



FINAL

REPORT

Proposed Goodwood Pit Extension
Natural Environment Report

Submitted to:

Lafarge Canada Inc.

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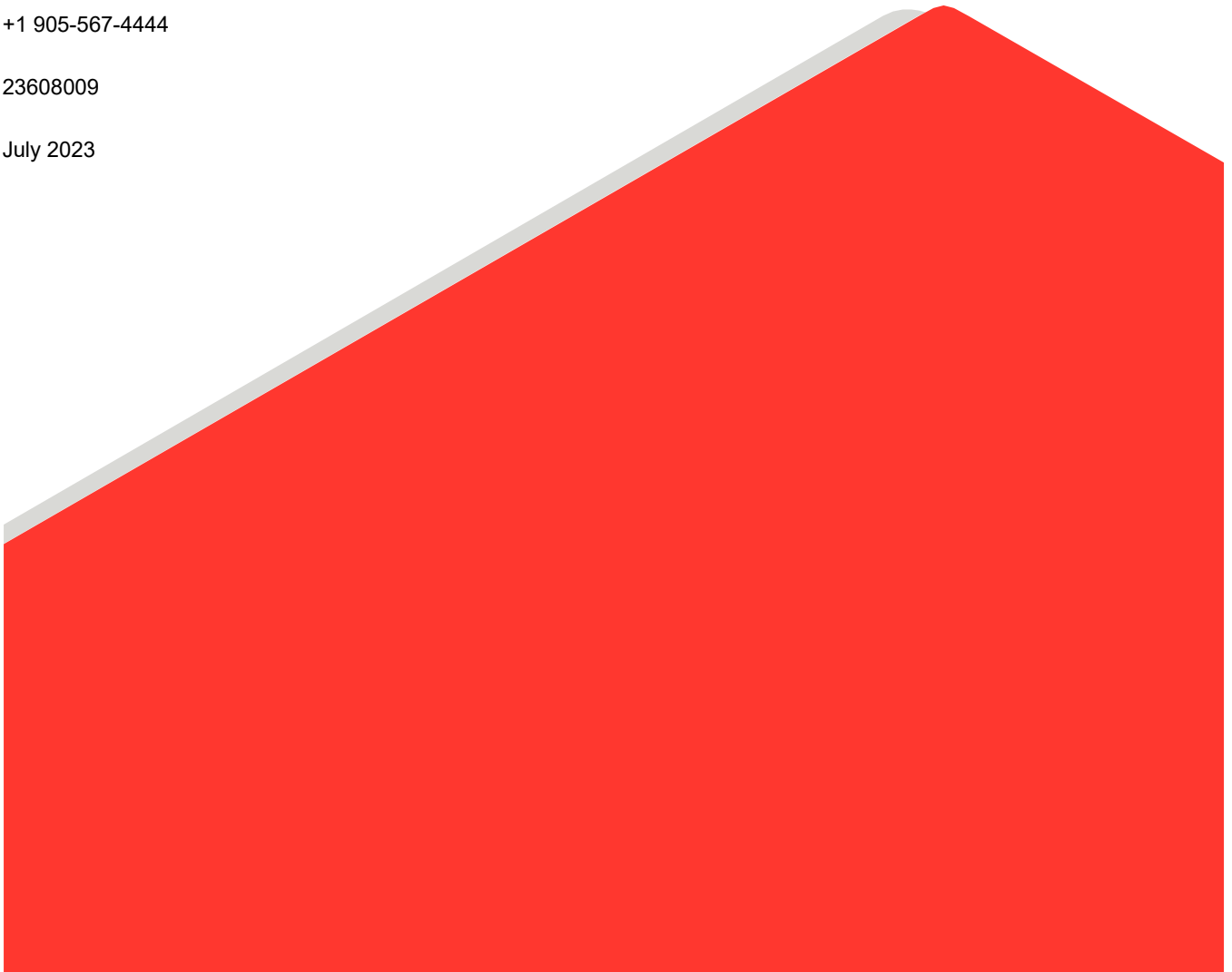
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July 2023



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Table of Contents

1.0	INTRODUCTION	1
1.1	Purpose	1
1.2	Site and Study Area Description	1
2.0	ENVIRONMENTAL POLICY CONTEXT	2
2.1	Aggregate Resources Act	2
2.2	Provincial Policy Statement.....	2
2.3	Fisheries Act.....	3
2.4	Migratory Birds Convention Act, 1994	4
2.5	Species at Risk	4
2.5.1	Species at Risk Act	4
2.5.2	Endangered Species Act, 2007	4
2.6	Provincial Plans.....	5
2.6.1	Oak Ridges Moraine Conservation Plan.....	5
2.6.2	Growth Plan for the Greater Golden Horseshoe.....	6
2.6.3	Lake Simcoe Protection Plan.....	6
2.7	Official Plans	6
2.7.1	Township of Uxbridge	6
2.7.2	Region of Durham.....	7
2.8	Lake Simcoe Region Conservation Authority	7
3.0	DESCRIPTION OF PROPOSED DEVELOPMENT	7
4.0	METHODS	8
4.1	Background Review	8
4.2	Species at Risk Screening	8
4.3	Field Surveys	9
4.3.1	Ecological Land Classification and Botanical Inventory.....	9
4.3.2	Breeding Bird Surveys	9

4.3.3	Bat Habitat Assessment and Acoustic Surveys.....	10
4.3.4	General Wildlife Surveys.....	11
4.3.5	Site Reconnaissance	11
4.4	Analysis of Significance and Sensitivity and Impact Assessment	11
5.0	EXISTING CONDITIONS	11
5.1	Regional Context.....	11
5.2	Hydrogeology	12
5.3	Surface Water Resources	12
5.4	Fish and Fish Habitat	13
5.5	Vegetation	13
5.5.1	Plant Communities.....	13
5.5.2	Vascular Plants	15
5.6	Wildlife and Wildlife Habitat.....	15
5.6.1	Breeding Birds.....	15
5.6.2	Bats	15
5.6.3	Other Wildlife.....	17
6.0	ASSESSMENT OF SIGNIFICANT NATURAL HERITAGE FEATURES.....	17
6.1	Significant Wetlands.....	17
6.2	Significant Woodlands.....	17
6.3	Significant Valleylands	18
6.4	Areas of Natural and Scientific Interest.....	18
6.5	Environmentally Significant Areas	18
6.6	Fish Habitat	19
6.7	Habitat of Endangered or Threatened Species.....	19
6.8	Significant Wildlife Habitat.....	20
6.8.1	Seasonal Concentration Areas	20
6.8.2	Rare Vegetation Communities	21
6.8.3	Specialized Habitat for Wildlife	21

6.8.4 Habitat for Species of Conservation Concern..... 22

6.8.5 Animal Movement Corridors 23

7.0 IMPACT ASSESSMENT 24

7.1 Wetlands 24

7.2 Eastern Meadowlark and Bobolink 24

8.0 MITIGATION AND MONITORING 25

8.1 General Best Management Practices 25

8.2 Eastern Meadowlark and Bobolink 25

9.0 REHABILITATION 25

10.0 CONCLUSIONS AND RECOMMENDATIONS 26

11.0 CLOSURE 26

TABLES

Table 1: Ecological Land Classification on the Site and in the Study Area..... 14

Table 2: Mean Bat Passes (Standard Deviation) by Species per Night in June 2018 16

Table 3: Total and Nightly Maximum Species at Risk Bat Passes in June 2018..... 16

FIGURES

Figure 1: Site Location and Study Area..... 34

Figure 2: Ecological Land Classification Survey Stations and Sensitive Features 35

APPENDICES

APPENDIX A

Photolog

APPENDIX B

Plant Species Observed in the Study Area

APPENDIX C

Wildlife Species Observed in the Study Area

APPENDIX D

Species at Risk Screening

1.0 INTRODUCTION

Golder Associates Ltd. (now WSP Canada Inc. or WSP) was retained by Lafarge Canada Inc. (Lafarge), a division of LafargeHolcim Canada, to complete hydrogeological and natural environment studies at 4900 4th Concession Road, Goodwood, Ontario (the Site; Figure 1) to accompany the application for a Class A licence under the *Aggregate Resources Act* (ARA) as well as a Regional and Local Official Plan Amendment and Zoning By-Law Amendment for the proposed extension of the existing Goodwood Pit (the Project).

1.1 Purpose

This report specifically addresses the requirements of a Natural Environment Report (NER; Aggregate Resources of Ontario Provincial Standards) and Environmental Impact Assessment (*Planning Act*).

For the purpose of this report, the following definitions are used:

- **Site** (Figure 1) – The total area within the property owned by Lafarge that is proposed for licensing under the ARA. The Site is approximately 17.9 hectares (ha) in area.
- **Extraction Limit** (Figure 1) – The total area within the Site that is proposed for aggregate extraction. The extraction limit is approximately 15.4 ha in area. The extraction limit will be set back 30 metres (m) along roads and residential lots and 15 m along property boundaries, except for boundaries abutting the existing Goodwood Pit where no setback is proposed to integrate the operations.
- **Study Area** (Figure 1) – The Study Area for the NER is defined in Sections 2.2 of the Aggregate Resources of Ontario Standards (MNR 2020) as the Site and surrounding 120 m. However, changes in groundwater level are expected to extend beyond the Site boundary (WSP 2023a), so the Study Area was expanded to include the area of anticipated groundwater level change. The Study Area is approximately 79.4 ha in area and extends up to 390 m from the Site boundary.

The purpose of this report is to assess potential environmental impacts of the proposed aggregate extraction on the Site with respect to the following:

- Environmental features and functions in the Study Area.
- Influence of extraction on the surrounding natural environment.
- Rehabilitation potential of the Site after extraction.

1.2 Site and Study Area Description

The Site is located on the west side of 4th Concession Road and the south side of Wagg Road in the Township of Uxbridge (Figure 1). There is a horse stable and a rounded fabric-top storage structure in the center of the Site surrounded by cultural meadow. The east portion of the Site is dominated by horse pasture and two linear spruce tree plantations bordered by deciduous trees, with one situated north-south, and the other situated east-west. There is also a small coniferous plantation in the southeast corner of the Site. The west portion of the Site is covered by a cash crop. The Site is bordered by deciduous trees along the south and west boundaries, and mixed deciduous and coniferous trees along the north and east boundaries.

Land use in the Study Area consists mainly of rural residential and mixed agricultural uses, with active aggregate extraction operations in the southwest portion of the Study Area. In addition, there is a coniferous plantation and a mixed forest in the north portion of the Study Area.

2.0 ENVIRONMENTAL POLICY CONTEXT

Documents reviewed to gain an understanding of the natural heritage features and regulations that are relevant to the proposed Site consisted of the following:

- Aggregate Resources Act (Ontario 1990) and Aggregate Resources of Ontario Standards (MNR 2020).
- Provincial Policy Statement (MMAH 2020a).
- Fisheries Act (Canada 1985).
- Migratory Birds Convention Act, 1994 (Canada 1994).
- Species at Risk Act (Canada 2002).
- Endangered Species Act, 2007 (Ontario 2007).
- Oak Ridges Moraine Conservation Plan (Ontario 2017).
- Township of Uxbridge Official Plan (Uxbridge 2014).
- Region of Durham Official Plan (Durham 2017).
- Lake Simcoe Protection Plan (2009).
- Lake Simcoe Region Conservation Authority Reg. 179/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.

An overview of the above noted legislation and policy documents is provided in Sections 2.1 to 2.9.

2.1 Aggregate Resources Act

Applicants for a Class A licence under the ARA are required to prepare an NER in accordance with the Aggregate Resources of Ontario Standards. Where significant natural environment features occur on, or in proximity (i.e., within 120 m) to the proposed operation, the NER is also required to identify the particular features and functions of the designated natural environment feature(s), the nature of the potential negative impacts of the extractive operation, the proposed mitigation of those effects or remedial measures. Significant natural environment (or heritage) features are defined in the Provincial Policy Statement (PPS; MMAH 2020a) with guidance from supporting technical manuals prepared by the Ministry of Natural Resources and Forestry (MNR 2000, 2010; MNR 2015).

2.2 Provincial Policy Statement

The PPS was issued under Section 3 of the *Planning Act* and came into effect on May 1, 2020, replacing the earlier version issued on April 30, 2014.

The natural heritage policies of the PPS indicate that:

- 2.1.1 Natural features and areas shall be protected for the long-term.
- 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*.

- 2.1.3 Natural heritage systems shall be identified in Ecoregions 6E and 7E, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.
- 2.1.4 *Development* and *site alteration* shall not be permitted in:
 - a) significant wetlands in Ecoregions 5E, 6E and 7E; and,
 - b) significant coastal wetlands.
- 2.1.5 Unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration shall not be permitted in:
 - a) significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;
 - b) significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
 - c) significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
 - d) significant wildlife habitat;
 - e) significant areas of natural and scientific interest; and,
 - f) coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b).
- 2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.
- 2.1.7 Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.
- 2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.3, 2.1.4 and 2.1.5 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.

2.3 Fisheries Act

The purpose of the *Fisheries Act* (Canada 1985) is to maintain healthy, sustainable and productive Canadian fisheries through the prevention of pollution and the protection of fish and their habitat. All projects undertaking in-water or near-water work must comply with the provisions of the *Fisheries Act*.

All projects where work is being proposed that cannot avoid impacts to fish or fish habitat require a Fisheries and Oceans Canada (DFO) project review (DFO 2019). If it is determined through the DFO review process that the project will result in death of fish or harmful alteration, disruption or destruction (HADD) of fish habitat, an authorization is required under the *Fisheries Act*. This includes projects that have the potential to obstruct fish passage or affect flows.

Proponents of projects requiring a *Fisheries Act* Authorization are required to also submit a Habitat Offsetting Plan, which provides details of how the death of fish and/or HADD of fish habitat will be offset, and outlines associated costs and monitoring commitments. Proponents also have a duty to notify DFO of any unforeseen activities during the project that cause harm to fish or fish habitat, and outline the steps taken to address them.

2.4 Migratory Birds Convention Act, 1994

Most birds in Canada are protected by the federal *Migratory Birds Convention Act* (MBCA; Canada 1994), which prohibits the disturbance or destruction of migratory birds, their eggs and nests on all lands in Canada, even incidentally. Upon the enforcement of the Migratory Birds Regulations, 2022 (MBR, 2022; Canada 2022) in July 2022, nest protection has been limited to active nests for most migratory bird species. Schedule 1 of the MBR, 2022 identifies 18 migratory bird species whose nests are protected year-round and must be confirmed inactive for a defined period (ranging between 12 and 36 months depending on the species) before they can be disturbed or destroyed. The nests must also be registered at the start of the defined period.

Although Environment and Climate Change Canada (ECCC) can issue permits allowing the destruction of nests for scientific purposes or to prevent damage being caused by birds, there are currently no permits available to exempt development, including maintenance and rehabilitation activities. ECCC advises that proponents schedule activities outside of the migratory bird nesting season to avoid incidental take. Proponents can apply for a damage or danger permit to remove or actively deter migratory birds from structures if it can be clearly demonstrated that the bird activity is causing damage to the structure or poses a health and safety concern for people (e.g., large nesting gull colonies generating waste in public places).

2.5 Species at Risk

2.5.1 Species at Risk Act

At a federal level, species at risk (SAR) designations for species occurring in Canada are initially determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment and Climate Change, species are added to the federal List of Wildlife Species at Risk (Canada 2002).

It is prohibited to kill, harm, harass, capture, possess, collect, buy, sell, or trade individuals, as well as damage or destroy the residence of a species listed as extirpated, endangered, or threatened on Schedule 1 of the *Species at Risk Act* (SARA). Furthermore, species that are included on Schedule 1 as extirpated, endangered or threatened are afforded protection of species-specific critical habitat on federal lands once critical habitat is defined in a recovery strategy. Any alterations to critical habitat on federal lands require a permit under Section 73(3) of SARA.

