water features (e.g., rivers, creeks, drainage features, etc.) or other hydrological connections are present within the site or study area. Based on the background information reviewed (see **Section 2.3**) the Biederman Drain is the only feature with the potential to contain fish and this feature originates northeast of the study area, flowing northeast. DFO identifies this feature as the Biederman Drain 1, "Biederman Drain and South Branch B" and classifies it as a Class E municipal drain (OMAFRA 2020), indicating that sensitive warmwater fish species may be present, affecting timing and permits for instream drain maintenance works (Kavanagh et al. 2017). However, according to the Central Welland River Watershed Plan (NPCA 2010), the network of drainage ditches in the Wainfleet Bog have been classed by MNRF as marginal habitat.

Given that it is located outside the study area, the Biederman Drain will not be directly impacted by the proposal. Quarry extension drawdown and effects on the deep bedrock aquifer will not influence the flow regime of the drain. However, a portion of the surface catchment to this feature will be intercepted by the proposed extraction. This represents approximately 2% of the catchment area of the drain, which will be redirected to the Eagle Marsh Drain to the south of the quarry as part of the discharge regime for the existing licence. Water quality will be maintained in discharged groundwater, per the existing operation.

When the Site is developed, the runoff within the proposed limit of extraction will be directed via an internal drainage network to the sump within the existing licensed quarry where it will be discharged to Eagle Marsh Drain. In addition to the small portion (2%) of Biederman Drain intercepted by the proposed extension, small portions of Mill Race Creek and Eagle Marsh Drain will also be intercepted, but the former will be immeasurable and the latter will receive slightly increased discharge.

Based on the hydrogeologic investigation, no negative effects on aquatic habitat are expected as a result of the quarry expansion. Therefore, fish habitat is not discussed further in this report.

4 PHASING AND OPERATIONS PLANS

Waterford Sand, Stone and Gravel is applying for a Class A quarry below the water table, with a proposed licensed area of 72.3 ha, 51.2 ha of which would be in the extraction area as depicted in the Site Plans prepared by MHBC (May 2022). The floor elevation will vary between 163 and 168 masl, with the highest floor elevations occurring towards the north of the extraction area. Phasing will generally occur in a north to south direction, with multiple 'islands' to be omitted based on identified archaeological constraints. As previously discussed, intercepted groundwater will be collected in a sump and directed towards the existing quarry before being discharged to the Eagle Marsh Drain system.

An accompanying submission by MHBC contains rehabilitation plans developed with ecological input from RiverStone (**Appendix 10**). A description of the rehabilitation plan from an ecological perspective is included in **Section 5.7** below.

5 IMPACT ASSESSMENT AND RECOMMENDATIONS

Based on the results of the background information collected and site investigations as detailed in **Section 3**, in concert with the proposed quarry extraction and phasing plan outlined in **Section 4** and **Appendix 10**, the following sections provide an assessment of potential impacts to identified natural

features of conservation interest and the natural environment overall. Natural features of conservation interest along with recommended setbacks are shown on **Figure 5**, with the proposed quarry overlaid on **Figure 6**.

5.1 Impact Assessment Approach

To carry out an ecological assessment of potential impacts associated with the proposed quarry extraction activities within the site, RiverStone has employed the following approach:

1. *Predict* impacts to natural features and species of conservation interest based on the proposed quarry 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 natural features and species of conservation interest 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, 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 a natural feature or species. In the context of the ARA application considered herein, direct impacts largely pertain to the necessary removal of vegetation and habitats within the quarry extraction area. Indirect impacts may include disturbance affects on wildlife communities on adjacent lands, or degradation of water quality within a downstream receiver. The major project phases for which impacts must be assessed include the operational phase and a post-rehabilitation phase. The operational phase involves below-water quarry extraction. The post-rehabilitation phase occurs when all rehabilitation activities are complete.

The site is designated a mixture of Environmental Protection Area, Possible Extra Industrial, and Rural according to Schedule B of the Township's OP (January 2016). The Region of Niagara has designated the northern portion of the study area as an Environmental Protection Area as per Schedule C of the Region's Official Plan. The Environmental Protection Area is associated with the woodland and PSW features in the northern portion of the study area. RiverStone has reviewed the proposed designations and zoning and this impact assessment takes into consideration the activities that are permissible with these in place. Our determination of whether the risk of potential impacts on a specific feature is acceptable relies upon the relevant policies and legislation considered in **Section 6**, as well as our assessment of the significance or quality of the feature.

The major constraints identified during this study that occur within the site or study area are listed in **Table 2** in **Section 3.7**, and include 1) Provincially Significant Wetlands, 2) Habitat of Endangered and Threatened Species, 3) Significant Woodland, and 4) Significant Wildlife Habitat. As outlined in the impact assessments for each feature that follows, ecologically appropriate setbacks to disturbance and extraction activities from these significant natural features have been incorporated into the site plan as the primary mitigation tool to avoid impacts. It is noted that the lands at the northern end of the site have been excluded from the extraction area and are intended to remain in their current state, including the extensive forest/swamp complex that contains both PSW and the Significant Woodland.

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.

5.2 Provincially Significant Wetlands

As described in **Section 3.7.1**, a portion of the Provincially Significant Wainfleet Bog Wetland Complex is present to the north of the site. The portion of the PSW is associated with the swamp communities located at the northern edge of the study area. The following pathways of effects from the proposed quarry on PSW features were assessed for potential impacts:

- Alterations of surface water and/or groundwater contributions to wetlands that may result from below water extraction operations, from increased coverage of impervious surfaces, modifications to existing topography or drainage, or from localized water table alterations related to the post-rehabilitation quarry pond level.
- Thermal loadings to the groundwater where it is exposed within the quarry extraction area, adversely affecting wetland communities which receive groundwater contributions.
- Noise and light pollution that may affect the ability of wetland wildlife to successfully carry out their life processes (e.g., feeding/foraging, nesting, etc.); and
- Potential disruption of wildlife movement or dispersal corridors.

The greatest potential for impact to the PSW would be associated with direct loss of this feature due to access and extraction activities. To avoid this type of impact, the proposed extraction area has been situated outside the boundaries of the PSW with no site alteration to occur within 30 m of the wetland communities. Therefore, no direct loss of wetland habitat will result from the proposal.

Potential water balance implications of the proposal relate to groundwater flow effects during active extraction operations, post-rehabilitation changes in localized water table elevations, and changes in surface catchment areas and water balance across the site in the long term. The physical effects that were assessed in detail in the groundwater modeling and analysis included in the Level 1 and Level 2 Water Study Report (WSP 2022) suggest that because the quarry will be lowering the groundwater elevation in the bedrock, extraction has the potential to “under-drain” the thick clay layer which underlies the bog. However, the under-draining effect is minimal and will take decades to propagate to the surface waters of the bog due to the thickness of the clay which underlies it. Therefore, the hydrogeological changes to the bog will be so low as to be “immeasurable” during the operational phase of the quarry. Surface water discharging from the proposed extraction area is intercepted by the Biederman Drain and a minor change in the annual water balance is interpreted to have an immeasurable effect on the wetland.

Extraction near the PSW units also has the potential to disrupt the ability of wetland wildlife to carry out their life processes, and could result in water quality impacts from dust, spills, and other accidents. Such impacts can largely be addressed by designating an ecologically appropriate setback and via a comprehensive system of erosion and sediment control (ESC) measures, combined with other measures, such as a Spill Management Plan, contained in the site plans (MHBC 2022). The most effective ESC design incorporates a multi-barrier approach, is adaptive and thereby responds to shifting site conditions, and involves regular inspection and monitoring.

To protect the PSW units during implementation of the proposed quarry, in addition to the proactive adjustment of extraction limits in the final site plans to reflect feature boundaries and setbacks, RiverStone recommends the following measures:

- **Proposed extraction activities shall be setback a minimum of 30 m from the boundary of the PSW as shown on Figure 6. The 30 m setback should be well-marked prior to the onset of site preparation.**
- **The 30 m PSW setback area shall be undisturbed and remain as natural self-sustaining vegetation.**
- **Sediment and erosion control measures shall be employed along the extraction limit to prevent the erosion of unstable soils and the movement of sediment and/or other deleterious substances into the adjacent PSW. These measures shall be in place prior to the onset of site preparation.**
- **Sediment fencing must be constructed of heavy material and solid posts and be properly installed (trenched in) to maintain its integrity during inclement weather events.**
- **Once installed, sediment fencing shall be routinely monitored and maintained.**
- **All stockpiled aggregates shall be stored in a location that will prevent the movement of sediment-laden runoff into the PSW units and their setbacks.**
- **A detailed groundwater monitoring program has been recommended in the Level 1 and Level 2 Water Study Report (WSP 2022), which includes continuous water level measurements using dataloggers at the site groundwater monitoring wells. The water level data will be summarized in an annual monitoring report submitted to the NDMNRF or MECP.**

5.3 Endangered and Threatened Species

5.3.1 Spoon-leaved Moss

Spoon-leaved Moss is a shiny, green to greenish yellow-brown species of moss with creeping stems and ascending, intertwined branches that form deep mats. Spoon-leaved Moss grows in a variety of communities but in Ontario, is most commonly found in low-lying areas that are seasonally flooded under trees or shrub thickets. Patches of Spoon-leaved Moss were identified in the northwestern corner and southeastern corner of the study area (**Figure 6**). In discussion on site with MNRF it was determined that the patch of Spoon-leaved Moss proximate to Biederman Road has likely become adapted to impacts from the surrounding land uses which includes both a roadway and quarry. At that time, MNRF indicated that simply excluding the patch of moss near Biederman Road from the extraction limit was sufficient to avoid impacts. Potential impacts of quarrying activities on patches of this species in the northwestern corner of the site could include direct loss of habitat through removal of vegetation and changes in surface runoff patterns. To avoid impacts to Spoon-leaved Moss identified within the study area, the proposed limit of extraction has been designed to exclude all areas found to contain this species. To further reduce the likelihood of negative impacts, RiverStone recommends:

- **No vegetation clearing or site alteration occur in the ecological communities occupied by Spoon-leaved Moss, unless the required approvals under the *ESA* are secured that would permit such activities.**

- **Water balance be maintained to the portions of the lands adjacent to the proposed licence that contain Spoon-leaved Moss.**

5.3.2 Eastern Whip-poor-will

Eastern Whip-poor-will is a nocturnal insectivore meaning that this species of bird feeds primarily at night on insect species. Whip-poor-will are most commonly associated with early successional habitats and sparse forest communities. Three (3) Whip-poor-wills were identified within the northern portion of the study area. The extent of Category 1 and Category 2 habitat associated with the identified Whip-poor-wills is provided on **Figure 6**. The proposed extraction plan will not include any portion of the identified Category 1 habitat (**Figure 6** and **Appendix 10**). As the Category 2 habitat for this species overlaps with the proposed extraction area, an Information Gathering Form (IGF) was submitted to MECP for review. A response to the IGF was received in February 2021 (see **Appendix 2**), and a subsequent meeting was held with the MECP reviewer to discuss noted issues.

RiverStone will continue to work with MECP to ensure that the proposed quarry complies with the provincial *Endangered Species Act, 2007*. This will include seeking authorizations pertaining to Eastern Whip-poor-will (and any other relevant species) prior to undertaking the activities that represent an impact to identified habitat. As such, the proposed quarry will either result in no impacts to Whip-poor-will and their habitat or will provide an overall benefit to the species.

- **Prior to site alteration activities within the northern portion of site, conduct further consultation with MECP regarding requirements for authorizations related to Whip-poor-will, including but not necessarily limited to preparation of an overall benefit permit.**

5.4 Significant Woodland

As noted in **Section 3.7.4**, the forest communities associated with the PSW in the northern portion of the study area meet the definition of significant woodlands (**Figure 6**). In this case, the significant woodland occupies the entire forest/swamp complex that extends to the north the site.

The proposed licence area is located outside of significant woodland **(Figure 6**). Although potential impacts have been minimized by avoiding the feature, there is still the potential for indirect impacts to the feature. As the extent of the significant woodland is contained within the mapped PSW boundary, the recommendations associated with avoiding and minimizing the potential for impacts to the PSW will also result in the protection of the significant woodland feature. Therefore, to protect the significant woodland and its ecological function, RiverStone recommends that:

- **A 30 m protective buffer be placed along the edge of the significant woodland (Figure 5). The buffer is to be left in its current state.**

- **The recommendations offered herein to protect the PSW (Section 5.2) must be implemented in full as they will also serve to protect the significant woodland.**

5.5 Significant Wildlife Habitat

Neither MNRF, the Region of Niagara, nor Township of Wainfleet have designated SWH within any portion of the study area. RiverStone completed a habitat-based assessment of potential SWH within the site in accordance with the Ecoregion 7E criteria schedules. The results of this habitat-based assessment led to the completion of several targeted on-site surveys to address remaining information

gaps. Based on the results of RiverStone's SWH assessment (see **Appendix 5**), the following SWH features were identified.

5.5.1 Seasonal Concentration Areas of Animals

5.5.1.1 Reptile Hibernaculum

Based on the results of RiverStone's onsite assessments, reptile (snake) hibernaculum has potential to occur along the northern edge of the Onondaga Escarpment Brow (**Figure 6**). To protect potential reptile hibernacula during implementation of the proposed extraction activities, RiverStone recommends the following measures:

- **Proposed extraction area not be located within 30 m of the Onondaga Escarpment Brow (Figure 6). Vegetation within the 30 m setback is to remain as natural self-sustaining vegetation.**

5.5.2 Habitat of Species of Conservation Concern

5.5.2.1 Special Concern and Rare Wildlife Species

Eastern Wood Pewee and Wood Thrush

Eastern Wood-pewee breed in open forest communities that have limited understory (COSEWIC 2012a). This species is most abundant in intermediate to mature aged forests; however, the size of individual forest patches has not been identified as a factor in determining habitat use. The presence of perches (i.e., dead branches) within forests that can be used for foraging is required for this species to utilize a given forest patch (COSEWIC 2012a).

Wood Thrush are typically found in mature deciduous and mixed forest communities containing well-developed understory layers. Wood Thrush preferentially select areas of contiguous forest; however, this species may be found in smaller forest patches where conditions are suitable. This species typically selects Sugar Maple or American Beech saplings as nest sites (COSEWIC 2012b).

The proposed extraction plan excludes the forest communities that are present within the study area. The additional setback from these communities recommended in **Section 5.4** of this report further minimizes the potential for impacts to Eastern Wood-pewee, Wood Thrush, or their habitat. To this end, RiverStone recommends that:

- **The recommendations offered herein to protect significant woodland (Section 5.4) must be implemented in full as they will also serve to protect Eastern Wood-pewee and Wood Thrush breeding and foraging habitat adjacent to the site.**
- **The recommendations offered herein to protect Migratory Birds (Section 5.6) must be implemented in full as they will also serve to protect Eastern Wood-pewee and Wood Thrush.**

Monarch

As caterpillars, Monarch's feed exclusively on Milkweed (*Asclepias* spp.). Given this species' reliance on a host plant, breeding habitat for Monarch is limited to areas where Milkweed is present. As adult butterflies, Monarchs seek out wildflowers such as Goldenrods (*Solidago* spp.), Asters (*Doellingeria* spp., *Eurybia* spp., *Oclemena* spp., *Symphyotrichum* spp., and *Virgulus* spp.); non-native species such as Purple Loosestrife (*Lythrum salicaria*) also provide a food source for adults.

The proposed development plan requires the removal of vegetation from the open communities present within the site. As the stripping of existing vegetation will occur in a phased manner, full removal of breeding and foraging habitat for Monarch is not anticipated. Additionally, potential food sources and breeding habitat is found within the site outside of the proposed extraction area within the Cultural Thickets and Meadows in the northern portion of the site; these areas are proposed to be left in a natural state. There is no expectation that proposed extraction activities will negatively impact the availability or function of potential habitat for Monarch within the local landscape.

5.6 Other Natural Features and Functions

Although most of the site is occupied by cultivated agricultural fields, the proposed quarry extraction activities will result in the minor removal of natural vegetation (i.e., trees occurring within a short hedgerow, certain small areas of disturbed herbaceous vegetation, etc.). As such, the ecological function of these areas will be negatively impacted during site preparation and during the life of the quarry until rehabilitation. To mitigate some of the ecological impacts associated with the minor loss of vegetation cover, and to provide broad recommendations to guide rehabilitation, RiverStone recommends the following measures:

- **All necessary removal of natural vegetation (e.g., tree/shrub clearing, fallow fields, etc.) within the proposed quarry extraction area should be completed outside of the primary breeding bird nesting window (i.e., between April 1 and August 31). If limited vegetation removal must occur early during this period (i.e., between April 1-April 15), a nest survey should be conducted by a qualified biologist within 5 days of commencement of vegetation removal activities to identify and locate active nests of bird species (where present) protected by the federal *Migratory Bird Convention Act, 1994* or provincial *Fish and Wildlife Conservation Act, 1997*. If a nest is located or evidence of breeding noted, a mitigation plan should be developed to avoid any potential impacts on birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season.**

5.7 Rehabilitation

The final quarry footprint will occupy all of the licensed extraction area approximately 15 m below existing grade with an average floor elevation of approximately 165 masl. The WSP Assessment (2022) predicts a post-extraction water level of approximately 174.1 masl so the resulting quarry lake may be about 10 m deep. Lake edges will include vertical quarry walls, and several sections will be backfilled on their upper bench at the shore to create naturally vegetated habitat on the slope and in the nearshore zone. Several other areas will have a talus or creviced cliff face where setbacks allow. Vegetation clearing will be minimized along the quarry edges and setback areas. Vegetation will be added to create terrestrial habitat.

Progressive and final rehabilitation are described in detail on the site plans prepared by MHBC, with input from RiverStone. The following rehabilitation components have been incorporated into the site plan:

- Any existing trees and shrubs that have started to regrow within the rehab areas are to be maintained as much as possible.

- Above water table rehabilitated areas shall be seeded with a naturalizing mix of wildflowers and grasses to stabilize slopes and minimize mowing and maintenance (see species planting list)

- A minimum of 15 cm of suitable topsoil is to be spread throughout the area to be seeded

- Within the nodal plantings, trees are to be installed at 3-5 m centre spacing, depending on species and planted randomly spaced and staggered to appear more natural.

- All installed trees shall be a minimum of 1.2 m (~4 ft) in height with a sufficiently developed root ball to sustain planting.

- All tree installations shall include rodent guards that are flush with the ground surface.

- Within the nodal plantings, understory plantings shall complement the natural vegetation occurring adjacent to the subject lands and shall be spaced according to species anticipated growth rate.

- All installed shrubs shall consist of potted material at least 30cm tall in 1-3 gallon pots

- All planted vegetation is to be native to the local area and selected for hardiness, wind and drought resistance

- Any woody plant rood defects (e.g. girdling) shall be corrected prior to installation

- All woody plants shall be installed such that the root crown/trunk flare is exposed above the soil surface to ensure proper oxygenation of the rooting zone.

- All installed woody plants shall be watered (deep soaking) following installation

- Woody plant installations shall occur in the Spring (i.e. April or May) or fall (i.e. mid-September to early October) depending on seasonal conditions.

- The terrestrial habitat areas are to be planted so that seasonal maintenance is minimized once plants have been established and shall be left in a natural manner to fill in and naturalize through succession.

- Natural succession processes shall be encouraged in keeping with restoration objectives. During the first year, planted areas shall be watered and monitored until established. During the second year, the planted areas shall be inspected twice each year, once in the spring after leaf break and once in the fall prior to leaf drop to ensure any planted vegetation that is in poor condition is fertilized, watered and monitored to improve health and vigor. Within the first three years of installation, any planted vegetation that has failed to establish shall be replaced in the subsequent spring or fall.

Table 3. Species Suitable for the Law Extension Quarry Rehabilitation.

Trees/shrubs: mid- to upper-slopes; tableland	• Trembling Aspen (*Populus tremuloides*) • Black Cherry (*Prunus serotina*) • Sugar Maple (*Acer saccharum*) • Eastern Red Cedar (*Juniperus virginiana*) • Common Hackberry (*Celtis occidentalis*) • Bitternut Hickory (*Carya cordiformis*)	• Eastern Nineback (*Physocarpus opulifolius*) • Gray Dogwood (*Cornus racemosa*) • Choke Cherry (*Prunus virginiana*) • Alternate-leaved Dogwood (*Cornus alternifolia*) • Inland Serviceberry (*Amelanchier interior*) • Staghorn Sumac (*Rhus hirta*)
Trees/shrubs: lower slopes, riparian	• Eastern White Cedar (*Thuja occidentalis*) • Red Maple (*Acer rubrum*) • White Birch (*Betula papyrifera*) • Black Maple (*Acer nigrum*) • Black Walnut (*Juglans nigra*)	• Red-Osier Dogwood (*Cornus sericea*) • Chokeberry (*Aronia melanocarpa*) • Meadowsweet (*Spiraea alba*) • Nannyberry (*Viburnum lentago*) • Buttonbush (*Cephalanthus occidentalis*)
General rehabilitation seed mix	• New England Aster (*Aster novae-angliae*) • Black Eyed Susan (*Rudbeckia hirta*) • Sand Dropseed (*Sporobolus cryptandrus*) • Canada Wild Rye (*Elymus canadensis*) • Canada Golden Rod (*Solidago canadensis*)	• Wild Bergamot (*Monarda fistulosa*) • Smooth Blue Aster (*Aster laevis*) • Little Bluestem (*Andropogon scoparius*) • Indian Grass (*Sorghastrum nutans*)
Herbaceous: aquatic	• Softstem Bulrush (*Schnoeplectus tabernaemontanii*) • Broad-leaved Arrowhead (*Sagittaria latifolia*) • Green-fruited Burreed (*Sparganium emersum*)	• Dark-green Bulrush (*Scirpus atrovirens*) • Common Wooly Bulrush (*Scirpus cyperinus*)

6 APPLICABLE ENVIRONMENTAL LEGISLATION AND POLICIES

The following commentary summarizes the federal, provincial, and municipal environmental legislation and policies that are applicable to the ARA applications considered herein and describes how the recommendations provided in this report will permit the proposed land use changes to comply with these provisions.

6.1 Township of Wainfleet Official Plan (January 2016 Consolidation)

The Township's OP is prepared as required under section 14.7(3) of the *Planning Act*. The OP sets out goals, objectives, and policies that direct and manage land-use and future development activities and their effects on the social and natural environment across the Township. Provincial plans that offer direction on matters of provincial interest (e.g., Provincial Policy Statement, etc.) are implemented principally through the Township's OP. Provided herein is a description of relevant environmental and natural heritage policies contained within the Township's OP and an assessment of how the proposed quarry operations are consistent with such policies.

> 3.2.1.4 Within the Environmental Protection Area designation, development, site alteration, and non-linear infrastructure shall not be permitted except for the following: a) Forest, fish and wildlife management; b) Conservation and flood or erosion control projects where it has been demonstrated that they are necessary in the public interest and other alternatives are not available; c) Small scale, passive recreational uses and accessory uses such as trails, boardwalks, footbridges, fences,

docks and picnic facilities that will have no negative impacts on natural features or ecological functions of the Natural Heritage System; and d) Existing agricultural uses in accordance with Policy 3.2.1.14. Where such uses are proposed, the proponent shall be required to prepare an Environmental Impact Study in accordance with Section 8.9 to the satisfaction of the Region in consultation with the Township and the Niagara Peninsula Conservation Authority.

3.2.1.6 Development and site alteration may be permitted without an amendment to this Plan on adjacent lands, subject to the following: a) It has been demonstrated through an EIS in accordance with Section 8.9 that there will be no negative impact on the feature or its ecological function; and, b) The proposed development or site alteration is not prohibited by other Policies in this Plan. Where development or site alteration is proposed in or near a Linkage illustrated conceptually on Schedule A the Linkage shall be considered in the development review process. Development should be located, designed and constructed to maintain and, where possible, enhance the ecological functions of the age in connecting Core Natural Heritage Areas or an alternative linkage should be developed.

3.2.3.2 Notwithstanding Section 3.2.1.4, within fish habitat, development and site alteration may be permitted if it will result in no net loss of the productive capacity of fish habitat as determined by the Department of Fisheries and Oceans or its designate. First priority will be given to avoiding harmful alteration or destruction of fish habitat by redesigning or relocating the proposal or mitigating its impacts. The proponent shall be required to prepare an EIS to the satisfaction of the Department of Fisheries and Oceans, or its designate, in accordance with Section 8.9.

It is RiverStone's opinion that the proposed quarry activities considered herein address the Township's OP provisions related to protection of the Natural Environment for the following reasons:

- No extraction activities or other disturbances are proposed within any Natural Environment feature designated under the Township's OP (including Schedules and Background Maps) or identified by RiverStone during on-site investigations and field surveys completed between 2017-2019 (**Figure 6**). No negative impacts are anticipated for any natural heritage features associated with the Core Natural Heritage Areas, any features identified as Environmental Protection Areas, or fish habitat.
- This NER contains sufficient information to satisfy the scope and content requirements of the Township's EIS policies.

6.2 Niagara Region Official Plan (Consolidated 2014)

Section 6 of the Niagara Region Official Plan addresses resources, while Section 7 of the plan deals with the Natural Environment. It should be noted that based on Schedule C of the Official Plan, the site and study area are outside of the Greenbelt Plan area and as such, the policies of that plan do not apply.

Policy 7.A.2.1 Development and site alteration shall only be permitted if it will not have negative impacts, including cross-jurisdictional and cross-watershed impacts, on:
a) The quantity and quality of surface and ground water;
b) The functions of ground water recharge and discharge areas, aquifers and headwaters;

c) The natural hydrologic characteristics of watercourses such as base flow;
d) Surface or ground water resources adversely impacting on natural features or ecological functions of the Core Natural Heritage System or its components;
e) Natural drainage systems, stream forms and shorelines; and
f) Flooding or erosion.

As per the impact assessment provided in **Section 5**, the proposed quarry is not anticipated to result in negative impact to the quality or quantity of ground or surface water (WSP, 2021), nor will it impact natural features or functions of the Core Natural Heritage System. This is consistent with Policy 7.A.2.1

Policy 7.B.1.1 The Core Natural Heritage System consists of:
a) Core Natural Areas, classified as either Environmental Protection Areas or Environmental Conservation Areas;
b) Potential Natural Heritage Corridors connecting the Core Natural Areas;
c) the Greenbelt Natural Heritage and Water Resources Systems; and
d) Fish Habitat.

As outlined in **Section 5** of this report, the northern portion of the study area contains an Environmental Protection Area as identified by Schedule C of the Official Plan.

Policy 7.B.1.3 Environmental Protection Areas include provincially significant wetlands; provincially significant Life Science Areas of Natural and Scientific Interest (ANSIs); and significant habitat of endangered and threatened species. In addition, within the Greenbelt Natural Heritage System, Environmental Protection Areas also include wetlands; significant valleylands; significant woodlands; significant wildlife habitat; habitat of species of concern; publicly owned conservation lands; savannahs and tallgrass prairies; and alvars.

As outlined in **Section 5** of this report, the northern portion of the study area contains an Environmental Protection Area that appears to have been identified due to the presence of a Provincially Significant Wetland.

Policy 7.B.1.5 To be identified as significant a woodland must meet one or more of the following criteria:
a) Contain threatened or endangered species or species of concern;
b) In size, be equal to or greater than:
i. 2 hectares, if located within or overlapping Urban Area Boundaries;
ii. 4 hectares, if located outside Urban Areas and north of the Niagara Escarpment;
iii. 10 hectares, if located outside Urban Areas and south of the Escarpment;
c) Contain interior woodland habitat at least 100 metres in from the woodland boundaries;
d) Contain older growth forest and be 2 hectares or greater in area;
e) Overlap or contain one or more of the other significant natural heritage features listed in Policies 7.B.1.3 or 7.B.1.4; or
f) Abut or be crossed by a watercourse or water body and be 2 or more hectares in area.

