**REPORT**

# Havelock Wastewater Treatment Plant

*Natural Environment Report*

Submitted to:

CIMA+
900-101 Fredrick Street
Kitchener, ON N2H 6R2

Submitted by:

**Golder Associates Ltd.**
6925 Century Avenue, Suite #100, Mississauga, Ontario, L5N 7K2, Canada

+1 905 567 4444

21459099

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# Distribution List

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# 1.0 INTRODUCTION

Golder Associates Ltd. (Golder), member of WSP, was retained by CIMA+ (CIMA) to complete a natural environment assessment to accompany a Schedule C Municipal Class Environmental Assessment (EA) for the proposed expansion of the Havelock Wastewater Treatment Plant (WWTP) (the Project), located at 719 Old Norwood Road, Havelock, Ontario (the site). It is understood that capacity expansion at the WWTP is required to accommodate forecasted growth in the Township of Havelock-Belmont-Methuen (Township).

The purpose of this report is to characterize existing conditions on the site and in the study area, assess potential environmental impacts of the Project on environmental features and functions on the site and in the study area, and recommend appropriate mitigation measures to avoid or minimize impacts, where possible.

## 1.1 Site and Study Area Description

The site is approximately 15.7 hectares (ha) in area and located to the south of Old Norwood Road. The site is rectangular in shape with a triangular section extending northeast, and an access road extending northwest to Old Norwood Road. The site is only accessible from Old Norwood Drive, with some internal road networks connecting the existing WWTP to two sewage lagoon cells also on the site that were previously used for treatment but were decommissioned in 2009. Effluent from the WWTP is discharged approximately 900 m east of the sewage lagoons into Plato Creek.

Because the effluent discharge location is some distance from the site, two study areas are defined for the Project, one for the plant site and one for the discharge location. Study area boundaries are shown on Figure 1.

The plant study area is defined as the site plus lands within 120 m of the site. Land cover in the plant study area surrounding the site consists of a mix of private agricultural land, deciduous forest, and wetland areas. Two small ponds are located north and west of the site in the plant study area.

The discharge study area is defined as a 120 m buffer around the point of discharge into Plato Creek and a 400 m reach of the creek, 100 m upstream and 300 m downstream of the discharge point. Land cover in the discharge study area surrounding the creek is mostly wetland and deciduous forest.

# 2.0 POLICY CONTEXT

## 2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) was issued under Section 3 of the Planning Act (MMAH 2020a). The natural heritage policies of the PPS are intended to protect natural features and their ecological functions for the long term, and restoring or improving linkages between these natural features, surface water features and ground water features.

Development and site alteration are prohibited within significant wetlands and significant coastal wetlands. Development and site alteration is not permitted in fish habitat or habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.

Development may be permitted within or adjacent to several other types of natural features where it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, including significant wetlands (north of Ecoregions 5E, 6E and 7E), significant woodlands, significant valleylands, significant wildlife habitat (SWH), significant areas of natural and scientific interest (ANSI), and other coastal wetlands.

## 2.2 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 planning to undertake 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 is likely to result in death of fish or harmful alteration, disruption or destruction (HADD) of fish habitat, an Authorization is likely to be 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 death of fish or harm to fish or fish habitat, and outline the steps taken to address them.

## 2.3 Migratory Birds Convention Act, 1994

Most birds in Canada are protected by the federal *Migratory Birds Convention Act, 1994* (MBCA) (Canada 1994), which prohibits the disturbance or destruction of migratory birds, their eggs and nests on all lands in Canada from harm and exploitation, even incidentally. There are currently no permits available to exempt development, including maintenance and rehabilitation activities. Environment and Climate Change Canada (ECCC) advises that proponents schedule activities outside of the migratory bird nesting season to avoid incidental take.

## 2.4 Fish and Wildlife Conservation Act, 1997

The *Fish and Wildlife Conservation Act, 1997* (FWCA) (Ontario 1997) governs the protection, ownership and possession, sale, trafficking, hunting, trapping and fishing of wildlife. It protects species and their habitats from damage or destruction, outside the context of hunting, trapping, or fishing, including for furbearer dens (occupied or un-occupied); beaver dams or lodges (unless to protect personal property); and the destruction or removal of a bird nest or eggs (some nuisance species are exempt and excludes migratory birds protected by the MBCA).

## 2.5 Species at Risk

### 2.5.1 Species at Risk Act

At a federal level, 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. On private or provincially-owned lands, only migratory birds and aquatic species listed as endangered, threatened, or extirpated are protected under SARA. 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

SAR designations for species in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of the Environment, Conservation and Parks, species are added to the provincial *Endangered Species Act, 2007* (ESA) which came into effect June 30, 2008 (Ontario 2007). The legislation prohibits the killing or harming of species identified as endangered or threatened in the various schedules to the *Act*. The ESA also provides habitat protection to all species listed as threatened or endangered. As of June 30, 2008, the Species at Risk in Ontario (SARO) List is contained in Ontario Regulation (O. Reg.) 230/08 and updated as needed based on COSSARO recommendations.