On private or provincially-owned lands, only individuals and residences of migratory birds (as defined by the MBCA) and aquatic species that are listed as endangered, threatened, or extirpated are protected under SARA, and critical habitat protection on non-federal lands is afforded only to aquatic species, unless ordered by the Governor in Council.

2.5.2 Endangered Species Act, 2007

Species at risk designations for species in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO). If approved by the provincial Minister of the Environment, Conservation and Parks, species are added to the *Endangered Species Act, 2007* (ESA).

Subsection 9(1) of the ESA prohibits the killing, harming, or harassing of species identified as ‘endangered’ or ‘threatened’ in the various schedules to the Act. Subsection 10(1) (a) of the ESA states that “No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario (SARO) list as an endangered or threatened species.” As of June 30, 2008, the SARO list is contained in O. Reg. 230/08.

The ESA also provides general habitat protection to all species listed as threatened or endangered under the Act. Species-specific habitat protection is only afforded to those species for which a habitat regulation has been prepared and passed into law as a regulation of the ESA. The ESA has a permitting process to allow alterations to protected species or their habitats. In addition, the ESA allows for a registration approach for projects meeting specific conditions.

2.6 Provincial Plans

2.6.1 Oak Ridges Moraine Conservation Plan

The Oak Ridges Moraine is a terrain feature that stretches from the northeast corner of Peel Region to the central townships of Northumberland County and represents the height of land across this area (Chapman and Putnam 1984). Most of the watercourses that drain to Lake Ontario in this region have their headwaters in the Oak Ridges Moraine. Similarly, many of the watercourses that drain north to the Kawartha Lakes and the Trent-Severn Waterway have their origins in the moraine. Many significant natural features are present on the Oak Ridges Moraine. To protect the natural environment features and qualities of the Oak Ridges Moraine, the provincial government has designated the moraine a special land use planning area and has formulated the Oak Ridges Moraine Conservation Plan (ORMCP) to identify the land use designations for the lands within the Oak Ridges Moraine planning area and to establish the various policies that attend proposed development within this area (Ontario 2017).

The Site and Study Area are designated as Countryside Area in the ORMCP (Ontario 2017). Aggregate operations are permitted in areas designated as Countryside Area in accordance with the provisions of Section 35 of the ORMCP.

In general, development is prohibited within and adjacent to Key Natural Heritage Features (KNHFs), which include wetlands, habitat of endangered and threatened species, fish habitat, areas of natural and scientific interest (life science), significant valleylands, significant woodlands, significant wildlife habitat (including habitat of special concern species), and sand barren, savannahs, and tallgrass prairies; and within Key Hydrologic Features (KHF), which include permanent and intermittent streams, wetlands, kettle lakes, and seepage areas and springs. Development for a mineral aggregate operation or wayside pit may be approved if the KNHF is a significant woodland and it is occupied by young plantations or early successional habitat, if development is not prohibited under the ESA and if the Site is rehabilitated according to ORMCP requirements.

The landform conservation area designation is applied to areas of the Oak Ridges Moraine where complex landform patterns warrant special policies and practices to protect the character of the landform, including limitations to development within or alteration to the landform and rehabilitation requirements (MNR no date; Ontario 2017). A small portion of the Study Area is moderately complex landform, but the Site is not within a landform conservation area (Figure 1).

2.6.2 Growth Plan for the Greater Golden Horseshoe

The Growth Plan for the Greater Golden Horseshoe was issued under the *Places to Grow Act, 2005* and came into effect on May 16, 2009, with amendments approved and coming into effect in August 2020 (MMAH 2020b). The Growth Plan is intended, in coordination with other provincial plans, to establish a unique land use planning framework for the Greater Golden Horseshoe that supports the achievement of complete communities, a thriving economy, clean and healthy environment and social equity (MMAH 2020b). A natural heritage system for the Greater Golden Horseshoe has been mapped under the Growth Plan to support planning for the protection of the region's natural heritage and biodiversity. However, the provincial mapping does not apply until it has been implemented in the applicable municipal official plan(s).

Applications for aggregate pit expansions may be permitted in KNHFs, KNFs and any associated vegetation protection zones but must be consistent with the PPS and satisfy rehabilitation requirements detailed in Section 4.2.8 subsections 4 and 5 of the Growth Plan. However, policies of the Growth Plan do not apply in the Greenbelt Area where there are similar policies in other provincial plans (e.g., the ORMCP) unless stated otherwise in either plan. Where there is conflict in policies regarding the natural environment, the more protective policy prevails.

2.6.3 Lake Simcoe Protection Plan

The Site is located within the Lake Simcoe watershed boundary and subject to the policies of the Lake Simcoe Protection Plan (Ontario 2009) enacted under the *Lake Simcoe Protection Act, 2008*. The plan's objectives are to protect, improve or restore the ecological health of the Lake Simcoe watershed.

Development and alteration within and adjacent to shorelines, wetlands and permanent or intermittent streams is strictly managed under the Lake Simcoe Protection Plan (Ontario 2009). Although most policies relating to these features do not apply within the Oak Ridges Moraine Plan Area, section 6.10-DP of the plan states that where development or site alteration is permitted within 120 m of these features (including within the Oak Ridges Moraine), activities should be integrated with and not constrain any ongoing or planned stewardship or remediation efforts.

2.7 Official Plans

The Site and Study Area are within the municipal jurisdictions of the Township of Uxbridge and Durham Region. The Project is therefore subject to the policies of the Township of Uxbridge Official Plan (OP) and Durham Regional OP. Municipal official plans must be consistent with the PPS and conform to the ORMCP where the plan boundaries overlap, except where more restrictive OP policies apply.

2.7.1 Township of Uxbridge

The Township of Uxbridge OP (Office Consolidation January 2014; Uxbridge 2014) guides growth and development primarily within the urban limits of the Town of Uxbridge. For rural areas of Uxbridge, including the Site, land uses are guided by the Durham Regional OP (Durham 2017; Section 2.7.2).

According to Schedule I (ORMCP Area Key Natural Heritage and Hydrologically Sensitive Features) of the Township of Uxbridge OP, there is a significant woodland located in the south portion of the Study Area. However, based on aerial photography and field observations, this woodland does not exist. There are no other mapped Key Natural Heritage and Hydrologically Sensitive Features on the Site or in the Study Area.

2.7.2 Region of Durham

According to Schedule A (Regional Structure) of the Durham Regional OP (May 11, 2017 consolidation), the Site is designated Oak Ridges Moraine Area. According to Schedule B (Greenbelt Natural Heritage System & Key Natural Heritage and Hydrologic Features) of the OP, KNHFs on the Site include the north-south strip of spruce plantation in the center of the Site and a narrow strip of spruce plantation in the southeast corner of the Site. KNHFs in the Study Area include the mapped woodland in the south portion of the Study Area that does not exist, and the spruce plantation in the north portion of the Study Area. Development within the Oak Ridges Moraine is prohibited in KNHFs and KHF, including any associated vegetation protection zone. An EIS is required where development is proposed within the minimum area of influence surrounding a KNHF or a KHF. An application for a mineral aggregate operation or wayside pit within a KNHF may be approved if the KNHF is occupied by young plantations or early successional habitat, and the requirements of the ORMCP are met.

According to Schedule D (High Potential Aggregate Resource Areas), the Site is located within an Area of High Potential Aggregate Resources. These areas are designated to provide opportunities for the extraction of aggregate resources, while protecting significant natural environmental features.

2.8 Lake Simcoe Region Conservation Authority

The Site is within the jurisdiction of the Lake Simcoe Region Conservation Authority (LSRCA). Any development or activities proposed within the regulation limit as governed by Ontario Regulation 179/06 Lake Simcoe Region Conservation Authority Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses under the *Conservation Authorities Act* may require a permit. Based on available regulation limit mapping (LSRCA 2018), the Site is not within the regulation limits of the LSRCA. Further, projects under the purview of the ARA do not require conservation authority permits.

3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

It is understood that the Site is proposed for extension of the existing Goodwood Pit. Access to the Site will be through the common boundary with the Goodwood Pit.

The proposed licence area is approximately 17.9 ha with an extraction area limit of 15.4 ha (Figure 1). Approximately 5.3 ha of the extraction will be below water. Setbacks are as follows: 15 m along the north boundary, a 30 m setback along the eastern boundary, and no setback along the south and west boundary where the Site is adjacent to the existing Goodwood Pit. The pit floor will reach a minimum elevation of approximately 310 metres above sea level (masl), corresponding to roughly 38 m to 32 m below current ground surface.

The annual tonnage from the proposed licence will be 1,177,000 tonnes per year which is the same as the existing Goodwood Pit. Extraction will begin in the west of the Site and progress east. Operations will be serviced by several loaders, a screening plant, and a portable crushing plant. Extraction of aggregate below the water table may use a dragline method. Extracted material from below the water table will be temporarily stockpiled near the face of the extraction with pore water allowed to drain back into the subsurface. Material processing will also occur on-site.

Site operations will not require any pumping or active dewatering. No fuel will be stored on-Site.

4.0 METHODS

4.1 Background Review

The investigation of existing conditions on the Site and in the Study Area included a background information search and literature review to gather data about the local area and provide context for the evaluation of the natural features. Information and data sources reviewed included the following:

- Make-a-Map: Natural Heritage Areas application (MNRF 2023), which includes species and natural areas information queries;
- Species at Risk in Ontario (SARO) List (MECP 2023);
- Atlas of the Breeding Birds of Ontario (Cadman et al. 2007);
- eBird range maps (eBird 2023);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2020);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Bat Conservation International (BCI) range maps (BCI 2023);
- Aquatic species at risk maps (DFO 2023);
- Ontario Butterfly Atlas (Macnaughton et al. 2023);
- Vascular Plants at Risk in Ontario (Leslie 2018);
- Township of Uxbridge Official Plan (Uxbridge 2014);
- Region of Durham Official Plan (Durham 2017);
- Oak Ridges Moraine Conservation Plan (Ontario 2017);
- information contained in natural heritage related map layers from Ontario Base Map series, Natural Resource Values Information System (NRVIS) mapping and Land Information Ontario (LIO); and
- existing aerial photography.

To develop a preliminary understanding of the ecological communities, wildlife habitat, and natural heritage features that may be affected by the proposed Project, data from the Make-a-Map: Natural Heritage Areas application (MNRF 2023) were used to create base layer mapping for the Study Area. A geographic query of the application database was conducted to identify natural heritage features and element occurrences of rare, threatened, or endangered species within two kilometres (km) of the Project Site.

4.2 Species at Risk Screening

A SAR screening assessment was conducted and updated in 2023 to determine which SAR had potential habitat in the Study Area. SAR considered in the screening assessment include those species listed under the ESA and SARA. A screening of all SAR that have the potential to be found in the vicinity of the Study Area was conducted first as a desktop exercise using the sources listed in Section 4.1. Species with ranges overlapping the Study Area, or recent occurrence records in the vicinity, were screened by comparing their habitat requirements to habitat conditions in the Study Area.

The potential for the species to occur was determined through a probability of occurrence. A ranking of low indicates no availability of suitable habitat for that species in the Study Area and no recorded occurrences. Moderate probability indicates more potential for the species to occur, as suitable habitat appeared to be present in the Study Area, but no occurrence of the species has been recorded. Alternatively, a moderate probability could indicate an observation of a species, but there is no suitable habitat on the Site or in the Study Area. High potential indicates a known species record in the Study Area (including during field surveys or background data review) and good quality habitat is present.

Searches were conducted during field surveys for suitable habitats and signs of all SAR identified through the desktop screening. If the potential for the species to occur in the Study Area was moderate or high, the screening was refined based on field investigations (i.e., habitat assessment) and/or species-specific surveys. Any habitat identified during field surveys that had potential to provide suitable conditions for additional SAR not already identified through the desktop screening was also assessed and recorded.

4.3 Field Surveys

The habitats and communities on the Site and accessible portions of the Study Area along the perimeter of the Site were characterized through field surveys. The following sections outline the methods used for each of the field surveys. During all surveys, area searches were conducted, and additional incidental wildlife, plant, and habitat observations were recorded. Searches were also conducted to document the presence or absence of suitable habitat for those species identified in the desktop SAR screening described above. Surveys were conducted during the fall of 2017, spring of 2018, and fall of 2019. A site reconnaissance was subsequently conducted in spring 2023 to confirm existing conditions on the Site and in the Study Area.

4.3.1 Ecological Land Classification and Botanical Inventory

Plant community classification and botanical inventory were initially conducted on September 17, 2017 as part of a preliminary site reconnaissance and supplemented with additional field investigation on June 1, 2018.

Plant communities were characterized using the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al. 1998; Lee 2008). Plant community boundaries preliminarily delineated through existing imagery were verified and revised as required. Plant communities were evaluated as potential habitat for SAR determined to have moderate or high potential to occur in the Study Area through the desktop screening.

The botanical inventory included area searches in all naturally-occurring habitats on the Site and in accessible areas of the Study Area. The searches were conducted by systematically walking through all habitats on the Site, in a meandering fashion, generally paralleling the principal (long) axis of a natural area, where feasible, and ensuring that the full width of the area was examined. A list of all plant species identified during the survey was compiled and any plant SAR were georeferenced.

4.3.2 Breeding Bird Surveys

Breeding bird surveys were completed by an avian specialist at five point count stations on the Site. Station locations are identified on Figure 2. Station locations were selected to ensure all habitat types present on the Site were surveyed. The surveys were conducted over two rounds, on June 1 (Round 1) and June 18 (Round 2), 2018, in accordance with methods outlined in the Canadian Breeding Bird Survey (Downes and Collins 2003) and the Breeding Bird Atlas of Ontario (OBBA; Cadman et al. 2007). The OBBA protocol requires five minute point counts with two visits during the breeding season; however, the observation period was extended to ten minutes to improve detection. Each point count plot consisted of a circle with a 100 m radius from the centre point (where

the observer stands). All birds seen or heard within the point count plot during the 10 minute survey period were recorded and observations were made regarding sex, age and notable behaviour, when possible. Birds heard or seen outside of the 100 m radius were also recorded using methods from the OBBA, including estimated distance (where possible). Surveys were conducted between 30 minutes before sunrise and 10:00 am to capture the period of maximum bird song activity.

4.3.3 Bat Habitat Assessment and Acoustic Surveys

During the site reconnaissance on September 17, 2017, the entire Site was searched for suitable habitats for roosting bats, including accessible areas of the horse stable (Golder 2018). Treed communities were surveyed for large-diameter (i.e., diameter at breast height [DBH] >25 cm) snags or cavity trees with potential to function as bat maternity roosts. Moderate bat roosting potential was identified in the horse stable and deciduous forest windbreak along the southern perimeter of the Site (Golder 2018), warranting further investigation via acoustic surveys.

Further habitat assessment was warranted in the deciduous forest windbreak to confirm candidacy as significant wildlife habitat for maternity colonies. The assessment was completed on October 23, 2019 and consisted of a search for large-diameter trees with suitable maternity roost features, including cavities, cracks, peeling bark, squirrel nests and dead, retained leaf clusters, following provincial survey protocol for SAR bats in treed habitats (MNRF 2017).

Bats were surveyed using full spectrum acoustic monitoring bat detectors. Bat acoustic surveys are a suitable method for the detection of the eight bat species known to occur in Ontario, including the four species listed as endangered under the ESA: little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), eastern small-footed myotis (*Myotis leibii*) and tri-colored bat (*Perimyotis subflavus*). Although acoustic detection is not suitable for determining specific maternity roosting locations, this survey method is adequate for determining the relative richness and abundance of bats, based on passage rates.