As outlined in Section 3.7.4, the forested communities present in the northern portion of the study area were assumed to be a significant woodland as this forest is greater than 10 ha in area and overlaps with one or more of the significant natural heritage features (i.e., a PSW). As per the impact assessment provided in **Section 5.4**, a 30 m vegetation protection zone has been applied to this feature which is consistent with the requirements of policy 7.B.1.22 of the Official Plan.

> Policy 7.B.1.15 Within Fish Habitat as identified on Schedule C, or adjacent lands as specified in Table 7-1, development and site alteration may be permitted if it will result in no net loss of the productive capacity of fish habitat as determined by the Department of Fisheries and Oceans or its designate.

The proposed quarry is not anticipated to result in negative impacts to any fish habitat within the study area as fish habitat is not present (per **Section 3.7.7** of this report).

> Policy 7.B.1.16 The Region recognizes that the primary function of the Municipal Drains shown on Schedule C is to provide drainage for agricultural lands. These drains also may be used to convey irrigation water for agricultural use. The Region supports ongoing drain maintenance in accordance with the Federal Department of Fisheries and Oceans' Class Authorization System for Agricultural Municipal Drains. Where development, site alteration or building is proposed adjacent to a Municipal Drain a buffer zone a minimum 15 metres in width measured from the stable top of bank shall be required to provide access for drain maintenance, protect the integrity of the drains and protect environmental health.

As per **Section 3.7.7** of this report, no municipal drains are located within 15 m of the proposed quarry.

> Policy 7.B.1.31 Where a new mineral aggregate operation or an expansion to an existing operation is proposed outside the Greenbelt Natural Heritage System within an Environmental Conservation Area, a Potential Natural Heritage Corridor or Fish Habitat or within adjacent lands as set out in Table 7-1 the Environmental Impact Study will include consideration of:
> a) Whether the following will be maintained or enhanced before, during and after mineral aggregate extraction,
> i) connectivity among Core Natural Areas and hydrologic features; and
> ii) significant hydrologic features and functions; and
> b) How significant natural heritage features and ecological functions that would be affected will be replaced, on or off site, with features and functions of equal or greater ecological value that are representative of the natural ecosystem in that particular setting or ecodistrict.

The proposed development is not located within any of the natural heritage systems or areas identified on Schedule C of the official plan. Additionally, where these features are located proximate to the proposed quarry, site alteration has been set back a minimum of 30 m from the boundary of these features (see **Section 5**). This will maintain connectivity between these features where applicable) and is consistent with Policy 7.B.1.31.

6.3 Provincial *Aggregate Resources Act*, R.S.O. 1990, c. A.8

The information and recommendations provided in this report satisfy the requirements restated below for Natural Environment Level 1 and Level 2 Assessments for a Class A licence:

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

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

The following natural features of conservation interest per ARA policies were identified within the site and/or study area: 1) Provincially Significant Wetlands, 2) Habitat of Endangered and Threatened Species, 3) Significant Woodland, and 4) Significant Wildlife Habitat. Recommendations and measures to ensure the above features are protected and/or potential impacts are appropriately mitigated are provided in **Section 5**.

6.4 Growth Plan for the Greater Golden Horseshoe (2019)

The Growth Plan for the Greater Golden Horseshoe ("Growth Plan") was issued under the Places to Grow Act, 2005. The Growth Plan was most recently amended in August 2020. The Growth Plan is a Provincial Plan that applies to the Greater Golden Horseshoe are of Southern Ontario and builds on the Provincial Policy Statement (PPS) to establish a unique land use planning framework for the *GGH* that supports the achievement of *complete communities*, a thriving economy, a clean and healthy environment, and social equity.

The Growth Plan includes a Natural Heritage System which is a defined as a system made up of *natural heritage features and areas*, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. The system can include *key natural heritage features***,** *key hydrologic features*, federal and provincial parks and conservation reserves, other *natural heritage features and areas*, lands that have been restored or have the potential to be restored to a natural state, associated areas that support *hydrologic functions*, and working landscapes that enable *ecological functions* to continue

The northern portion of the quarry extension lands includes a portion of area that has been mapped as being part of the Growth Plan *Natural Heritage System.* However, the majority of the proposed quarry extension is located outside of the area that is mapped as *Natural Heritage System.* The majority of the area that has been mapped as *Natural Heritage System* within the proposed Licence boundary is currently in an active agricultural condition. Only a small portion of the NHS mapped area contains natural heritage features. With the exception of identified habitat for species at risk, which will be managed through an ESA process, these features are not considered to be significant or *key natural heritage features.*

Relevant Growth Plan policies are reviewed and discussed in the accompanying planning report by MHBC. It is our understanding that, given the nature of the application (expansion to existing operation), the proposal remains consistent with natural heritage-related policies of the Growth Plan.

6.5 Provincial Policy Statement (2020), pursuant to the Planning Act, R.S.O. 1990, c. P. 13

The 2014 Provincial Policy Study (PPS) is promulgated under the *Planning Act, 1990* and provides direction to municipalities on matters of provincial interest related to land-use planning. Municipal OP's must be consistent with the PPS. The PPS instructs (s. 2.1.1) that *natural features and areas shall be protected for the long term* and that (s. 2.1.2):

> *The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.*

The PPS prohibits development and site alteration within the following natural heritage features in Ecoregion 7E (s. 2.1.4):

- Significant Wetlands
- Significant Coastal Wetlands

The PPS also prohibits development and site alteration within the following natural heritage features in Ecoregion 6E (s. 2.1.5) *unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions*:

- Significant Woodlands
- Significant Valleylands
- Significant Wildlife Habitat
- Significant Areas of Natural and Scientific Interest
- Non-Significant Coastal Wetlands

The PPS does not permit development and site alteration in fish habitat (s. 2.1.6) or the habitat of endangered and threatened species (s. 2.1.7) except in accordance with federal and provincial requirements, respectively. Finally, with respect to lands adjacent to significant natural heritage features, the PPS requires that (s. 2.1.8):

> *Development and site alteration shall not be permitted on adjacent lands to the 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 that there will be no negative impacts on the natural features or on their ecological functions.*

In considering the above PPS policies, RiverStone has determined that the proposed extraction activities have addressed the natural heritage provisions of the 2014 PPS for the following reasons:

- Per **Table 2** of this report, No Significant Areas of Natural or Scientific Interest are present within the site or study area.

- Per **Table 2** of this report, No Fish Habitat is present within the site or study area.
- Per **Section 5.2** of this report, RiverStone does not anticipate any negative impacts to the Provincially Significant Wetland Complex, which is located outside of the site and proposed extraction area, and is protected by suitable setbacks, provided that the recommended mitigation measures are implemented in full.
- Per **Section 5.3** of this report, RiverStone does not anticipate any negative impacts to the Habitat of Endangered and Threatened Species which is located on adjacent lands outside of the proposed extraction area, provided that the recommended mitigation measures are implemented in full.
- Per **Section 5.4** of this report, RiverStone does not anticipate any negative impacts to the significant woodland located at the north end of the study area, provided that the recommended avoidance and mitigation measures are implemented in full.
- Per **Appendix 5** and **Section 5.5** of this report, RiverStone does not anticipate any negative impacts to Significant Wildlife Habitat given implementation of the proposed extraction activities provided that the recommended mitigation measures are implemented in full.

6.6 Provincial *Endangered Species Act*, S.O. 2007, c. 6

The *Endangered Species Act, 2007* (ESA) protects designated endangered and threatened species in Ontario from being killed, harmed, or harassed (s. 9) or having their habitat damaged or destroyed (s. 10). As indicated in **Section 5.3**, one (1) species protected under provisions of the ESA (i.e., Spoon-leaved moss) was determined to have confirmed habitat within the adjacent lands (i.e., study area), but not in the proposed extraction area. A second species (Whip-poor-will), was determined to have habitat within the proposed extraction area. As detailed in **Section 5.3**, and provided that the recommended mitigation measures offered in **Section 5.3** are implemented in full, the proposed extraction activities are not expected to contravene the ESA.

6.7 Federal *Species at Risk Act*, S.C. 2002, c. 29

The federal *Species at Risk Act* (SARA) was promulgated in 2002 to protect indigenous species from disappearing, and to recover those identified as Extirpated, Endangered, or Threatened on federal lands. The official list of species at risk under SARA is contained in Schedule 1 of the Act.

The key requirements of SARA – including prohibitions on killing/harming a listed Extirpated, Endangered, or Threatened species (s. 32), destroying its "residence" (s. 32), and destroying its "critical habitat (s. 58) – are largely restricted to federal lands. As the site (and adjacent lands) are located on private lands, these provisions are not applicable to the proposed quarry applications considered herein. Notwithstanding the above, Endangered and Threatened species listed on Schedule 1 that are either fish or migratory birds are afforded protection from killing/harming and from having their "residence "damaged or destroyed. For birds, a "residence" includes a nest.

No bird species listed Extirpated, Endangered, or Threatened on Schedule 1 of SARA were documented on the site. Further, no fish habitat or watercourses are present within the site or study area. Given this, RiverStone has determined that the proposed extraction activities are consistent with the requirements of SARA (also see RiverStone's recommendations related to protection of migratory bird nests in **Section 6.9**).

6.8 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 in **Section 3.7.7**, no watercourses or fish habitat (as defined within the *Fisheries Act*) are present within the site or study area. The Biederman Drain #1, South Branch B originates approximately 225 m northeast of the site boundary to the north of the Onondaga Escarpment. This drain is a Municipal Drain Class E, according to the DFO classification system (OMAFRA 2020), but the Central Welland Watershed Study (NPCA 2010) deemed it to have only marginal fish habitat. No negative impacts to the baseline surface water flows and are predicted for the Biederman Drain located north of the proposed licence. The diversion of approximately 2% of the Biederman Drain catchment area within the extension lands is not expected to have negative impacts to the aquatic community that may be present off-site. As such, it is the opinion of RiverStone that activities proposed on the site will not contravene the *Fisheries Act*, and that an authorization under the Section 35(2) is not required. Should however, during the course of this project, situations arise leading to occurrences that result in a HADD, persons responsible for the project have a "duty to notify" DFO, take corrective actions, and provide written reports under Section 38 of the *Act.*

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

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

As recommended in **Section 5.6**, all clearing of vegetation required to implement the proposed development plan should be restricted to times outside of the period April 1 to August 31 inclusive. If development and site alteration must occur during this period, a nest survey should be conducted by a qualified avian biologist prior to commencement of construction activities to identify and locate active nests of migratory bird species covered by the MBCA or FWCA. If a nest is located or evidence of breeding noted, then a mitigation plan should be developed to address any potential impacts on migratory birds or their active nests. Mitigation may require establishing appropriate buffers around active nests or delaying construction activities until the conclusion of the nesting season.

7 CONCLUSIONS

In accordance with *Aggregate Resources Act* policies, the preceding Level 1 and 2 Natural Environment Report provides a detailed characterization of the natural environment occurring within and adjacent to an existing and proposed licence. This report details a comprehensive approach to confirming the presence and absence of natural features of conservation interest that are afforded protection under the ARA and applicable legislation and policies at the municipal, provincial and federal levels. Potential negative impacts were assessed with recommendations for preventive, mitigative and rehabilitation measures where appropriate.

Based on the findings herein, RiverStone has determined that the proposed ARA licence application addresses the applicable policies and legislation, provided that the recommendations contained in **Section 5** are implemented in full. The requested local and regional planning approvals will allow for the proposed extractive land use without compromising the ecological values of the study area.

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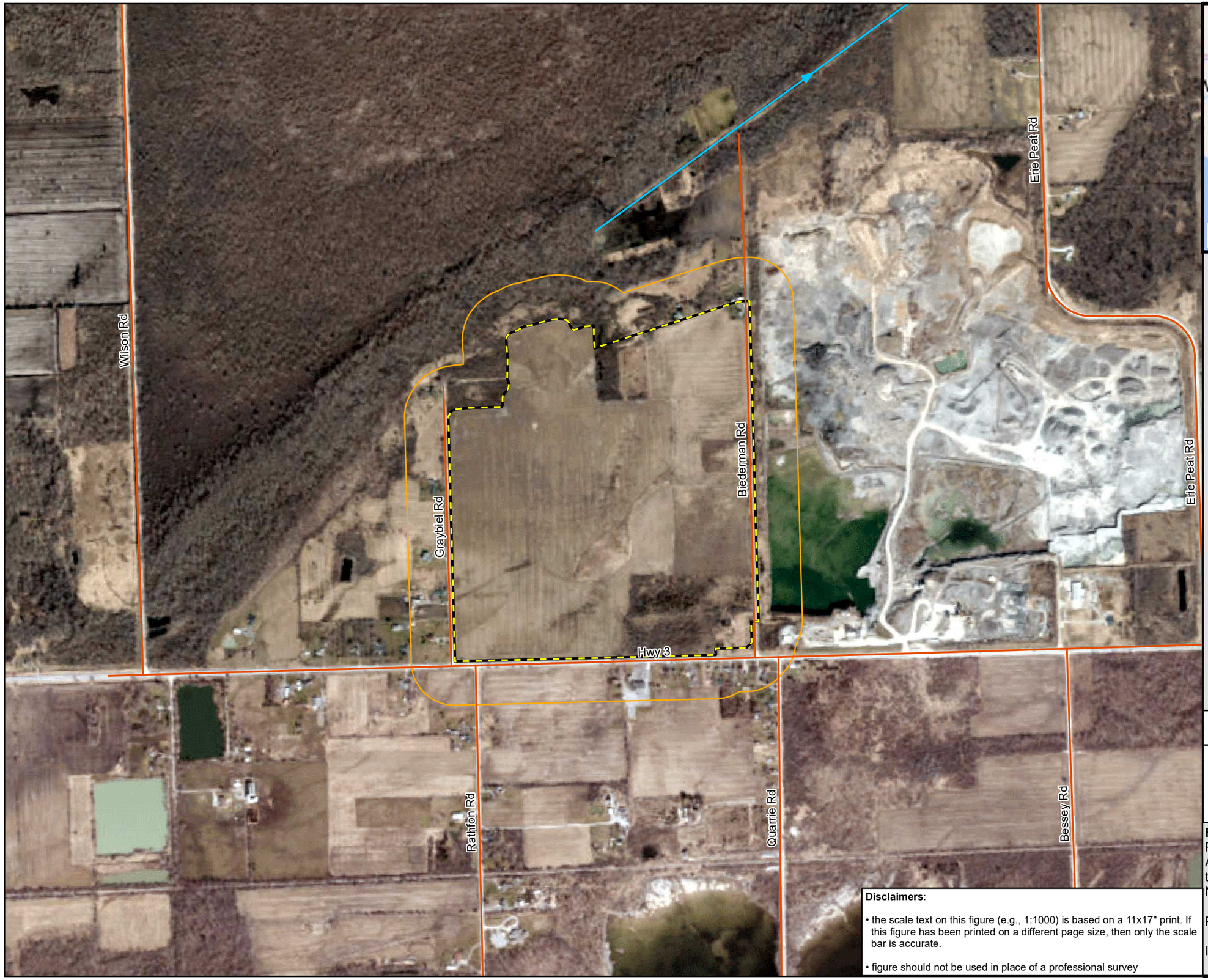

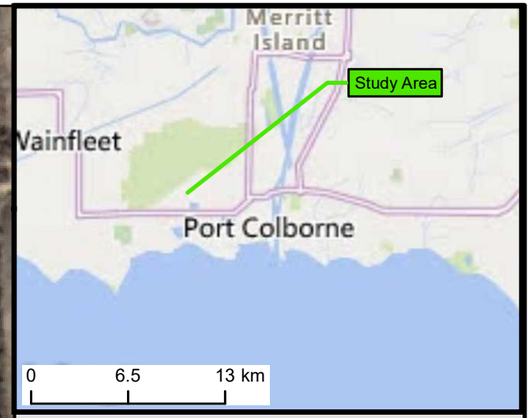

Legend

Ontario Base Mapping (OBM)

- Roads

Planning Boundaries

- Site (Proposed Licence Boundary)
- Study Area

Anthropogenic Features

- Beiderman Drain

N

Orthorectified aerial photo - 2020

Scale	RS Project No.	Date Last Updated	By
1:10,000	2017-046	May 02, 2022	JG

0 150 300 Metres

RiverStone Environmental Solutions Inc

Figure 1. Location of site and study area. .
Part of Lots 6 and 7, Concession 2, Part of Road Allowance Between Lots 5 and 6, Concession 2, in the Township of Wainfleet, Regional Municipality of Niagara

Prepared For: Waterford Sand Stone and Gravel

Inset: General location of Study Area

Disclaimers:

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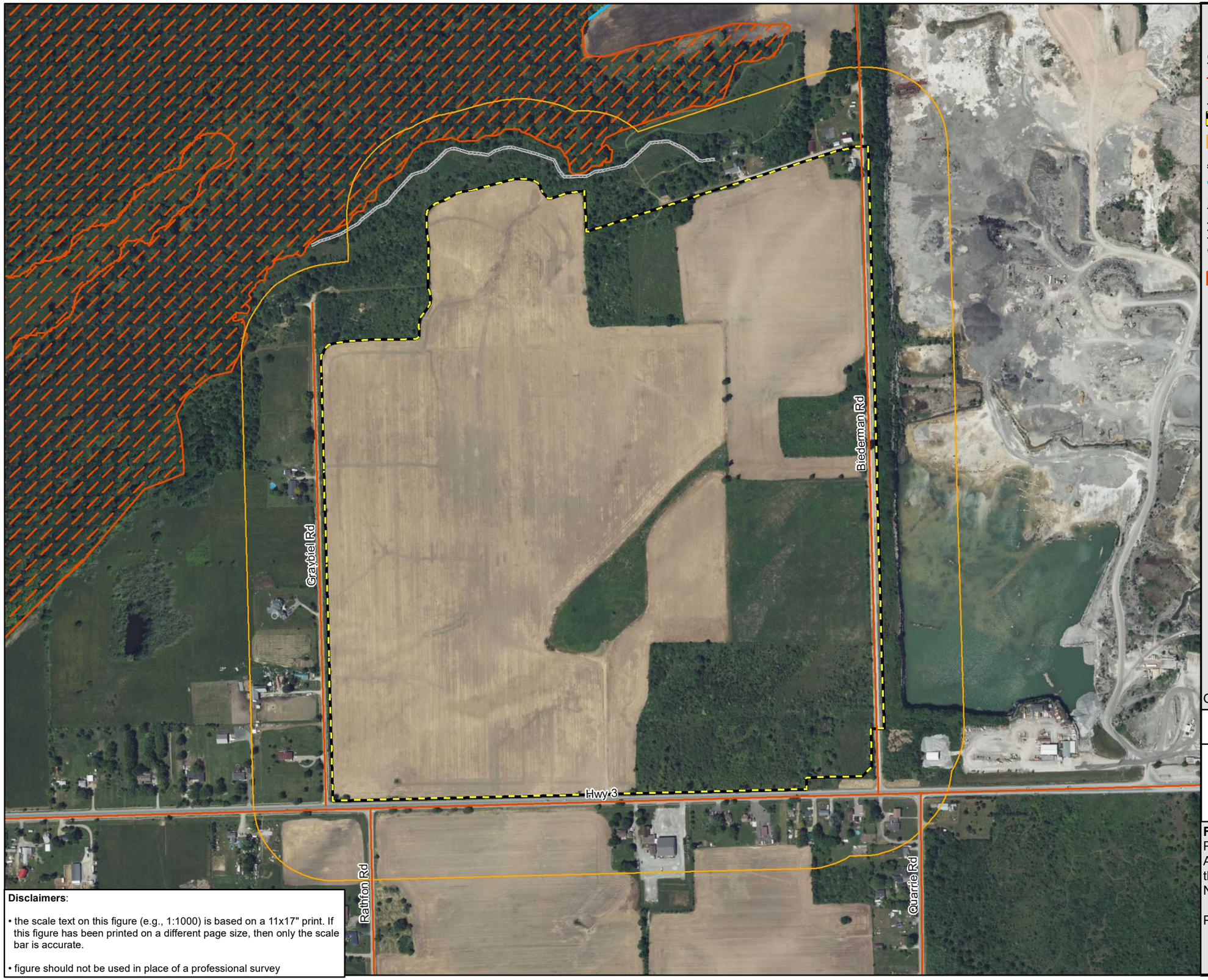

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Ontario Base Mapping (OBM)

- Roads

Planning Boundaries

- Site (Proposed Licence Boundary)
- Study Area

Anthropogenic Features

- Biederman Drain

Features with Recognized High Natural Heritage Value - Identified by the Province or the Relevant Approval Authorities

- Onondaga Escarpment Brow
- Wainfleet Bog Provincially Significant Wetland Complex (as mapped in 2017 with MNRF)

N

Orthorectified aerial photo - 2020

Scale	RS Project No.	Date Last Updated	By
1:5,500	2017-046	May 02, 2022	JG

0 80 160 Metres

RiverStone Environmental Solutions Inc.

Figure 2. Reference map.
Part of Lots 6 and 7, Concession 2, Part of Road Allowance Between Lots 5 and 6, Concession 2, in the Township of Wainfleet, Regional Municipality of Niagara

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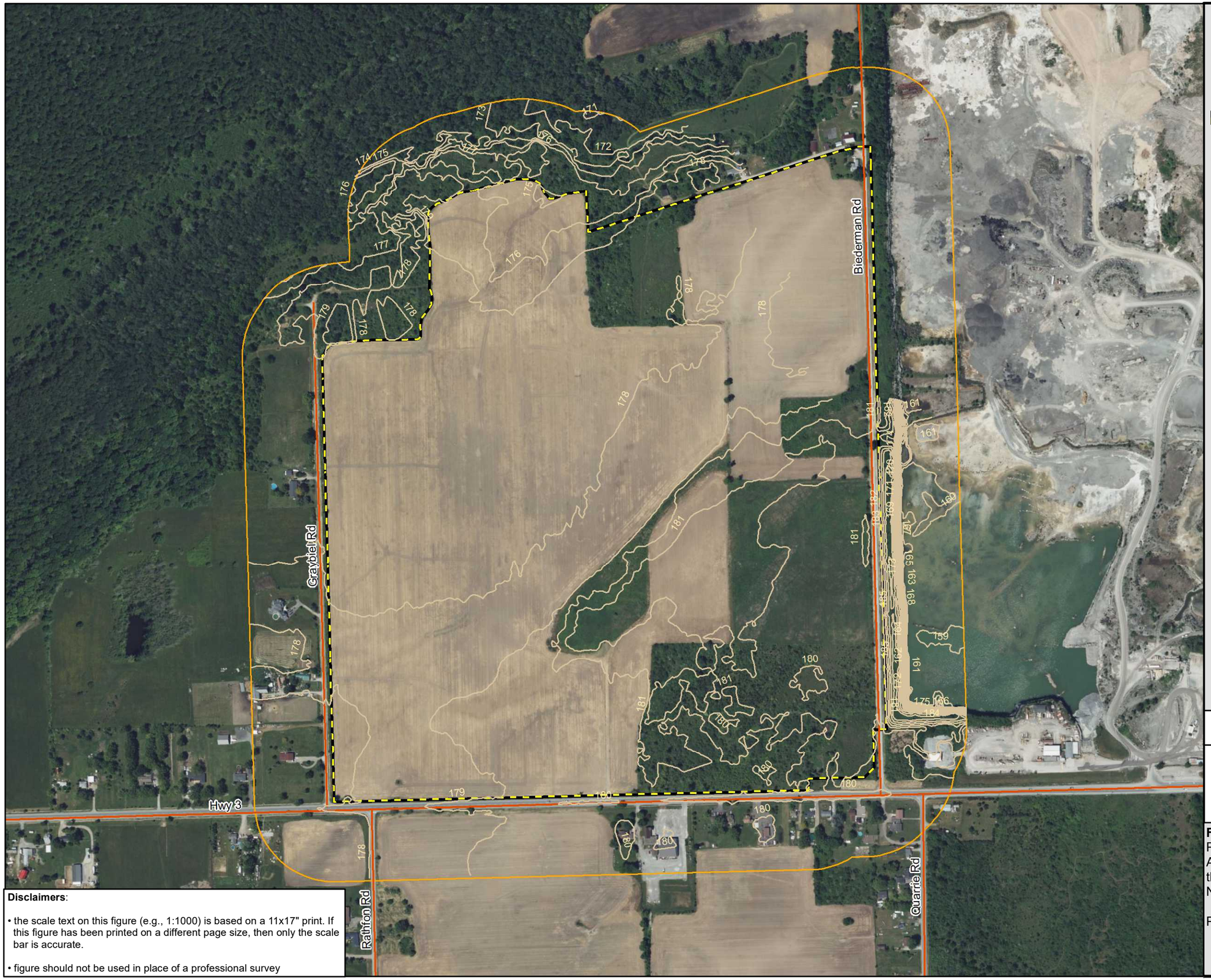

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Ontario Base Mapping (OBM)

Roads

Planning Boundaries

Site (Proposed Licence Boundary)

Study Area

Contours provided by MHBC

1 m Contours

N

Orthorectified aerial photo - 2020

Scale	RS Project No.	Date Last Updated	By
1:5,500	2017-046	May 02, 2022	JG

0 80 160 Metres

RiverStone Environmental Solutions Inc.

Figure 3. Topographic contours of the study area. Part of Lots 6 and 7, Concession 2, Part of Road Allowance Between Lots 5 and 6, Concession 2, in the Township of Wainfleet, Regional Municipality of Niagara

Prepared For: Waterford Sand Stone and Gravel

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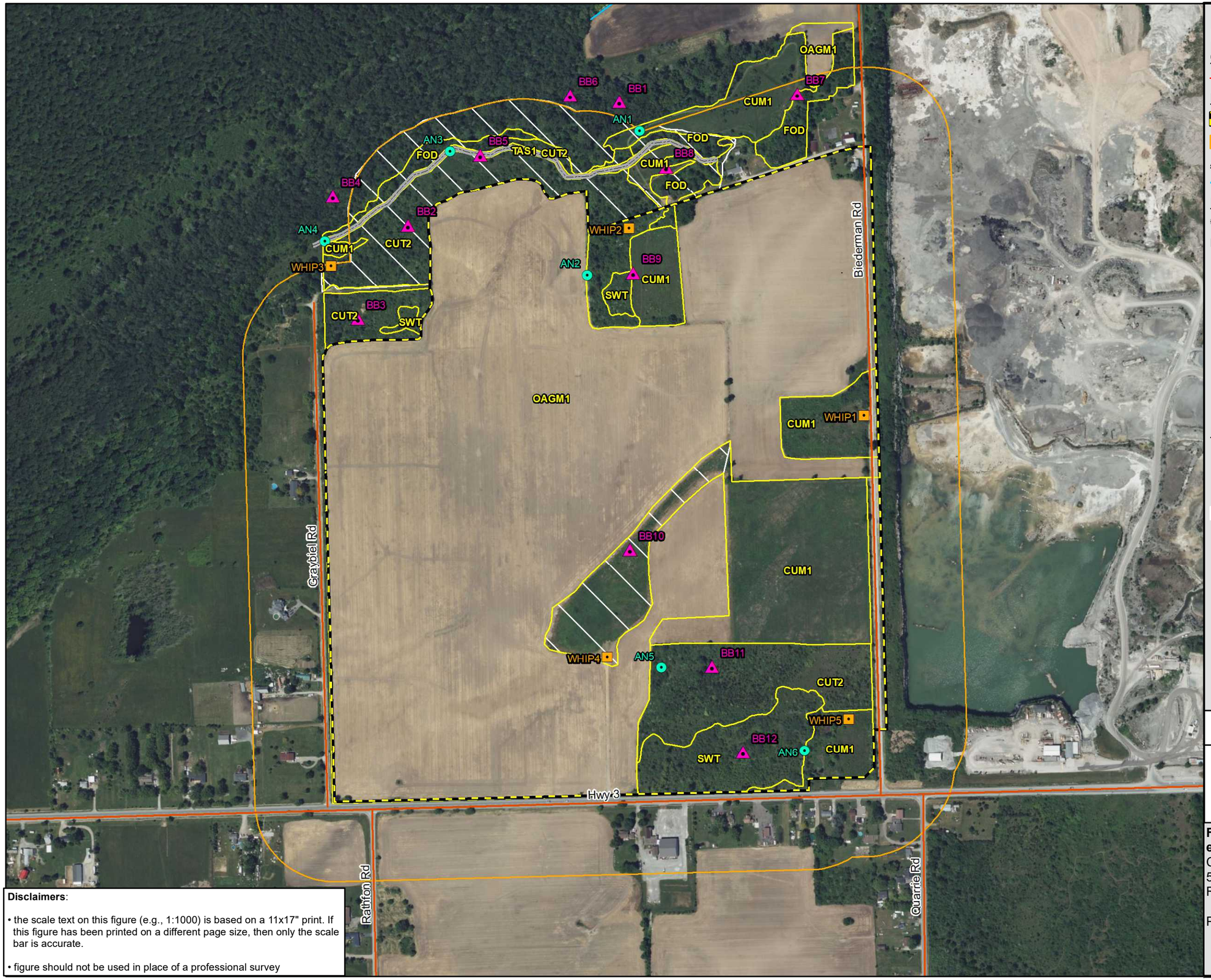

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Legend

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Ontario Base Mapping (OBM)

- Roads

Planning Boundaries

- Site (Proposed Licence Boundary)
- Study Area

Anthropogenic Features

- Biederman Drain

Biophysical Features+Functions-RiverStone

- Onondaga Escarpment Brow (approx.)