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 SARO list as an endangered or threatened species".

General habitat protection is provided by the ESA to all threatened and endangered species. 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 and registration process where alterations to the habitat of protected species may be considered.

## 2.6 A Place to Grow: 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 on 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 Golder 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 Golder 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).

Growth Plan policies require that new development within the natural heritage system demonstrates no negative impacts on key natural heritage features or key hydrologic features/functions, consistent with policies in the PPS (MMAH 2020a). Additionally, Growth Plan policies identify the following limitations to development: the disturbed area must not exceed 25% of the total developable area, the impervious surface area must not exceed 10% of the total developable area, and at least 30% of the total developable area must remain or be returned to natural self-sustaining vegetation (Section 4.2.2.3(a); MMAH 2020b).

The site and study areas are within the Growth Plan NHS.

## 2.7 Official Plans

The site and study areas are within a two-tier municipal planning area, subject to official plan (OP) policies of both the Township of Havelock-Belmont-Methuen (Havelock-Belmont-Methuen 2015) and Peterborough County (Peterborough 2020).

Sensitive natural features and areas are included in the Environmental Protection designation in the Township OP. According to Schedule B1 of the Township OP, there are no Environmental Protection designated areas that overlap the plant study area, but a provincially significant wetland overlaps the discharge study area (Havelock-

Belmont-Methuen 2015). According to Schedule A1 of the Township OP, land use designation on the site is disposal industrial where the WWTP is situated and rural elsewhere, with surrounding lands in the plant study area also designated as rural. Land use designation in the discharge study area is rural.

No schedules relating to natural environment features are provided in the County OP.

## 2.8 Crowe Valley Conservation Authority

The site and plant study area are not located within the jurisdiction of any conservation authority. However, the discharge study area is under Crowe Valley Conservation Authority (CVCA) jurisdiction.

Ontario Regulation 159/06 was enacted under the authority of Section 28 of the *Conservation Authorities Act* (Ontario 1990) to ensure public safety by protecting property with respect to natural hazards, and to safeguard watershed health by preventing pollution and destruction of sensitive environmental areas such as wetlands, shorelines and watercourses. O. Reg. 159/06 establishes regulated areas where development could be subject to flooding, erosion, or dynamic beaches, or where interference with wetlands and alterations to shorelines and watercourses might have an adverse effect on those environmental features. Per O. Reg. 159/06, development, interference, or alteration of these features including within their regulation limits is prohibited without written permission from the CVCA.

# 3.0 DESCRIPTION OF PROPOSED DEVELOPMENT

Two scenarios have been put forward to accommodate increased capacity of the WWTP based on results from the assimilative capacity study (ACS) completed for the Project (Golder 2022a, b): 1) increased flow into Plato Creek throughout the year; and 2) increased flow into Plato Creek from October to July and storage of wastewater in the recommissioned lagoons between August and September. Both scenarios would require changes to the plant footprint (new tanks and building expansion). Scenario 2 would require draining and resurfacing the lagoons as part of recommissioning. Recommissioning activities, vehicles and equipment would be confined to the site.

# 4.0 METHODS

## 4.1 Background Review

The investigation of existing conditions for the site and study areas included a desktop background information search and literature review to gather data about the local area and provide context for the evaluation of the natural features, including:

- Ministry of Natural Resources and Forestry (MNRF), Natural Heritage Information Centre (NHIC) Make-a-Map geographic explorer for species at risk (SAR) and natural areas information queries (MNRF 2021a)
- Readily available MNRF mapping and existing studies, as well as any additional information from the MNRF and Ministry of the Environment, Conservation and Parks (MECP) obtained through a data request
- Information (including any watershed studies and wetland mapping) and mapping available through the Township or CVCA

- SAR range mapping to determine if the site falls within the range for species regulated under the Ontario ESA and the federal SARA
- Atlas of Breeding Birds of Ontario (Cadman et al. 2007)
- Atlas of the Mammals of Ontario (Dobbyn 1994)
- Reptiles and Amphibians of Ontario (Ontario Nature 2021)
- Bat Conservation International (BCI) range maps (BCI 2021)
- Ontario Butterfly Atlas (Jones et al. 2021)
- eBird species maps (eBird 2021)
- iNaturalist database (iNaturalist 2021)
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Map (DFO 2022)
- MNRF Land Information Ontario Aquatic Resources Area Layer (MNRF 2021b)
- MNRF Fish On-Line (MNRF 2021c)
- Township OP (Havelock-Belmont-Methuen 2015)
- County OP (Peterborough 2020)
- Information contained in natural heritage related map layers from Ontario Base Map series, Natural Resource Values Information System (NRVIS) mapping and/or Land Information Ontario
- Existing aerial photography

To develop an understanding of the ecological communities, fish and wildlife habitat and potential natural heritage features in the study areas, MNRF LIO data were used to create base layer mapping for the study areas. A geographic query of the NHIC database was conducted to identify element occurrences of any natural heritage features, including wetlands, areas of natural and scientific interest (ANSI), rare plant communities, provincially rare species (ranked S1-S3 by NatureServe) and other natural heritage features within 1 km of the site. The MNRF LIO as well as DFO data were reviewed for sensitive fish features in the discharge study area. An information request was also submitted to the MECP and MNRF on September 14, 2021. A response was received on December 10, 2021 and the additional information was incorporated into this report.