Two acoustic bat detector units (SM4 units; Wildlife Acoustics) were deployed for 17 consecutive nights, one at the horse stable on Site and one in the deciduous forest windbreak along the southern perimeter of the Site. Bat detector unit locations are identified on Figure 2. Bat detectors recorded autonomously, collecting bat echolocation calls in triggered wav format. Detectors were deployed on June 1, 2018 and retrieved on June 18, 2018. The detectors were set to record from 30 minutes before sunset to 30 minutes after sunrise on each night. Sonobat Data Wizard was used to attribute file names and scrub the data set of noise files. The data were analyzed and auto-classified using SonoBat 4.2.1 nNE. The Sonobat program is specifically intended to discriminate among bats to the species level when possible, and validation of the species-level classification was conducted by Golder's bat acoustic specialist. The results of the species classification were tallied on a per-night basis for each station for each species or species group. Once automated classification was complete, a subset of the files was reviewed for quality assurance by an experienced and qualified bat acoustic specialist using the SonoVet tool. All recordings identified as high frequency calls were reviewed and a subset of the low frequency calls was also reviewed. Greater review effort was devoted to high frequency calls because all the SAR bats have high frequency calls. For calls that were auto classified to species by SonoBat but not reviewed, the SonoBat classification was accepted.

4.3.4 General Wildlife Surveys

General wildlife and wildlife habitat surveys were conducted concurrent with the other field surveys. General wildlife surveys included track and sign surveys, area searches, and incidental observations. Incidental observations of wildlife were also recorded during other field surveys (i.e., breeding bird surveys, aquatic habitat assessment). The full range of habitats in the Study Area were searched, with special attention paid to edge habitats and other areas where mammals might be active. Areas of exposed substrate such as sand or mud were located and examined for any visible tracks. Any wildlife (including mammals, butterflies, and dragonflies) seen and identified were recorded. When encountered, tracks and other signs (e.g., tracks, scat, hair, tree scrapes) were identified to a species, if possible, and recorded. All suitable habitats for reptiles were searched (e.g., flipping logs and other types of cover objects, observations in piles of rocks) where access was available, and all reptiles and amphibians observed were identified and recorded.

A habitat assessment for SAR was also conducted in the Study Area. Specific habitat features that support various life processes of SAR, such as nesting and roosting Sites, foraging habitat, and hibernation habitat were recorded. Any SAR individuals seen and identified were recorded, and notes taken on the behaviour, location, and type of habitat where the individual was observed.

4.3.5 Site Reconnaissance

A site reconnaissance was completed by a WSP biologist on May 23, 2023 to confirm existing conditions including land cover on the Site and in the Study Area. The biologist walked through the site where access was available, documenting general conditions and confirming presence of sensitive natural features identified during earlier field surveys. Where access was unavailable, the biologist scanned the area from a vantage point, using binoculars if necessary. Searches were also conducted to document the presence or absence of suitable habitat for those species identified in the updated SAR screening.

4.4 Analysis of Significance and Sensitivity and Impact Assessment

An assessment was conducted to determine if any significant environmental features, SAR, or other significant species exist, or have moderate or high potential to exist, in the Study Area and assess whether the development would negatively impact surrounding significant natural heritage features or SAR. Preventative, mitigative, and remedial measures were considered in assessing the net effects of the proposed extraction operation on the surrounding ecosystem.

5.0 EXISTING CONDITIONS

5.1 Regional Context

The Study Area is located in Ecoregion 6E (Lake Simcoe – Rideau), which covers just over 6% of southern Ontario (Crins et al. 2009). Ecoregion 6E is underlain by bedrock of dolomite and limestone, and is characterized by gently rolling surface terrain interspersed by drumlin fields and moraines. Soils are primarily mineral-based and dominated by Gray Brown Luvisols and Melanic Brunisols. Most of the region is covered by cropland or pasture (57%), with 16% covered by forest and 4% covered by water (Crins et al. 2009).

The Study Area is located in the Oak Ridges Moraine physiographic region (Chapman and Putnam 1984). The region is characterized by hills composed of sand and gravel, and occasionally till. The northern edge of the moraine contains numerous swampy-floored valleys. The Oak Ridges Moraine is the headwater region for numerous streams. Agriculture is common on gentler hillsides and in the sandy outwash areas, and are often

used for cattle farming, potatoes and rye. Kettle lakes are also a common feature of this physiographic region (Chapman and Putnam 1984).

The Study Area is in the Pefferlaw River subwatershed, which drains approximately 425 km² of southern Ontario. The Pefferlaw River travels from the headwaters in the Oak Ridges Moraine to the mouth at Lake Simcoe. Land use throughout the subwatershed is dominated by agriculture, but most of the watercourses flow through wetlands and forests (LSRCA 2012).

The Study Area is within the Deciduous Forest Region of Ontario. Dominant tree species of the Deciduous Forest Region include white pine (*Pinus strobus*), red pine (*Pinus resinosa*), eastern hemlock (*Tsuga canadensis*), eastern white cedar (*Thuja occidentalis*), yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), basswood (*Tilia americana*), and red oak (*Quercus rubra*). However, species with more southern affinities can also be found in this region, including black walnut (*Juglans nigra*), butternut (*Juglans cinerea*), sassafras (*Sassafras albidum*) and many types of oak (*Quercus* spp.), and hickory (*Carya* spp.) (Rowe 1972). The forest life is the most diverse in Ontario and a number of nationally rare species occur in this region, including species of plants, mammals, birds, reptiles, and amphibians at the northern limit of their ranges (MNRF 2019).

5.2 Hydrogeology

A ground elevation high of approximately 348 masl exists in the southwest corner of the Site whereas a low of approximately 342 masl occurs in the northeast portion of the Site. Regional groundwater modelling undertaken for the Region of Durham suggests that recharge rates in the vicinity of the Site are on the order of 200 mm/yr (Earthfx 2010). Based on the same study, the Site is inferred to be just downgradient of a regional groundwater divide within the Oak Ridges Moraine Aquifer Complex (ORAC), with groundwater flowing in a generally northwards direction through the Site at groundwater elevations in the +/- 320 masl range (Earthfx 2010). Consistent with these study predictions, proximal well records (MECP 2019) list water table depths greater than 20 m below ground surface in this area.

Further details on hydrogeology are provided in the *Water Report Level 2* prepared for the Project (WSP 2023a).

5.3 Surface Water Resources

There are no mapped surface water features on the Site or in the Study Area (LIO 2018), and no surface water features were identified on the Site or in the Study Area during field surveys. The nearest naturally occurring surface water features are two small wetlands to the northeast of the Study Area along the rail corridor, one intersecting the Study Area boundary and one located 173 m from the Study Area, and a third wetland located 266 m to the northwest of the Study Area (Figure 1).

According to the property tenant on the Site, who has occupied the Site since 2001, flowing surface water (i.e., runoff) is typically observed only during the spring melt, during which time the runoff either ponds within localized depressions and infiltrates; or exits the Site via topographic lows at the north, south and east of the Site (WSP 2023a). Based on topographic mapping, the following catchment areas were identified:

- Catchment draining south towards the existing Goodwood Pit. The existing pit floor appears to have no natural outlet, suggesting it drains internally to infiltration with no external runoff.
- Catchment draining north across a low point along the rail line, and from there draining northwest to a wetland approximately 600 m northwest of the Site.

- Catchment draining to the east via sheet flow to a roadside ditch, across Concession Road 4 via culvert and then infiltrating within adjacent farm field.

Further details of the water budget are provided in the *Water Report Level 2* prepared for the Project (WSP 2023a).

5.4 Fish and Fish Habitat

There are no surface water features on the Site or in the Study Area to provide aquatic habitat for fish.

5.5 Vegetation

5.5.1 Plant Communities

A map of the plant communities (vegetation types) in the Study Area as determined through ELC and updated to reflect current (2023) conditions is provided on Figure 2. The area of each plant community and percent representation on the Site and in the Study Area are provided in Table 1. Representative photos of the plant communities in the Study Area are provided in Appendix A (Photos 1-6). Anthropogenic land cover types are also included on the figure and in the table for reference. None of the identified plant communities are provincially rare (S1-S3), noting that field verification of desktop community classifications was largely confined to the Site.

Plant communities on the Site are representative of a rural agricultural landscape. Over one-third each of the Site is old field meadow (CUM1-1) and in use as horse pastures (OAGM3). A large portion of the old field meadow represents former annual row crop (soybeans in 2018) left fallow. Rural properties comprise about 9% of the Site. The southern perimeter of the Site is lined by a narrow strip of sugar maple dominated deciduous forest (FOD6-5) presumably retained as a windbreak. Several large diameter trees with cavities were observed in this forest during field surveys. Two white spruce (*Picea glauca*) plantations are present on the Site (CUP3-8). Altogether, treed communities comprise about 17% of the Site.

The broader Study Area is also mostly under rural agricultural land cover, with crop fields, pasture, rural properties, cultural meadow and fencerow combined comprising 54% of the Study Area. The existing Goodwood Pit extraction area comprises 32% of the Study Area. Treed communities comprise about 12% of the Study Area. The nearest wetland (shallow marsh/deciduous swamp) abuts the Study Area perimeter with minimal (<0.01 ha)

Table 1: Ecological Land Classification on the Site and in the Study Area

Ecological Land Classification ¹			Area on Site (ha)	Percent of Site (%)	Area in Study Area (ha)	Percent of Study Area (%)
Map Code	Vegetation or Land Cover Type	Field Description				
CUM/CUT	Cultural Meadow / Cultural Thicket	This plant community is located off-Site in the northwest part of the Study Area north of the railway tracks. It consists of a mosaic of areas of old field cultural meadow and areas of deciduous thicket. This community was classified from aerial imagery.	—	—	2.47	3.11
CUM1-1	Dry-Moist Old Field Meadow	This plant community is located in two areas on Site: in an area west of the farm buildings, and in most of the western half of the Site where a field formerly planned with annual row crop (soybeans in 2018) has been left fallow. This plant community is also located off-Site north of the railway tracks. The on-Site old field meadow was dominated by terrestrial grasses and forbs including orchard grass (<i>Dactylis glomerata</i>), smooth brome (<i>Bromus inermis</i>), and goldenrod (<i>Solidago</i> spp.). The off-Site old field meadow was classified from aerial imagery.	7.07	39.51	8.95	11.26
CUP3-8	White Spruce Coniferous Plantation	This plant community is located in two areas on-Site adjacent to the agricultural and residential buildings, and off-Site north of the railway tracks. These plantations consist of mature white spruce (<i>Picea glauca</i>).	1.12	6.25	2.90	3.64
CVC4	Extraction	This area consists of the existing pit located south of the Site boundary.	—	—	25.65	32.25
CVR4	Rural Property	These areas consist of rural, low-density residential and farm properties. They are located on the eastern half of the Site and off-Site in the Study Area along Wagg Road and Concession Road 4.	1.55	8.69	15.47	19.46
FOC1	Dry-Fresh Pine Coniferous Forest	This plant community is located north of the Site boundary and southwest of the intersection of Wagg Road and Concession Road 4. It is dominated by semi-mature white pine (<i>Pinus strobus</i>) with an understory dominated by staghorn sumac (<i>Rhus typhina</i>).	—	—	1.07	1.35
FOC4	Fresh-Moist White Cedar Coniferous Forest	This plant community is located at the eastern end of the Site and consists of a dense monoculture of eastern white cedar (<i>Thuja occidentalis</i>). This plant community has anthropogenic origins.	0.14	0.78	0.19	0.24
FOD6-5	Fresh-Moist Sugar Maple-Hardwood Deciduous Forest	This plant community is located along the southern boundary of the Site immediately north of the existing pit. It consists of a narrow, linear strip of mature sugar maple (<i>Acer saccharum</i>) dominated deciduous forest. The canopy also contains white ash (<i>Fraxinus americana</i>), basswood (<i>Tilia americana</i>), American beech (<i>Fagus grandifolia</i>) and white pine. The understory contains white ash and alternate leaved dogwood (<i>Cornus alternifolia</i>). The ground cover layer consisted of an assemblage of upland forest herbs including bloodroot (<i>Sanguinaria canadensis</i>) and Virginia waterleaf (<i>Hydrophyllum virginianum</i>).	1.21	6.78	2.50	3.14
FOM5	Dry-Fresh White Birch-Poplar-Conifer Mixed Forest	This plant community is located in the Study Area north of the Site boundary and south of Wagg Road. It consists of white birch (<i>Betula papyrifera</i>), white pine, and trembling aspen (<i>Populus tremuloides</i>). The understory is dominated by Staghorn sumac.	—	—	0.82	1.04
MAS/SWD	Shallow Marsh / Deciduous Swamp	This plant community was classified from aerial imagery. It is located in the Study Area northeast of the Site boundary and northeast of the intersection of Wagg Road and Concession Road 4. It contains an area of shallow marsh dominated by cattail (<i>Typha</i> sp.) and an area of deciduous swamp dominated by white birch.	—	—	<0.01	<0.01
OAGM1	Annual Row Crops	Annual row crop agriculture is present off-Site in the Study Area to the east of Concession Road 4.	—	—	3.92	4.93
OAGM2	Perennial Row Crops	This plant community is a hay field. It is in the Study Area north of the Site boundary and south of Wagg Road.	—	—	2.75	3.46
OAGM3	Specialty Crops (Pasture)	Pasture is located in several areas throughout the Study Area. Lightly to moderately grazed horse pastures occupy most of the eastern half of the Site. Horse pastures in the central portion of the Site south of the barn are more heavily grazed. Pasture is also located in the Study Area north of the Site boundary, north and south of Wagg Road.	6.17	34.52	9.06	11.40
ROAD	Road	Public roadways are located in the Study Area to the east and the north of the Site boundary.	—	—	1.76	2.22
TAGM5	Fencerow	This treed fencerow is located along the northern boundary of the Site. It is variably dominated by various species of mature deciduous and coniferous trees including cottonwood (<i>Populus deltoides</i>), white pine, white spruce, and black locust (<i>Robinia pseudoacacia</i>).	0.61	3.42	1.81	2.27
Total			17.87	100.00	79.41	100.00

¹ Lee et al. 1998; Lee 2008
 ha = hectares; % = percent; — = not present

5.5.2 Vascular Plants

A total of 88 vascular plant species were identified during the botanical inventory (Appendix B). Of these, 57% are native species and 38% are introduced (non-native) species. The remaining 5% could not be identified to species level due to plant condition or seasonal timing (e.g., was not flowering). Most of the native plant species identified during the botanical inventory are secure and common in Ontario and globally (S4 or S5; G4 or G5). One sapling butternut (*Juglans cinerea*), designated as endangered under the ESA, was identified on the Site in the deciduous forest windbreak separating the Site from the existing Goodwood Pit; however, the tree appears to have been destroyed during a tornado that came through the area in 2022 (Figure 2; Appendix A, Photos 7-10).

5.6 Wildlife and Wildlife Habitat

5.6.1 Breeding Birds

In total 36 bird species were recorded during breeding bird and other surveys on the Site (Appendix C). Most of the species recorded during the surveys are common in the region. Commonly observed species included red-eyed vireo (*Vireo olivaceus*), American goldfinch (*Carduelis tristis*), American robin (*Turdus migratorius*), cedar waxwing (*Bombycilla cedrorum*) and indigo bunting (*Passerina cyanea*). Two species, European starling (*Sturnus vulgaris*) and rock pigeon (*Columba livia*), are introduced species. Four noteworthy bird species due to their conservation status were observed on the Site: bank swallow (*Riparia riparia*) and eastern meadowlark (*Sturnella magna*), both of which are designated as threatened under the ESA, and barn swallow (*Hirundo rustica*) and eastern wood-pewee (*Contopus virens*), both of which are designated as special concern under the ESA.