Ecological Communities

Terrestrial Communities

- OAGM1: Annual Row Crops
- CUM1 -Mineral Cultural Meadow
- CUT2 -Bedrock Cultural Thicket
- FOD: Deciduous Forest
- TAS1: Carbonate Shrub Talus

Wetland Communities

- SWT-Mineral Swamp Thicket

Locations of Targeted Surveys (2017-2019)

- Anuran Call Survey Station
- Breeding Bird Station
- Whip-poor-will Survey Station
- Snake Survey Area

Orthorectified aerial photo - 2020

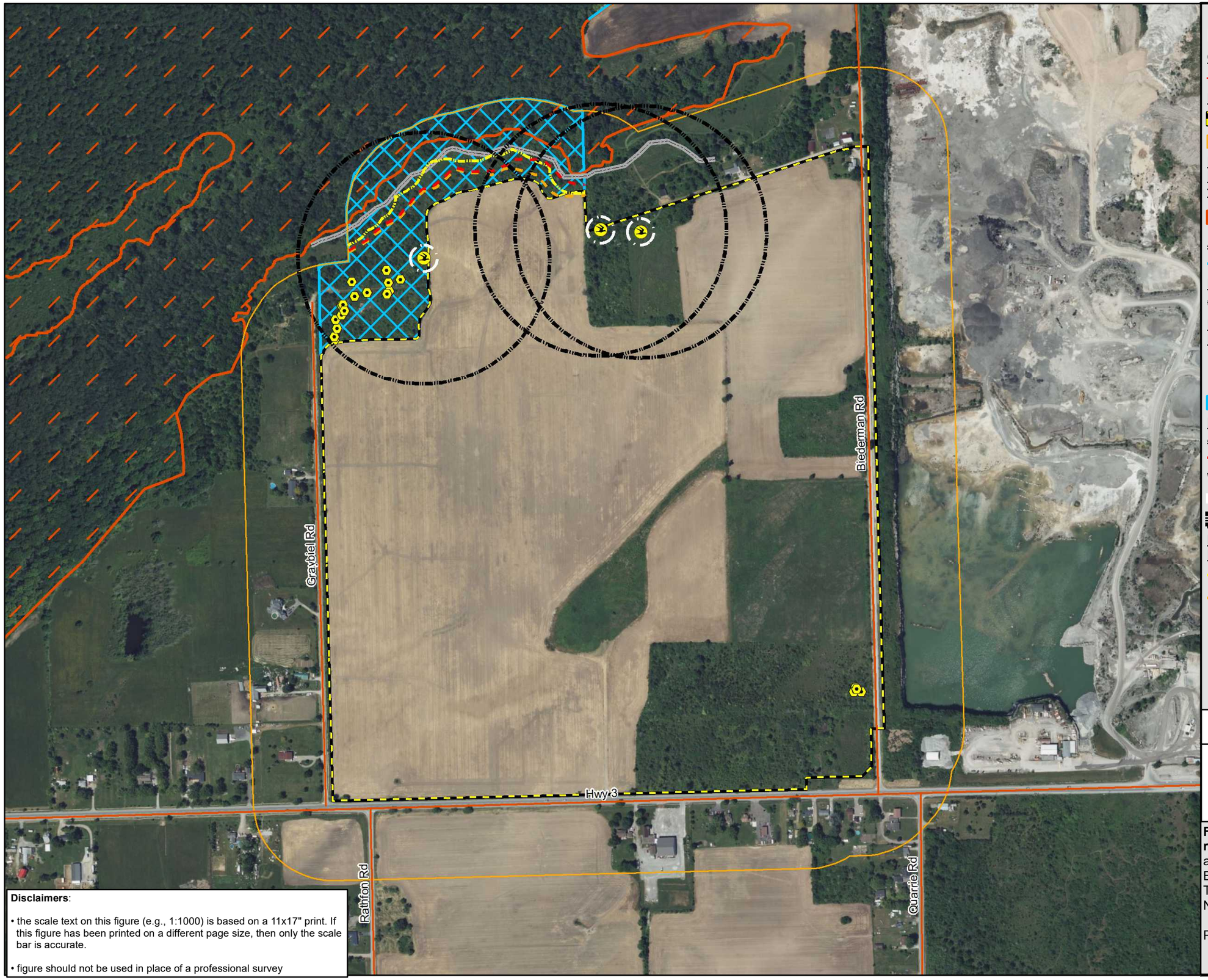
Scale	RS Project No.	Date Last Updated	By
1:5,500	2017-046	Jun 16, 2022	JG

0 80 160 Metres

RiverStone Environmental Solutions Inc.

Figure 4. Targeted survey locations and ecological communities. Part of Lots 6 and 7, Concession 2, Part of Road Allowance Between Lots 5 and 6, Concession 2, in the Township of Wainfleet, Regional Municipality of Niagara

Prepared For: Waterford Sand Stone and Gravel



Legend

Ontario Base Mapping (OBM)

- Roads

Planning Boundaries

- Site (Proposed Licence Boundary)
- Study Area

Features with Recognized High Natural Heritage Value - Identified by the Province or the Relevant Approval Authorities

- Wainfleet Bog Provincially Significant Wetland Complex (as mapped in 2017 with MNRF)

Anthropogenic Features

- Biederman Drain

Biophysical Features+Functions-RiverStone

- Onondaga Escarpment Brow

Features with Recognized High Natural Heritage Value - Identified by RiverStone

- Eastern Whip-poor-will (calling location)
- Spoon-leaved Moss
- Significant Woodland / Significant Wildlife Habitat

Development Setbacks Required by Relevant Approval Authorities

- 30 m Setback from Significant Woodlands

Whip-poor-will Habitat

- Category 1 Habitat (20m Around Nest)
- Category 2 Habitat (170m Around Category 1)

Measures Recommended by RiverStone to Prevent and/or Reduce Impacts

- 30 m Setback from PSW
- 30 m Setback from Onondaga Escarpment Brow

Orthorectified aerial photo - 2020

Scale	RS Project No.	Date Last Updated	By
1:5,500	2017-046	May 02, 2022	JG

0 80 160 Metres

RiverStone Environmental Solutions Inc

Figure 5. Biophysical features and functions and recommended protection measures. Part of Lots 6 and 7, Concession 2, Part of Road Allowance Between Lots 5 and 6, Concession 2, in the Township of Wainfleet, Regional Municipality of Niagara

Prepared For: Waterford Sand Stone and Gravel

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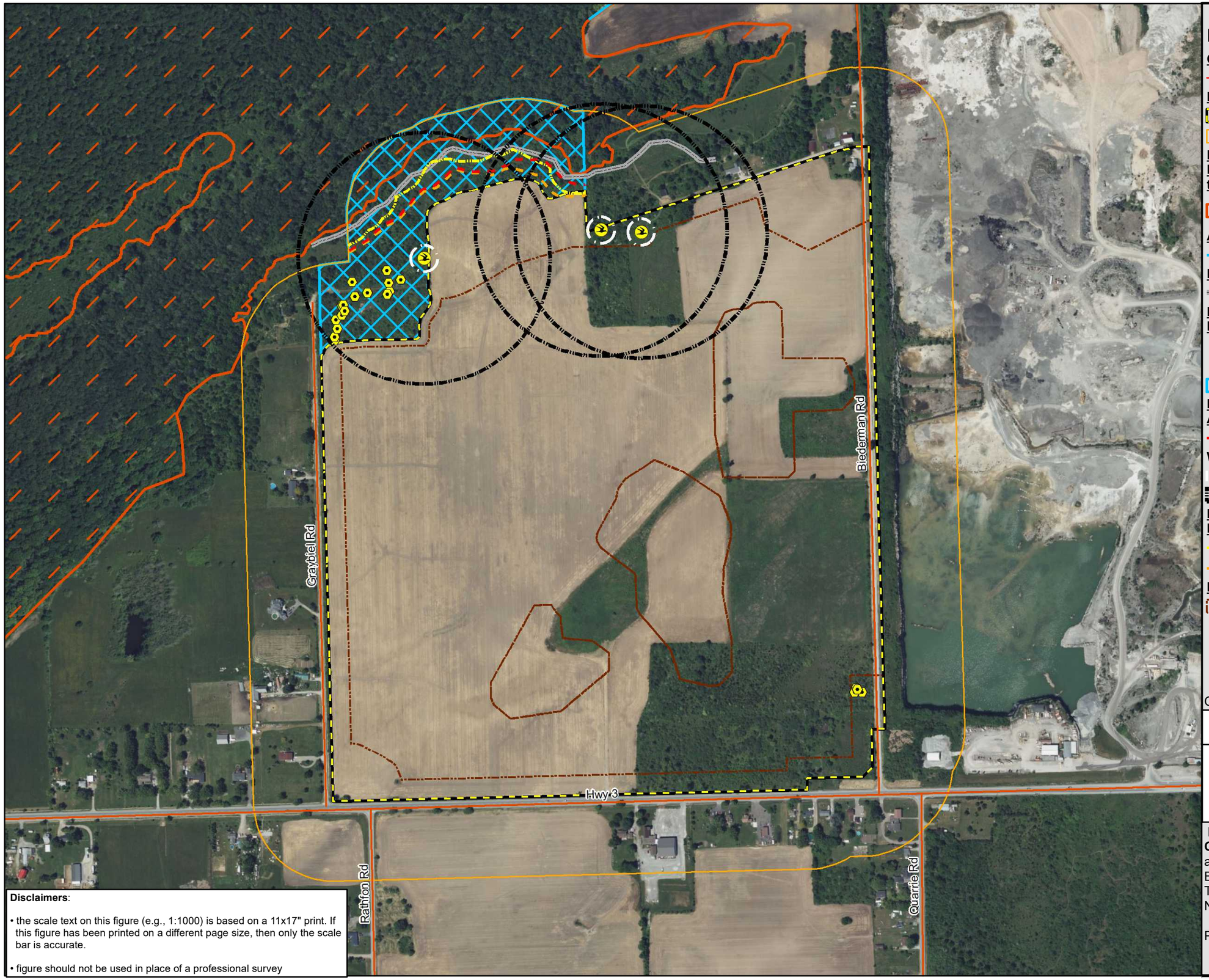

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Ontario Base Mapping (OBM)
- Roads

Planning Boundaries
- Site (Proposed Licence Boundary)
- Study Area

Features with Recognized High Natural Heritage Value - Identified by the Province or the Relevant Approval Authorities
- Wainfleet Bog Provincially Significant Wetland Complex (as mapped in 2017 with MNRF)

Anthropogenic Features
- Biederman Drain

Biophysical Features+Functions-RiverStone
- Onondaga Escarpment Brow

Features with Recognized High Natural Heritage Value - Identified by RiverStone
- Eastern Whip-poor-will (calling location)
- Spoon-leaved Moss
- Significant Woodland / Significant Wildlife Habitat

Development Setbacks Required by Relevant Approval Authorities
- 30 m Setback from Significant Woodlands

Whip-poor-will Habitat
- Category 1 Habitat (20m Around Nest)
- Category 2 Habitat (170m Around Category 1)

Measures Recommended by RiverStone to Prevent and/or Reduce Impacts
- 30 m Setback from PSW
- 30 m Setback from Onondaga Escarpment Brow

Proposed Development and Site Alteration
- Proposed Extraction Limit

Orthorectified aerial photo - 2020

Scale	RS Project No.	Date Last Updated	By
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RIVERSTONE ENVIRONMENTAL SOLUTIONS INC

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

Figure 6 - Development Plan, Biophysical Constraints And Recommendations Part of Lots 6 and 7, Concession 2, Part of Road Allowance Between Lots 5 and 6, Concession 2, in the Township of Wainfleet, Regional Municipality of Niagara

Prepared For: Waterford Sand Stone and Gravel

Appendix 1. Curriculum Vitae for Primary RiverStone Investigators

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 fish habitat surveys and mapping, aquatic 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 2008–2021.

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*
- 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 defendable 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.

Kevin D. Trimble, M.Sc.
Senior Ecologist / Project Manager

CAREER AND ACADEMIC HISTORY

2016 – Present	**Senior Ecologist / Project Manager; RiverStone Environmental Solutions Inc.**
2003 – 2015	Principal, Senior Ecologist; Golder Associates Ltd.
1999 – 2003	Senior Project Manager; ESG International
1995 – 1999	Project Manager; Beak International
1993 – 1995	Senior Ecologist; Harrington and Hoyle Ltd.
1989 – 1993	Senior Ecologist; Cumming Cockburn Ltd.
1987 – 1989	Walleye Unit Biologist; Ontario Ministry of Natural Resources, Thunder Bay, ON
1988	M.Sc. Biology Lakehead University, Thunder Bay, ON
1984	B.Sc.(Honours) Biology, University of Toronto, Toronto, ON

PROFESSIONAL EXPERIENCE

Kevin is a senior ecologist, project manager experienced in impact analysis, rehabilitation and ecological monitoring. He has more than 26 years of extensive experience integrating physical resource disciplines with multi-disciplinary biological data to carry out permitting and environmental impact assessments, provide conceptual guidance for site design, and develop rehabilitation plans. He has directed a number of development and power projects and has led terrestrial and aquatic components for many projects in sectors including mining, linear development, aggregate resources, nuclear, transportation, and infrastructure. He has directed a number of investigations of terrestrial resources, including amphibian surveys and migration studies, upland wildlife habitat utilization studies, vegetation community analysis and rare species assessments. Kevin comes originally from an aquatic ecology background and has been involved in a wide range of aquatic investigations, including monitoring and assessment for power plants. He has dealt with rare species issues, provided expert testimony at the Ontario Municipal Board (OMB) and the Niagara Escarpment Commission (NEC), and has guest lectured at McMaster University, the University of Guelph and several community colleges on the subject of ecological design and rehabilitation.

Surface Mining and Reclamation

- Tomlinson Brechin Quarry in City of Kawartha Lakes, ON; *for R.W. Tomlinson Ltd.;* **Key Tasks**: Bioscience component lead for a 400 ha limestone quarry. Provided due diligence assistance during property purchase and directed all aquatic and terrestrial studies leading to submissions for municipal planning approvals, the Aggregate Resources Act, and public consultations.
- Manitoulin Quarry on Manitoulin Island, ON; *for Lafarge Canada Inc*; **Key Tasks**: Directed the Natural Environment components of a 1,135 ha quarry licence under the Aggregate Resources Act, as well as local municipal approvals, community and First Nations engagement, and follow-up research and monitoring.
- MacMillan Pit in Puslinch, ON; *for TCG Materials Ltd.*; **Key Tasks**: An intensive monitoring program was carried out on three stream tributaries as a condition of site plan approval. Brook trout spawning success, and

aquatic habitat quality parameters were measured seasonally and collated with flow, temperature and chemistry data to assess changes resulting from aggregate extraction.

- MacMillan Pit in Puslinch, ON; *for Aberfoyle, Puslinch*; **Key Tasks**: As a part of rehabilitation planning, ecologically based design concepts were developed and tested to create high quality amenity ponds through aggregate extraction. Water quality, bathymetry, biological production and ecosystem development were monitored, and recommendations made to modify lake configuration. Structural habitat experiments were run to assess responses in fish production, algal growth, etc.
- Centreville Quarry in Kingston, ON; *for Lafarge Canada Inc.*; **Key Tasks**: An environmental impact analysis was conducted for approval and licensing of a proposed limestone quarry operation in eastern Ontario. Groundwater flow and quality, surface water management, bioregional ecosystem effects, impacts to adjacent wetlands and nationally rare species were among the issues integrated with other disciplines in the approval process. Data were also used to provide input to the design of reclamation and after use plans.
- Bere Pit in London, ON; *for Lafarge Canada Inc.*; **Key Tasks**: Managed the environmental components of a pit expansion on lands owned by the Upper Thames Conservation Authority. A Natural Environment Technical Report was prepared with field data acquisition, background data and analyses in concert with physical resource analyses. Given the nature of the property ownership, additional negotiations and consultations were undertaken to assist with public participation.
- Regan Pit Expansion in Uxbridge, ON; *for Lafarge Canada Inc.*; **Key Tasks**: A detailed multi-disciplinary environmental investigation was conducted over a five year period for this expansion of an existing licensed pit in Uxbridge Township. Rehabilitation concepts were developed to update the plan for the existing pit in a regional ecosystem context. A number of rare species issues were incorporated into the analyses, agency negotiations and rehabilitation design.
- Mosport Site in Township of Clarington, ON; *for Dufferin Aggregates Ltd.*; **Key Tasks**: A Proposed gravel pit expansion involved evaluation of an old growth forest against criteria for core forests, rare species management and corridor areas in the Oak Ridges Moraine Implementation Guidelines.
- Acton Quarry in Acton, ON; *for Dufferin Aggregates Ltd.*; **Key Tasks**: Management of environmental components of ongoing expansion studies and monitoring. A detailed study design was derived to monitor compliance with water taking permits and investigate quarry expansion. The ecological investigation required that direction was provided to other project team components so that data collection and analyses were integrated with surface and groundwater flow monitoring.
- Sunderland Site in Sunderland, ON; *for Vicdom Sand and Gravel Ltd.*; **Key Tasks**: Proposed mining of an esker in central Ontario was evaluated for environmental impacts and rehabilitation potential. The site is situated between several components of a provincially significant wetland complex and several stream systems. Seasonal monitoring of fish and wildlife was undertaken as part of the reporting and approvals process.
- Limehouse Pit in Limehouse, ON; *for J.C. Duff Ltd.*.; **Key Tasks**: Proposed expansion of a gravel pit in the Niagara Escarpment Planning was assessed for ecological issues pertaining to terrestrial resources, local catchments and adjacent natural features

Environmental Assessment

- Environmental Assessment for upgrading of Rutherford Road at Hwy 27 in the Region of York, ON; *for Region of York*; **Key Tasks**: lead an ecological team to refine the environmental components and provide proactive input to the design engineers, particularly with regard to the Humber River and associated floodplain crossings.

- Environmental Assessment for Clair Road Improvements in Guelph, ON; *for City of Guelph*; **Key Tasks**: acted as the ecological component lead for an EA dealing with an east-west route selection and conceptual design for widening of Clair Road in Guelph. Routes were compared for potential environmental affects, and the selected route was assessed in detail for water crossings and vegetation, with design input on water management.
- Environmental Assessment for Consumers Road in Clarington, ON; *for CIMA+*; **Key Tasks**: directed the ecological components of EA components and followup assessments regarding several road crossings of streams and wetlands. Work involved scoping and supervising field studies, agency liason, mitigative design input and permitting.
- Environmental Assessment for a highway crossing of the Welland River, ON; *for private client*; **Key Tasks**: Participated with a team of environmental specialists in conducting an environmental assessment and impact analyses at a proposed highway crossing of the Old Welland Canal and Welland River. Riparian and aquatic habitat evaluations were considered with preliminary alternatives to the undertaking.
- Environmental Assessment for the widening of Highway 6 in Guelph Twp., ON; *for City of Guelph*; **Key Tasks**: update and confirm the environmental components of an outdated environmental assessment, obtain agency approvals and provide technical input to the detailed design and construction for a section of Highway 6 to be widened north of the City of Guelph. Issues included a coldwater stream crossing, provincially significant wetland encroachment and corridor tree preservation planning.
- Environmental Assessment compliant with the World Bank and Tanzanian standards in Ngara, Tanzania; *for Kabanga Nickel Co.*; **Key Tasks**: Directed in-country field studies, multi-disciplinary integration, impact assessment and preparation of EA reporting.
- Environmental Assessment for the Cliffs Chomite Project in the Ring of Fire, ON; *for Cliffs Natural Resources Inc.*; **Key Tasks**: Component Lead and Senior Technical Reviewer for Aquatic and Terrestrial components. Provided assistance and oversight to Discipline Leads responsible for study design, baseline field programs and impact assessment. The EA includes extensive engagement and consultation with Aboriginal communities, the general public and many federal/provincial regulatory agencies.
- Federal Environmental Assessment for construction and operation of a new 4,000 MW nuclear generation facility in Tiverton, ON; *for Bruce Power*; **Key Tasks**: Senior Reviewer and technical advisor to the Aquatic and Terrestrial Ecology components of the federal EA process.
- Environmental Effects Assessment for a radio-active waste repository in Tiverton, ON; *for Bruce Power*; **Key Tasks**: Terrestrial Environment Senior Reviewer and technical advisor of a proposed deep geologic repository for long-term and intermediate level radio-active waste.
- Environmental Assessment for refurbishing the Pickering 'B' nuclear plan for continued operations in Pickering, ON; *for Ontario Power Generation*; **Key Tasks**: severed as Senior Reviewer and technical advisor to aquatic and terrestrial components of the EA.
- Environmental Assessment for development of Bronte Harbour in Halton, ON; *for Region of Halton*; **Key Tasks**: Worked with a team of structural and water resource engineers. Assessed ecological conditions at the proposed marina and park site, in the context of the Western Lake Ontario shoreline and lower Bronte Creek. Potential impacts and development alternatives were assessed as part of a Federal Environmental Assessment Review. Habitat targets and design input led to a Fisheries Act Compensation Agreement for the project.
- Protocol development for review of pipeline works in Lake Erie, ON; *for Talisman Energy*; **Key Tasks**: Developed a protocol for DFO review of pipeline works in Lake Erie, and conducted many impact analyses and DFO authorizations for Talisman Energy's nearshore pipeline construction and transfers.
- Provincial and federal EAs for wind farms and solar farms in Ontario; *for private clients*; **Key Tasks**: Project Director, Project Manager and Sr. Reviewer on numerous provincial and federal EAs for wind farms and solar farms in Ontario. Coordinated multi-disciplinary teams to meet CEAA and provincial EA requirements for new power projects and related transmission infrastructure.

- Environmental Assessment for refurbishing the Bruce 'A' nuclear facility in Tiverton, ON; *for Bruce Power*; **Key Tasks**: Aquatic and terrestrial ecology project team input and senior review for the study design, baseline and impact assessment associated with the refurbishment of Bruce A Refurbishment Project. A number of significant species and habitats were incorporated in the assessment, which reviewed construction, operation and closure phases of the refurbishment. Multi-disciplinary team involvement drew on existing data, agency designations, local knowledge and field data collection programs emphasizing area VECs.
- Environmental Assessment for Western Waste Management Facility Refurbishment Waste Storage Project in Tiverton, ON; for Ontario Power Generation; **Key Tasks**: Provided senior ecology review to staff responsible for biological assessment of woodlots and semi-aquatic habitats in relation to an expansion/development project. Assisted with workplan design and field survey program and schedule in consultation with relevant contacts. Including: senior technical support for and consultation with sub contractors and working closely with the project team and client to prepare a natural environment report that highlighted ELC communities, habitat assessment and resident fauna. On-going communication with government agencies and academic experts for report preparation and follow-up recommendations.
- Provincial Category B Environmental Assessment in St. Clair Township, ON; *for St. Clair Power L.P.*; **Key Tasks**: Aquatic component lead and senior terrestrial ecology review for the St. Clair Energy Centre Category B Environmental Assessment defined under the Ontario Ministry of the Environment's Guide to Environmental Assessment Requirements for Electricity Projects. The proposed St. Clair Energy Centre is a 570 MW combined cycle, natural gas-fired electricity generating station. The assessment involves a multi-disciplinary team evaluating the effects of the project on air, noise, geology and hydrogeology, surface water resources, ecological resources, archaeological, cultural and heritage resources, visual and aesthetic resources, and socio-economic resources. First Nations and aboriginal interests are considered through on-going consultation with band members and responsible agencies, and literature-based research.
- Municipal Servicing Environmental Assessment and Land Development EIS in Narin, ON; *for private client*; **Key Tasks**: Managed the environmental components of an Environmental Assessment was conducted for a hamlet in East Williams Township to assess servicing requirements and growth constraints. Water management and sewage alternatives were developed and assessed with a public consultation process and impact analyses. Subsequent plans of subdivision were developed with comprehensive EIS components evaluating terrestrial ecosystem implications such as wildlife habitat utilization, vegetation communities and upland corridors and linkages.
- Environmental Assessment for the Long Point Pipeline Crossing in Long Point, ON; *for Pembina Resources*; **Key Tasks**: Managed a multi-disciplinary team in evaluating the potential impacts of running a gas pipeline across an unstable section of the Long Point Peninsula. The project involved assessment of fish and wildlife habitat use, the designation of the area as a World Biosphere Reserve, and the geomorphologic requirements for stable pipe burial.
- Environmental Assessment for a Watermain Crossing of the Thames River London, ON; *for private client*; **Key Tasks**: Investigated potential impacts of a water main crossing of the Thames River under a Class Environmental Assessment. The area of concern included valley slopes, floodplain and river bed adjacent to the Clarke side Road bridge. Specific study components addressed aquatic habitat, hydrologic modelling and mitigation. In addition, construction and monitoring methods were recommended and Fisheries Act implications were addressed.
- Aquatic ecology assessment and impact analysis for a waterfront pleasure boat facility on the Ottawa River, ON; *for private client*; **Key Tasks**: Conducted an aquatic ecology assessment and impact analysis for a waterfront pleasure boat facility on the Ottawa River. Considerations included local habitat, system wide impacts and zebra mussel implications, in addition to design input.

Expert Testimony

- Municipal Servicing and Land Development OMB, East Williams Twp., ON; for R.B. Schlegel; **Key Tasks**: Managed the environmental components and expert testimony of an Environmental Assessment that was conducted for a hamlet in East Williams Township to assess servicing alternatives and growth constraints. Water management and sewage alternatives were developed and assessed with a public consultation process and impact analyses. Subsequent plans of subdivision were developed with comprehensive EIS components evaluating terrestrial ecosystem implications such as wildlife habitat utilization, vegetation communities and upland corridors and linkages
- Jasper Ridge, Milton ON; ERT re Contravention of NEPDA; **Key Tasks**: Provided expert testimony and assistance with mediation for charges pertaining to unpermitted golf course fairway construction on an estate property abutting the Niagara Escarpment on Highway 25 in Milton.
- Summerhaven Wind Farm ERT; Haldimand Co ON; **Key Tasks**: Environmental director and expert witness for Renewal Energy Approvals and testimony at Environmental Review Tribunal (ERT) hearings for NextEra Energy Resources. The project involved a 59 turbine wind farm and related infrastructure.
- OPG Deep Geologic Nuclear Waste Respository; Tiverton ON; **Key Tasks**: For federal Joint Review Panel (JRP) hearings 2013-2014, was the Natural Heritage Director for the aquatic and terrestrial CEAA components and provided testimony and hearing support to OPG and Nuclear Waste Management Organization (NWMO) during federal hearings.
- Bond Lake Park Homes OMB, Richmond Hill, ON: **Key Tasks**: Environmental impact analysis, ecosystem design and OMB testimony were provided for a 200 ha mixed use development on the Oak Ridges Moraine. The plan was assessed for potential impacts, followed by recommendations to modify it to meet the overall intent of the Oak Ridges Moraine Implementation Guidelines.
- Stormy Point Road Access OMB, Rosseau, ON; **Key Tasks**: Conducted aquatic habitat and fish inventories; and provided expert testimony to the OMB relating to a proposed bridge access through an inundated easement to Stormy Point development area.