5.6.2 Bats

There was a moderate to high level of overall bat activity at both stations (Table 2). Mean number of bat passes per night was similar between the stations, though variation in the number of bat passes among nights at a station was much higher at station GBAT02. The same five species were detected at both stations. Big brown bat (*Eptesicus fuscus*) was by far the most commonly detected at both stations, followed by hoary bat (*Lasiurus cinereus*). One SAR bat was confirmed, little brown myotis, designated as endangered under the ESA.

At GBAT01 there were five SAR or potential SAR bat (i.e., unknown high frequency bat) passes detected (Table 3). The earliest detection of a SAR or potential SAR bat was at 22:10 on June 10, approximately 72 minutes after sunset. The absence of SAR bat detections within the first hour after sunset indicates it is unlikely there is a maternity roost for SAR bats in the vicinity of this station. Little brown myotis is present in the area and is likely using the area near this station for feeding or for commuting between roosts and feeding areas.

At GBAT02 there were 10 SAR or potential SAR bat passes detected (Table 3). There was a single potential SAR bat detected within the first hour after sunset, recorded at 21:43 on June 5, approximately 45 minutes after sunset. The earliest detection of a confirmed SAR bat was of little brown myotis, recorded at 22:03 on June 15, approximately 61 minutes after sunset. The low level of SAR and potential SAR bat activity recorded at this station and the fact that only one of the ten passes occurred within an hour after sunset indicate it is unlikely SAR bats are roosting in the vicinity of this station.

Based on bat data from the 2018 acoustic surveys, it does not appear that a SAR bat maternity roost was present on the Site. However, the high level of big brown bat activity at both stations suggests the Site may have supported a maternity colony of this species in 2018. Follow-up assessment of habitat suitability for maternity roosts in October identified 31 large-diameter trees with suitable features for maternity roosts in the deciduous forest windbreak, supporting this conclusion.

Table 2: Mean Bat Passes (Standard Deviation) by Species per Night in June 2018

Station	Nights Surveyed	All Bat Species	All High Frequency	All Low Frequency	Low Frequency Unknown ¹	High Frequency Unknown ²	Hoary Bat	Silver-haired Bat	Big Brown Bat	Eastern Red Bat	Big Brown or Silver-haired Bat ³	Unknown Myotis ⁴	Little Brown Myotis ^{5,6}
GBAT01	17	69.12 (37.48)	2.35 (1.54)	66.76 (36.83)	1.53 (1.28)	0.12 (0.33)	10.65 (6.89)	1.24 (1.64)	40.65 (25.5)	2.06 (1.68)	12.71 (8.11)	0(0)	0.18 (0.53)
GBAT02	17	76.06 (85.75)	2.12 (2.80)	73.94 (84.82)	2.82 (4.23)	0.18 (0.39)	12.35 (11.51)	1.59 (2.67)	50.00 (60.64)	1.53 (2.24)	7.18 (9.46)	0.06 (0.24)	0.35 (0.86)

¹ Recordings classified as bats with low frequency calls but could not be classified to the species level, typically including hoary bat, big brown bat, and silver-haired bat.

² Recordings classified as bats with high frequency calls but could not be classified to the species level, typically including red bat, tri-colored bat, and all bats in the *Myotis* genus.

³ Recordings classified as either big brown bat or silver-haired bat but could not be distinguished.

⁴ Recordings classified as bats of the *Myotis* genus but could not be classified to the species level.

⁵ Species listed as endangered under the *Endangered Species Act, 2007*.

⁶ Species listed as endangered under the *Species at Risk Act*.

Table 3: Total and Nightly Maximum Species at Risk Bat Passes in June 2018

Station	Total (Maximum) Unknown High Frequency ¹	Total (Maximum) Myotis Species	Total (Maximum) Little Brown Myotis
GBAT01	2 (1)	0 (0)	3 (2)
GBAT02	3 (1)	1 (1)	6 (3)

¹ Recordings classified as bats with high frequency calls but could not be classified to the species level, typically including red bat, tri-colored bat, and all bats in the *Myotis* genus.

5.6.3 Other Wildlife

In addition to the 36 bird species observed during breeding bird and other surveys (Section 5.6.1) and five bat species observed during acoustic monitoring (Section 5.6.2), two other wildlife species (one mammal species and one butterfly species) were observed in the Study Area during the general wildlife surveys in 2018 or during the site reconnaissance in September 2017. The butterfly, monarch (*Danaus plexippus*), is designated as special concern under the ESA. A complete list of wildlife species observed in the Study Area is provided in Appendix C.

6.0 ASSESSMENT OF SIGNIFICANT NATURAL HERITAGE FEATURES

This section assesses the natural heritage features and functions (as outlined in Section 2.0) located within the Study Area.

6.1 Significant Wetlands

The PPS (MMAH 2020a) requires that municipalities and others responsible for land use planning protect PSW. A wetland is determined to be a PSW using evaluation procedures established by the Province, as amended from time to time. Wetlands are assessed based on a range of criteria, including biology, hydrology, societal value, and special features (MNRF 2018b). Based on current LIO mapping, there are no PSW on the Site or in the Study Area.

All wetlands, regardless of provincial significance, are designated as KNHFs in the ORMCP (Ontario 2017). An unevaluated wetland is mapped (LIO) in the Study Area in the location of the existing Goodwood Pit, but this wetland is not present. Two small wetlands are located to the northeast of the Study Area along the rail corridor, one intersecting (<0.01 ha) the Study Area boundary and one located 173 m from the Study Area, and a third wetland is located 266 m to the northwest of the Study Area (Figure 1). These wetlands are located outside the area of anticipated changes to groundwater levels and regardless are perched above the water table (WSP 2023a). However, evaluation of local drainage patterns as part of the hydrology study for the Project identified hydrologic relation of the Site via catchment to the wetland to the northwest (Section 5.3; WSP 2023a). The Site water budget concluded the Project will result in some losses to off-site runoff. The decrease in northerly off-site runoff (2,600 m³/day to 300 m³/day) may result in a corresponding decrease in inflow (estimated at 6% reduction) to this wetland, occurring largely during the spring freshet when water has been observed to flow off-site (WSP 2023a). Further evaluation of Project effects is warranted, and wetlands are carried forward to the impact assessment (Section 7.0).

6.2 Significant Woodlands

Woodlands can vary in their level of significance at the local, regional, and provincial levels. Significant woodlands are areas that are ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to their contribution to the broader landscape because of their 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 (MMAH 2020a). For areas on the Oak Ridges Moraine, the ORMCP Technical Paper 7 (Identification and Protection of Significant Woodlands) specifies which woodlands may qualify as significant (MMAH no date).

Based on the ORCMP Technical Paper 7, woodlands in Countryside Areas are required to be a minimum of 4 ha in area and 40 m in width to qualify as significant, unless they intersect a KNHF, KHF or their vegetation protection zone, in which case the area requirement is reduced to 0.5 ha (MMAH no date). Based on aerial

imagery interpretation, there are no woodlands on the Site or off-site in the Study Area that meet both required criteria for woodland significance.

The Township of Uxbridge OP identifies a significant woodland in the southern portion of the Study Area mostly outside the Site boundary (Schedule I; Uxbridge 2014). However, this woodland has been almost entirely removed by extraction, with a remnant strip of deciduous forest (FOD6-5) along the southern perimeter of the Site (Figure 2). Approximately 1.2 ha of the deciduous forest are within the Site boundary (Table 1 in Section 5.5.1). Moreover, municipal OPs defer to the ORMCP and policies therein.

Significant woodlands are included in the classification of KNHFs in the Durham Regional OP, which are mapped on Schedule B – Map B1 of the plan (Durham 2017). The north-south oriented portions of the spruce plantations (CUP3-8) on the Site are designated in the Durham Regional OP as KNHFs, as are the former woodland in the southern portion of the Study Area (now extraction and remnant FOD6-5) and the spruce plantation (CUP3-8) to the north of the Site in the Study Area (Schedule B – Map B1b; Figure 2).

According to the ORMCP (Ontario 2017), development is generally prohibited within 30 m of KNHFs (including significant woodlands). However, the characteristics of the woodlands present on the Site and in the Study Area that have been mapped as significant in the OPs do not meet any of the criteria for woodland significance according to the ORMCP (Ontario 2017). Further assessment is not warranted.

6.3 Significant Valleylands

Recommended criteria for designating significant valleylands under the PPS include prominence as a distinctive landform, degree of naturalness, importance of its ecological functions, restoration potential, and historical and cultural values. For areas on the Oak Ridges Moraine, the ORMCP Technical Paper 1 (Identification of Key Natural Heritage Features) specifies which valleylands may qualify as significant (MMAH no date). These include:

- Streams with well defined valley morphology and average width of 25 m or more.
- Spillways and ravines with the presence of flowing or standing water for at minimum two months in an average year, minimum dimensions of 50 m length and 25 m width, minimum area of 0.5 ha, and well defined morphology (two valley walls of minimum 15% slope and 5 m height and a valley floor).

There are no significant valleylands on the Site or in the Study Area. Further assessment is not warranted.

6.4 Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSI) are designated by the MNR based on the presence of unique natural landscapes or existing features that meet specific criteria as having life or earth science values related to protection, scientific study or education. There are no ANSI on the Site or in the Study Area. Further assessment is not warranted.

6.5 Environmentally Significant Areas

Environmentally significant areas are designated areas within the natural heritage system that are particularly sensitive due to their significant characteristics and which require additional protection to preserve their environmental qualities. The locations of environmentally significant areas are identified on Schedule I of the Township of Uxbridge OP. There are no environmentally significant areas on the Site or in the Study Area. Further assessment is not warranted.

6.6 Fish Habitat

No surface water features were identified on the Site or in the Study Area during field surveys. Therefore, there is no fish habitat on the Site or in the Study Area. Further assessment is not warranted.

6.7 Habitat of Endangered or Threatened Species

The Ministry of the Environment, Conservation and Parks (MECP) designates critical habitat as habitat that is necessary for the maintenance, survival, and/or recovery of naturally occurring or reintroduced populations of species designated as endangered or threatened under the ESA, and where those areas of occurrence are occupied or habitually occupied by the species during all or any part(s) of their life cycles.

Three species designated as endangered or threatened under the ESA were confirmed present on the Site: bank swallow, eastern meadowlark, and little brown myotis. Butternut, designated as endangered under the ESA, was confirmed present on the Site in 2017, after which a butternut health assessment was completed in 2019 and ESA authorization received to remove the tree (confirmation ID M-103-1341322872), but the tree appears to have been destroyed during the tornado that passed through the area in 2022 and is not considered further in this assessment. The change in status of the butternut sapling on the Site was communicated to the MECP on June 29, 2023 (WSP 2023b).

Bank swallows were observed flying through breeding bird survey station 5 (Figure 2) during both survey rounds, suggesting active foraging on the Site. Bank swallows breed in a variety of natural and anthropogenic habitats, including lake bluffs, stream and river banks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999). No suitable nesting habitat was observed on the Site, but the sand and gravel pits in the nearby gravel pits may provide suitable substrate for nest cavities. Development of the Site will not affect nests in the existing Goodwood Pit, if present. According to the general habitat description for bank swallow (MNRF 2015a), foraging habitat within 500 m of the outer edge of a breeding colony is protected and must be assessed for potential impacts due to development. Foraging habitat includes open areas where insects are found, such as lakes, wetlands, grassland, and open agricultural fields (Falconer et al. 2016). The Site and Study Area are located in a predominantly agricultural landscape that provides numerous sources of foraging habitat for this species, and no nesting habitat will be removed due to its absence from the Site. Based on this analysis, the temporary removal of a small area of foraging habitat on the Site will not have a significant adverse impact on the availability of foraging habitat or foraging behaviour of bank swallows in the vicinity of the existing Goodwood Pit should a nesting colony be present. Further assessment is not warranted.

Two eastern meadowlarks were observed singing and calling in the horse paddocks in the northeast portion of the Site during the May 2023 site reconnaissance. The paddocks in this portion of the Site had taller vegetation and appeared unused for pasture. In Ontario, eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2003). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970). Eastern meadowlark is carried forward to the impact assessment (Section 7.0).

Little brown myotis was recorded at both bat detector stations on Site. This species will roost in both natural and man-made structures. In natural areas, maternity colonies require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. Maternity colonies have also been observed in the attics of buildings within 1 km of water. Activity levels were low at both detectors on Site, indicating low

probability of use of the Site by maternity colonies. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above-freezing temperatures are required. There were no suitable features for hibernacula identified on Site and are unlikely to occur elsewhere in the Study Area. The Site is likely being used for foraging and transit, and opportunities for these life requirements are not limited in the Study Area and broader region. Further assessment is not warranted.

One species designated as threatened under the ESA was determined to have moderate potential to occur on the Site, bobolink (*Dolichonyx oryzivorus*). In Ontario, bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation (Gabhauer 2007). Bobolink prefers grassland habitat with a forb component and a moderate litter layer. They have low tolerance for presence of woody vegetation and are sensitive to frequent mowing within the breeding season. They are most abundant in established, but regularly maintained, hayfields, but also breed in lightly grazed pastures, old or fallow fields, cultural meadows and newly planted hayfields. Some of the horse paddocks with taller vegetation on the Site may provide suitable breeding habitat, although this species was not observed on the Site during any of the field surveys between 2017 and 2023. Because breeding bird surveys were not completed since 2017 and potential habitat is available on the Site, bobolink is precautionarily carried forward to the impact assessment (Section 7.0).

Remaining species designated as threatened or endangered under the ESA identified in the SAR screening were determined to have low potential to occur on the Site and in the Study Area (Appendix D).

6.8 Significant Wildlife Habitat

For areas on the Oak Ridges Moraine, the ORMCP Technical Paper 2 (Significant Wildlife Habitat) specifies which wildlife habitats may qualify as significant (MMAH no date). SWH should be evaluated in the context of the entire planning authority's jurisdiction, and only the best examples are considered significant.

There are four general types of significant wildlife habitat: seasonal concentration areas; rare vegetation communities or specialized habitat for wildlife; habitat for species of conservation concern; and animal movement corridors. The specific habitats considered in this report are evaluated based on the criteria outlined in the ORMCP Technical Paper 2 (MMAH no date). All types of SWH are discussed below in relation to the Site and the Project.

6.8.1 Seasonal Concentration Areas

Seasonal concentration areas of animals are considered to be areas where large numbers of a species gather together at one time of the year, or where several species congregate on an annual basis. The ORMCP Technical Paper 2 (MMAH no date) identifies the following eight types of seasonal concentration areas of animals that may be considered SWH:

- waterfowl stopover and staging areas (terrestrial);
- waterfowl stopover and staging areas (aquatic);
- waterfowl nesting areas;
- colonially-nesting bird breeding habitat (bank and cliff);
- colonially-nesting bird breeding habitat (tree/shrubs);
- colonially-nesting bird breeding habitat (ground);

- snake hibernacula; and
- deer wintering areas.

There are no waterfowl stopover or staging areas, waterfowl nesting areas, colonially-nesting bird breeding habitat or snake hibernacula in the Study Area. Deer yards (winter concentration areas) are mapped by the MNRF. There are no mapped deer yards in the Study Area, and forest patches in the Study Area are too small to support deer winter congregations. Further assessment is not warranted.

6.8.2 Rare Vegetation Communities

Rare vegetation communities are vegetation communities that are considered rare in the province. It is assumed that these vegetation communities are at risk of disappearing from the landscape due to their current rarity and that they are more likely than other more common vegetation communities to support rare species and other features that are considered significant. The ORMCP Technical Paper 2 (MMAH no date) identifies six rare vegetation communities that may be considered SWH:

- hickory deciduous forest (FOD2-3);
- oak-hickory deciduous forest (FOD2-2);
- mixed oak deciduous forest (FOD1-4);
- black oak deciduous forest (FOD1-3);
- white oak deciduous forest (FOD1-2); and
- sugar maple – black maple deciduous forest (FOD6-2).

None of these rare vegetation communities are present on the Site or in the Study Area. Further assessment is not warranted.

6.8.3 Specialized Habitat for Wildlife

Specialized habitat for wildlife is habitat or microhabitat that provides a critical resource for a group of wildlife. The ORMCP Technical Paper 2 (MMAH no date) identifies 10 specialized habitats that may be considered SWH:

- wetland (marsh) bird breeding habitat;
- open country bird breeding habitat;
- interior forest (area-sensitive) bird breeding habitat;
- nesting habitat for raptors associated with wetlands, lakes, ponds and rivers;
- woodland raptor nesting habitat;
- turtle nesting habitat;
- turtle overwintering areas;
- amphibian breeding habitat (woodlands);
- amphibian breeding habitat (wetlands); and
- seeps and springs.

There are no turtle nesting or overwintering areas, seeps, springs, amphibian breeding habitat, wetland bird breeding habitat or nesting habitat for raptors associated with wetlands, lakes, ponds and rivers in the Study Area given the absence of aquatic features. Forest patches in the Study Area are too small to qualify as woodland raptor nesting habitat or forest interior bird breeding habitat. Most of the open habitat in the Study Area is under agricultural use as annual row crop and horse pasture, and therefore does not meet criteria for open country bird breeding habitat. Cultural meadow and thicket habitats in the Study Area do not meet area criteria (10 ha or greater). In conclusion, there is no specialized habitat for wildlife on the Site or in the Study Area. Further assessment is not warranted.

6.8.4 Habitat for Species of Conservation Concern

The ORMCP Technical Paper 2 (MMAH no date) identifies eight species of conservation concern whose habitat may be considered SWH:

- brown thrasher (*Toxostoma rufum*);
- bobolink (*Dolichonyx oryzivorus*);
- eastern meadowlark (*Sturnella magna*);
- field sparrow (*Spizella pusilla*);
- western meadowlark (*Sturnella neglecta*);
- upland sandpiper (*Bartramia longicauda*);
- ruffed grouse (*Bonasa umbellus*); and
- American bullfrog (*Lithobates catesbeianus*).

Bobolink and eastern meadowlark have been listed as threatened on the ESA since the ORMCP Technical Paper 2 was released and therefore their habitats, are considered in Section 6.7 (Habitat of Endangered or Threatened Species). Brown thrasher, western meadowlark, upland sandpiper and ruffed grouse were not observed in the Site. There is no aquatic habitat to support American bullfrog.

Field sparrow was observed (auditory) at breeding bird survey station 5 during both survey rounds (Figure 2). Based on location and distance of the recorded individuals from the station centre point, they were likely occupying the cultural meadow/cultural thicket and possibly deciduous forest/open agriculture interface to the west and northwest of the Site. These habitats do not meet the area and ELC ecosite criteria for significance according to the ORMCP Technical Paper 2. Further assessment is not warranted.

All species designated as special concern under the ESA should also be considered in the evaluation of habitat for species of conservation concern as SWH in the ORMCP policy area. Three species designated as special concern under the ESA were confirmed present on the site: barn swallow, eastern wood-pewee and monarch.

Barn swallows were observed flying through breeding bird survey station 3 (Figure 2) during both survey rounds, suggesting active foraging on the Site. Barn swallows breed in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared rights-of-way, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are

reused (Brown and Brown 1999). The agricultural buildings on the Site (e.g., horse stable) may provide suitable nesting habitat, but no evidence of nests was observed during surveys. The Site and Study Area are located in a predominantly agricultural landscape that provides numerous sources of foraging habitat for this species. Habitat on the Site is therefore not significant for this species and therefore does not qualify as SWH. Further assessment is not warranted.

Eastern wood-pewee was observed at four of the five breeding bird stations (stations 2-5), noting that spacing between stations was in some instances less than 200 m and therefore some double counting of individuals was possible. Based on location and distance of the recorded individuals from the station centre points, they were likely occupying the deciduous forest windbreak along the southern boundary of the Site and possibly the spruce plantation to the southwest of the horse stable on the Site. Eastern wood-pewees inhabit a wide variety of wooded upland and lowland habitats, including deciduous, coniferous, and mixed forests (COSEWIC 2012), though use of coniferous forests is uncommon (Peck and James 1987). This species occurs most frequently in forests with some degree of openness. Intermediate-aged forests with a relatively sparse midstory are preferred. In younger forests with a relatively dense midstory, it tends to inhabit the edges. This species also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighbourhoods. The nest is constructed in a wide variety of deciduous and coniferous trees. Deciduous and mixed forests and, to a lesser degree, spruce plantations on the Site and in the Study Area provide suitable nesting habitat for this species. Suitable habitat off the Site in the study area will not be disturbed and habitat for eastern wood-pewee is well-represented throughout the broader region. Over a third of the potential habitat on the Site is coniferous forest/plantation, which appears to be sub-optimal habitat for this species (Peck and James 1987). In addition, the deciduous forest on the Site appears to be a remnant strip retained as a windbreak that is unlikely to support more than 1-2 nesting pairs based on typical breeding densities of fewer than 0.5 pairs per hectare (Watt et al. 2020). Habitat on the Site is therefore not significant for this species and therefore does not qualify as SWH. Further assessment is not warranted.

Adult monarchs were observed nectaring on site. Monarchs require milkweed (*Asclepias* spp.) plants to feed caterpillars, but will visit many species of flowering plants for nectar (MECP 2020). This species is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks (COSEWIC 2010). Common milkweed (*Asclepias syriaca*) was observed growing on site in low density, but no monarch caterpillars were observed. Common milkweed is common in rural areas including along roadsides, around rural buildings, in waste places, along cultivated fields and in old fields left to revegetate, and it appears to be increasing in abundance in southern Ontario (OMAFRA 2020). The presence of milkweed is not an indication of monarch breeding. Suitable habitat off the Site in the Study Area will not be disturbed and habitat for monarch is well-represented throughout the broader region. Habitat on the Site is therefore not significant for this species and therefore does not qualify as SWH. Further assessment is not warranted.

6.8.5 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another, and the ORMCP Technical Paper 2 (MMAH no date) emphasizes the importance of these corridors in maintaining genetic diversity in populations, permitting seasonal migrations and facilitating movement throughout a home range to meet life requisites (e.g., forage, shelter). Examples include trails used by deer to move to wintering areas or areas used by amphibians between breeding and summer or overwintering habitat. To qualify as SWH, these corridors should be a critical link between habitats that are regularly used by wildlife, and particularly where those habitats themselves are confirmed or candidate SWH.

There are no watercourses in the Study Area to function as aquatic or riparian corridors facilitating animal movement. Forest patches in the Study Area are disjunct within the broader agricultural landscape, providing no apparent animal movement corridors. Further assessment is not warranted.

7.0 IMPACT ASSESSMENT

7.1 Wetlands

An approximate 6% reduction in inflow to the unevaluated wetland 266 m to the northwest of the Study Area is anticipated to result from decreased off-site runoff due to the Project (WSP 2023a). A decrease in inflow can alter the plant, and in turn wildlife, community composition of the affected wetland. Wetland plant community composition is influenced by the duration, timing, frequency of saturation, and depth of water (Sheldon et al. 2005). Wildlife associations with wetlands are generally dependant on vegetation structure (derived from plant community composition) and water permanency and depth (e.g., Snodgrass et al. 2000; González-Gajardo et al. 2009).

Based on satellite imagery, the wetland appears to be a deciduous swamp. This assumption is supported by LIO mapping, which identifies woodland in the wetland boundary. However, the woodland is not considered significant according to the Township of Uxbridge OP (Schedule I; Uxbridge 2014). Since the wetland sits above the water table (WSP 2023a), trees are likely acquiring most of their water supply from surface runoff and precipitation and therefore are more sensitive to changes in inflow than trees drawing from groundwater. However, the anticipated reduction in inflow is considered a minor loss from a hydrological perspective (WSP 2023a) and most trees affiliated with swamps in southern Ontario are not wetland obligates and therefore resilient to variations in water supply. Based on the combined information, the minor loss to inflow is not anticipated to measurably change the plant community characteristics of the wetland, and thereby the associated wildlife community of the wetland.

7.2 Eastern Meadowlark and Bobolink

Based on observation of eastern meadowlark on the Site and habitat availability on the Site for eastern meadowlark and bobolink determined from known habitat preferences, the Project would result in the removal of 5.06 ha of eastern meadowlark and potential bobolink habitat. Disturbance to or removal of the habitat of these species is prohibited under the ESA. Authorization under the ESA is required to avoid contravention of the Act. Authorization requirements are dependent on the area of habitat to be disturbed or removed. Where the area of habitat to be disturbed or removed is equal to or less than 30 ha, a proponent can apply for an ESA permit exemption under O.Reg. 830/21. Requirements of the exemption include 1) submission of a notice of activity to the MECP; 2) preparation of a management plan that identifies the mitigation the proponent will implement to avoid or minimize impacts to the species; and 3) either a) creation or enhancement of compensation habitat in accordance with section 17 of O.Reg. 830/21; or b) payment of a species conservation charge in accordance with section 9(1)(b) of O.Reg. 829/21. Lafarge will submit a notice of activity, prepare a management plan, and either develop compensation habitat or pay the species conservation charge ahead of Site development.

Implementation of any conditions of the ESA authorization is considered adequate mitigation to render Project effects on eastern meadowlark and bobolink negligible.

8.0 MITIGATION AND MONITORING

8.1 General Best Management Practices

Standard best management practices that will be implemented to mitigate disturbance or damage to adjacent natural features include the following:

- Avoid removal of vegetation during the migratory bird nesting period (April 5 – August 26; ECCC 2019). Where vegetation removal cannot be avoided during this period, precede disturbance with a nesting survey by a qualified biologist and implement appropriate activity buffers around any active nests found during the survey until the young have fledged.
- Remove the barn and trees on the Site outside of the bat maternity roosting period (May 1 – July 31) to minimize adverse impacts on bats (not SAR) that may be roosting in these features.

8.2 Eastern Meadowlark and Bobolink

Mitigation for eastern meadowlark and bobolink includes registering the Project with the MECP through the online Notice of Activity and developing and executing a management plan in accordance with O.Reg. 830/21. Both actions will be completed ahead of Site development. Mitigation identified in the management plan to avoid or minimize impacts to these species will include scheduling habitat removal outside of the migratory bird nesting period (April 5 – August 26; ECCC 2019). Development of compensation habitat in accordance with section 17 of O.Reg. 830/21 or payment of a species conservation charge in accordance with section 17 of O.Reg. 829/21 will be completed to offset the loss of habitat.

9.0 REHABILITATION

The post-extraction rehabilitation plan has been designed to fit into the overall regional context and complement the existing topography and land cover in the area. Because over one-third of the extraction is below water, the overall final rehabilitation plan will consist of a 5.7 ha centrally located pond with 3:1 re-vegetated side slopes (9.7 ha) reaching the Site setbacks and draining towards the pond. The pond will be physically isolated from the existing Goodwood Pit along its southern perimeter. The future pond water elevation is estimated to be approximately 321 to 322 masl.

The following recommendations should be incorporated into the planting design. All plantings (i.e., nodal plantings) included in the rehabilitation plan should be locally native, non-invasive species that create habitat in the short term and promote natural succession processes. Recommended shoreline and aquatic plants include shrubs such as red-osier dogwood (*Cornus sericea*) and slender willow (*Salix petiolaris*), and herbaceous plants such as water plantain (*Alisma plantago-aquatica*), lake sedge (*Carex lacustris*), swamp milkweed (*Asclepias incarnata*), softstem bulrush (*Schoenoplectus tabernaemontani*), and cattail (*Typha* spp.). Shallow wetland habitats should be created through construction of submerged benches up to 2 m deep. Shallow emergent marsh vegetation (i.e., herbaceous species listed above) should be planted in water ± 0.15 m deep and extend ± 5 m from the shore and be interspersed with cover structures (e.g., boulders and root wads) in the shallow shoreline wetland areas. Organic material and topsoil should be added to the shoreline areas to promote shoreline vegetation, and the placement of basking logs (i.e., large woody debris) and rubble/boulders along the shoreline is recommended to create turtle basking areas, waterfowl nesting areas, and bird perching sites.

Side slopes above the water table should be rough graded to a 3:1 aspect to ensure stability. The slopes should be seeded with a mix of grasses and legumes consisting of native, non-invasive species. Terrestrial nodal

plantings on the side slope and within the setback area should include a mixture of coniferous and deciduous tree species to promote species diversity and provide a variety of species to compensate for any substrate deficiencies. Recommended species include white pine, basswood, trembling aspen (*Populus tremuloides*), and white birch (*Betula papyrifera*), with a secondary focus on species such as choke cherry (*Prunus virginiana*), alternate-leaved dogwood (*Cornus alternifolia*), highbush cranberry (*Viburnum opulus*), nannyberry (*Viburnum lentago*) and serviceberry (*Amelanchier* spp.). It is recommended that ash (*Fraxinus* spp.) species be avoided in rehabilitation plantings due to the invasion of emerald ash borer.

10.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed Goodwood Pit Extension (the Project) has been assessed for potential ecological impacts under the ARA Provincial Standards, the PPS, the policies of the ORMCP, Township of Uxbridge and Region of Durham, as well as other relevant legislation, including the ESA.

Based on this assessment, it is expected that the Project will result in no negative impacts to the significant natural features and functions in the Study Area. These conclusions are based on the following assumptions:

- Mitigation and monitoring as described in Section 8.0 will be implemented.
- The Site will be rehabilitated in accordance with the requirements of the rehabilitation plan developed with ecological concepts from this report.

11.0 CLOSURE

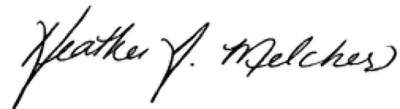
We trust this report meets your current needs. If you have any further questions regarding this report, please contact the undersigned.