Surface Water Assessment and Design

- Stormwater Management Pond, Outlet 22 in Grimsby, ON; *for private client*; **Key Tasks**: A stormwater management design was modified to facilitate biological treatment, create visual amenities and habitat, and maximize water quality. The ecological aspects of hydraulics, grading and planting were designed for submergent, fluctuating, and riparian zones of the pond system.
- Chester Springs Marsh, Toronto, ON; *for private client*; **Key Tasks**: The ecological components of a floodplain wetland habitat were designed as part of a demonstration project in the lower Don River parklands, a degraded system in downtown Toronto.
- Aquatic habitat restoration for the Aberfoyle Pit, Aberfoyle, ON; *for private client*; **Key Tasks**: Physical and biological monitoring were combined with experimental creation of littoral areas for aesthetics, forage production and nursery habitats.
- Aquatic habitat restoration in Laurel Creek at Bechtel Park in Waterloo, ON; *for private client*; **Key Tasks**: The ecological and natural channel design elements were contributed for two projects integrating park management with flood/erosion control, protection of exposed sewers and habitat rehabilitation.
- Habitat rehabilitation in Lover's Creek, ON; *for private client*; **Key Tasks**: Wetland management and instream habitat rehabilitation were designed as part of an impact assessment and Fish Habitat Compensation Agreement for a golf course.

- Flood plain rehabilitation in the Grand River Valley, Kitchener, ON; *for private client*; **Key Tasks**: Ecosystem design called for floodplain rehabilitation and wetland creation in the Grand River valley, along with aggregate resource extraction and residential development planning.
- Stream Rehabilitation in Guelph, ON; *for private client*; **Key Tasks**: A subdivision was designed to include an artificial wetland in conjunction with water management and coldwater stream rehabilitation.

Ecological Analysis, Monitoring, and Design

- Ecosystem Design on Wolfe Island in Kingston, ON; *for private client*; **Key Tasks**: Proactive multi-disciplinary ecosystem design planning for this 1200 acre site includes a marina, hotel, golf course, fisheries development, wetlands, resort homes and natural habitat areas.
- Ecological Studies in Trenton and Ipperwash, ON; *for Defence Construction Canada*; **Key Tasks**: Conducted oversight and senior technical review for several projects involving inventory and assessment of species at risk on DCC properties with implications for ongoing site management.
- Environmental Design Concepts and Environmental Impact Study in Richmond Hill, ON; *for private client*; **Key Tasks**; Environmental design concepts were derived for an 800 ac site on the Oak Ridges Moraine, in the context of bioregional ecosystem management plans established by the Town.
- Landscape Scale Rehabilitation Designs in various locations in Ontario; *for private clients*; **Key Tasks**: Managed the development of multi-disciplinary design concepts for rehabilitation of aggregate extraction sites, municipal lands and development properties in a regional, ecosystem context. These projects have been performed in conjunction with environmental impact analyses for proposed land use changes, as well as for infrastructure development and municipal rehabilitation initiatives. Evaluations of existing and potential ecosystem components and functions are conducted and integrated with ground and surface water investigations to derive concepts of large scale rehabilitation targets that can be implemented at the site level. Numerous pit and quarry expansions have involved updating rehabilitation plans for existing licensed sites.
- Representation in Policy Review in various locations in Ontario; for Ontario Stone, Sand and Gravel Association and Lafarge Canada Inc.; *for private clients*; **Key Tasks**: Managed multi-disciplinary review and agency consultation in response to draft policy changes. Represented Ontario Stone, Sand and Gravel Association (OSSGA) and Lafarge Canada Inc., to provide proactive input to OMNR for preparation of Oak Ridges Moraine Plan technical guidelines. Represented Urban Development Institute in providing detailed agency input to the Natural Heritage Reference Manual and Provincial Policy Statement updates. Also represented a number of private landowner interests in providing agency input on Official Plan updates.
- Environmental Opportunities/Constraints Mapping and Analysis; *for private client*; **Key Tasks**: Using Geographic Information Systems, ecosystem opportunities and constraints were assessed in relation to secondary planning study areas, numerous development sites and aggregate extraction areas. Existing multi-disciplinary data are combined with agency designations and ecosystems analysis to prioritize areas for land use change and environmental protection. Subsequent design and impact analysis work focuses on the development or aggregate extraction proposals, stormwater management and fish habitat compensation works.

Waterfront Development

- Bronte Harbour; for *Region of Halton;* **Key Tasks**: Worked with a team of structural and water resource engineers. Assessed ecological conditions at the proposed marina and park site, in the context of the Western Lake Ontario shoreline and lower Bronte Creek. Potential impacts and development alternatives were assessed as part of a Federal Environmental Assessment Review. Habitat targets and design input lead to a Fisheries Act Compensation Agreement for the project.
- Waterfront Habitat Design; for private client; **Key Tasks**: As part of the Great Lakes Remedial Action Plan, a series of habitat projects on the St. Lawrence River was integrated with the riverfront park system and

industrial lands through downtown Cornwall. In addition to providing aquatic, wetland and shoreline habitats, the projects were designed to meet community goals for parks use and management, aesthetics and recreation (including bicycle and pedestrian paths) and opportunities for fishing and wildlife viewing.

- Martindale Pond; *for City of St. Catharines*; **Key Tasks**: Contributed to the assessment of ecologic and geomorphologic functions of a 91 ha impoundment at Port Dalhousie. Improvement of flow characteristics and habitat conditions were goals for a large scale dredging project to create a world class rowing facility. The ecologic analysis incorporated the results of chemical contaminant investigations in the water and sediment.
- Victoria Harbour Yacht Club in Georgian Bay, ON; *for Matthews Group*; **Key Tasks**: project included sampling and analysis of contaminated sediment under MOEE dredgate management policies, aquatic habitat assessment, and development of a Fish Habitat Compensation Agreement at the site.
- The Landings at Wolfe Island near Kingston, ON; *for private client*; **Key Tasks**: contributed ecological analyses to a waterfront development concept for this 430 ha site near Kingston. The concept incorporates golf courses, hotel, marina and housing. Completed aquatic habitat and detailed fish community assessments with contribution to site layout, shoreline management, golf course design, water management and impact analysis. Post-development ecological functions were predicted for land use scenarios, and used as development criteria.
- Long Point Pipeline Crossing, Long Point, ON; *for Pembina Resources*; **Key Tasks**: Managed a multi-disciplinary team in evaluating the potential impacts of running a gas pipeline across an unstable section of the Long Point Peninsula. The project involved assessment of fish and wildlife habitat use, the designation of the area as a World Biosphere Reserve, and the geomorphologic requirements for stable pipe burial.

Natural Valley and Channel Rehabilitation

- Laurel Creek at Bechtel Park in Waterloo, ON; *for private client*; **Key Tasks**: The ecological and natural channel design elements were contributed for two projects integrating park management with flood/erosion control, protection of exposed sewers and habitat rehabilitation.
- Maple Hill Creek in Waterloo, ON; *for private client*; **Key Tasks**: Redesign of an urban stream through an easement on residential properties, to prevent erosion and improve aesthetics.
- Kolb Creek in Kitchener, ON; *for private client*; **Key Tasks**: Channelization, flooding and entrenchment problems were solved by designing a geomorphologically stable valley to support coolwater fish species, human amenities and wildlife habitat.
- Lakeview Terrace in Grimsby, ON; *for Ashenhurst Nouwens Engineering Ltd.*; **Key Tasks**: The rehabilitation of a Lake Ontario tributary was incorporated into a development design with floodplain habitat and water management
- Carp River at the Palladium in Kanata, ON; *for private client*; **Key Tasks**: As part of the development design, concepts were prepared to integrate the river with its floodplain, manage site runoff, reintroduce stable, productive meanders and compensate for impacts of the project on habitat.
- Beaver River in Beaverton, ON; *for private client*; **Key Tasks**: In response to erosion and the degradation of a dam, a concept for large scale valley rehabilitation was derived as a framework for site specific projects.
- Hanlon Creek in Guelph, ON; *for Candevco Ltd.*; **Key Tasks**: Involvement in this watershed study lead to the generation of concepts for several kilometers of new coldwater stream habitat in association with ecosystem design and land use planning.
- Frenshman's Creek in Fort Erie, ON; *for Matthews Group Ltd.*; **Key Tasks**: This study involved stream assessment and geomorphologic design, integrated with Carolinian Forest protection and a residential development plan.

- National Pines Golf Course, Lover's Creek in Barrie, ON; *for Innisgreen Investments Ltd.*; **Key Tasks**: Instream habitat rehabilitation was designed as part of an impact assessment and Fish Habitat Compensation Agreement for a golf course.
- Sturgeon River in Hillsdale, ON; *for Mel Code Planning*; **Key Tasks**: Subdivision planning involved multi-disciplinary impact analysis of a salmonid stream.

Professional Affiliations

American Fisheries Society, Past Executive Member
Society for Conservation Biology
Society for Ecological Restoration, Past Executive Member

RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

Craig Mann, H.BSc.F, Dipl. IFRM.

Ecologist, Arborist, Wetland Specialist

CAREER AND ACADEMIC HISTORY

2016 – Present	**Ecologist, RiverStone Environmental Solutions**
2009 – 2016	Project Ecologist – Terrestrial, MMM Group Ltd, (Ecoplans Ltd.) Kitchener, ON
2006 – 2009	Terrestrial Ecologist, Michalski Nielsen Associates Ltd.
2000 – 2001	B.Ed, Lakehead University, Thunder Bay, Education
1996 – 1999	H.B.Sc.F, Lakehead University, Thunder Bay, Forestry
1994 – 1996	Diploma, Lakehead University, Thunder Bay, Integrated Forest Resource Management

PROFESSIONAL EXPERIENCE

- Since 2009, has been involved in numerous projects and has gained sound understanding of the requirements for field assessment and preparation of documentation for Class Environmental Assessments for transportation and land development projects.
- Extensive knowledge of the ecology of central and northern Ontario, is proficient in conducting an array of field duties that include vegetation inventories, vegetation community mapping, woodland assessment, ELC, Species-at-Risk habitat assessments, amphibian surveys, wildlife inventories, benthic invertebrate collection, water sampling and fish rescues / transfer.
- Additional responsibilities include project coordination, proposal preparation, analysis of potential impacts, development of mitigation measures and report preparation.
- Prior work experience developed the bulk of his vegetation identification, ecological interpretation and outdoor skill while working with various forestry companies in northwest, northeast and central Ontario and implementing an enhanced water quality monitoring program in the Muskoka region. These experiences included the installation of permanent forestry plots, forest resource information surveys, road and cut-block location, tree marking, timber scaling, tree planting, forest tending, benthic monitoring and the use various other EMAN protocols.
- Extensive experience working in multi-disciplinary teams, with volunteer groups including government agencies.
- Played a key role in the natural environment component of numerous planning, preliminary design and detail design for highway projects for the Ministry of Transportation (MTO). Responsibilities have included project coordination, review of background natural environment information, terrestrial field surveys, analysis of habitat types, potential impacts, development of mitigation measures for Species at Risk Act (SARA) and Endangered Species Act (ESA) authorizations, preparation of technical specialist reports and providing input to Transportation Environmental Study Reports (TESR) and Design and Construction Reports (DCR).

The following is a partial list of consulting-based project experience since 2009.

Ecological Site Assessments/Environmental Impact Studies/Natural Heritage Evaluations

- Environmental Impact Statement in the **Town of Gravenhurst**; **Key Tasks**: Vegetation classification (ELC), wetland boundary mapping, identification of significant natural heritage features, wildlife species sightings and description of potential habitat for wildlife, Species at Risk assessment and data management to support a multiple lot severance.
- Environmental Impact Statement in the **Town of Gravenhurst**; **Key Tasks**: Vegetation classification (ELC), assessment of watercourse, assessment of fish habitat, wildlife species sightings, Species at Risk assessment and data management to support redevelopment of the property.
- Environmental Impact Statement in the **Town of Gravenhurst**; **Key Tasks**: Vegetation classification (ELC), identification of significant natural heritage features, wildlife species sightings and description of potential habitat for wildlife, Species at Risk assessment and data management as due diligence for lot purchase.

Fisheries and Aquatic Assessments

- Fish Rescue in Gamebridge Ontario, **Trent Severn Waterway**; **Key Tasks**: fish rescue in support of lock reconstruction.

Transportation Experience

- Highway 11/17 Twinning from the **Manitoba border east to Kenora ON** Sections 1 and 2, Kenora ON: **Key Tasks:** Terrestrial Ecologist. Field assessments of vegetation and wildlife resources within the project limits. Documented the character, sensitivity and significance of terrestrial features, assessed impacts and developed appropriate mitigation strategies. Prepared a Terrestrial Preliminary Design and Detailed Design Reports (in progress). **Client: MTO Northwest Region**
- Hwy Structures - New Liskeard (GWP 5014-E-0019), **New Liskeard Area, ON** (2015–2018): **Key Tasks:** Project Ecologist. Assessment of vegetation and wildlife resources for the rehabilitation / replacement of 11 highway crossing structures throughout the New Liskeard area. Responsibilities included vegetation and wildlife inventories, documentation of the character, sensitivity and significance of all terrestrial features, assessment of impacts, development of appropriate mitigation strategies and documentation. **Client: MTO Northeast Region**
- Local Roads Board Structures - New Liskeard (GWP 5014-E-0024), **New Liskeard Area, ON** (2015–2017): **Key Tasks:** Project Ecologist. Assessment of vegetation and wildlife resources for the rehabilitation / replacement of seven local road crossing structures throughout the New Liskeard area. Responsibilities included vegetation and wildlife inventories, documentation of the character, sensitivity and significance of all terrestrial features, assessment of impacts, development of appropriate mitigation strategies and documentation. **Client: MTO Northeast Region**
- Highway 11 Rehabilitation (GWP 5382-11-00), **North Bay, ON** (2014–2015): **Key Tasks:** Project Ecologist. Assessment of vegetation and wildlife resources for watercourse structure replacement and highway resurfacing along Highway 11 from 6.9 km north of the Highway 11/17 junction, north for 7 km. Responsibilities included vegetation and wildlife inventories, documentation of the character, sensitivity and significance of all terrestrial features, assessment of impacts and development of appropriate mitigation strategies. **Client: MTO Northeast Region**
- Highway 11/17 Route Planning Study from Highway 630 to224.4 km east of Highway 533, **Mattawa ON** (2013): **Key Tasks:** Terrestrial Ecologist. Assessment of vegetation and wildlife resources along a new highway corridor. Responsibilities included vegetation inventory, documentation of the character, sensitivity

and significance of all terrestrial features, assessment of impacts and development of appropriate mitigation strategies. **Client: MTO Northeast Region**

- Highway 11 Rehabilitation (GWP 5200-10-00), **Temagami, ON** (2013–2014): **Key Tasks:** Project Ecologist. Assessment of vegetation and wildlife resources for watercourse structure replacement and highway resurfacing along Highway 11 from 27.4 km north of Highway 64 to 0.7 km South of Lakeshore Drive in the town of Temagami, Ontario. Responsibilities included vegetation and wildlife inventories, documentation of the character, sensitivity and significance of all terrestrial features, assessment of impacts and development of appropriate mitigation strategies. **Client: MTO Northeast Region**

- Highway 11b Rehabilitation (GWP 5421-04-00), **Coleman, ON** (2013–2014): **Key Tasks:** Project Ecologist. Assessment of vegetation and wildlife resources for watercourse structure replacement and highway resurfacing along Highway 11b just south of the Town of Cobalt. Responsibilities included vegetation and wildlife inventories, documentation of the character, sensitivity and significance of all terrestrial features, assessment of impacts and development of appropriate mitigation strategies. **Client: MTO Northeast Region**

- Highway 560 Rehabilitation (GWP 5199-10-00), **Gowganda, ON** (2013–2014): **Key Tasks:** Project Ecologist. Assessment of vegetation and wildlife resources for watercourse structure replacement and highway resurfacing along Highway 560 east and west of the town of Gowganda, Ontario. Responsibilities included vegetation and wildlife inventories, documentation of the character, sensitivity and significance of all terrestrial features, assessment of impacts and development of appropriate mitigation strategies. **Client: MTO Northeast Region**

- Highway 112 and 650 Rehabilitation (GWP 5110-06-00), **Kirkland Lake, Gowganda, ON** (2013–2014): **Key Tasks:** Project Ecologist. Assessment of vegetation and wildlife resources for watercourse structure replacement and highway resurfacing along Highways 112 and 650 from Highway 11 to Highway 66, as well as a short section of Highway 650 from its intersection with Highway 112 extending 1.6 km east. Responsibilities included vegetation and wildlife inventories, documentation of the character, sensitivity and significance of all terrestrial features, assessment of impacts and development of appropriate mitigation strategies. **Client: MTO Northeast Region**

- Highway 144 Rehabilitation (3 sections) from **Township of Dowling north to 52 km south of Highway 560, Greater Sudbury Area, ON** (2013): **Key Tasks**: Project Ecologist. Highway resurfacing and culvert works along three sections of Highway 144 from Dowling Township north to Highway 560. Work completes included vegetation and wildlife inventory and assessment of habitats for potential impacts, development of mitigation measures, clearance for work in potential Blanding's Turtle habitat from MNRF, completion of existing conditions and impact assessment report. **Client: MTO Northeast Region**

- Highway 101 Rehabilitation, **Timmins, ON** (2013): **Key Tasks:** Terrestrial Ecologist. Assessment of vegetation and wildlife resources for watercourse structure replacement and highway resurfacing along Highway 101 from the junction of Highway 144, west for 16.9 km. Responsibilities included vegetation and wildlife inventory, document character, sensitivity and significance of all terrestrial features, assess potential preliminary impacts and development of preliminary mitigation strategies. **Client: MTO Northeast Region**

- Highway 11/17 Route Planning Study from **North Bay to Bondfield, ON** (2013): **Key Tasks:** Terrestrial Ecologist. Assessment of vegetation and wildlife resources along a new highway corridor. Responsibilities included vegetation inventory, documentation of the character, sensitivity and significance of all terrestrial features, assessment of potential preliminary impacts and development of preliminary mitigation strategies. **Client: MTO Northeast Region**

- Highway 11/17 Twinning Detailed Design (Hodder Avenue to Highway 527, Highway 527 to MacKenzie Station, **Red Rock to Nipigon and Ouimet to Dorion, ON** (2009–ongoing): **Key Tasks:** Terrestrial

Ecologist. Conducted field assessments of vegetation and wildlife resources. Documented the character, sensitivity and significance of all terrestrial features, assessed impacts and developed appropriate mitigation strategies and prepared impact assessment reports. **Client: MTO Northwest**

- Highway 66 Realignment, **Virginiatown, ON**: **Key Tasks:** Terrestrial Ecologist. Assessment of vegetation and wildlife resources for the realignment of 3.6 km of Highway 66 around North Virginiatown. Responsibilities included confirmation of documented vegetation and wildlife, documentation of the character, sensitivity and significance of all terrestrial features, assessment of impacts and development of appropriate mitigation strategies. **Client: MTO Northeast Region**

- Highway 60 Twinning Hwy 11 to Hwy 35 District of Muskoka Preliminary Design Study, **Huntsville, ON**: **Key Tasks:** Terrestrial Ecologist. Conducted field assessments of all vegetation and wildlife resources within the project limits. Documented the character, sensitivity and significance of all terrestrial features, assessed impacts, provided input to the selection of alternatives and developed appropriate mitigation strategies. **Client: MTO Northeast**

- Bridge rehabilitations, Hwy 144 bridges Makami River and East Sand River, Hwy 11 bridges Gull Lake, North Muskoka River and South Muskoka River, ON: **Key Tasks:** Terrestrial Ecologist. Conducted field assessments of vegetation and wildlife resources within the area of the existing bridges. Documented the character, sensitivity and significance of terrestrial features, assessed impacts and developed appropriate mitigation strategies. Prepared Terrestrial Impact Assessment Reports.

Relevant Certification or Training Courses

2018 Surface Miner Core Module MTCU Program Certificate
2016 MNRF Data Sensitivity Training
2015 WHMIS Certificate completion
2015 Ecological Land Classification (ELC) Provincial
2007 Ecological Land Classification (ELC) Southern Ontario
2015 Class 2 Backpack Electrofishing Certificate
2014 CN Rail Safety for Canadian Contractors
2014 Butternut Health Assessor Certificate, Ministry of Natural Resources
2013 Certificate in Garden Design, George Brown College
2010 Certified Seed Collector
2005 Ontario Tree Marker Course
2000 Ontario Timber Scalers License

Appendix 2. Agency Correspondence

RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

From:	Fricke, Britney
To:	James Parkin; Caitlin Port
Cc:	Shanks, Amy; Acs, Erik; Busnello, Pat; elamb@waterfordgroup.ca; D Deluce; Sarah Ivins; Boudens, Adam; Lampman, Cara
Subject:	RE: Law Quarry Extension - Hydrogeology and Natural Environment Report TORs
Date:	August 6, 2021 10:01:08 AM
Attachments:	Significant Wildlife Habitat Screening Table for Niagara Region.docx 2017-046 RiverStone - Waterford - TOR - FINAL.pdf

Hi James and Caitlin,

Regional staff have reviewed the Terms of Reference (TOR) for the Natural Heritage Evaluation (NHE), and find it generally acceptable. We offer the following comments for consideration:

1) In the future, please include a map illustrating the boundaries of the Study Area in TOR submissions as well as Species at Risk (SAR) and Significant Wildlife Habitat (SWH) screenings. Attached is a SWH screening table which we prefer is used during TOR development. This will assist staff with scoping of field surveys.
2) The TOR doesn't propose the completion of targeted turtle surveys. Staff request that Riverstone Environmental Solutions Inc. consider adding turtle surveys to their work program to definitively confirm presence/absence. The final Natural Heritage Evaluation should include an assessment of potential turtle habitat within the study area and include appropriate rationale if targeted turtle surveys (following an approved survey protocol) were deemed to not be necessary.
3) A high level/general water balance will be required to demonstrate no hydrologic impacts to the wetlands. The NHE should describe the pre- and post-development surface water drainage patterns and assess impacts to the wetlands. Supporting field investigations may be required to support characterization (i.e., topography survey, stormwater management plan, hydrogeological assessment to determine spring high groundwater table).
4) Significant Woodland boundaries, if present, must be staked in the field with Regional Environmental Planning staff prior to the submission of the Natural Heritage Evaluation.
5) Portions of the subject lands are identified within the Provincial Growth Plan Natural Heritage System. A discussion of Growth Plan policy implications (specifically Policy 4.2.8 – Mineral Aggregate Resources), should be captured in the NHE policy review section.
6) If S1-S3 species are found on site or within adjacent lands, their locations and habitat extent must also be mapped and included within the impact assessment to ensure no negative impact to the species or its habitat.
7) Please ensure that the NHE considers the area of natural cover that are not currently mapped, consistent with policy 7.B.1.8 of the Regional Official Plan. For example, if wetlands or woodlands are identified outside of currently mapped features, through ELC, ensure consideration as to whether these features meet the Region's criteria for designation.
8) Please include all field survey data sheets as an appendix in the NHE.

The above comments are provided in effort to ensure that the application will include all information needed to address the CNHS policies of the ROP and relevant Provincial policies. **Please note that the Niagara Peninsula Conservation Authority (NPCA) continues to be responsible for the review and comment on planning applications related to hazard lands and their regulated features. I have circulated the TOR to the NPCA and the City, and will forward any comments from them once received. Any future comments should be read in conjunction with the comments above.**

The JART will review the completed NHE against the requirements in the proposed TOR and comments above, together with any additional feedback provided by the NPCA and City. Should Riverstone Environmental Solutions Inc. be of the opinion that one or more of the requirements outlined above or by the NPCA/City should not be included within the NHE scope, the JART may entertain a reduced scope if sufficient rationale is provided. Should the comments be acceptable, the JART will accept the proposed NHE TOR along with any email correspondence as the final NHE TOR, with both appended to the NHE. From a Regional perspective, there is no need to submit a revised TOR. Please just include all relevant agency correspondence as an appendix in the NHE.

Please let me know if you have any questions.

Have a great weekend,

Britney Fricke, MCIP, RPP **(she/her)**
Senior Planner
Planning and Development Services Department
Regional Municipality of Niagara
1815 Sir Isaac Brock Way, PO Box 1042
Thorold, Ontario L2V 4T7
Phone: 905-980-6000 ext. 3432
Toll-free: 1-800-263-7215
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From: Caitlin Port <cport@mhbcplan.com>
Sent: Wednesday, July 14, 2021 12:32 PM
To: Shanks, Amy <Amy.Shanks@niagararegion.ca>
Cc: elamb@waterfordgroup.ca; James Parkin <jparkin@mhbcplan.com>; Acs, Erik <Erik.Acs@niagararegion.ca>
Subject: Law Quarry Extension - Hydrogeology and Natural Environment Report TORs

Hi Amy,

Please find attached the TORs for the Hydrogeology Report and the Natural Environment Report.

Thanks,
Caitlin

From: Shanks, Amy <Amy.Shanks@niagararegion.ca>
Sent: February 11, 2021 1:43 PM
To: elamb@waterfordgroup.ca; Caitlin Port <cport@mhbcplan.com>
Cc: Norman, Sean <Sean.Norman@niagararegion.ca>; Acs, Erik <Erik.Acs@niagararegion.ca>; Sarah Ivins <sivins@wainfleet.ca>; D Deluce <ddeluce@npca.ca>; Busnello, Pat <pat.busnello@niagararegion.ca>; Fricke, Britney <Britney.Fricke@niagararegion.ca>
Subject: Draft Preconsultation Form - Law Quarry, Wainfleet

Hi Ed and Caitlin,

Please find attached a draft version of the pre-consultation form, as well as the following draft schedules, which will be attached to the completed preconsultation form:

- A: Subject Lands
- B: Required Information and Studies
- C: Other Preliminary Comments
- D: Pre-consultation Meeting Participants
- E: Financial Impact Assessment (previously provided to you in a separate email)

In order to finalize the preconsultation process, we will need to hold a formal preconsultation meeting over Zoom. The purpose of this meeting will be to allow us to formally outline the process going forward and the detailed submission requirements, as well as to provide an opportunity to discuss next steps.

Please provide me with a list of dates and times your team will be available for this meeting, and I will make the necessary arrangements.

If you have any questions, please let me know.

Thank you,
Amy

Amy Shanks, M.PL.
Development Planner
Planning and Development Services

Regional Municipality of Niagara
1815 Sir Isaac Brock Way, PO Box 1042
Thorold, Ontario L2V 4T7
905-980-6000 ext. 3264
amy.shanks@niagararegion.ca

Mike Francis

From: McKenna, Tara (MNRF) <Tara.McKenna@ontario.ca>
Sent: September 13, 2018 4:10 PM
To: Kevin Trimble
Cc: Caitlin Port; Reimer, Elizabeth (MNRF); Hermansen, Helen (MNRF); 217-046 Waterford NER Update Wainfleet; Ed Lamb
Subject: RE: Law Crushed Stone Extension SE wetland status

Hi Kevin,

Helen has reviewed the information below, and based on our discussions, we can offer the following comments:

In this case, we can update the wetland database and identify this wetland as “un-evaluated”. Based on the information you’ve provided, this wetland would score below the threshold of points required to rank it as a PSW. Additionally, because it’s further than 750m away from other PSW wetlands, it does not meet the threshold to be complexed with PSW wetlands in the area.

Please note, however, that wetland assessments and evaluations are considered open files, subject to change as more information becomes available or because of changes to the wetland itself. If any new SAR observations or other relevant information becomes available, we may recommend that an evaluation record be completed for this area in support of an ARA application.

Please let us know if you have any questions.

Best regards,
Tara

Tara McKenna, M.Pl.
District Planner

Ministry of Natural Resources and Forestry, Guelph District
1 Stone Road West
Guelph ON, N1G 4Y2
(P) 519-826-4912
(F) 519-826-4929
email: tara.mckenna@ontario.ca

From: Kevin Trimble [mailto:kevin@rsenviro.ca]
Sent: September-12-18 1:56 PM
To: McKenna, Tara (MNRF)
Cc: Caitlin Port; Reimer, Elizabeth (MNRF); Hermansen, Helen (MNRF); 217-046 Waterford NER Update Wainfleet; Ed Lamb
Subject: RE: Law Crushed Stone Extension SE wetland status

Hi Tara,

Just thought I’d ping to see if the info you sent was adequate for you to complete your work on that SE wetland ?

Also, I was wondering if it would be worth touching base again soon to rehash your final determinations for each wetland area we'd discussed/walked .

Kevin Trimble M.Sc.

Senior Advisor

RiverStone Environmental Solutions Inc.

47 Quebec Street, Bracebridge Ontario, P1L 2A5

Email: kevin@rsenviro.ca

Office 705.645.9887 ext. 203 | Cell 705.394.4045 | Fax 888.857.4979

Southern Ontario Office 1-866-776-7160

www.rsenviro.ca

From: Kevin Trimble
Sent: August 28, 2018 2:08 PM
To: 'McKenna, Tara (MNRF)' <Tara.McKenna@ontario.ca>
Cc: James Parkin <jparkin@mhbcplan.com>; Reimer, Elizabeth (MNRF) <Elizabeth.Reimer@ontario.ca>; Hermansen, Helen (MNRF) <helen.hermansen@ontario.ca>
Subject: RE: Law Quarry Extension SE wetland status

Hi Tara,

The following is an overview of what we've done in that southeast wetland to date. Our field staff are OWES certified and utilize OWES for wetland delineation, in addition to ELC characterization. OWES is also drawn on for the general assessment of existing conditions and significant features/functions associated with wetlands. However, we do not generally conduct OWES wetland evaluations when we are retained by a proponent, since agency staff most often prefer to handle those separately (with exceptions).

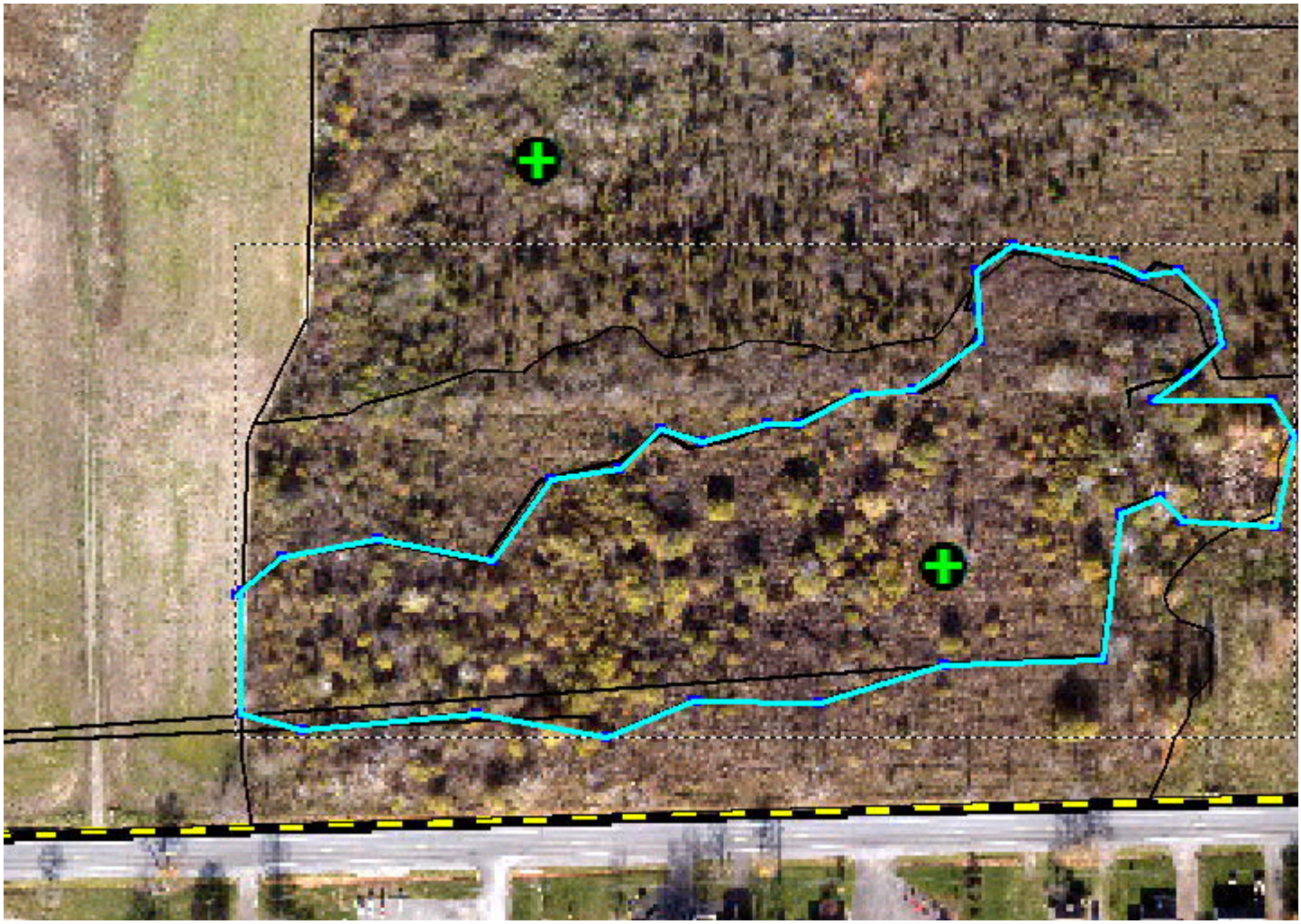
We have assessed the wetland in the southeast corner of the property on several occasions in 2017 and 2018 for flora, fauna, and we have walked and mapped the observed vegetation community boundaries. Although the southeastern wetland is separated by an annual row crop field a good distance (more than 900 m) from the wetlands associated with the PSW to the north, we continued to assess it as a distinct unit using OWES protocol (and ELC) as well.

So far our observations reveal that the SE wetland differs in form and function from the PSW and we have not observed any surface water connections. The wetland is situated within a rectangular-shaped vegetated area that was an old homestead now left fallow with mixed thickets, old orchard, and cultural woodland patches surrounding it. The combination of shallow flat bedrock (often observed exposed), and the anthropogenic disturbance (historical ploughing, gardening, dug pond, foundations, thick areas of invasive buckthorns, apple, pear, sweet cherry, and multiflora rose bushes) allows some shallowly indented areas of the flat landscape to collect water for long periods of time. Preliminary information suggests this feature is isolated from groundwater or surface water connections (likely perched on shallow bedrock), but the hydrogeological assessment is ongoing at this time.

As a seasonally-inundated area, this feature supports facultative wetland plants, such as Southern Arrowwood (*Viburnum dentatum*), Large Gray Willow (*Salix atrocinerea;* an exotic), White Meadowsweet (*Spirea alba*), White Elm (*Ulmus Americana*), Devil's Beggarsticks (*Bidens frondosa*, Invasive), Fox Sedge (*Carex vulpinoidea*) and Dudley's Rush (*Juncus dudleyi*). Some smaller interior patches support obligate wetland species such as Hop Sedge (*Carex lupulina*), Floating Manna Grass (*Glyceria septentrionalis*), and Blunt Spikerush (*Eleocharis obtusa).* There is also an oval-shaped dug pond overgrown at the edges that was observed to be permanently inundated and dominated by cattails (*Typha angustifolia*) throughout. The pond is situated to the southeast of the wetland and is incorporated into the entire wetland boundary.

Our wildlife and SAR surveys have documented Western Chorus Frog breeding in the shallow marsh communities, and early successional bird habitat on this portion of the property; therefore, impacts to these features and their vegetated buffers will be considered as we continue our studies. Below is a screenshot of the preliminary wetland boundaries we have from our coarse data. Our GIS tech is in training but we can follow up with a shapefile if that would help you. Also note that spoon-leafed moss were found adjacent to Biederman Rd., outside and just northeast of this wetland area.

Thanks again for MNRF's continued guidance with this project and let us know if you have any questions.



Kevin Trimble M.Sc.
Senior Advisor ° ∘ <°)))))><

RiverStone Environmental Solutions Inc. ><(((((°> ° °
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www.rsenviro.ca

From: McKenna, Tara (MNRF) <Tara.McKenna@ontario.ca>
Sent: August 14, 2018 10:10 AM
To: Kevin Trimble <kevin@rsenviro.ca>
Cc: James Parkin <jparkin@mhbcplan.com>; Reimer, Elizabeth (MNRF) <Elizabeth.Reimer@ontario.ca>; Hermansen, Helen (MNRF) <helen.hermansen@ontario.ca>
Subject: RE: Law Quarry Extension update

Hi Kevin,

I hope your summer is going well! I was touching base with Helen out of the Vineland office about the status of the wetland boundaries for this file. Regarding the wetlands in the southeastern portion of the site, has or will the project team be evaluating it as per OWES?

Evaluating this wetland as per OWES would help to inform its status as PSW or non-PSW for the purposes of reviewing this application under provincial policy.

Let me know if you want to discuss further.

Best,
Tara

Tara McKenna, M.Pl.
District Planner

Ministry of Natural Resources and Forestry, Guelph District
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From: Kevin Trimble [mailto:kevin@rsenviro.ca]
Sent: March-29-18 7:03 AM
To: Reimer, Elizabeth (MNRF); McKenna, Tara (MNRF)
Cc: James Parkin; Caitlin Port
Subject: Law Quarry Extension update

Elizabeth and Tara,

Further to the meeting that Bill Kester and Tristan Knight attended with you earlier this year, and per your request, please find attached a summary of findings to date from 2017 and our workplan for 2018.

Please note that the farm in the northeast corner of the proposed extension area, which is excluded from the project in the attached figures, has now been included in the proponent's land assemblage and our mapping and field scope will be updated in the near future to reflect this.

Please contact me if you have questions or suggestions.

Kevin Trimble M.Sc.
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From: Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>
Sent: February 5, 2021 8:54 AM
To: Glenn Cunnington
Cc: 217-046 Waterford NER Update Wainfleet; Kevin Trimble; Bev Wicks
Subject: MECP SARB Review: IGF Law Crushed Stone License Expansion Project

Hi Glenn,

Below are Ministry of Environment Conservation and Parks (MECP) Species at Risk Branches (SARB) comments and suggestions regarding the information Gathering Form (IGF) submitted for the Law Crushed Stone License Expansion Project.

General Comments

- Please state why Massasauga rattlesnake has not been examined in more detail in Table 3 and 4. They are known to occur in the wetland to the north of the subject property so it is reasonable that Massasauga rattlesnake could occur here and therefore have protected habitat within the subject property. It is recommended that Massasauga rattlesnake be examined Tables 3 and 4.

Section 3 Table 1

- The detailed description of the methodology for the site clearing, grubbing and beaming states that it "will be phased to minimize the extent of disturbed area on the property within the license boundary". Please clarify what is meant by "phased" as that seems to suggest these activities may be ongoing over the lifetime of the project but the time period for this activity is stated to be three months.
- If possible, provide a map of the potential phases and their locations/areas. The main intent of the map would be to indicate where and when extraction and clearing might commence to gage when impacts to Species at Risk (SAR) may occur over time.
- Please provide details on the amount of material to be extracted and the expected depth of the final extraction area relative to the current ground level. If possible, please also provide hydrology reports related to the potential impacts to the water table.
- It is stated that rehabilitation will occur on a progressive basis. Please provide details on what the progressive rehabilitation will consist of and what will trigger an area to be rehabilitated.

Section 4 Table 2

General Comment

- Please provide more details related to the search effort of each species. It is recommended specific details be included such as and not limited to: number of surveyors, timing of surveys and number of survey stations or points.

Little Brown Bat, Northern Long-eared Bat

- Please state if any acoustic monitoring was completed in addition to the snag/cavity tree surveys conducted for bats.

Massasauga

- It is stated that "complete protocol (i.e., 2 years of surveys) were not completed as consultation with MNRF after 2017 and initial 2018 surveys concluded that additional surveys were not required". Please include this consultation with the MNRF as an attachment to the IGF.

- Please confirm if only emergence surveys where performed in 2018 and only visual encounter surveys where performed in 2017. Please state if any coverboard surveys where performed.

  Spoon-leaved Moss
- It is unclear what areas where searched using targeted surveys and how they where searched. Please provide additional details on the methods used for the species-specific surveys and what areas where searched and considered to have similar habitat conditions.

  Eastern Meadowlark and Bobolink
- The attached map (Figure A) dose not include the survey location as stated in the search effort column. Please revise the attached map to include the survey locations.

Section 4 Table 3

General Comments

- For species that have been listed as absence at or near the proposed activity location please include more information in each of the subsequent rows. For example, in "Description of habitat features on site" it could be stated that the habitat was surveyed for but none of the habitat requirements where found on site.
- Please note that the presence/ absence question asks if species or habitat at or near the proposed activity location. Where observations of species have occurred nearby it is likely that the species could be present (especially true to avian species) but the habitat might not be. These species should still be considered present despite as lack of current observations or habitat.
- During a standard review of the subject property the Species at Risk Branch identified additional SAR which are known to occur on or adjacent to the subject property. Please examine these species (listed below) in the IGF.
    - Barn Swallow (*Hirundo rustica*);
    - Bank Swallow (*Riparia riparia*);
    - Blanding's Turtle (*Emydoidea blandingii*);
    - Spotted Turtle (*Clemmys guttata*).

  Eastern Whip-poor-will
- The IGF states that the "locations and dates of observations are provided on the attached figure". The figure only includes the location of these observations and not the date. Please include the date in the IGF table and other prudent details about the Eastern Whip-poor-will observations.
- Please provide mapping of the different categories of Eastern Whip-poor-will habitat which occur within Subject Property overlapping it with the proposed extraction areas.

  Spoon-leaved Moss
- Please provide mapping of critical habitat of Spoon-leaved Moss within the Subject Property overlapping it with the proposed extraction areas.
- The Federal Recovery Strategy for Spoon-leaved Moss suggests that they occur and depend on areas which are at least seasonally moist or flooded. Given this information please examine how changes to the water table and local moisture regime as a result of extraction below the water table could impact Spoon-leave Moss.

Section 6 Table 4

Eastern Whip-poor-will

- Please state the amount (in area) of each category of Eastern Whip-poor-will habitat that will be impacted by the proposed activities. Please also explore how the function of reach category of habitat will be impacted.

  Spoon-leaved Moss

- Please state the amount (in area) of critical habitat of Spoon-leaved Moss habitat that will be impacted by the proposed activities.
- While it is understood that the area occupied by the moss will be avoided the habitat which is adjacent to these species which support it and would also be protected. Please examine the impacts to critical habitat in these areas.

I look forward to receiving an updated IGF addressing the comments and recommendations above.

Regards,

Shamus Snell
A/ Management Biologist
Species at Risk Branch
Ministry of Environment, Conservation and Parks
Email: shamus.snell@ontario.ca

From: Glenn Cunnington <glenn@rsenviro.ca>
Sent: January 28, 2021 3:51 PM
To: Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>
Cc: 217-046 Waterford NER Update Wainfleet <217-046@rsenviro.ca>; Kevin Trimble <kevin@rsenviro.ca>; Bev Wicks <bev@rsenviro.ca>
Subject: RE: Information Gathering Form (IGF) - Township of Wainfleet

Hi Shamus,

Thank you for your response. Please accept this email as confirmation that our request for review on this file is still active and we are still seeking a response.

Best regards,

Glenn
--
Glenn Cunnington, Ph.D., Can-CISEC
Senior Ecologist | Species at Risk Specialist
RiverStone Environmental Solutions Inc.
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From: Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>
Sent: January 28, 2021 3:40 PM
To: Glenn Cunnington <glenn@rsenviro.ca>
Cc: 217-046 Waterford NER Update Wainfleet <217-046@rsenviro.ca>; Kevin Trimble <kevin@rsenviro.ca>; Bev Wicks <bev@rsenviro.ca>
Subject: Information Gathering Form (IGF) - Township of Wainfleet

Hi Glenn,

Due to a high volume of requests received during the transition of the Endangered Species Act from the Ministry of Natural Resources and Forest (MNRF) to the Ministry of Environment, Conservation and Parks (MECP) and work restrictions and delays as a result of COVID-19 a number of requests which came into our office during that time may not have been responded to. I am working though some of these requests to ensure that someone has reached out to you and if not to check to see if your request for review is still active and if you would still like a response.

My apologies if no one from our office has reached out to you sooner.

Regards,

Shamus Snell
A/ Management Biologist
Species at Risk Branch
Ministry of the Environment, Conservation and Parks
Email: shamus.snell@ontario.ca

From: Glenn Cunnington <glenn@rsenviro.ca>
Sent: September 1, 2020 3:16 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: 217-046 Waterford NER Update Wainfleet <217-046@rsenviro.ca>; Kevin Trimble <kevin@rsenviro.ca>; Bev Wicks <bev@rsenviro.ca>
Subject: RE: Information Gathering Form (IGF) - Township of Wainfleet

Hi Mallory,

I am just following up on the IGF submitted on February 25, 2020 associated Waterford Sand and Gravel Ltd.'s application in the Township of Wainfleet. If you could provide an update on who the Management Biologist is that has been assigned to this file and/or when we can anticipate receiving a response from MECP it would be appreciated.

Best regards,

Glenn
--
Glenn Cunnington, Ph.D., Can-CISEC
Senior Ecologist | Species at Risk Specialist

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Please be advised that due to the evolving impact of COVID-19, RiverStone's office is closed to visitors effective Tuesday, March 17 @ 12:30 p.m. While the office will be closed, RiverStone staff are still available to assist clients and are working either remotely from home or in the controlled office environment. We can be reached via our work email or info@rsenviro.ca.

We always welcome the opportunity to connect with you.

From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: February 25, 2020 2:17 PM
To: Glenn Cunnington <glenn@rsenviro.ca>; Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: 217-046 Waterford NER Update Wainfleet <217-046@rsenviro.ca>; Ed Lamb <elamb@waterfordgroup.ca>; Kevin Trimble <kevin@rsenviro.ca>; Caitlin Port <cport@mhbcplan.com>
Subject: RE: Information Gathering Form (IGF) - Township of Wainfleet

Hi Glenn,

Thank you for your email.

A MECP Management Biologist will review this file, and will follow up with you on IGF.

Thanks,

Mallory Nadon,
for Permissions and Compliance Section
Species at Risk Branch
Ministry of the Environment, Conservation and Parks

From: Glenn Cunnington <glenn@rsenviro.ca>
Sent: February 25, 2020 1:08 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: 217-046 Waterford NER Update Wainfleet <217-046@rsenviro.ca>; Ed Lamb <elamb@waterfordgroup.ca>; Kevin Trimble <kevin@rsenviro.ca>; Caitlin Port <cport@mhbcplan.com>
Subject: Information Gathering Form (IGF) - Township of Wainfleet

Good afternoon,

Waterford Sand and Gravel Ltd. is in the process of seeking approvals under the *Aggregate Resources Act* for a proposed expansion of an existing license for extraction below the water table in the Township of Wainfleet. As part of this

process, RiverStone has prepared an Information Gathering Form (IGF) and associated mapping detailing the results of surveys for endangered and threatened species on the lands proposed for the expansion.

Please contact me should you have any questions.

Best regards,

Glenn
--
Glenn Cunnington, Ph.D., Can-CISEC
Senior Ecologist | Species at Risk Specialist
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Appendix 3. Representative Photographs

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Photo 1. Representation photo of Cultural Meadow Community (CUM1) (May 8, 2017).

Photo 2. Cultural Thicket (CUT2) located (April 26, 2018).

Photo 3. Upland Deciduous Forest (FOD) forest conditions in the north portion of the study area (June 21, 2017).

Photo 4. Spring field conditions of OAGM1 vegetation community (May 8, 2017).

Photo 5. Spring conditions of Deciduous Swamp (SWD) community located in the north portion of the study area (May 8, 2017).

Photo 6. Thicket Swamp (SWT) community located in the southeast corner of the site (September 14, 2017).

Photo 7. Representative photograph of Spoon Leaved Moss located in the northwest portion of the study area (May 7, 2017).

Photo 8. Debris piled in the north portion of the study area that provides potential snake habitat (August 10, 2017).

Photo 9. Basking snake having emerged from hibernation habitat along the Onondaga Escarpment Brow (April 26, 2018).

Photo 10. Onondaga Escarpment Brow located in the north portion of the study area (April 26, 2018).

Appendix 4. Assessment of Endangered and Threatened Species

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Habitat-based Approach

Properly assessing whether an area is likely to contain Endangered or Threatened species for the purposes of determining whether a proposed development is likely to have a negative impact is becoming more difficult as the number of listed species increases. Approaches that depend solely on documenting the presence of individuals of a species in an area almost always underrepresent the biodiversity actually present because of the difficulty of observing species that are usually rare and well camouflaged. Given these difficulties, and the importance of protecting habitats of Endangered and Threatened species, RiverStone's primary approach to site assessment is habitat-based. This means that our field investigations focus on *evaluating the potential for features within an area of interest to function as habitat for species considered potentially present*, *rather than searching for live specimens*. An area is considered potential habitat if it satisfies a number of criteria, usually specific to a species, but occasionally characteristic of a broader group (e.g., several turtles use sandy shorelines for nesting, multiple bat species use dead or dying trees for roosting habitat). Physical attributes of a site that can be used as indicators of its potential to function as habitat for a species include structural characteristics (e.g., physical dimensions of rock fragments or trees, water depth), ecological community (e.g., meadow marsh, rock barren), and structural connectivity to other habitat features required by the species. Species-specific habitat preferences and/or affinities are determined from status reports produced by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Cadman et al. (2007), published and unpublished documents, and direct experience.

Table 1 provides RiverStone's desktop screening and on-site assessment for Endangered and Threatened species. RiverStone measures species- and feature-specific distances from the boundaries of proposed lots or development area(s)—rather than from the boundary of the significant natural heritage feature—and refers to this area as *adjoining lands* (AL). Evaluating the likelihood of species' presence and the potential for negative impacts using this approach ensures that the Adjacent Lands test of the PPS will be met.

For the purposes of RiverStone's assessment, the *site* as shown in **Figure 1** is referred to as the Area of Interest (AOI) and the adjoining lands (AL) extents are depicted by the *study area* shown on the same figure.

Common Name[1]	Scientific Name	Step 1 (Desktop): Rationale for considering	Step 2 (Desktop): Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from aerial photography and other information sources indicate that potential habitat or communities might be present? Area of Interest (AOI)	Step 2 (Desktop): Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from aerial photography and other information sources indicate that potential habitat or communities might be present? Adjoining Lands (AL)	Step 3 (On Site): Potential and/or confirmed habitat documented during on-site assessment: Area of Interest (AOI)	Step 3 (On Site): Potential and/or confirmed habitat documented during on-site assessment: Adjoining Lands (AL)	Step 4: Is there potential for the species, its habitat, or ecological community to be negatively impacted by the activities that would be permissible within the AOI?
Endangered & Threatened (Provincially): status from Species at Risk in Ontario List (O Reg 230/08); updated August 2018							
Blanding's Turtle	*Emydoidea blandingii*	NHIC Databases	NO, suitable wetland and/or aquatic communities are absent.	YES, suitable wetland and/or aquatic communities may be present.	NO, potential habitat is absent from the AOI and it is very unlikely that species would move through AOI to reach areas of suitable habitat (i.e., the AOI is not situated between areas of potential habitat).	NO, suitable habitat not documented within a distance that would be impacted by the proposed development.	NO, see step 3.
Massasauga (Carolinian pop.)	*Sistrurus catenatus*	NHIC Databases	YES, forest communities are present.	YES, forest and wetland communities are present.	NO, individuals of this species were not detected during targeted onsite surveys. Communications with MNRF indicated this area is not known to contain this species.	NO, individuals of this species were not detected during targeted onsite surveys. Communications with MNRF indicated this area is not known to contain this species.	NO, see step 3.
Eastern Whip-poor-will	*Caprimulgus vociferus*	OBBA	YES, both natural and anthropogenic openings in canopy could provide suitable breeding and foraging habitat.	YES, both natural and anthropogenic openings in canopy could provide suitable breeding and foraging habitat.	YES, individuals documented during targeted onsite surveys.	YES, individuals documented during targeted onsite surveys.	YES.
Bobolink	*Dolichonyx oryzivorus*	OBBA	YES, suitable grassland or agricultural communities may be present.	YES, suitable grassland or agricultural communities may be present.	NO, suitable habitat is not present. Species was not documented during targeted onsite surveys.	NO, suitable habitat is not present. Species was not documented during targeted onsite surveys.	NO, see step 3.
Least Bittern	*Ixobrychus exilis*	NHIC Databases	NO, suitable wetland communities (e.g., cattail marsh) are absent.	YES, suitable wetland communities may be present.	NO, suitable wetland communities (e.g., cattail marsh) are not present within the AOI.	NO, suitable wetland communities were not documented within a distance that would be impacted by the development proposed within the AOI.	NO, see step 3.
Chimney Swift	*Chaetura pelagica*	OBBA	YES, dark sheltered hollow vertical structures (chimneys, smoke stacks, silos, etc.) suitable for nesting or roosting may be present.	YES, dark sheltered hollow vertical structures (chimneys, smoke stacks, silos, etc.) suitable for nesting or roosting may be present.	NO, suitable nesting structures were not documented within the AOI. Additionally, species not detected during onsite surveys.	NO, suitable nesting structures not documented within a distance that would be impacted by development within the AOI.	NO, see step 3.
Barn Swallow	*Hirundo rustica*	OBBA	YES, man-made or natural structures suitable for nesting may be present.	YES, man-made or natural structures suitable for nesting may be present.	NO, suitable nesting structures were not documented within the AOI. Additionally, species not detected during onsite surveys.	NO, while suitable man-made structures are present on AL, this species was not detected during targeted onsite surveys.	NO, see step 3.
Eastern Meadowlark	*Sturnella magna*	OBBA	YES, suitable grassland or agricultural communities may be present.	YES, suitable grassland or agricultural communities may be present.	NO, suitable habitat is not present. Species was not documented during targeted onsite surveys.	NO, suitable habitat is not present. Species was not documented during targeted onsite surveys.	NO, see step 3.
Bank Swallow	*Riparia riparia*	OBBA	YES, man-made or natural structures suitable for nesting may be present.	YES, man-made or natural structures suitable for nesting may be present.	NO, man-made or natural structures suitable for nesting are absent.	NO, while suitable man-made structures may be present on AL, this species was not detected during targeted onsite surveys.	NO, see step 3.
Yellow-breasted Chat	*Icteria virens*	NHIC Databases	YES, suitable early successional vegetation communities may be present.	YES, suitable early successional vegetation communities may be present.	NO, while the AOI does contain areas of dense shrubs in early successional communities, this species was not documented within the AOI during targeted onsite surveys.	NO, while suitable early successional vegetation communities may be present on AL, this species was not detected during targeted surveys.	NO, see step 3.
Piping Plover	*Charadrius melodus*	NHIC Databases	NO, suitable dry sandy or gravelly beaches are not present.	NO, suitable dry sandy or gravelly beaches are not present.	NO, suitable dry sandy or gravelly beaches are not present.	NO, suitable dry sandy or gravelly beaches are not present.	NO, see steps 2 and 3.
Eastern Small-footed Myotis	*Myotis leibii*	Range Map	NO, natural structures (e.g., talus slopes, rocky ridges, rock outcrops, cliff crevices, rock fields) suitable for roosting do not appear to be present.	NO, natural structures (e.g., talus slopes, rocky ridges, rock outcrops, cliff crevices, rock fields) suitable for roosting do not appear to be present.	NO, suitable roosting habitat not identified within the AOI.	NO, while the AL do contain structures in which this species may roost, they are not located within a distance that would be impacted by the proposed development.	NO, see step 3.