Signature Page

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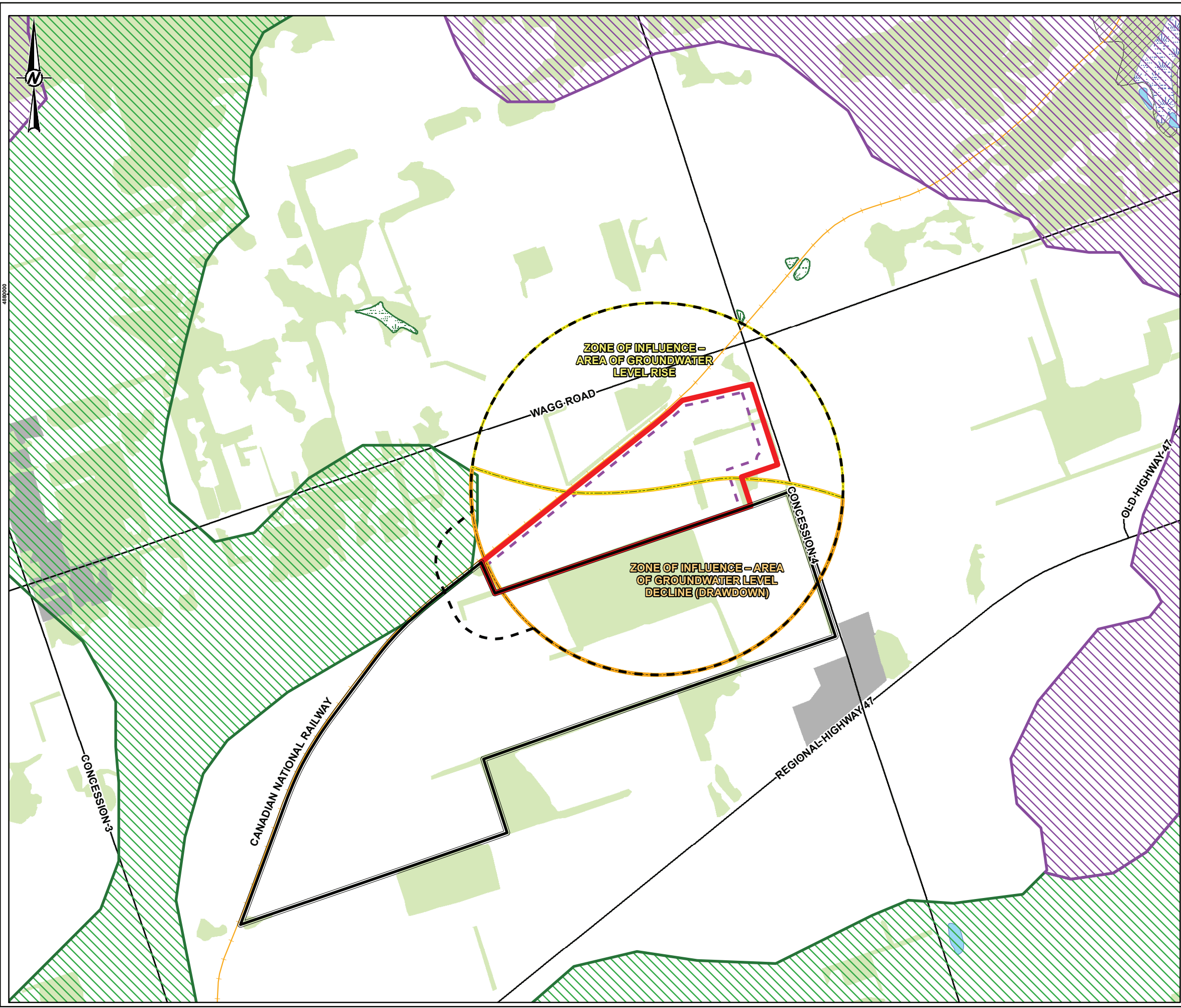
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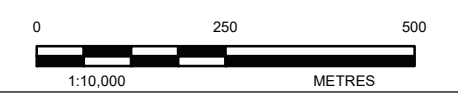
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FIGURES



- LEGEND**
- RAILWAY
 - CONTOUR (5 m INTERVAL)
 - WATERCOURSE
 - WATERBODY
 - UNEVALUATED WETLAND
 - PROVINCIALLY SIGNIFICANT WETLAND
 - WOODED AREA
 - BUILT-UP AREA
 - CANDIDATE ANSI, LIFE SCIENCE
 - LIMIT OF EXTRACTION
 - SITE BOUNDARY
 - STUDY AREA
 - ZONE OF INFLUENCE - AREA OF GROUNDWATER LEVEL DECLINE (DRAWDOWN)
 - ZONE OF INFLUENCE - AREA OF GROUNDWATER LEVEL RISE
- LANDFORM CONSERVATION AREA**
- COMPLEX LANDFORM (ORM CATEGORY 1)
 - MODERATELY COMPLEX LANDFORM (ORM CATEGORY 2)
 - EXISTING PIT BOUNDARY



REFERENCE(S)

1. BASEDATA: MNR/LIO OBTAINED APRIL 2019
2. IMAGERY: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
3. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
LAFARGE CANADA INC.

PROJECT
GOODWOOD PIT EXTENSION
4900 CONCESSION ROAD 4, TOWNSHIP OF UXBRIDGE

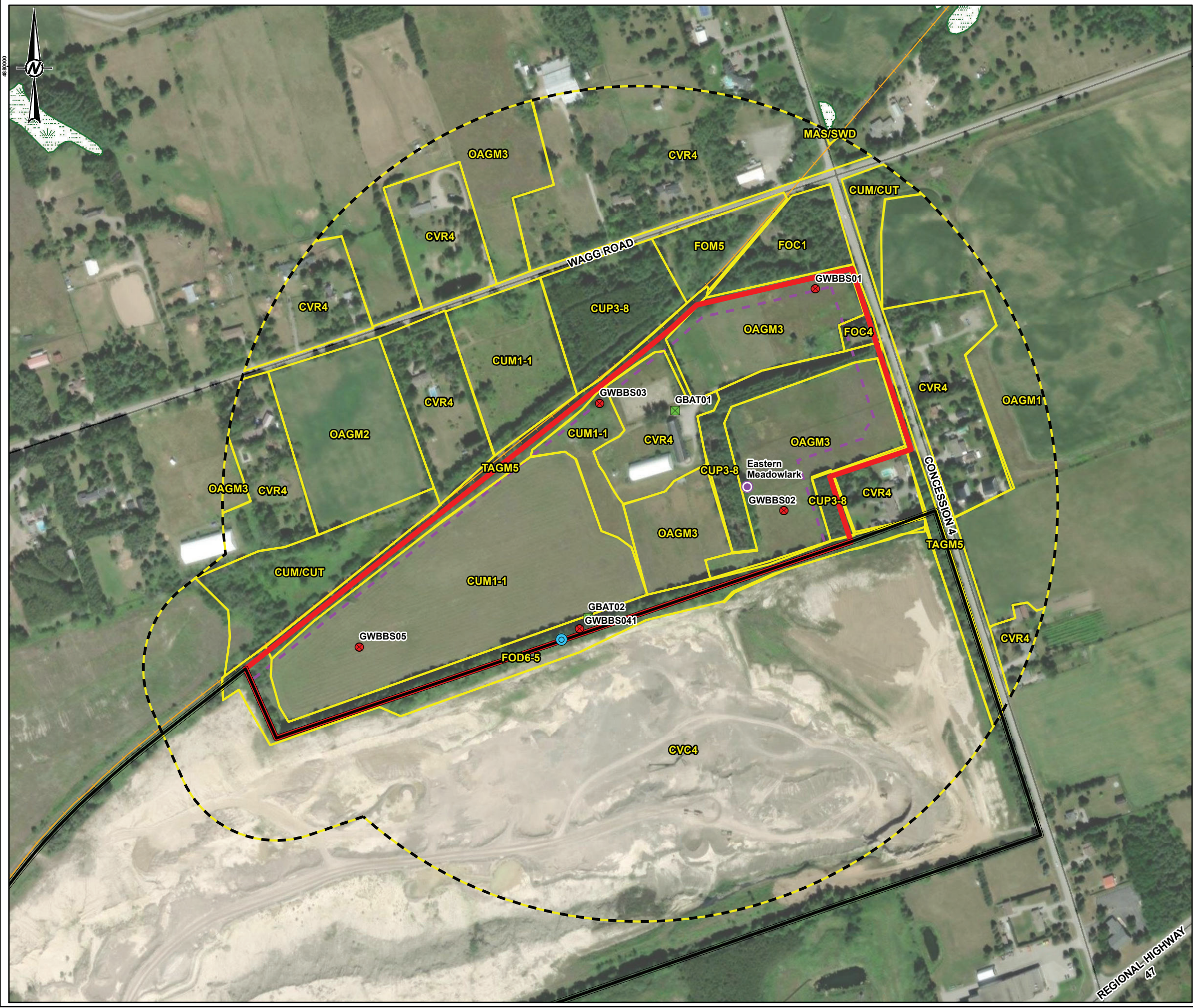
TITLE
SITE LOCATION AND STUDY AREA

CONSULTANT	DATE	REVISION
	YYYY-MM-DD	2023-06-29
	DESIGNED	SO
	PREPARED	SO
	REVIEWED	BB
	APPROVED	HM

PATH: S:\Chemical\Engineering\ON_Lab\4900\4900001_Natural_Environment\23608009_0001_C4-0001.mxd PRINTED ON: 2023-06-29 AT: 13:58:19 PM

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LEGEND

- RAILWAY
- CONTOUR (5 m INTERVAL)
- WATERCOURSE
- WATERBODY
- UNEVALUATED WETLAND
- PROVINCIALY SIGNIFICANT WETLAND
- BAT DETECTOR LOCATION
- BREEDING BIRD SURVEY LOCATION
- EASTERN MEADOWLARK OBSERVATION
- BUTTERNUT SAPLING (DESTROYED)
- ECOLOGICAL LAND CLASSIFICATION (ELC)
- LIMIT OF EXTRACTION
- SITE BOUNDARY
- STUDY AREA
- EXISTING PIT BOUNDARY

ELC CODE	ELC DESCRIPTION
CUM/CUT	Cultural Meadow - Cultural Thicket
CUM1-1	Dry-Moist Old Field Meadow
CUP3-8	White Spruce Coniferous Plantation
CVC4	Extraction - Quarry
CVR4	Rural Residential
FOC1	Dry-Fresh Pine Coniferous Forest
FOC4	Fresh-Moist White Cedar Coniferous Forest
FOD6-5	Fresh-Moist Sugar Maple - Hardwood Deciduous Forest
FOM5	Dry-Fresh Wite Birch - Poplar - Conifer Mixed Forest
MAS/SWD	Shallow Marsh / Deciduous Swamp
OAGM1	Open Agriculture - Annual Row Crop
OAGM2	Open Agriculture - Hay Field
OAGM3	Open Pasture
TAGM5	Treed Fence Row - Mixedwood



REFERENCE(S)

1. BASEDATA: MNRF LIO OBTAINED APRIL 2019
2. IMAGERY: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
3. SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 17N

CLIENT
LAFARGE CANADA INC.

PROJECT
GOODWOOD PIT EXTENSION
4900 CONCESSION ROAD 4, TOWNSHIP OF UXBRIDGE

TITLE
ECOLOGICAL LAND CLASSIFICATION, SURVEY STATIONS AND SENSITIVE FEATURES

CONSULTANT	DATE	BY
WSP	YYYY-MM-DD	2023-06-29
DESIGNED		SO
PREPARED		SO
REVIEWED		BB
APPROVED		HM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

APPENDIX A

Photolog



Photo 1: Annual row crop (soy) on the Site with mixed forest windrow in background in 2018.



Photo 2: Horse pasture on the Site with spruce plantation in background in 2018.



Photo 3: Barn on the Site in 2018.



Photo 4: Agricultural buildings and surrounding cultural meadow on the Site in 2018.



Photo 5: Fallow crop field in May 2023.



Photo 6: Downed trees in the deciduous forest windbreak along the southern boundary of the Site, May 2023.



Photo 7: Butternut sapling on the Site in 2017.



Photo 8: Butternut sapling on the Site in 2019 during the butternut health assessment.



Photo 9: Downed vegetation in May 2023 at the location of the butternut sapling first documented on the Site in 2017 and last confirmed present in 2019.



Photo 10: Close-up of the location of the butternut sapling first documented on the Site in 2017 and last confirmed present in 2019.

APPENDIX B

**Plant Species Observed in the
Study Area**

Table B-1: Plant Species Observed in the Study Area

Scientific Name	Common Name	Origin ¹	ESA ²	COSEWIC ³	SARA ⁴	GRANK ⁵	SRANK ⁵
Trees							
<i>Acer negundo</i>	Manitoba maple	(N)	—	—	—	G5	S5
<i>Acer saccharum</i>	Sugar maple	N	—	—	—	G5	S5
<i>Carya cordiformis</i>	Bitternut hickory	N	—	—	—	G5	S5
<i>Fagus grandifolia</i>	Beech	N	—	—	—	G5	S4
<i>Fraxinus americana</i>	White ash	N	—	—	—	G5	S5
<i>Juglans cinerea</i>	Butternut ⁶	N	END	END	END	G4	S3?
<i>Larix laricina</i>	Tamarack	N	—	—	—	G5	S5
<i>Malus pumila</i>	Apple	I	—	—	—	G5	SNA
<i>Picea abies</i>	Norway spruce	I	—	—	—	G5	SNA
<i>Picea glauca</i>	White spruce	N	—	—	—	G5	S5
<i>Pinus strobus</i>	White pine	N	—	—	—	G5	S5
<i>Pinus sylvestris</i>	Scots pine	I	—	—	—	GNR	SNA
<i>Populus alba</i>	White poplar	I	—	—	—	G5	SNA
<i>Populus deltoides</i>	Eastern cottonwood	N	—	—	—	G5T5	S5
<i>Populus tremuloides</i>	Trembling aspen	N	—	—	—	G5	S5
<i>Prunus serotina</i>	Black cherry	N	—	—	—	G5	S5
<i>Robinia pseudoacacia</i>	Black locust	I	—	—	—	G5	SNA
<i>Salix babylonica</i>	Weeping willow	I	—	—	—	GNR	SNA?
<i>Thuja occidentalis</i>	Eastern white cedar	N	—	—	—	G5	S5
<i>Tilia americana</i>	Basswood	N	—	—	—	G5	S5
<i>Tsuga canadensis</i>	Eastern hemlock	N	—	—	—	G4G5	S5
<i>Ulmus americana</i>	White elm	N	—	—	—	G5?	S5
Small trees, shrubs and woody vines							
<i>Cornus alternifolia</i>	Alternate-leaved dogwood	N	—	—	—	G5	S5
<i>Cornus stolonifera</i>	Red osier dogwood	N	—	—	—	G5	S5
<i>Parthenocissus inserta</i>	Virginia creeper	N	—	—	—	G5	S5
<i>Prunus virginiana</i>	Choke cherry	N	—	—	—	G5	S5
<i>Rhamnus cathartica</i>	Common buckthorn	I	—	—	—	GNR	SNA
<i>Rhus typhina</i>	Staghorn sumac	N	—	—	—	G5	S5
<i>Rubus allegheniensis</i>	Mountain blackberry	N	—	—	—	G5	S5
<i>Rubus idaeus</i>	Red raspberry	N	—	—	—	G5T5	S5
<i>Rubus odoratus</i>	Purple-flowering raspberry	N	—	—	—	G5	S5
<i>Sambucus</i> sp.	Elderberry sp.	—	—	—	—	—	—
<i>Solanum dulcamara</i>	Climbing nightshade	I	—	—	—	GNR	SNA