[1]Shaded rows denote species or communities for which negative impacts have been deemed possible.

Appendix 4: Table 1. Results of desktop screening and on-site assessment for Endangered and Threatened Species

Common Name[1]	Scientific Name	Step 1 (Desktop): Rationale for considering	Step 2 (Desktop): Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from aerial photography and other information sources indicate that potential habitat or communities might be present? Area of Interest (AOI)	Step 2 (Desktop): Adjoining Lands (AL)	Step 3 (On Site): Potential and/or confirmed habitat documented during on-site assessment Area of Interest (AOI)	Step 3 (On Site): Adjoining Lands (AL)	Step 4: Is there potential for the species, its habitat, or ecological community to be negatively impacted by the activities that would be permissible within the AOI?
Little Brown Bat	*Myotis lucifugus*	Range Map	YES, dark sheltered hollow vertical structures (e.g., large trees with cavities or rock crevices) suitable for gestating or roosting may be present.	YES, dark sheltered hollow vertical structures (e.g., large trees with cavities or rock crevices) suitable for gestating or roosting may be present.	NO, clusters of trees with snags/cavities were not documented. Most trees within the AOI are limited in size and do not exceed 25 cm DBH.	NO, while treed communities are present on AL, they are not located within a distance that would be impacted by development within the AOI.	NO, see step 3.
Northern Long-eared Bat	*Myotis septentrionalis*	Range Map	YES, dark sheltered hollow vertical structures (e.g., large trees with cavities or rock crevices) suitable for gestating or roosting may be present.	YES, dark sheltered hollow vertical structures (e.g., large trees with cavities or rock crevices) suitable for gestating or roosting may be present.	NO, clusters of trees with snags/cavities were not documented. Most trees within the AOI are limited in size and do not exceed 25 cm DBH.	NO, while treed communities are present on AL, they are not located within a distance that would be impacted by development within the AOI.	NO, see step 3.
Tri-colored Bat	*Perimyotis subflavus*	Range Map	YES, dark sheltered hollow vertical structures (e.g., trees with clusters of dead leaves [witches brooms]) suitable for gestating or roosting may be present.	YES, dark sheltered hollow vertical structures (e.g., trees with clusters of dead leaves [witches brooms]) suitable for gestating or roosting may be present.	NO, clusters of trees with 'witches brooms' were not documented. Most trees within the AOI are limited in size and do not exceed 25 cm DBH.	NO, while treed communities are present on AL, they are not located within a distance that would be impacted by development within the AOI.	NO, see step 3.
Butternut	*Juglans cinerea*	Range Map	YES, difficult to rule out without on-site assessment.	YES, difficult to rule out without on-site assessment.	NO, this species was not documented within the AOI during onsite assessments.	NO, this species was not documented within a distance that would be impacted by development within the AOI.	NO, see step 3.
Spoon-leaved Moss	*Bryoandersonia illecebra*	N/A	YES, difficult to rule out without on-site assessment.	YES, difficult to rule out without on-site assessment.	YES, while not within the known range for this species, individuals were identified during onsite surveys.	NO, no individuals of this species were identified within AL	YES.

[1]Shaded rows denote species or communities for which negative impacts have been deemed possible.

Appendix 5. Assessment of Significant Wildlife Habitat

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Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Seasonal Concentration Areas of Animals			
Waterfowl Stopover and Staging Areas (Terrestrial)	Fields with sheet water during Spring (mid March to May) Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. Agricultural fields with waste grains are commonly used by waterflow, these are not considered SWH unless they have spring sheet water available.	CUM1 , CUT1 Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	NO, while the ELC ecosites associated with this SWH category are present, areas were not flooded during spring months suggesting that this habitat is not present.
Waterfowl Stopover and Staging Areas (Aquatic)	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 abundance food supply (mostly aquatic invertebrates and vegetation in shallow water)	MAS1 , MAS2, MAS3, SAS1, SAM1, SAF1 , SWD1 , SWD2, SWD3, SWD4, SWD5, SWD6, SWD7	NO, while the ELC ecosites associated with this SWH category are present, these communities are limited in size compared to those present in the larger landscape. The limited size of these features suggests that this category of SWH is not present.
Shorebird Migratory Stopover Areas	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.	BBO1, BBO2, BBS1, BBS2, BBT1, BBT2, SDO1, SDS2, SDT1, MAM1 , MAM2, MAM3, MAM4, MAM5	NO, shorelines or seasonally flooded, muddy un-vegetated shorelines are not present.
Raptor Wintering Areas	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 wind swept with limited snow depth or accumulation. Eagle sites have open water, large trees and snags available for roosting.	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW. Bald Eagle: Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	NO, while forest and field communities are present, the extent of these communities are limited on the site compared to the surrounding landscape suggesting that features on the site do not provide this function.
Bat Hibernacula	Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. Active mine sites are not SWH. The locations of bat hibernacula are relatively poorly known.	Bat Hibernacula may be found in these ecosites: CCR1, CCR2, CCA1, CCA2. (Note: buildings are not considered to be SWH).	NO, the site does not contain ecosites associated with this SWH category.
Bat Maternity Colonies	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 (dominant trees > 80yrs old) deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees Female Bats prefer wildlife trees (snags) in early stages of decay, class 1-3 . 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.	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD, FOM, SWD, SWM.	NO, while forested communities are present in the study area, they do not contain a large number of snag/cavity trees. Additionally, trees within the forest communities are generally less than 25 cm DBH.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Turtle Wintering Areas	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.	Snapping and Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO. Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as overwintering habitat.	NO, while wetlands are present in the study area, they do not contain sufficient water depths to provide overwintering habitat for turtles.
Reptile Hibernaculum	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.	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1, FOC3.	YES, during onsite assessments, large numbers of eastern garter snakes were documented in early spring along the scarp located at the north end of the study area.
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	Any site or areas with exposed soil banks, sandy hills, borrow pits, steep slopes, and sand piles that are undisturbed or naturally eroding that is not a licensed/permitted aggregate area. Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation.	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles. Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1, CUT1, CUS1, BLO1, BLS1, BLT1, CLO1, CLS1, CLT1.	NO, while the study area does contain a scarp, this feature is not of sufficient height to provide nesting habitat for bank and cliff species.
Colonially - Nesting Bird Breeding Habitat Breeding Habitat (Tree/Shrubs)	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.	SWM2, SWM3, SWM5, SWM6, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7, FET1.	NO, while swamp communities are present within the study area, no evidence of colonial nests were identified during on site investigations.
Colonially - Nesting Bird Breeding Habitat (Ground)	Nesting colonies of gulls and terns are on islands or peninsulas (natural or artificial) associated with open water, marshy areas, lake or large river (two-lined on a 1;50,000 NTS map). Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.	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	NO, the study area lacks islands or peninsulas and nesting colonies were not identified during targeted breeding bird surveys.
Migratory Butterfly Stopover Areas	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 Erie or Lake Ontario. 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 with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. 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.	Combination of ELC Community Series; need to have present one Community Series from each land class: <u>Field:</u> CUM, CUT, CUS <u>Forest:</u> FOC, FOD, FOM, CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	NO, while the study area does contain field and forest communities, these areas do not contain an abundance of nectar plants nor were aggregations of butterflies documented during spring or fall onsite surveys.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Landbird Migratory Stopover Areas	Woodlots need to be > 10 ha in size and within 5 km of Lake Ontario. If multiple woodlands are located along the shoreline of those woodlands <2 km 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 location along the shore and located within 5 km of Lake Ontario are Candidate SWH.	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD.	NO, the study area lacks islands or peninsulas.
Deer Winter Congregation Areas	Woodlots will typically be >100 ha in size or if large woodlots are rarest in a planning area woodlots >50 ha. in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. Large woodlots > 100 ha 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. Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF	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.	NO, the study area does not contain deer winter congregation areas identified by MNRF.
Rare Vegetation Communities			
Cliffs and Talus Slopes	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	Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT	NO, the site does not contain ecosites associated with this SWH category.
Sand Barren	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	ELC Ecosites: SBO1, SBS1, SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always < 60%.	NO, the site does not contain ecosites associated with this SWH category.
Alvar	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 may be complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.	ALO1, ALS1, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2 Five Alvar Indicator Species: 1) Carex crawei, 2) Panicum philadelphicum, 3) Eleocharis compressa, 4) Scutellaria parvula, 5) Trichostema brachiatum These indicator species are very specific to Alvars within Ecoregion 6E	NO, the site does not contain ecosites associated with this SWH category.
Old Growth Forest	Old Growth forests are characterized by exhibiting the greatest number of old-growth characteristics, such as mature forest with large trees that has been undisturbed. Heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Forest Community Series: FOD, FOC, FOM, SWD, SWC, SWM	NO, while the study area does contain forest communities, these areas do not contain trees of sufficient size to suggest the presence of old growth forest.
Savannah	A Savannah is a tallgrass prairie habitat that has tree cover between 25–60%.	TPS1, TPS2, TPW1, TPW2, CUS2	NO, the site does not contain ecosites associated with this SWH category.
Tallgrass Prairie	Tallgrass Prairie is an open vegetation with less than < 25% tree cover, and dominated by prairie species, including grasses.	TPO1, TPO2	NO, the site does not contain ecosites associated with this SWH category.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Other Rare Vegetation Community	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M. The OMNRF/NHIC will have up to date listing for rare vegetation communities.	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.	NO, the site does not contain any rare vegetation communities.
Specialized Habitats for Wildlife			
Waterfowl Nesting Area	A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) 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. Upland areas should be at least 120 m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. Wood Ducks, Bufflehead, Common Goldeneye and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites.	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4 Note: includes adjacency to provincially Significant Wetlands	NO, while the study area does contain wetland communities and is adjacent to a PSW, nesting waterfowl were not documented during onsite assessments.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	NO, while the study area does contain wetland communities and is adjacent to a PSW, Bald Eagles or Osprey were not identified during onsite assessments.
Woodland Raptor Nesting Habitat	All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat. Interior habitat determined with a 200m buffer. In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	NO, while the study area does contain forested communities, no stick nests were identified during onsite assessments.
Turtle Nesting Areas	Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. For an area to function as a turtle nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	Exposed mineral soil (sand or gravel) areas adjacent (<100m) or within the following ELC Ecosites: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, BOO1	NO, suitable nesting habitat for turtles or evidence of turtle nesting activities were not documented within the study area.
Seeps and Springs	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system. Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.	Seeps/Springs are areas where groundwater 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.	NO, areas of groundwater coming to the surface were not documented within the study area during onsite assessments.
Amphibian Breeding Habitat (Woodland)	Presence of a wetland or pond >500 m^2 (about 25 m diameter) within or adjacent (within 120m) to a woodland (no minimum size). The wetland, lake or pond and surrounding forest, would be the Candidate SWH. 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.	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.	NO, while two of the listed frog species were identified at multiple survey stations, these species were not present in sufficient numbers (i.e., Call Level Codes of 3) to identify these areas as SWH.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Amphibian Breeding Habitat (Wetlands)	Wetlands and pools (including vernal pools) >500 m^2 (about 25 m 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.	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	NO, while three of the listed frog species were identified at multiple survey stations, these species were not present in sufficient numbers (i.e., Call Level Codes of 3) to identify these areas as SWH.
Woodland Area-Sensitive Bird Breeding Habitat	Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. Interior forest habitat is at least 200 m from forest edge habitat.	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD.	NO, while forested communities are present within the study area, only the 'edge' habitat is present. The larger forest community extends outside of the study area and contains the interior forest habitat associated with this SWH category.
Habitat for Species of Conservation Concern (not including Endangered or Threatened Species)			
Marsh Bird Breeding Habitat	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.	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, FEO1, BOO1. For Green Heron: All SW, MA and CUM1 sites.	NO, the ELC ecosites assoicated with this SWH category are not present within the study area.
Open Country Bird Breeding Habitat	Large grassland areas (includes natural and cultural fields and meadows) >30 ha 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.	CUM1, CUM2	NO, while the study area does contain cultural meadow communities, they are not of sufficient size to meet the criteria of this SWH category.
Shrub/Early Successional Bird Breeding Habitat	Large field areas succeeding to shrub and thicket habitats >30 ha in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e., no row-cropping, haying or livestock 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 lightly grazed pasturelands.	CUT1, CUT2, CUS1, CUS2, CUW1, CUW2. Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	NO, while one indicator species (Brown Thrasher) was observed in the north portion of the study area (stations 6 and 7), the observations were not indicative of confirmed nesting or breeding.
Terrestrial Crayfish	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish. Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed.	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, SWD, SWT, SWM, CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.	NO, terrestrial crayfish chimneys were not identified within the study area.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Ecoregion 6E	Candidate Significant Wildlife Habitat	ELC Ecosites	Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from available information sources and on-site assessment indicate that candidate SHW might be present?
Special Concern and Rare Wildlife Species	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	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. All plant and animal element occurrences (EO) within a 1 or 10 km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy	**See Table 2**
Animal Movement Corridors			
Amphibian Movement Corridors	Movement corridors between breeding habitat and summer habitat. 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.	Corridors may be found in all ecosites associated with water. Corridors will be determined based on identifying the significant breeding habitat for these species (see above).	NO, as no SWH amphibian breeding habitat (wetland) was identified in the study area, amphibian movement corridors are not present.

*as per Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (January 2015)

Common Name[1]	Scientific Name	Step 1 (Desktop): Rationale for considering species or ecological	Step 2 (Desktop): Do site-specific attributes (e.g., ecological system and landscape configuration) assessed from aerial photography and other information sources indicate that potential habitat or communities might be present?		Step 3 (On Site): Potential and/or confirmed habitat documented during on-site assessment		Step 4: Is there potential for the species, its habitat, or ecological community to be negatively impacted by the activities that would be permissible within the AOI?
			Area of Interest (AOI)	Adjoining Lands (AL)	Area of Interest (AOI)	Adjoining Lands (AL)	
Special Concern (Provincially): status from Species at Risk in Ontario List (O Reg 230/08); updated August 2018.							
Northern Map Turtle	*Graptemys geographica*	Herp Atlas	NO, suitable large rivers or lakes are not present.	NO, suitable large rivers or lakes are not present.	NO, suitable large rivers or lakes are not present.	NO, suitable large rivers or lakes are not present.	NO, see steps 2 and 3.
Eastern Musk Turtle	*Sternotherus odoratus*	Herp Atlas	YES, suitable wetland communities may be present.	YES, suitable wetland communities may be present.	NO, suitable wetland and/or aquatic communities are absent.	NO, suitable wetland and/or aquatic communities are absent.	NO, see step 3.
Snapping Turtle	*Chelydra serpentina*	Herp Atlas	YES, suitable wetland and/or aquatic communities may be present.	YES, suitable wetland and/or aquatic communities may be present.	NO, while wetlands are present they lack suitable water depths to support this species.	NO, suitable wetland communities are not present within a distance that would be impacted by development within the AOI.	NO, see step 3.
Eastern Ribbonsnake	*Thamnophis sauritus*	Herp Atlas	YES, open-canopy areas adjacent to wetlands are present.	YES, open-canopy areas adjacent to wetlands are present.	NO, species not identified during onsite surveys	POSSIBLE, while individuals of this species were not identified during onsite assessments, communities with the potential to function as habitat are located in the northern portion of the AL associated with the PSW.	NO, potential habitat is absent from the AOI and it is very unlikely that species would move through AOI to reach areas of suitable habitat (i.e., the AOI is not situated between areas of potential habitat).
Canada Warbler	*Cardellina canadensis*	OBBA	YES, difficult to rule out without on-site assessment.	YES, areas of wet forest or thicket swamp suitable for nesting (i.e., with well-developed shrub layers) may be present.	NO, species not detected during targeted surveys.	NO, species not detected during targeted surveys.	NO, see step 3.
Common Nighthawk	*Chordeiles minor*	Range Map	YES, both natural and anthropogenic openings in canopy could provide suitable breeding and foraging habitat.	YES, both natural and anthropogenic openings in canopy could provide suitable breeding and foraging habitat.	NO, species not detected during targeted surveys.	NO, species not detected during targeted surveys.	NO, see step 3.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Range Map	YES, open to semi-open communities with mature trees for nesting may be present.	YES, open to semi-open communities with mature trees for nesting may be present.	NO, species not detected during targeted surveys.	NO, species not detected during targeted surveys.	NO, see step 3.
Golden-winged Warbler	*Vermivora chrysoptera*	Range Map	YES, early successional vegetation communities with the physical structure necessary to provide breeding habitat may be present.	YES, early successional vegetation communities with the physical structure necessary to provide breeding habitat may be present.	NO, while early successional vegetation communities are present, this species was not detected during targeted onsite surveys.	NO, while early successional vegetation communities are present, this species was not detected during targeted onsite surveys.	NO, see step 3.
Wood Thrush	*Hylocichla mustelina*	OBBA	YES, areas with well-developed understorey within deciduous and/or mixed forest may be present.	YES, areas with well-developed understorey within deciduous and/or mixed forest may be present.	YES, species was detected during targeted onsite surveys.	YES, species was detected during targeted onsite surveys.	YES.
Eastern Wood Pewee	*Contopus virens*	OBBA	NO, suitably sized area of intact forest is absent.	YES, suitably sized area of intact forest is present.	YES, species was detected during targeted onsite surveys.	YES, species was detected during targeted onsite surveys.	YES.
Bald Eagle	*Haliaeetus leucocephalus*	Range Map	NO, large, potential nesting trees adjacent to open water are absent.	YES, large, potential nesting trees adjacent to open water may be present.	NO, species not detected during targeted surveys, and no stick nests were observed.	NO, species not detected during targeted surveys, and no stick nests were observed.	NO, see step 3.
Monarch	*Danaus plexippus*	Range Map	YES, both natural and anthropogenic openings in canopy could provide suitable breeding and foraging habitat.	YES, both natural and anthropogenic openings in canopy could provide suitable breeding and foraging habitat.	YES, Milkweed (Asclepias syriaca) is present; therefore, these areas could function as suitable breeding and foraging habitat.	YES, Milkweed (Asclepias syriaca) is present; therefore, these areas could function as suitable breeding and foraging habitat.	YES.

[1]Shaded rows denote species or communities for which negative impacts have been deemed possible.

Appendix 6. List of Vascular Plant Species Recorded during Targeted Surveys and/or Incidentally

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Appendix 6. Flora documented within the study area between 2017 and 2019.

SCIENTIFIC NAME	COMMON NAME	CC[1]	CW[1]	G_RANK[3]	S_RANK[4]	COSEWIC[5]	SARA STATUS[6]	SARA SCHEDULE[6]	SARO[7]	TALLGRASS PRAIRIE SPECIES (Rodger, 1998)[10]	TALLGRASS SAVANNAH SPECIES (Rodger, 1998)[10]	TALLGRASS ECOLOGY (SEE LEGEND) (Rodger, 1998)[10]	CAROLINIAN ZONE (OLDHAM 2017)[8]	Vegetation Observed
Acer negundo	Manitoba Maple	0	-2	G5	S5								C	X
Acer saccharum	Sugar Maple	4	3	G5	S5								C	X
Achillea millefolium	Common Yarrow	*	3	G5	SNA								IX	X
Agrostis gigantea	Redtop	*	0	G4G5	SNA								IC	X
Ambrosia artemisiifolia	Common Ragweed	0	3	G5	S5								C	X
Asclepias syriaca	Common Milkweed	0	5	G5	S5								C	X
Betula papyrifera	Paper Birch	2	2	G5	S5								C	X
Cornus sericea	Red-osier Dogwood	2	-3	G5	S5								C	X
Daucus carota	Wild Carrot	*	5	GNR	SNA								IC	X
Euthamia graminifolia	Grass-leaved Goldenrod	2	-2	G5	S5								C	X
Fraxinus pennsylvanica	Green Ash	3	-3	G5	S4								C	X
Glechoma hederacea	Ground-ivy	*	3	GNR	SNA								IC	X
Hypericum perforatum	Common St. John's-wort	*	5	GNR	SNA								IC	X
Juglans nigra	Black Walnut	5	3	G5	S4?								C	X
Juniperus virginiana	Eastern Red Cedar	4	3	G5	S5								C	X
Lepidium campestre	Field Peppergrass	*	5	GNR	SNA								IC	X
Leucanthemum vulgare	Oxeye Daisy	*	5	GNR	SNA								IC	X
Lotus corniculatus	Garden Bird's-foot Trefoil	*		GNR	SNA								IC	X
Malus pumila	Common Apple	*	5	G5	SNA								IC	X
Melilotus albus	White Sweet-clover	*	3	G5	SNA								IC	X
Phleum pratense	Common Timothy	*	3	GNR	SNA								IC	X
Plantago major	Common Plantain	*	-1	G5	SNA								IC	X
Poa pratensis ssp. pratensis	Kentucky Bluegrass	0	1	G5T5	SNA								IC	X
Populus tremuloides	Trembling Aspen	2	0	G5	S5								C	X
Prunus virginiana	Chokecherry	2	1	G5	S5									X
Quercus rubra	Northern Red Oak	6	3	G5	S5								C	X
Ranunculus acris	Common Buttercup	*	-2	G5	SNA								IC	X
Rhamnus cathartica	European Buckthorn	*	3	GNR	SNA								IC	X
Rhus typhina	Staghorn Sumac	1	5	G5	S5								C	X
Salix eriocephala	Cottony Willow	4	-3	G5	S5								C	X
Scirpus atrovirens	Dark-green Bulrush	3	-5	G5?	S5								C	X
Solidago nemoralis ssp. nemoralis	Gray-stemmed Goldenrod	2	5	G5T5	S5								C	X
Tilia americana	Basswood	4	3	G5	S5								C	X
Toxicodendron radicans var. rydbergii	Western Poison Ivy	0	0	G5	S5								C	X
Tragopogon dubius	Yellow Goatsbeard	*	5	GNR	SNA								IC	X
Trifolium pratense	Red Clover	*	2	GNR	SNA								IC	X
Ulmus americana	White Elm	3	-2	G5	S5								C	X
Verbascum thapsus	Common Mullein	*	5	GNR	SNA								IC	X
Viburnum opulus ssp. opulus	Cranberry Viburnum	*	0	GNR	SNA								IX	X
Vicia cracca	Tufted Vetch	*	5	GNR	SNA								IX	X
Abutilon theophrasti	Velvetleaf	*	4	GNR	SNA								IC	X
Acer saccharinum	Silver Maple	5	-3	G5	S5								C	X
Ageratina altissima	White Snakeroot	5	3	G5	S5								C	X
Agrimonia gryposepala	Hooked Agrimony	2	2	G5	S5								C	X
Agrostis perennans	Upland Bentgrass	5	1	G5	S4?								U	X
Alliaria petiolata	Garlic Mustard	*	0	GNR	SNA								IC	X
Amelanchier interior	Inland Serviceberry			GNA	SU								R	X
Arabidopsis lyrata ssp. lyrata	Lyre-leaved Rockcress	7	4	G5	S4									X
Arctium lappa	Great Burdock	*	0	GNR	SNA								IU	X
Arctium minus	Common Burdock	*	5	GNR	SNA								IC	X
Artemisia biennis	Biennial Wormwood	*	-2	G5	SNA								IR	X
Artemisia vulgaris	Common Wormwood	*	5	GU	SNA								IX	X
Asclepias incarnata	Swamp Milkweed	6	-5	G5	S5								C	X
Barbarea vulgaris	Bitter Wintercress	*	0	GNR	SNA								IC	X
Berberis thunbergii	Japanese Barberry	*	4	GNR	SNA								IX	X
Bidens frondosa	Devil's Beggarticks	3	-3	G5	S5								C	X
Calamagrostis canadensis var. canadensis	Bluejoint Reedgrass	4	-5	G5T5	S5								C	X
Capsella bursa-pastoris	Common Shepherd's Purse	*	1	GNR	SNA								IC	X
Cardamine hirsuta	Hairy Bittercress	*	3	GNR	SNA								IU	X
Carex annectens	Yellow-fruited Sedge	9	-3	G5	S2								R	X
Carex blanda	Woodland Sedge	3	0	G5	S5								C	X
Carex brunnescens ssp. brunnescens	Brownish Sedge	7	-3	G5T5	SU								U	X
Carex comosa	Bearded Sedge	5	-5	G5	S5								C	X
Carex crinita	Fringed Sedge	6	-4	G5	S5								C	X
Carex cristatella	Crested Sedge	3	-4	G5	S5								C	X
Carex gracillima	Graceful Sedge	4	3	G5	S5								C	X
Carex granularis	Limestone Meadow Sedge	3	-4	G5	S5								C	X
Carex gynandra	Nodding Sedge	7	-4	G5	S5								R	X
Carex hystericina	Porcupine Sedge	5	-5	G5	S5								C	X
Carex lacustris	Lake Sedge	5	-5	G5	S5								C	X
Carex laxiflora	Loose-flowered Sedge	5	0	G5	S5								C	X
Carex leptalea	Bristle-stalked Sedge	8	-5	G5	S5								U	X
Carex lupulina	Hop Sedge	6	-5	G5	S5								C	X
Carex molesta	Troublesome Sedge	5	2	G4	S4S5								C	X
Carex praegracilis	Clustered Field Sedge	*	-3	G5	SNA								IU	X
Carex radiata	Eastern Star Sedge	4	5	G5	S5								C	X
Carex sparganioides	Burreed Sedge	5	0	G5	S4S5								C	X
Carex stipata	Awl-fruited Sedge	3	-5	G5	S5								C	X
Carex stricta	Tussock Sedge	4	-5	G5	S5								C	X
Carex swanii	Swan's Sedge	7	3	G5	S4					X		1,3,6,Sa	U	X
Carex tenera	Tender Sedge	4	-1	G5	S5								C	X
Carex tribuloides	Blunt Broom Sedge	5	-4	G5	S4								C	X
Carex vulpinoidea	Fox Sedge	3	-5	G5	S5								C	X
Carya cordiformis	Bitternut Hickory	6	0	G5	S5								C	X
Carya ovata	Shagbark Hickory	6	3	G5	S5								C	X
Centaurea nigrescens	Short-fringed Knapweed		5	GNR	SNA								IX	X
Cerastium fontanum	Common Mouse-ear Chickweed	*	3	GNR	SNA								IC	X
Chelidonium majus	Greater Celadine	*	5	GNR	SNA								IU	X
Cicuta maculata var. maculata	Spotted Water-hemlock	6	-5	G5T5	S5								C	X
Cinna arundinacea	Stout Woodreed	7	-3	G5	S4								C	X

Appendix 6. Flora documented within the study area between 2017 and 2019.

SCIENTIFIC NAME	COMMON NAME	CC[1]	CW[1]	G_RANK[3]	S_RANK[4]	COSEWIC[5]	SARA STATUS[6]	SARA SCHEDULE[6]	SARO[7]	TALLGRASS PRAIRIE SPECIES (Rodger, 1998)[10]	TALLGRASS SAVANNAH SPECIES (Rodger, 1998)[10]	TALLGRASS ECOLOGY (SEE LEGEND) (Rodger, 1998)[10]	CAROLINIAN ZONE (OLDHAM 2017)[8]	Vegetation Observed
Cirsium arvense	Canada Thistle	*	3	GNR	SNA								IC	X
Cornus obliqua	Silky Dogwood	5	-4	G5T5	S5								C	X
Cornus racemosa	Grey Dogwood	2	-2	G5?	S5								C	X
Crataegus punctata	Dotted Hawthorn	4	5	G5	S5								C	X
Crataegus succulenta var. succulenta	Fleshy Hawthorn	4	5	G5TNR	S5								C	X
Dactylis glomerata	Orchard Grass	*	3	GNR	SNA								IC	X
Danthonia spicata	Poverty Oatgrass	5	5	G5	S5								C	X
Dianthus armeria	Deptford Pink	*	5	GNR	SNA								IC	X
Dipsacus fullonum	Common Teasel	*	5	GNR	SNA								IC	X
Draba verna	Spring Draba	*	5	GNR	SNA								IU	X
Elymus repens	Quackgrass	*	3	GNR	SNA								IC	X
Elymus virginicus var. virginicus	Virginia Wildrye	5	-2	G5T5	S5								C	X
Epilobium ciliatum ssp. ciliatum	Northern Willowherb	3	3	G5T5	S5								C	X
Equisetum arvense	Field Horsetail	0	0	G5	S5								C	X
Erigeron annuus	Annual Fleabane	0	1	G5	S5								C	X
Erigeron philadelphicus	Philadelphia Fleabane	1	-3	G5	S5								C	X
Erigeron strigosus	Rough Fleabane	0	1	G5	S5								C	X
Erythronium americanum	Yellow Trout Lily	5	5	G5	S5									X
Euonymus obovatus	Running Strawberry-bush	6	5	G5	S4								C	X
Fagus grandifolia	American Beech	6	3	G5	S4								C	X
Festuca rubra ssp. rubra	Red Fescue	*	1	G5T5	SNA								IC	X
Fragaria virginiana ssp. glauca	Smooth Wild Strawberry	2	1	G5T5	SU									X
Fraxinus americana	White Ash	4	3	G5	S4								C	X
Galium aparine	Common Bedstraw	4	3	G5	S5								C	X
Galium tinctorium	Dyer's Bedstraw	5	-5	G5	S5								U	X
Galium triflorum	Three-flowered Bedstraw	4	2	G5	S5								C	X
Geranium maculatum	Spotted Geranium	6	3	G5	S5								C	X
Geum canadense	Canada Avens	3	0	G5	S5								C	X
Geum laciniatum	Rough Avens	4	-3	G5	S4								C	X
Glyceria grandis	Tall Mannagrass	5	-5	G5	S5								U	X
Glyceria septentrionalis	Eastern Mannagrass	8	-5	G5	S4								U	X
Glyceria striata	Fowl Mannagrass	3	-5	G5	S5								C	X
Humulus lupulus	Common Hop	*	3	G5	SU								R	X
Juncus articulatus	Jointed Rush	5	-5	G5	S5								U	X
Juncus dudleyi	Dudley's Rush	1	0	G5	S5								C	X
Juncus effusus	Soft Rush	4	-5	G5T5	S5?									X
Lactuca canadensis	Canada Lettuce	3	2	G5	S5								U	X
Lemna minor	Small Duckweed	2	-5	G5	S5								C	X
Leonurus cardiaca	Common Motherwort	*	5	GNR	SNA								IC	X
Ligustrum vulgare	European Privet	*	1	GNR	SNA								IX	X
Lindera benzoin	Northern Spicebush	6	-2	G5	S4								C	X
Lonicera morrowii	Morrow's Honeysuckle	*	5	GNR	SNA								IR	X
Lycopus americanus	American Water-horehound	4	-5	G5	S5								C	X
Lycopus uniflorus	Northern Water-horehound	5	-5	G5	S5								C	X
Lythrum salicaria	Purple Loosestrife	*	-5	G5	SNA								IC	X
Medicago lupulina	Black Medick	*	1	GNR	SNA								IC	X
Myosoton aquaticum	Giant Chickweed	*	-1	GNR	SNA								IR	X
Narcissus pseudonarcissus	Commom Daffodil	*		GNR	SNA								IR	X
Oenothera biennis	Common Evening Primrose	0	3	G5	S5								C	X
Onoclea sensibilis	Sensitive Fern	4	-3	G5	S5								C	X
Oxalis stricta	European Wood-sorrel	0	3	G5	S5								C	X
Panicum capillare	Common Panicgrass	0	0	G5	S5								C	X
Panicum virgatum	Old Switch Panicgrass	6	-1	G5	S4					X	X	1,3,5,Sa,L	U	X
Parthenocissus quinquefolia	Virginia Creeper	6	1	G5	S4?								U	X
Penthorum sedoides	Ditch-stonecrop	4	-5	G5	S5								C	X
Persicaria maculosa	Spotted Lady's-thumb	*	-3	G3G5	SNA								IC	X
Persicaria sagittata	Arrow-leaved Smartweed	5	-5	G5	S4S5								U	X
Persicaria virginiana	Virginia Smartweed	6	0	G5	S4								C	X
Phalaris arundinacea var. arundinacea	Reed Canarygrass	0	-4	GNR	S5								C	X
Picea abies	Norway Spruce	*	5	G5	SNA								IX	X
Picea glauca	White Spruce	6	3	G5	S5								U	X
Pilosella caespitosa	Meadow Hawkweed	*	5	GNR	SNA								IX	X
Plantago lanceolata	English Plantain	*	0	G5	SNA								IC	X
Plantago rugelii	Rugel's Plantain	1	0	G5	S5								C	X
Poa compressa	Canada Bluegrass	0	2	GNR	SNA								IC	X
Poa palustris	Fowl Bluegrass	5	-4	G5	S5								C	X
Podophyllum peltatum	May-apple	5	3	G5	S5								C	X
Polystichum acrostichoides	Christmas Fern	5	5	G5	S5								C	X
Polystichum lonchitis	Northern Holly Fern	9	5	G5	S4								H	X
Populus deltoides ssp. deltoides	Eastern Cottonwood	4	-1	G5T5	S5								C	X
Populus grandidentata	Large-toothed Aspen	5	3	G5	S5								C	X
Populus nigra	Black Poplar	*	5	G5	SNA								IR	X
Populus × canadensis	Canada Poplar	*		GNA	SNA								hyb	X
Portulaca oleracea	Common Purslane	0	1	GU	SNA								IU	X
Potentilla norvegica	Rough Cinquefoil	0	0	G5	S5									X
Potentilla recta	Sulphur Cinquefoil	*	5	GNR	SNA								IC	X
Prunus avium	Sweet Cherry	*	5	GNR	SNA								IR	X
Prunus domestica	Damson Plum	*	5	GNR	SNA									X
Prunus serotina	Black Cherry	3	3	G5	S5								C	X
Quercus macrocarpa	Bur Oak	5	1	G5	S5								C	X
Quercus palustris	Swamp Pin Oak	9	-3	G5	S4					X	X	-6,11,Sa,L	C	X
Ranunculus abortivus	Kidney-leaved Buttercup	2	-2	G5	S5								C	X
Ranunculus sceleratus var. sceleratus	Cursed Buttercup	2	-5	G5T5	SNA									X
Ribes americanum	American Black Currant	4	-3	G5	S5								C	X
Ribes cynosbati	Eastern Prickly Gooseberry	4	5	G5	S5								C	X
Rosa canina	Dog Rose	*	5	GNR	SNA								IX	X
Rubus allegheniensis	Alleghany Blackberry	2	2	G5	S5								C	X
Rubus flagellaris	Northern Dewberry	4	4	G5	S4								C	X
Rubus idaeus ssp. strigosus	North American Red Raspberry	0	-2	G5T5	S5								C	X
Rubus odoratus	Purple-flowering Raspberry	3	5	G5	S5								C	X

Appendix 6. Flora documented within the study area between 2017 and 2019.

SCIENTIFIC NAME	COMMON NAME	CC[1]	CW[1]	G_RANK[3]	S_RANK[4]	COSEWIC[5]	SARA STATUS[6]	SARA SCHEDULE[6]	SARO[7]	TALLGRASS PRAIRIE SPECIES (Rodger, 1998)[10]	TALLGRASS SAVANNAH SPECIES (Rodger, 1998)[10]	TALLGRASS ECOLOGY (SEE LEGEND) (Rodger, 1998)[10]	CAROLINIAN ZONE (OLDHAM 2017)[8]	Vegetation Observed
Rumex crispus	Curly Dock	*	-1	GNR	SNA								IC	X
Salix amygdaloides	Peach-leaved Willow	6	-3	G5	S5								C	X
Salix atrocinerea	Rusty Willow	*		G5TNR	SNA								IR	X
Salix bebbiana	Bebb's Willow	4	-4	G5	S5								C	X
Salix discolor	Pussy Willow	3	-3	G5	S5								C	X
Salix interior	Sandbar Willow	3	-5	GNR	S5								C	X
Salix lucida	Shining Willow	5	-4	G5	S5								U	X
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush	5	-5	G5	S5								C	X
Scirpus cyperinus	Common Woolly Bulrush	4	-5	G5	S5								C	X
Scutellaria lateriflora	Mad-dog Skullcap	5	-5	G5	S5								C	X
Senecio vulgaris	Common Ragwort	*	5	GNR	SNA								IX	X
Setaria faberi	Giant Foxtail	*	2	GNR	SNA								IC	X
Setaria pumila	Yellow Foxtail	*	0	GNR	SNA								IC	X
Setaria viridis	Green Foxtail	8	5	GNR	SNA								IC	X
Sium suave	Common Water-parsnip	4	-5	G5	S5								C	X
Solidago altissima var. altissima	Eastern Tall Goldenrod	1	3	GNR	S5								C	X
Solidago gigantea	Giant Goldenrod	4	-3	G5	S5								C	X
Solidago rugosa ssp. rugosa	Northern Rough-stemmed Goldenrc	4	-1	G5T5	S5								C	X
Sonchus arvensis ssp. arvensis	Field Sow-thistle	*	1	GNRTNR	SNA								IC	X
Sonchus arvensis ssp. uliginosus	Smooth Sow-thistle	*		GNRTNR	SNA									X
Spiraea alba	White Meadowsweet	3	-4										C	X
Stellaria longifolia	Long-leaved Starwort	2	-4	G5	S5								C	X
Stellaria media	Common Chickweed	*	3	GNR	SNA								IC	X
Symphyotrichum lanceolatum ssp. lanceolat	Panicled Aster												C	X
Symphyotrichum lateriflorum var. lateriflor	Calico Aster	3	-2	G5T5	S5								C	X
Symphyotrichum novae-angliae	New England Aster	2	-3	G5	S5								C	X
Symphyotrichum urophyllum	Arrow-leaved Aster	6	5	G4G5	S4								C	X
Syringa vulgaris	Common Lilac	*	5	GNR	SNA								IX	X
Thalictrum pubescens	Tall Meadow-rue	5	-2	G5	S5								C	X
Torilis japonica	Erect Hedge-parsley	*	5	GNR	SNA								IX	X
Trifolium hybridum	Alsike Clover	*	1	GNR	SNA								IC	X
Ulmus pumila	Siberian Elm	*	5	GNR	SNA								IX	X
Ulmus rubra	Slippery Elm	6	0	G5	S5								C	X
Urtica dioica ssp. gracilis	Slender Stinging Nettle	2	-1	G5T5	S5								C	X
Vaccinium corymbosum	Highbush Blueberry	8	-3	G5	S4								C	X
Valerianella locusta	European Cornsalad	*		G5	SNA								IR	X
Verbena urticifolia	White Vervain	4	-1	G5	S5								C	X
Veronica arvensis	Corn Speedwell	*	5	GNR	SNA								IC	X
Veronica officinalis	Common Speedwell	*	5	G5	SNA								IX	X
Veronica serpyllifolia	Thyme-leaved Speedwell	0	-3	G5	SNA								IC	X
Viburnum lentago	Nannyberry	4	-1	G5	S5								C	X
Viburnum rafinesquianum	Downy Arrowwood	7	5	G5	S5								C	X
Vicia tetrasperma	Four-seeded Vetch	*	5	GNR	SNA								IU	X
Viola affinis	Le Conte's Violet	6	-3	G5	S4?								U	X
Viola pubescens var. pubescens	Downy Yellow Violet	5	4	G5T5	S5								C	X
Viola sororia	Woolly Blue Violet	4	1	G5	S5								C	X
Vitis riparia	Riverbank Grape	0	-2	G5	S5								C	X
Crataegus macrosperma	Big-fruited Hawthorn	4	5	G5	S5								C	X

Appendix 7. List of Wildlife Species recorded during Targeted Surveys and/or Incidentally

RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

Class	Common Name	Scientific Name	Nature of Record
Amphibia	American Toad	*Anaxyrus americanus*	Vocalization
Amphibia	Gray Tree Frog	*Hyla versicolor*	Vocalization
Amphibia	Green Frog	*Lithobates clamitans*	Vocalization
Amphibia	Northern Leopard Frog	*Lithobates pipiens*	Vocalization
Amphibia	Spring Peeper	*Pseudacris crucifer*	Vocalization
Amphibia	Wood Frog	*Lithobates sylvaticus*	Vocalization
Amphibia	Western Chorus Frog	*Pseudacris triseriata*	Vocalization
Aves	Alder Flycatcher	*Empidonax alnorum*	Vocalization
Aves	American Crow	*Corvus brachyrhynchos*	Vocalization
Aves	American Goldfinch	*Spinus tristis*	Observation/Vocalization
Aves	American Redstart	*Setophaga ruticilla*	Observation/Vocalization
Aves	American Robin	*Turdus migratorius*	Observation/Vocalization
Aves	American Woodcock	*Scolopax minor*	Observation/Vocalization
Aves	Baltimore Oriole	*Icterus galbula*	Observation/Vocalization
Aves	Bank Swallow	*Riparia riparia*	Observation/Vocalization
Aves	Barn Swallow	*Hirundo rustica*	Observation (flyover)
Aves	Black-billed Cuckoo	*Coccyzus erythropthalmus*	Observation/Vocalization
Aves	Black-capped Chickadee	*Poecile atricapillus*	Observation/Vocalization
Aves	Blue Jay	*Cyanocitta cristata*	Observation/Vocalization
Aves	Blue-winged Warbler	*Vermivora cyanoptera*	Vocalization
Aves	Bobolink	*Dolichonyx oryzivorus*	Observation (flyover)
Aves	Brown Thrasher	*Toxostoma rufum*	Vocalization
Aves	Brown-headed Cowbird	*Molothrus ater*	Confirmed Breeding (fledged young)
Aves	Canada Goose	*Branta canadensis*	Observation/Vocalization
Aves	Cedar Waxwing	*Bombycilla cedrorum*	Observation/Vocalization
Aves	Chipping Sparrow	*Spizella passerina*	Observation/Vocalization
Aves	Common Grackle	*Quiscalus quiscula*	Observation/Vocalization
Aves	Common Raven	*Corvus corax*	Vocalization
Aves	Common Yellowthroat	*Geothlypis trichas*	Vocalization
Aves	Dark-eyed Junco	*Junco hyemalis*	Observation/Vocalization
Aves	Dickcissel	*Spiza americana*	Observation/Vocalization
Aves	Downy Woodpecker	*Picoides pubescens*	Observation/Vocalization
Aves	Eastern Bluebird	*Sialia sialis*	Vocalization
Aves	Eastern Kingbird	*Tyrannus tyrannus*	Vocalization
Aves	Eastern Phoebe	*Sayornis phoebe*	Observation/Vocalization
Aves	Eastern Towhee	*Pipilo erythrophthalmus*	Observation/Vocalization
Aves	Eastern Whip-poor-will	*Caprimulgus vociferus*	Vocalization

Class	Common Name	Scientific Name	Nature of Record
Aves	Eastern Wood-pewee	*Contopus virens*	Vocalization
Aves	European Starling	*Sturnus vulgaris*	Observation/Vocalization
Aves	Field Sparrow	*Spizella pusilla*	Observation/Vocalization
Aves	Golden-crowned Kinglet	*Regulus satrapa*	Observation/Vocalization
Aves	Gray Catbird	*Dumetella carolinensis*	Confirmed Breeding (fledged young)
Aves	Great Horned Owl	*Bubo virginianus*	Vocalization
Aves	Great-creasted Flycatcher	*Myiarchus crinitus*	Vocalization
Aves	Horned Lark	*Eremophila alpestris*	Vocalization
Aves	House Wren	*Troglodytes aedon*	Observation/Vocalization
Aves	House Sparrow	*Passer domesticus*	Observation/Vocalization
Aves	Killdeer	*Charadrius vociferus*	Observation/Vocalization
Aves	Mallard	*Anas platyrhynchos*	Observation
Aves	Mourning Dove	*Zenaida macroura*	Observation/Vocalization
Aves	Northern Cardinal	*Cardinalis cardinalis*	Vocalization
Aves	Northern Flicker	*Colaptes auratus*	Vocalization
Aves	Northern Mockingbird	*Mimus polyglottos*	Vocalization
Aves	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	Observation/Vocalization
Aves	Osprey	*Pandion haliaetus*	Observation
Aves	Ovenbird	*Seiurus aurocapilla*	Vocalization
Aves	Peregrine Falcon	*Falco peregrinus*	Observation/Vocalization
Aves	Purple Martin	*Progne subis*	Confirmed Breeding (fledged young, adult feeding young on hydro wire)
Aves	Red-bellied Woodpecker	*Melanerpes carolinus*	Vocalization
Aves	Red-eyed Vireo	*Vireo olivaceus*	Confirmed Breeding (feeding fledged Brown-headed Cowbird)
Aves	Red-tailed Hawk	*Buteo jamaicensis*	Observation (soaring)
Aves	Red-winged Blackbird	*Agelaius phoeniceus*	Observation/Vocalization
Aves	Ring-billed Gull	*Larus delawarensis*	Observation/Vocalization
Aves	Ring-necked Pheasant	*Phasianus colchicus*	Observation
Aves	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Observation/Vocalization
Aves	Ruby-crowned Kinglet	*Regulus calendula*	Vocalization
Aves	Rusty Blackbird	*Euphagus carolinus*	Observation/Vocalization
Aves	Savannah Sparrow	*Passerculus sandwichensis*	Vocalization
Aves	Scarlet Tanager		see "additional observations" on one of the bird surveyes
Aves	Song Sparrow	*Melospiza melodia*	Observation/Vocalization
Aves	Spotted Sandpiper	*Actitis macularius*	Observation/Vocalization
Aves	Tree Swallow	*Tachycineta bicolor*	Observation/Vocalization

Class	Common Name	Scientific Name	Nature of Record
Aves	Tufted Titmouse	*Baeolophus bicolor*	Vocalization
Aves	Turkey Vulture	*Cathartes aura*	Observation
Aves	Warbling Vireo	*Vireo gilvus*	Vocalization
Aves	Willow Flycatcher	*Empidonax traillii*	Observation/Vocalization
Aves	Wild Turkey	*Meleagris gallopavo*	Observation/Vocalization
Aves	White-breasted Nuthatch	*Sitta carolinensis*	Vocalization
Aves	White-throated Sparrow	*Zonotrichia albicollis*	Vocalization
Aves	Wood Duck	*Aix sponsa*	Observation (pair)
Aves	Wood Thrush	*Hylocichla mustelina*	Observation/Vocalization
Aves	Yellow-bellied Sapsucker	*Sphyrapicus varius*	Observation/Vocalization
Aves	Yellow-billed Cuckoo	*Coccyzus americanus*	Vocalization
Aves	Yellow Warbler	*Setophaga petechia*	Observation/Vocalization
Mammalia	Coyote	*Canis latrans*	Observation, Scat, Vocalization
Mammalia	Eastern Cottontail	*Sylvilagus floridanus*	Observation
Mammalia	Raccoon	*Procyon lotor*	Tracks
Mammalia	Red Fox	*Vulpes vulpes*	Observation
Mammalia	White-tailed Deer	*Odocoileus virginianus*	Tracks, Trails
Reptilia	Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	Observation
Reptilia	Dekay's Brown Snake	*Storeria dekayi*	Observation

Appendix 8. Results of Anuran Call Surveys

RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

Appendix 8. Results of 2017 Calling Anuran Surveys, Law Quarry.

Station ID	Survey #1 – April 9, 2017	Survey #2 – May 15, 2017	Survey #3 – June 8, 2017	Comments
AN1	Western Chorus Frog (3) Wood Frog (1-1) American Toad (1-1) Northern Leopard Frog (1-1)	No Calls	Gray Tree Frog (1-3)	**Survey #1:** Spring Peeper calls heard in separate wetland/pond closer towards house. Northern Leopard Frog, American Toad and Wood Frog heard calling also after survey. **Survey #2:** Spring Peeper (1-2) and Green Frog (1-2) heard calling from pond near house. **Survey #3:** American Toad and Green Frog heard calling from drain to the north of survey.
AN2	No Calls	No Calls	No Survey	**Survey #1:** **Survey #2:** Spring Peeper calls abundant and heard throughout marsh. Gray Tree Frog calls on the north and south edges of the marsh. Green Frog call on the east side of the marsh. **Survey #3:** Habitat not present to support anurans.
AN3	No Calls	Gray Tree Frog (1-1 and 1-4)	American Toad (1-1)	**Survey #1:** No anuran calls within station. Wood Frog, Spring Pepper and Chorus Frog calling several 100 m beyond. **Survey #2:** Gray Tree Frog calls are low and in the distance, difficult to count. **Survey #3:** American Toad possibly calling from pond/drain along field.
AN4	Western Chorus Frog (3) Spring Pepper (1-1 and 2-4)	Gray Tree Frog (2-6)	Gray Tree frog (2-5)	**Survey #1:** Wall of calling Chorus Frog in the distance. **Survey #2:** No comments **Survey #3:** Same Gray Tree Frog as heard at station 2.
AN5	Western Chorus Frog (1-8) Spring Pepper (1-8)	Gray Tree Frog (1-2)	No Survey	**Survey #1:** **Survey #2:** Additional Gray Tree Frog recorded in shrubby area on way to station.

				Survey #3: Habitat not present to support anurans.
AN6	Spring Peeper (2-6 and 2-8) Western Chorus Frog (3 and 2-4)	Gray Tree Frog (1-3)	No Calls	**Survey #1:** Spring Peeper and Chorus Frog both calling from small pond north of station. **Survey #2:** Gray Tree Frog calling from around pond feature. **Survey #3:** Grey Tree Frog (1-1) heard calling to north/northeast of station.

Appendix 9. Results of Breeding Bird Surveys

RIVERSTONE
ENVIRONMENTAL SOLUTIONS INC.

Appendix 9. Results of Breeding Bird Surveys completed by RiverStone in (2017).

Common Name	Scientific Name	Breeding Bird Stations[1] and Breeding Status[2]											
		BB1	BB2	BB3	BB4	BB5	BB6	BB7	BB8	BB9	BB10	BB11	BB12
American Crow	*Corvus brachyrhynchos*				O	O							
American Goldfinch	*Spinus tristis*	O	O		O	O				Po	O	O	Po
American Redstart	*Setophaga ruticilla*				O	O	O	O	O				
American Robin	*Turdus migratorius*	Po	Po		O	O	Po	O	O	O	O	Po	Po
Alder Flycatcher	*Empidonax alnorum*		O										
Baltimore Oriole	*Icterus galbula*					O	O	O				O	O
Black-billed Cuckoo	*Coccyzus erythropthalmus*			O									
Black-capped Chickadee	*Poecile atricapillus*			O		Po			O				O
Blue Jay	*Cyanocitta cristata*			O	O		O	O					
Blue-winged Warbler	*Vermivora cyanoptera*			O									
Brown Thrasher	*Toxostoma rufum*						O	O					
Brown-headed Cowbird	*Molothrus ater*	O	O	O	O	O	O		Po		O	O	O
Canada Goose	*Branta canadensis*					O			O	O			
Cedar Waxwing	*Bombycilla cedrorum*	Po	O				O		O		O	Po	
Chipping Sparrow	*Spizella passerina*	O							Po				
Common Grackle	*Quiscalus quiscula*				O	O	O	O				O	
Common Raven	*Corvus corax*												O
Common Yellowthroat	*Geothlypis trichas*	O	O		O	O	Po	O				O	

Common Name	Scientific Name	Breeding Bird Stations[1] and Breeding Status[2]											
		BB1	**BB2**	**BB3**	**BB4**	**BB5**	**BB6**	**BB7**	**BB8**	**BB9**	**BB10**	**BB11**	**BB12**
Dickcissel	*Spiza americana*								O (Over head)	Po			
Downy Woodpecker	*Picoides pubescens*	Po	O					O					
Eastern Towhee	*Pipilo erythrophthalmus*	O	O	O	Po				O		O		
European Starling	*Sturnus vulgaris*								O	O	O	O	
Eastern Kingbird	*Tyrannus tyrannus*												O
Eastern Wood-pewee	*Contopus virens*		Po		O	Po							
Field Sparrow	*Spizella pusilla*		O	O	O		Po	O	Po				
Gray Catbird	*Dumetella carolinensis*	Po	Po	O	O	O	O	O	Po		Po	O	O
Great Crested Flycatcher	*Myrarchus crinitus*	O											
Hairy Woodpecker	*Picoides villosus*					O							
Horned Lark	Eremophila alpestris	O								Po			
House Wren	T*roglodytes aedon*	O			O	Po	Po	O					O
Indigo Bunting	*Passerina cyanea*				O				O	O		O	
Killdeer	*Charadrius vociferus*					O			O	O			
Mourning Dove	*Zenaida macroura*						O		O		O		
Northern Cardinal	*Cardinalis cardinalis*	O	Po	O	O	Po	O	O	O			O	O
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*				O	O		O	O	Po		O	
Ovenbird	*Seiurus aurocapilla*			O	O	O							

Common Name	Scientific Name	Breeding Bird Stations[1] and Breeding Status[2]											
		BB1	**BB2**	**BB3**	**BB4**	**BB5**	**BB6**	**BB7**	**BB8**	**BB9**	**BB10**	**BB11**	**BB12**
Red-bellied Woodpecker	*Sphyrapicus ruber*					O	Po		O				
Red-eyed Vireo	*Vireo olivaceus*			O		O							
Red-winged Blackbird	*Agelaius phoeniceus*					O	O	O		O		O	O
Ring-billed Gull	*Larus delawarensis*	O	O		O	O	O	O	O	O			
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			Po		O	O				O		
Savannah Sparrow	*Passerculus sandwichensis*								Po	O			
Song Sparrow	*Melospiza melodia*	O				O	O		Po	O	O	Po	Po
Spotted Sandpiper	*Actitis macularius*									O			
Tennessee Warbler	*Oreothlypis peregrina*	O						O	O				
Tree Swallow	*Tachycineta bicolor*						O	O	O				
Turkey Vulture	*Cathartes aura*					O				O			
Tufted Titmouse	*Baeolophus bicolor*			O									
Warbling Vireo	*Vireo gilvis*												O
Wild Turkey	*Meleagris gallopavo*									O			
Willow Flycatcher	*Empidonax traillii*	Po							Po				
Wood Thrush	*Hylocichla mustelina*	O	O	O	O	O							
Yellow Warbler	*Setophaga petechia*	CO	Po	O	Po	O	Po	O	O		Po	Po	Po
Yellow-billed Cuckoo	*Coccyzus americanus*	O	O										

[1] Locations of stations are provided on Figure 4.