Appendix B – Plant Species Observed in the Study Area

Scientific Name	Common Name	Origin ¹	ESA ²	COSEWIC ³	SARA ⁴	GRANK ⁵	SRANK ⁵
<i>Sorbus americana</i>	American mountain-ash	N	—	—	—	G5	S5
<i>Viburnum lentago</i>	Nannyberry	N	—	—	—	G5	S5
<i>Viburnum trilobum</i>	Highbush cranberry	N	—	—	—	G5T5	S5
<i>Vitis riparia</i>	Riverbank grape	N	—	—	—	G5	S5
Graminoids							
<i>Bromus inermis</i>	Smooth brome	I	—	—	—	GNR	SNA
<i>Dactylis glomerata</i>	Orchard grass	I	—	—	—	GNR	SNA
<i>Phalaris arundinacea</i>	Reed canary grass	N	—	—	—	G5	S5
<i>Phleum pratense</i>	Timothy	I	—	—	—	GNR	SNA
<i>Poa pratensis</i>	Kentucky bluegrass	I	—	—	—	G5T5?	SNA
Forbs							
<i>Actaea pachypoda</i>	Doll's-eyes	N	—	—	—	G5	S5
<i>Actaea rubra</i>	Red baneberry	N	—	—	—	G5	S5
<i>Ageratina altissima</i> (<i>Eupatorium</i>)	White snakeroot	N	—	—	—	G5T5	S5
<i>Alliaria petiolata</i>	Garlic mustard	I	—	—	—	GNR	SNA
<i>Ambrosia artemisiifolia</i>	Ragweed	N	—	—	—	G5	S5
<i>Anemone</i> sp.	Hepatica sp.	—	—	—	—	—	—
<i>Aralia nudicaulis</i>	Wild sarsaparilla	N	—	—	—	G5	S5
<i>Arctium minus</i>	Common burdock	I	—	—	—	GNR	SNA
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	N	—	—	—	G5	S5
<i>Asclepias syriaca</i>	Common milkweed	N	—	—	—	G5	S5
<i>Caulophyllum thalictroides</i>	Blue cohosh	N	—	—	—	G4G5	S5
<i>Chenopodium album</i>	Lamb's-quarters	I	—	—	—	G5T5	SNA
<i>Circaea lutetiana</i>	Enchanter's nightshade	N	—	—	—	G5	S5
<i>Cirsium arvense</i>	Canada thistle	I	—	—	—	GNR	SNA
<i>Daucus carota</i>	Wild carrot	I	—	—	—	GNR	SNA
<i>Echinocystis lobata</i>	Wild cucumber	N	—	—	—	G5	S5
<i>Echium vulgare</i>	Viper's bugloss	I	—	—	—	GNR	SNA
<i>Euthamia graminifolia</i>	Grass-leaved goldenrod	N	—	—	—	G5	S5
<i>Galium</i> sp.	Bedstraw sp.	—	—	—	—	—	—
<i>Geranium robertianum</i>	Herb-robert	I	—	—	—	G5	SNA
<i>Hydrophyllum virginianum</i>	Virginia waterleaf	N	—	—	—	G5	S5
<i>Leonurus cardiaca</i>	Common motherwort	I	—	—	—	GNR	SNA
<i>Linaria vulgaris</i>	Butter-and-eggs	I	—	—	—	GNR	SNA
<i>Maianthemum canadense</i>	Canada mayflower	N	—	—	—	G5	S5
<i>Maianthemum</i> sp.	Solomon's seal	—	—	—	—	—	—

Appendix B – Plant Species Observed in the Study Area

Scientific Name	Common Name	Origin ¹	ESA ²	COSEWIC ³	SARA ⁴	GRANK ⁵	SRANK ⁵
<i>Nepeta cataria</i>	Catnip	I	—	—	—	GNR	SNA
<i>Persicaria</i> sp.	Smartweed sp.	—	—	—	—	—	—
<i>Plantago lanceolata</i>	Narrow-leaved plantain	I	—	—	—	G5	SNA
<i>Plantago major</i>	Common plantain	I	—	—	—	G5	SNA
<i>Prunella vulgaris</i>	Heal-all	N	—	—	—	G5T5	S5
<i>Rudbeckia triloba</i>	Brown-eyed Susan	I	—	—	—	G5	SNA
<i>Sanguinaria canadensis</i>	Bloodroot	N	—	—	—	G5	S5
<i>Silene vulgaris</i>	Bladder campion	I	—	—	—	GNR	SNA
<i>Solidago canadensis</i>	Canada goldenrod	N	—	—	—	G5T5	S5
<i>Solidago flexicaulis</i>	Zig-zag goldenrod	N	—	—	—	G5	S5
<i>Symphotrichum lateriflorum</i>	Calico aster	N	—	—	—	G5T?	S5
<i>Symphotrichum novae-angliae</i>	New England aster	N	—	—	—	G5	S5
<i>Taraxacum officinale</i>	Common dandelion	I	—	—	—	G5	SNA
<i>Thalictrum pubescens</i>	Tall meadow-rue	N	—	—	—	G5	S5
<i>Tragopogon dubius</i>	Goat's-beard	I	—	—	—	GNR	SNA
<i>Trifolium pratense</i>	Red clover	I	—	—	—	GNR	SNA
<i>Tussilago farfara</i>	Colt's-foot	I	—	—	—	GNR	SNA
<i>Urtica dioica</i>	Stinging nettle	N	—	—	—	G5T?	S5
<i>Verbascum thapsus</i>	Common mullein	I	—	—	—	GNR	SNA
<i>Vicia cracca</i>	Cow-vetch	I	—	—	—	GNR	SNA
<i>Vincetoxicum rossicum</i>	Pale swallowwort	I	—	—	—	GNR	SNA

Notes:

- Origin: N = Native; (N) = Native in Canada but not locally; I = Introduced.
- Ontario Endangered Species Act, 2007 (ESA)* (O.Reg 242/08 last amended 21 July 2020 under Bill 197). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 25 January 2023 under O.Reg 9/23). END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC) <http://www.cosewic.gc.ca/> END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.
- Species at Risk Act (SARA)*, 2002. Schedule 1 (Last amended 3 February 2023). END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.
- Ranks based upon determinations made by the Ontario Natural Heritage Information Centre. G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure. SNA = Not applicable for Ontario Ranking (e.g. exotic species); SNR or GNR = Conservation status not yet assessed; SE = Exotic status; - rank cannot be identified because species not determined.
- One sapling was identified on the Site. The tree was not relocated during the May 2023 and was presumably destroyed during the 2022 tornado that came through the area.

APPENDIX C

**Wildlife Species Observed in the
Study Area**

Appendix C – Wildlife Species Observed in the Study Area

July 2023
23608009

Table C-1: Wildlife Species Observed in the Study Area

Common Name	Scientific Name	ESA ¹	COSEWIC ²	SARA ³	S RANK ⁴	G RANK ⁴
Arthropods						
Monarch	<i>Danaus plexippus</i>	SC	END	SC	S2N, S4B	G5
Birds						
American crow	<i>Corvus brachyrhynchos</i>	—	—	—	S5B	G5
American goldfinch	<i>Carduelis tristis</i>	—	—	—	S5B	G5
American robin	<i>Turdus migratorius</i>	—	—	—	S5B	G5
Bank swallow	<i>Riparia riparia</i>	THR	THR	THR	S4B	G5
Barn swallow	<i>Hirundo rustica</i>	SC	SC	THR	S4B	G5
Black-capped chickadee	<i>Poecile atricapillus</i>	—	—	—	S5	G5
Blue jay	<i>Cyanocitta cristata</i>	—	—	—	S5	G5
Brown-headed cowbird	<i>Molothrus ater</i>	—	—	—	S4B	G5
Cedar waxwing	<i>Bombycilla cedrorum</i>	—	—	—	S5B	G5
Chipping sparrow	<i>Spizella passerina</i>	—	—	—	S5B	G5
Common grackle	<i>Quiscalus quiscula</i>	—	—	—	S5B	G5
Common yellowthroat	<i>Geothlypis trichas</i>	—	—	—	S5B	G5
Downy woodpecker	<i>Picoides pubescens</i>	—	—	—	S5	G5
Eastern meadowlark	<i>Sturnella magna</i>	THR	THR	THR	S4B,S3N	G5
Eastern wood-pewee	<i>Contopus virens</i>	SC	SC	SC	S4B	G5
European starling	<i>Sturnus vulgaris</i>	—	—	—	SNA	G5
Field sparrow	<i>Spizella pusilla</i>	—	—	—	S4B	G5
Great blue heron	<i>Ardea herodias</i>	—	—	—	S4	G5
House wren	<i>Troglodytes aedon</i>	—	—	—	S5B	G5
Indigo bunting	<i>Passerina cyanea</i>	—	—	—	S4B	G5
Killdeer	<i>Charadrius vociferus</i>	—	—	—	S5B,S5N	G5
Mourning dove	<i>Zenaida macroura</i>	—	—	—	S5	G5
Mourning warbler	<i>Geothlypis philadelphia</i>	—	—	—	S4B	G5
Northern cardinal	<i>Cardinalis cardinalis</i>	—	—	—	S5	G5
Northern flicker	<i>Colaptes auratus</i>	—	—	—	S4B	G5
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	—	—	—	S4B	G5
Red-breasted nuthatch	<i>Sitta canadensis</i>	—	—	—	S5	G5
Red-eyed vireo	<i>Vireo olivaceus</i>	—	—	—	S5B	G5
Red-winged blackbird	<i>Agelaius phoeniceus</i>	—	—	—	S4	G5
Rock pigeon	<i>Columba livia</i>	—	—	—	SNA	G5
Savannah sparrow	<i>Passerculus sandwichensis</i>	—	—	—	S4B	G5
Song sparrow	<i>Melospiza melodia</i>	—	—	—	S5B	G5

Appendix C – Wildlife Species Observed in the Study Area

Common Name	Scientific Name	ESA ¹	COSEWIC ²	SARA ³	S RANK ⁴	G RANK ⁴
Turkey vulture	<i>Cathartes aura</i>	—	—	—	S5B,S3N	G5
White-breasted nuthatch	<i>Sitta carolinensis</i>	—	—	—	S5	G5
White-throated sparrow	<i>Zonotrichia albicollis</i>	—	—	—	S5B	G5
Wild turkey	<i>Meleagris gallopavo</i>	—	—	—	S5	G5
Mammals						
Eastern chipmunk	<i>Tamias striatus</i>	—	—	—	S5	G5

Notes:

- 1 *Ontario Endangered Species Act, 2007 (ESA)* (O.Reg 242/08 last amended 21 July 2020 under Bill 197). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 25 January 2023 under O.Reg 9/23). END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.
- 2 Committee on the Status of Endangered Wildlife in Canada (COSEWIC) <http://www.cosewic.gc.ca/> END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.
- 3 *Species at Risk Act (SARA)*, 2002. Schedule 1 (Last amended 3 February 2023). END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.
- 4 Ranks based upon determinations made by the Ontario Natural Heritage Information Centre. G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure. SNA = Not applicable for Ontario Ranking (e.g. exotic species); SNR or GNR = Conservation status not yet assessed; SE = Exotic status; - rank cannot be identified because species not determined.

APPENDIX D

Species at Risk Screening

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July 2023

23608009

Taxon	Common Name	Scientific Name	Endangered Species Act ¹	Species at Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements	Potential to Occur on Site or in Study Area	Rationale for Potential to Occur on Site or in Study Area
Amphibian	Western chorus frog - Great Lakes St. Lawrence / Canadian Shield population	<i>Pseudacris triseriata</i>	—	THR	THR	S3	In Ontario, habitat of this amphibian species typically consists of marshes or wooded wetlands, particularly those with dense shrub layers and grasses, as this species is a poor climber. They will breed in almost any fishless pond including roadside ditches, gravel pits and flooded swales in meadows. This species hibernates in terrestrial habitats under rocks, dead trees or leaves, in loose soil or in animal burrows. During hibernation, this species is tolerant of flooding (Environment Canada 2015).	None	No aquatic habitat to support this species on the site or in the study area.
Arthropod	Monarch	<i>Danaus plexippus</i>	SC	SC	END	S2N, S4B	In Ontario, monarch is found throughout the northern and southern regions of the province. This butterfly is found wherever there are milkweed (<i>Asclepias</i> spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks. Important staging areas during migration occur along the north shores of the Great Lakes (COSEWIC 2010).	High	Adults observed nectaring on site. Milkweed was observed on site in low density.
Arthropod	Mottled duskywing	<i>Erynnis martialis</i>	END	END	END	S2	In Ontario, the mottled duskywing is found in the same habitat as its food plant <i>Ceanothus</i> spp.: open or partially open, dry, sandy areas, or limestone alvars. These habitats are relatively uncommon and include dry open pine and pine oak woodland, other open dry woodlands, alvars, savannah and other dry open sandy habitats. Usually seen nectaring on wildflowers, or on wet sandy roads in the company of other duskywing species (Linton 2015).	Low	No dry open woodland habitat on the site or in the study area to support this species.
Bird	Bank swallow	<i>Riparia riparia</i>	THR	THR	THR	S4B	In Ontario, bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and river banks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999).	High	Observed on site during surveys. The sand and gravel pits within the southwest portion of the study area (existing quarry) may provide suitable nesting habitat. No suitable nesting habitat on site, but open agricultural areas suitable for foraging.
Bird	Barn swallow	<i>Hirundo rustica</i>	SC	THR	SC	S4B	In Ontario, barn swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared rights-of-way, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused (Brown and Brown 1999).	High	Observed on site during surveys. The agricultural buildings on the site may provide suitable nesting habitat, though no evidence of nesting observed during surveys. The open agricultural areas on site are suitable for foraging.

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Bird	Black tern	<i>Chlidonias niger</i>	SC	—	NAR	S3B	In Ontario, black tern breeds in freshwater marshlands where it forms small colonies. It prefers marshes or marsh complexes greater than 20 ha in area and which are not surrounded by wooded area. Black terns are sensitive to the presence of agricultural activities. The black tern nests in wetlands with an even combination of open water and emergent vegetation, and still waters of 0.5-1.2 m deep. Preferred nest sites have short dense vegetation or tall sparse vegetation often consisting of cattails, bulrushes and occasionally burreed or other marshland plants. Black terns also require posts or snags for perching (Weseloh 2007).	None	No marsh habitat on the site or in the study area to support this species.
Bird	Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	THR	S4B	In Ontario, bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation (Gabhauer 2007). Bobolink prefers grassland habitat with a forb component and a moderate litter layer. They have low tolerance for presence of woody vegetation and are sensitive to frequent mowing within the breeding season. They are most abundant in established, but regularly maintained, hayfields, but also breed in lightly grazed pastures, old or fallow fields, cultural meadows and newly planted hayfields. Their nest is woven from grasses and forbs. It is built on the ground, in dense vegetation, usually under the cover of one or more forbs (Martin and Gavin 1995).	Moderate	Potential nesting habitat on site due to the agricultural fields and paddocks being left fallow.
Bird	Canada warbler	<i>Cardellina canadensis</i>	SC	THR	THR	S4B	In Ontario, breeding habitat for Canada warbler consists of moist mixed forests with a well-developed shrubby understory. This includes low-lying areas such as cedar and alder swamps, and riparian thickets (McLaren 2007). It is also found in densely vegetated regenerating forest openings. Suitable habitat often contains a developed moss layer and an uneven forest floor. Nests are well concealed on or near the ground in dense shrub or fern cover, often in stumps, fallen logs, overhanging stream banks or mossy hummocks (Reitsma et al. 2010).	Low	There is no moist forest habitat on the site or in the study area to support this species.
Bird	Cerulean warbler	<i>Setophaga cerulea</i>	THR	SC	END	S3B	In Ontario, breeding habitat of cerulean warbler consists of second-growth or mature deciduous forest with a tall canopy of uneven vertical structure and a sparse understory. This habitat occurs in both wet bottomland forests and upland areas, and often contains large hickory and oak trees. This species may be attracted to gaps or openings in the upper canopy. The cerulean warbler is associated with large forest tracks, but may occur in woodlots as small as 10 ha (COSEWIC 2010). Nests are usually built on a horizontal limb in the mid-story or canopy of a large deciduous tree (Buehler et al. 2013).	Low	The forested areas on the site and in the study area are unlikely to be large enough to support this species.