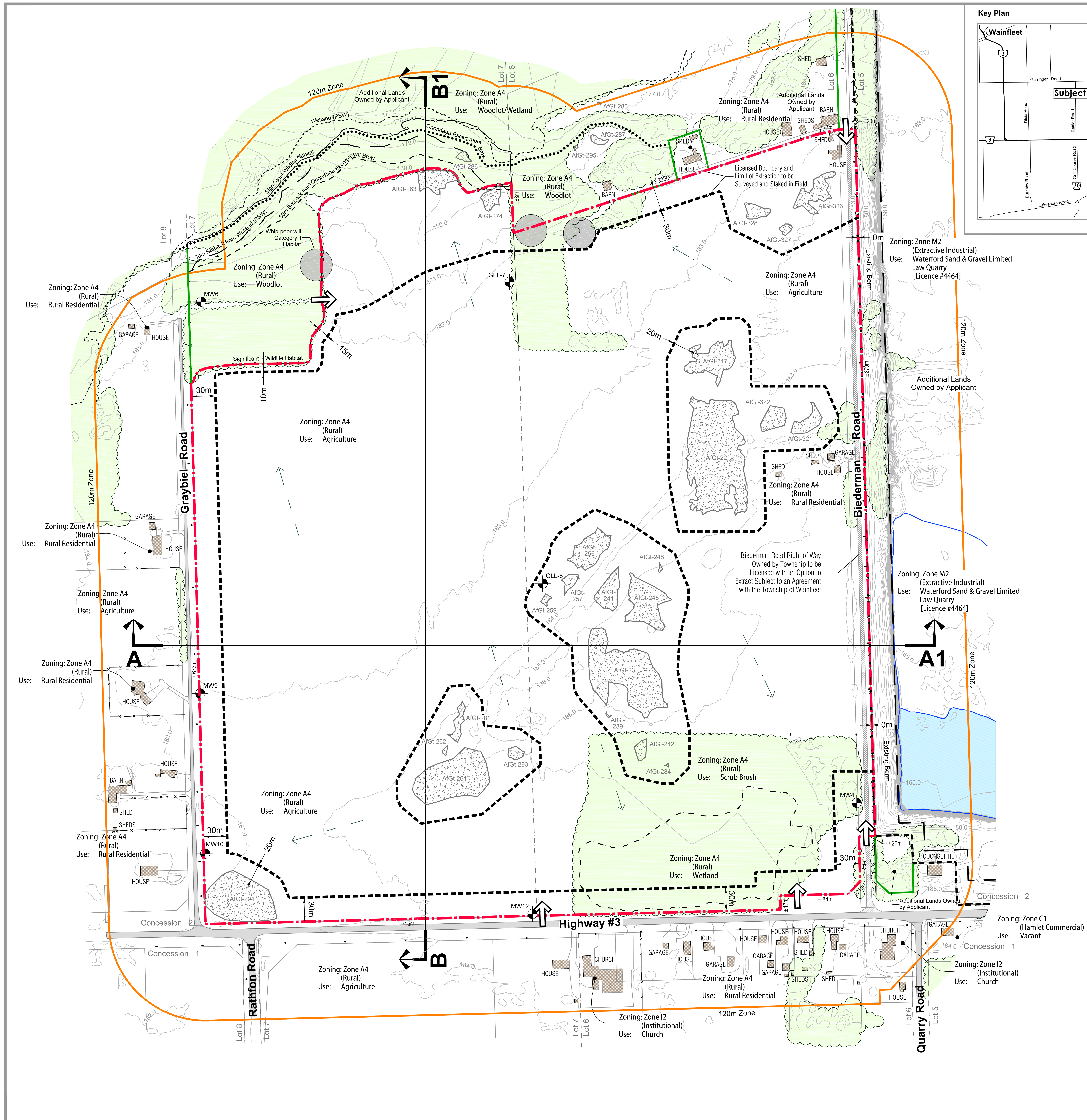
[2] Co = Confirmed Breeding; Pr = Probable Breeding; Po = Possible Breeding; O = Observed (no evidence of breeding)

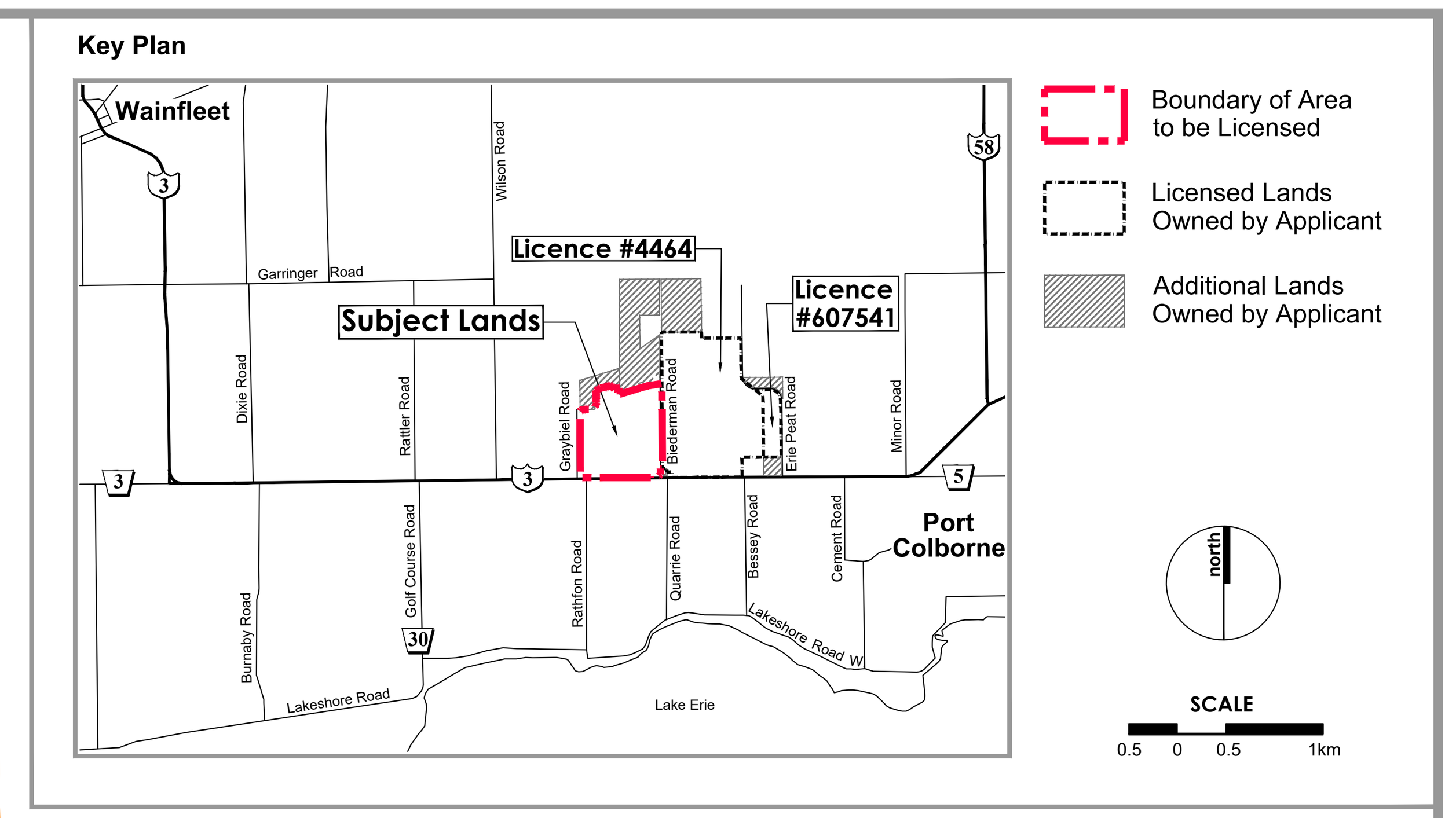
June 1, 2017: 0643-1009 h; 12-17 degrees C; cloud cover 10%; Wind Speed=0-2 (Beaufort Scale)

June 14, 2017: 0627-0945 h; 13-21 degrees C; cloud cover 0-20 %; Wind Speed=0-1 (Beaufort Scale)

June 27, 2017: 06:42-0954 h; 12-16 degrees C; cloud cover 40-90%; Wind Speed=0-2 (Beaufort Scale)

Appendix 10. Site Plans (prepared by MHBC)





Notes

A. General
1. This site plan is prepared under the Aggregate Resources Act (ARA), Aggregate Resources of Ontario: Site Plan Standards August 2020.
2. Area Calculations:
   Licence Area: 72.3 hectares (178.7 acres)
   Limit of Extraction: 51.2 hectares (126.5 acres)
3. All measurements shown are in metres unless specified otherwise.

B. References
1. Topographic information provided by GeoOptic. Base data was digitized using ARCGIS 10.2 and the newly acquired ortho imagery. The drone flight took place November 15, 2016 at 11:27am and was undertaken with an Aerohawk Hawkeye platform at 800ft agl, cleared with both Transport Canada and NavCan. Ground control was placed in a network of 20 points across the site and surveyed in with a Spectra Epoch50 DK GPS system with sub-centimetre precision. All coordinates are in NAD83 UTM18 / HTV2THE. The contour interval is 1m.
2. Property boundaries compiled from vuMap (First Base Solutions) online mapping service, Teranet parcel fabric layer.
3. Subject site is zoned 'A4' (rural) in the Township of Wainfleet Comprehensive Zoning By-law 034-2014 (September 2014).
4. Land use information and structures identified on or within 120 metres of the site boundary was determined using July 2018 aerial imagery and 2019/2021 site visits.

C. Drainage
1. Surface drainage on and within 120 metres of the licence boundary is by overland flow in the directions shown by arrows on the plan view, or by infiltration.

D. Groundwater
1. The groundwater table elevation on site ranges between ±170 masl in the southeast portion of the site to ±180 masl in the west portion of the site.The existing water table elevations are shown on each cross section on page 5 of 5. Groundwater table elevations provided by WSP (March 2022).

E. Site Access and Fencing
1. There are several existing field accesses to the site. There is one from Highway #3, a couple from Biederman Road and one at the northwest portion of the site.
2. Post and wire fencing (unless noted otherwise) exists in the locations shown on the plan view.

F. Aggregate Related Site Features
1. There are no existing aggregate operations or features on-site such as processing areas with stationary or portable equipment, stockpiles, recyclable materials, scrap, haul roads, fuel storage, berms or excavation faces.

G. Cross Sections
1. As shown on this page. Detailed sections are shown on page 5 of 5.
2. Cross section locations are identified on the plan view for each drawing.

H. Technical Reports - References
1. Hydrogeology: "Waterford Sand & Gravel Ltd., Law Quarry Extension Level 2 Hydrogeological Study Report" December 2021 (Source: WSP)
2. Natural Environment: "Natural Environment Report Level 1 and 2 Assessment, Law Crushed Stone Quarry", August 2020 (Source: Riverstone Environmental Solutions Inc.)
3. Noise: "Noise Impact Study - Project: ??" ??, 2022 (Source: Aercoustics Engineering Ltd.)
4. Archaeology: Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 3 Archaeological Assessment: Goodwood Location 1 (BaGt-45), Lafarge Goodwood Extension Property, Part of Lot 20, Concession 3, Geographic Township of Uxbridge, former Ontario County, now Regional Municipality of Durham, Ontario ", Dated Jul 13, 2021, Filed with MHSTCI Toronto Office on Jul 14, 2021, MHSTCI Project Information Form Number P256-0670-2021, MHSTCI File Number 0009350.

I. Other Reports - References
1. Air Quality Assessment: "Law Quarry Extension - Port Colborne, Ontario, Air Quality Assessment" February 3, 2022 (Source: RWDI Air Inc.)

Legal Description

Part of Lots 6 & 7, Concession 2 and
Part of Road Allowance Between Lots 5 & 6, Concession 2
(geographic Township of Wainfleet), Township of Wainfleet, Region of Niagara

Legend

- Boundary of Area to be Licensed
- Limit of Extraction — ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELLED DISTANCES
- Existing Licensed Boundary — LAW QUARRY - LICENCE #4464
- Additional Lands Owned by Applicant
- Contour with Elevation — METRES ABOVE SEA LEVEL
- Existing Limit of Extraction — LAW QUARRY - LICENCE #4464
- Private Laneway/ Roadway
- Public Road (Paved) / Public Road (Gravel)
- Lot and Concession
- Existing Fence — 1.2m POST & WIRE FARM FENCE UNLESS OTHERWISE NOTED
- Field Access
- Building/Structure — LOCATION AND USE FOR BUILDINGS ON-SITE AND WITHIN 120m OF SITE
- Monitoring Well — WSP 2021
- Direction of Surface Drainage (IF ANY)
- Existing Vegetation — APPROXIMATE LOCATION
- Hydro Poles
- Wetlands — RIVERSTONE 2020
- Flooded Quarry Area
- Onondaga Escarpment Brow — RIVERSTONE 2020
- 120m Zone
- Significant Wildlife Habitat — RIVERSTONE 2020
- Cross Sections — SEE PAGE 5 OF 5 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Archaeological Sites

Site Plan Amendments

No.	Date	Description	By

PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
MHBC
200 - 540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

NDMNRF Approval Stamp

MHBC Stamp

CAITLIN M. PORT REGISTERED PROFESSIONAL PLANNER R.P.P. ONTARIO PROFESSIONAL PLANNERS INSTITUTE INSTITUT DES PLANIFICATEURS PROFESSIONNEL DE L'ONTARIO

DRAFT

north

Applicant

Waterford

Waterford Sand & Gravel Limited
70 Ewart Avenue
Brantford, Ontario
N3T 5M1
Tel: (519) 752-1300

Applicant's Signature

Ed Lamb
VP/GM Construction Materials

Project

Law Quarry Extension

Part of Lots 6 & 7, Concession 2
Part of Road Allowance Between Lots 5 & 6, Concession 2
(Geographic Township of Wainfleet) Township of Wainfleet, Regional Municipality of Niagara

ARA Licence Reference No.

Pre-approval review:

For Client Review - March 2022

Plan Scale **1:2,500 (Arch D)**

SCALE 50 0 50 100 METRES

Plot Scale 1:2.5 [1mm = 2.5 units] MODEL

Drawn By D.G.S.

Checked By C.P.

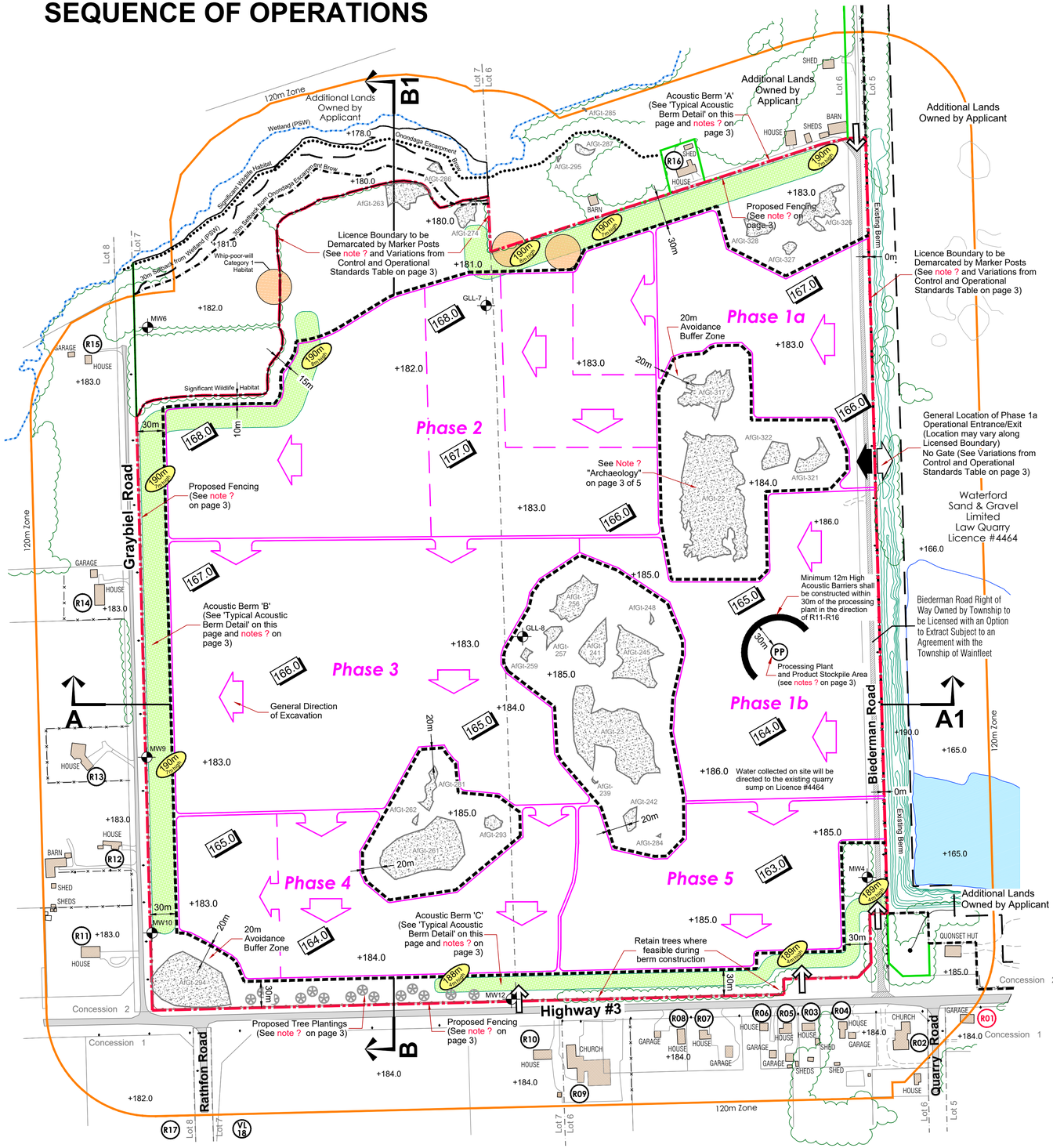
File No. **0956B**

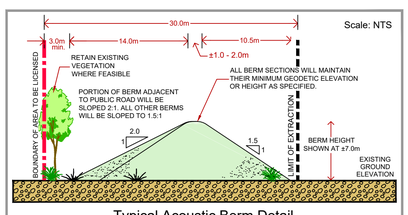
File Name **EXISTING FEATURES PLAN**

Drawing No. **1 OF 5**

K:\0956C-WATERFORD SAND AND GRAVEL LIMITED-LAW QUARRY EXTENSION\A\EXFEPLAN 1OF5 MARCH2022.DWG

SEQUENCE OF OPERATIONS





Typical Acoustic Berm Detail
(Also see note ?? on page 3)

ALL BERMS WILL BE VEGETATED AND MAINTAINED TO CONTROL EROSION. TEMPORARY EROSION CONTROL WILL IMPLEMENTED AS REQUIRED.

Legal Description

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Part of Road Allowance Between Lots 5 & 6, Concession 2
(geographic Township of Wainfleet)
Township of Wainfleet
Region of Niagara

Legend

- Boundary of Area to be Licensed
- Existing Licensed Boundary — LAW QUARRY - LICENCE #4464
- +180.0 — Existing Spot Elevation — METRES ABOVE SEA LEVEL (m A.S.L.)
- Existing Fence — 1.2m POST & WIRE FARM FENCE UNLESS OTHERWISE NOTED
- Building/Structure — LOCATION AND USE FOR BUILDINGS ON-SITE AND WITHIN 120m OF SITE
- Field Access
- MW10 — Monitoring Well — WSP 2021
- Existing Vegetation — APPROXIMATE LOCATION
- AfGt-263 — Archaeological Sites — (SEE NOTE ? "ARCHAEOLOGY", PAGE 3 OF 5)
- Tree Plantings — (SEE NOTE ? NOTES, PAGE 3 OF 5)
- A1 — Cross Sections — SEE PAGE 5 OF 5 FOR EXISTING AND REHABILITATED CROSS SECTIONS
- Limit of Extraction — ALL SETBACKS ARE DRAWN TO SCALE AND SHOW LABELED DISTANCES
- Additional Lands Owned by Applicant
- Operational Entrance — MAINTAINED BY A GATE WHICH WILL BE CLOSED WHEN PIT IS NOT IN OPERATION
- General Direction of Excavation — (SEE NOTES ON PAGE 3 OF 5)
- 190m Tangent — Proposed Acoustic Berm — WITH TOP OF BERM ELEVATION (MASL) SHOWN. SEE "TYPICAL BERM DETAIL" (THIS PAGE)
- Proposed Fence — 1.2m HIGH POST & WIRE FENCE UNLESS OTHERWISE NOTED
- 167.0 — Proposed Spot Elevation — QUARRY FLOOR BOTTOM OF FALKIRK FORMATION
- R04 — Noise Receptor — (SEE NOTE ? "NOISE", PAGE 3 OF 5)
- Internal Haul Road

Site Plan Amendments

No.	Date	Description	By

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
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NDMNRF Approval Stamp

MHBC Stamp

DRAFT — CAITLIN M. LEE — REGISTERED PROFESSIONAL PLANNER — R.P.P.

north

Applicant

Waterford

Waterford Sand & Gravel Limited
70 Ewart Avenue
Brantford, Ontario
N3T 5M1
Tel: (519) 752-1300

Applicant's Signature

Ed Lamb
VP/GM Construction Materials

Project

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(Geographic Township of Wainfleet) Township of Wainfleet, Regional Municipality of Niagara

ARA Licence Reference No.	Pre-approval review:
	For Client Review - March 2022
Plan Scale **1:2,500 (Arch D)**	Plot Scale 1:2.5 [1mm = 2.5 units] MODEL
SCALE 50 0 50 100 METRES	Drawn By D.G.S. / File No. 0956B
	Checked By C.P.

File Name

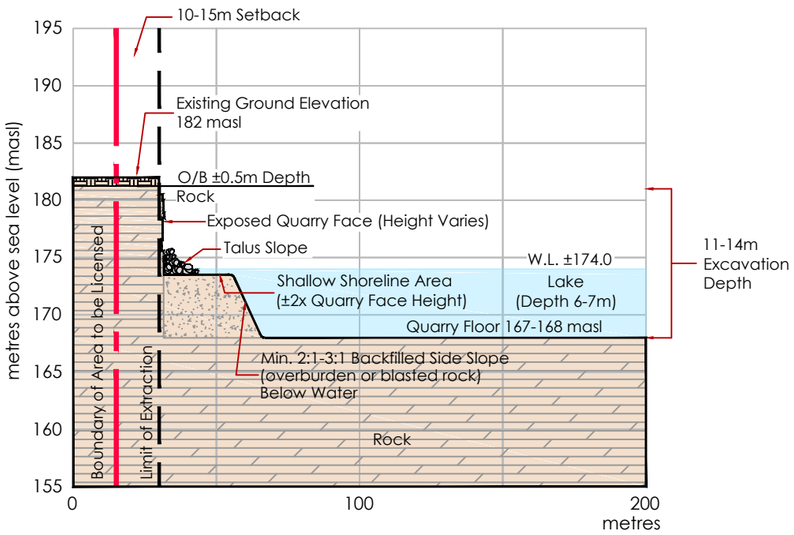
OPERATIONAL PLAN

Drawing No.

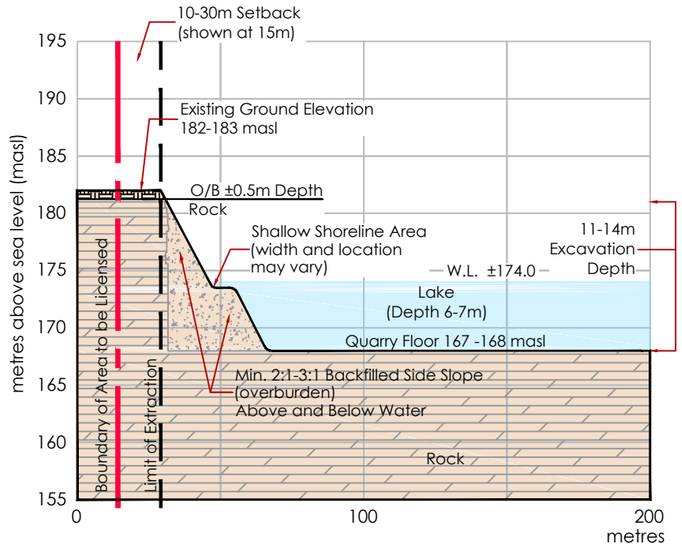
2 OF 5

K:\0956C-WATERFORD SAND AND GRAVEL LIMITED-LAW QUARRY EXTENSION\A\OPERPLAN 2OF5 MARCH2022 EMAIL.DWG

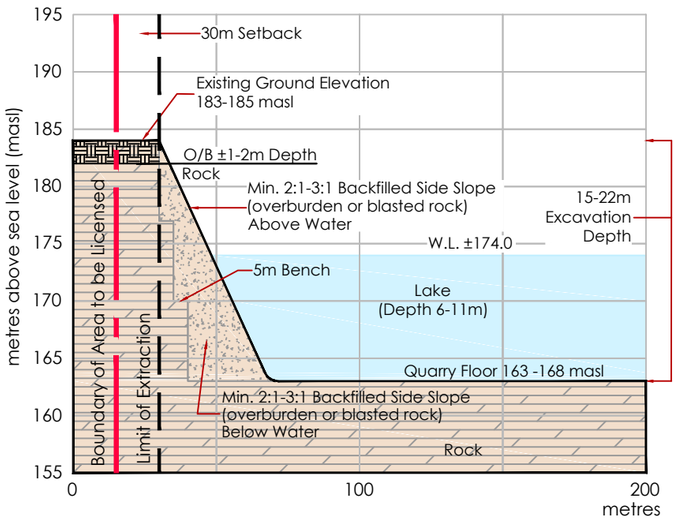
Side Slope Condition 1a
Exposed Quarry Face with Talus Slope and Shallow Shoreline Area
North Area of Site



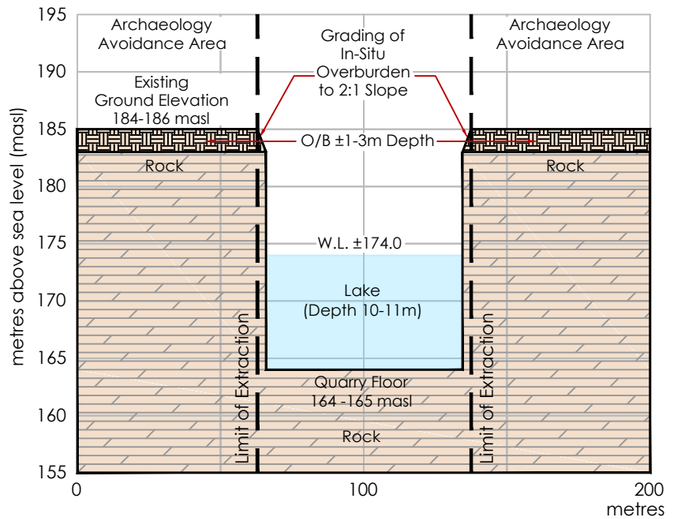
Side Slope Condition 1b
2:1 Backfilled Area Above and Below Water
North Area of Site



Side Slope Condition 2
Backfilled Area Above and Below Water with Shallow Shoreline Area
South and West Area of Site

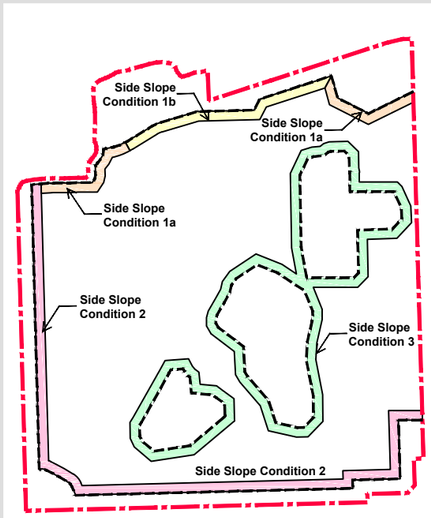


Side Slope Condition 3
2:1 Sloped Overburden to Top of Rock and Vertical Face
Unextracted Area of Site
(Archaeological Avoidance Areas)



Rehabilitation Options

Waterford Sand & Gravel Limited
Part of Lots 6 & 7, Concession 2 and
Part of Road Allowance Between Lots 5 & 6, Concession 2
(geographic Township of Wainfleet)
Township of Wainfleet
Region of Niagara



DATE: March 4, 2022
SCALE: ±1:2,000
FILE: 0956C
DRAWN: DGS

K:\0956C-Waterford Sand and Gravel Limited-Law Quarry Extension\A\Rehaplan 4of5 March2022.dwg

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