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Bird	Chimney swift	<i>Chaetura pelagica</i>	THR	THR	THR	S4B, S4N	In Ontario, chimney swift breeding habitat is varied and includes urban, suburban, rural and wooded sites. They are most commonly associated with towns and cities with large concentrations of chimneys. Preferred nesting sites are dark, sheltered spots with a vertical surface to which the bird can grip. Unused chimneys are the primary nesting and roosting structure, but other anthropogenic structures and large diameter cavity trees are also used (COSEWIC 2007).	Low	There are no houses with suitable chimneys to provide suitable anthropogenic habitat in the study area. The large diameter cavity trees in the deciduous forest windbreak separating the site from the existing quarry may provide suitable natural nesting habitat, but no observations of this species or evidence of nesting during field surveys.
Bird	Common nighthawk	<i>Chordeiles minor</i>	SC	SC	SC	S4B	In Ontario, these aerial foragers require areas with large open habitat. This includes farmland, open woodlands, clearcuts, burns, rock outcrops, alvars, bogs, fens, prairies, gravel pits and gravel rooftops in cities (Sandilands 2007).	Moderate	Treed communities adjacent to open habitats including pastures and fallow agricultural fields are present and may provide suitable nesting and foraging habitat.
Bird	Eastern meadowlark	<i>Sturnella magna</i>	THR	THR	THR	S4B	In Ontario, eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2003). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970)	High	The agricultural fields on site have been left fallow and two individuals were observed on site in 2023.
Bird	Eastern whip-poor-will	<i>Antrostomus vociferus</i>	THR	THR	THR	S4B	In Ontario, whip-poor-will breeds in semi-open forests with little ground cover. Breeding habitat is dependent on forest structure rather than species composition, and is found on rock and sand barrens, open conifer plantations and post-disturbance regenerating forest. Territory size ranges from 3 to 11 ha (COSEWIC 2009). No nest is constructed and eggs are laid directly on the leaf litter (Mills 2007).	Low	The forested areas on the site and in the study area are unlikely to be large enough to support this species.
Bird	Eastern wood-pewee	<i>Contopus virens</i>	SC	SC	SC	S4B	In Ontario, eastern wood-pewee inhabits a wide variety of wooded upland and lowland habitats, including deciduous, coniferous, or mixed forests. It occurs most frequently in forests with some degree of openness. Intermediate-aged forests with a relatively sparse midstory are preferred. In younger forests with a relatively dense midstory, it tends to inhabit the edges. Also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighborhoods. Nest is constructed atop a horizontal branch, 1-2 m above the ground, in a wide variety of deciduous and coniferous trees.	High	Observed on site during surveys. Deciduous and mixed forests and to a lesser extent coniferous plantations on the site and in the study area provide suitable nesting habitat.

Appendix D – Species at Risk Screening

July 2023

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Bird	Golden-winged warbler	<i>Vermivora chrysoptera</i>	SC	THR	THR	S4B	In Ontario, golden-winged warbler breeds in regenerating scrub habitat with dense ground cover and a patchwork of shrubs, usually surrounded by forest. Their preferred habitat is characteristic of a successional landscape associated with natural or anthropogenic disturbance such as rights-of-way, and field edges or openings resulting from logging or burning. The nest of the golden-winged warbler is built on the ground at the base of a shrub or leafy plant, often at the shaded edge of the forest or at the edge of a forest opening (Confer et al. 2011).	Low	Suitable early-successional habitat was not observed on site or in the study area.
Bird	Grasshopper sparrow <i>pratensis</i> subspecies	<i>Ammodramus savannarum pratensis</i>	SC	SC	SC	S4B	In Ontario, grasshopper sparrow is found in medium to large grasslands with low herbaceous cover and few shrubs. It also uses a wide variety of agricultural fields, including cereal crops and pastures. Close-grazed pastures and limestone plains (e.g. Carden and Napanee Plains) support highest density of this bird in the province (COSEWIC 2013).	Moderate	Potential nesting habitat on site due to the agricultural fields and paddocks being left fallow.
Bird	Least bittern	<i>Ixobrychus exilis</i>	THR	THR	THR	S4B	In Ontario, least bittern breeds in marshes, usually greater than 5 ha, with emergent vegetation, relatively stable water levels and areas of open water. Preferred habitat has water less than 1 m deep (usually 10 – 50 cm). Nests are built in tall stands of dense emergent or woody vegetation (Woodliffe 2007). Clarity of water is important as siltation, turbidity, or excessive eutrophication hinders foraging efficiency (COSEWIC 2009).	None	No marsh habitat to support this species on the site or in the study area.
Bird	Peregrine falcon	<i>Falco peregrinus</i>	SC	—	NAR	S4	In Ontario, peregrine falcon breeds in areas containing suitable nesting locations and sufficient prey resources. Such habitat includes both natural locations containing cliff faces (heights of 50 - 200 m preferred) and anthropogenic landscapes including urban centres containing tall buildings, open pit mines and quarries, and road cuts. Peregrine falcons nest on cliff ledges and crevices and building ledges. Nests consist of a simple scrape in the substrate (COSEWIC 2017).	None	No suitable nesting habitat on the site or in the study area.
Bird	Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	END	END	END	S3	In Ontario, red-headed woodpecker breeds in open, deciduous woodlands or woodland edges and are often found in parks, cemeteries, golf courses, orchards and savannahs (Woodliffe 2007). They may also breed in forest clearings or open agricultural areas provided that large trees are available for nesting. They prefer forests with little or no understory vegetation. They are often associated with beech or oak forests, beaver ponds and swamp forests where snags are numerous. Nests are excavated in the trunks of large dead trees (Frei et al. 2017).	Low	Large cavity trees or nesting cavities were not observed during surveys.

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Bird	Short-eared owl	<i>Asio flammeus</i>	SC	SC	THR	S4?B,S2S3N	In Ontario, short-eared owl breeds in a variety of open habitats including grasslands, tundra, bogs, marshes, clear-cuts, burns, pastures and occasionally agricultural fields. The primary factor in determining breeding habitat is proximity to small mammal prey resources (COSEWIC 2008). Nests are built on the ground at a dry site and usually adjacent to a clump of tall vegetation used for cover and concealment (Gahbauer 2007).	Low	Open habitats including pastures and fallow agricultural fields are present; however, nesting is unlikely due to the active nature of the site (quarry, farm equipment and animal paddock).
Bird	Wood thrush	<i>Hylocichla mustelina</i>	SC	SC	THR	S4B	In Ontario, wood thrush breeds in moist, deciduous hardwood or mixed stands that are often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches. This species selects nesting sites with the following characteristics: lower elevations with trees less than 16 m in height, a closed canopy cover (>70 %), a high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter (COSEWIC 2012).	Low	The forested areas of the site and study area lack microhabitat characteristics preferred by this species.
Bird	Yellow rail	<i>Coturnicops noveboracensis</i>	SC	SC	SC	S4B	In Ontario, yellow rail breeds mainly in sedge-dominated marshes with wet substrates or standing water up to 15 cm in depth. This species will also breed in wet hayfields. This species may be absent from historically used breeding territories on years when water levels are unsuitable, as habitat must remain wet throughout the nesting season to be used. This species breeds mainly in wetlands larger than 10 ha in area, but may breed in much smaller wetlands and will nest colonially (COSEWIC 2009).	None	No marsh habitat to support this species on the site or in the study area.
Fish	Redside dace	<i>Clinostomus elongatus</i>	END	END	END	S2	In Ontario, reddsides dace, a small coolwater species common in the USA but less so in Canada, is found in tributaries of western Lake Ontario, Lake Erie, Lake Huron and Lake Simcoe. They are found in pools and slow-moving areas of small headwater streams with clear to turbid water. Overhanging grasses, shrubs, and undercut banks, are an important part of their habitat, as are instream boulders and large woody debris. Preferred substrates are variable and include silt, sand, gravel and boulders. Spawning occurs in shallow riffle areas (Redside Dace Recovery Team 2010).	None	No aquatic habitat to support this species on the site or in the study area.
Mammal	Eastern small-footed myotis	<i>Myotis leibii</i>	END	—	—	S2S3	This species is not known to roost within trees, but there is very little known about its roosting habits. The species generally roosts on the ground under rocks, in rock crevices, talus slopes and rock piles. It occasionally inhabits buildings. Areas near the entrances of caves or abandoned mines may be used for hibernaculum, where the conditions are drafty with low humidity, and may be subfreezing.	Low	High-frequency and Myotis bats (species unconfirmed) recorded on site during field surveys, but at low rate and most likely little brown myotis. No suitable habitat for this species on site or in the study area.

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Mammal	Little brown myotis	<i>Myotis lucifugus</i>	END	END	END	S3	In Ontario, this species range is extensive and covers much of the province. It will roost in both natural and man-made structures. They require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. May form nursery colonies in the attics of buildings within 1 km of water. Caves or abandoned mines may be used for hibernaculum, but high humidity and stable above freezing temperatures are required.	High	Recorded on site during field surveys. Level and timing of activity does not suggest presence of maternity roosting habitat on site. No suitable hibernaculum habitat on the site or in the study area.
Mammal	Northern myotis	<i>Myotis septentrionalis</i>	END	END	END	S3	In Ontario, this species range is extensive and covers much of the province. It will usually roost in hollows, crevices, and under loose bark of mature trees. Roosts may be established in the main trunk or a large branch of either living or dead trees. Caves or abandoned mines may be used for hibernaculum, but high humidity and stable above freezing temperatures are required.	Low	High-frequency and <i>Myotis</i> bats (species unconfirmed) recorded on site during field surveys, but at low rate and most likely little brown myotis. No suitable hibernaculum habitat on the site or in the study area.
Mammal	Tri-colored bat	<i>Perimyotis subflavus</i>	END	END	END	S3?	In Ontario, tri-colored bat may roost in foliage, in clumps of old leaves, hanging moss or squirrel nests. They are occasionally found in buildings although there are no records of this in Canada. They typically feed over aquatic areas with an affinity to large-bodied water and will likely roost in close proximity to these. Hibernation sites are found deep within caves or mines in areas of relatively warm temperatures. These bats have strong roost fidelity to their winter hibernation sites and may choose the exact same spot in a cave or mine from year to year.	Low	High-frequency bats (species unconfirmed) recorded on site during field surveys, but at low rate and most likely little brown myotis. No suitable hibernaculum habitat on the site or in the study area.
Reptile	Blanding's turtle - Great Lakes / St. Lawrence population	<i>Emydoidea blandingii</i>	THR	THR	END	S3	In Ontario, Blanding's turtle will use a range of aquatic habitats, but favor those with shallow, standing or slow-moving water, rich nutrient levels, organic substrates and abundant aquatic vegetation. They will use rivers, but prefer slow-moving currents and are likely only transients in this type of habitat. This species is known to travel great distances over land in the spring in order to reach nesting sites, which can include dry conifer or mixed forests, partially vegetated fields, and roadsides. Suitable nesting substrates include organic soils, sands, gravel and cobble. They hibernate underwater and infrequently under debris close to water bodies (COSEWIC 2005).	None	No aquatic habitat to support this species on the site or in the study area.
Reptile	Eastern milksnake	<i>Lampropeltis triangulum</i>	—	SC	SC	S4	In Ontario, milksnake uses a wide range of habitats including prairies, pastures, hayfields, wetlands and various forest types, and is well-known in rural areas where it frequents older buildings. Proximity to water and cover enhances habitat suitability. Hibernation takes place in mammal burrows, hollow logs, gravel or soil banks, and old foundations (COSEWIC 2014).	Moderate	Open habitat including pastures and fallow agricultural fields for foraging are present. Old foundations and refuge piles are also present on site.

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Reptile	Eastern ribbonsnake - Great Lakes population	<i>Thamnophis sauritius</i>	SC	SC	SC	S3	In Ontario, eastern ribbonsnake is semi-aquatic, and is rarely found far from shallow ponds, marshes, bogs, streams or swamps bordered by dense vegetation. They prefer sunny locations and bask in low shrub branches. Hibernation occurs in mammal burrows, rock fissures or even ant mounds (COSEWIC 2012).	None	No aquatic habitat to support this species on the site or in the study area.
Reptile	Midland painted turtle	<i>Chrysemys picta marginata</i>	—	SC	SC	S4	In Ontario, painted turtles use waterbodies, such as ponds, marshes, lakes and slow-moving creeks, with a soft bottom and abundant basking sites and aquatic vegetation. This species hibernates on the bottom of waterbodies (Ontario Nature 2018).	None	No aquatic habitat to support this species on the site or in the study area.
Reptile	Northern map turtle	<i>Graptemys geographica</i>	SC	SC	SC	S3	In Ontario, the northern map turtle prefers large waterbodies with slow-moving currents, soft substrates, and abundant aquatic vegetation. Ideal stretches of shoreline contain suitable basking sites, such as rocks and logs. Along Lakes Erie and Ontario, this species occurs in marsh habitat and undeveloped shorelines. It is also found in small to large rivers with slow to moderate flow. Hibernation takes place in soft substrates under deep water (COSEWIC 2012).	None	No aquatic habitat to support this species on the site or in the study area.
Reptile	Snapping turtle	<i>Chelydra serpentina</i>	SC	SC	SC	S3	In Ontario, snapping turtle uses a wide range of waterbodies, but shows preference for areas with shallow, slow-moving water, soft substrates and dense aquatic vegetation. Hibernation takes place in soft substrates under water. Nesting sites consist of sand or gravel banks along waterways or roadways (COSEWIC 2008).	None	No aquatic habitat to support this species on the site or in the study area.
Reptile	Spotted turtle	<i>Clemmys guttata</i>	END	END	END	S2	In Ontario, spotted turtle habitat consists of shallow, slow-moving and unpolluted water such as ponds, bogs, marshes, ditches, vernal pools and sedge meadows. It is also occasionally found in woodland streams or sheltered shallow bays. These habitats are characterized by soft substrates and abundant aquatic vegetation. Females lay eggs in soil and leaf litter in wooded areas close to wetlands. Hibernation takes place in substrates under water, often under moss hummocks or muskrat dens (COSEWIC 2014).	None	No aquatic habitat to support this species on the site or in the study area.
Vascular Plant	American ginseng	<i>Panax quinquefolius</i>	END	END	END	S2	In Ontario, American ginseng is found in moist, undisturbed and relatively mature deciduous woods often dominated by sugar maple. It is commonly found on well-drained, south-facing slopes. American ginseng grows under closed canopies in neutral, loamy soils (COSEWIC 2000).	None	No moist undisturbed forest habitat on the site or in the study area to support this species.
Vascular Plant	Black ash	<i>Fraxinus Negra</i>	END ⁵	—	END	S4	Found throughout Ontario in moist ecosystems; commonly found in northern swampy woodlands (MNR 2018). This species typically grows on mucky or peaty soils and is considered a facultative wetland species (Reznicek et al. 2011).	None	No moist habitat on the site or in the study area to support this species.

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Vascular Plant	Butternut	<i>Juglans cinerea</i>	END	END	END	S3?	In Ontario, butternut is found along stream banks, on wooded valley slopes, and in deciduous and mixed forests. It is commonly associated with beech, maple, oak and hickory (Voss and Reznicek 2012). Butternut prefers moist, fertile, well-drained soils, but can also be found in rocky limestone soils. This species is shade intolerant (Farrar 1995).	Low	One sapling tree observed in the deciduous forest windbreak that separates the site from the existing quarry, but presumed destroyed during the tornado that passed through the area in 2022. The individual could not be relocated in 2023.

Notes:

¹ Ontario *Endangered Species Act, 2007* (ESA) (O.Reg 242/08 last amended 21 July 2020 under Bill 197). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 25 January 2023 under O.Reg 9/23). END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.

² *Species at Risk Act* (SARA), 2002. Schedule 1 (Last amended 3 February 2023). END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.

³ Committee on the Status of Endangered Wildlife in Canada (COSEWIC) <http://www.cosewic.gc.ca/> END = endangered; THR = threatened; SC = special concern; - = not listed or status cannot be identified because species not determined.

⁴ Provincial Ranks (SRANK) are Rarity Ranks assigned to a species or ecological communities, by the Natural Heritage Information Centre (NHIC). These ranks are not legal designations. SRANKS are evaluated by NHIC on a continual basis and updated lists produced annually. SX (Presumed Extirpated), SH (Possibly Extirpated – Historical), S1 (Critically Imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNA (Not Applicable), S#S# (Range Rank), S? (Not ranked yet), SAB (Breeding Accident), SAN (Non-breeding Accident), SX (Apparently Extirpated). Last assessed August 2011.

⁵ Habitat protection temporarily suspended until 25 January 2024 per O.Reg 23/22.

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