## 4.2 Species at Risk Screening

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

The potential for the species to occur was determined through a probability of occurrence. A ranking of low indicates no suitable habitat availability for that species in the study areas and no specimens identified. Moderate probability indicates more potential for the species to occur, as suitable habitat appeared to be present in the

study areas, 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 in the study areas. High potential indicates a known species record in the study areas (either during the field surveys or background data review) and good quality habitat is present.

Searches were conducted during all 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 areas was moderate or high, the screening was refined based on the results of the field surveys. Any habitat identified during the field surveys with potential to provide suitable conditions for additional SAR not already identified through the desktop screening was also assessed and recorded. All probability ratings were updated based on the results of the field surveys (Section 4.3).

## 4.3 Field Surveys

Field surveys were conducted to support the characterization of the existing environment. Terrestrial field surveys were conducted on the site and accessible portions of the plant study area, Aquatic surveys were conducted along Plato Creek in the discharge study area. The following sections outline the methods used for each of the field surveys.

### 4.3.1 Ecological Land Classification and Botanical Inventory

Plant communities in the plant study area were first delineated at a desktop level using high resolution aerial imagery, then confirmed in the field on June 10, 2021 and July 5, 2021 using the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998; Lee 2008). Information on dominant plant species and plant community structure and composition was recorded to better define and refine the plant community polygons.

The botanical inventory included area searches in all naturally occurring habitats on the site and accessible portions of the plant study area. The searches were conducted by systematically walking through all habitats in a meandering fashion, generally paralleling the principal (long) axis of a natural area, where feasible, and examining the full width of the area. Lists of all plant species identified were compiled.

### 4.3.2 Breeding Bird Surveys

Breeding bird point count surveys were conducted on the site at seven stations on June 10, 2021 and July 5, 2021 (Figure 2). Station HBBS07 was surveyed only once on June 10, 2021. Surveys followed protocols from the Canadian Breeding Bird Survey (Downes and Collins 2003) and the OBBA (Cadman et al. 2007). Point count stations were established in representative habitats on the site and attempts were made to space stations at minimum 250 m apart to avoid double counting individual birds. Surveys were conducted between 30 minutes before sunrise and 10:00 a.m. to encompass the period of maximum bird song.

Each station consisted of a circle with a 100 m radius from the centre point (where the observer stands), and each point count was 10 minutes in duration, and was separated into survey windows of 0-3, 3-5, and 5-10 minutes. All birds seen or heard were noted on pre-printed datasheets and observations were made regarding sex, age and notable behaviour, when possible. Birds heard or seen outside of the 100 m radius were also noted using methods from the OBBA, including estimated distance (where possible).

### 4.3.3 General Wildlife Survey and Habitat Assessment

General wildlife surveys included track and sign surveys, area searches, and incidental observations, concurrent with other field surveys. The full range of habitats 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. When encountered, tracks and other signs (e.g., tracks, scats, 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. Observations of wildlife species or signs were recorded during all field surveys. Searches were also conducted to document the presence or absence of suitable habitat, based on habitat preferences, for those species identified in the desktop SAR screening described in Section 4.2.

### 4.3.4 Aquatic Habitat Assessment

A detailed aquatic habitat assessment was conducted on July 19, 2021 to document the aquatic features, presence and quality of fish habitat in Plato Creek at the point of effluent discharge. The assessment was conducted up to 100 m upstream and 300 m downstream from the discharge location. The assessment was completed by walking along the length of the assessed reach to determine habitat morphology and watercourse characteristics. The reach of Plato Creek was characterized according to watercourse size, type, flow regime, and presence of tributaries and downstream receptors. The channel within the assessed reach was classified into habitat units, based on morphology types (e.g., riffle, run, pool; modified from O'Neil and Hildebrand 1986), at regular intervals along the length of the survey area, and the following parameters were measured or visually assessed:

- Bankfull width and depth, wetted width and depth, and channel length.
- Watercourse patterns and confinement, channel form, stage and turbulence.
- Bank stability visually assessed as low, moderate, or high. Evidence of undercut banks and slumping were documented.
- Bank composition as a percentage of total area within each habitat unit (e.g., organics, silt, clay, sand, gravel, cobble, boulder, and bedrock). Bank height and slope were documented.
- Substrate composition as a percentage of total area within each habitat unit using the Modified Wentworth Scale (Wentworth 1922) (e.g., organics, clay, silt, sand, gravel, cobble, boulders, and bedrock).
- In-situ water quality parameters including temperature, pH, and electrical conductivity.
- Availability of instream cover visually assessed as overhanging vegetation (i.e., riparian vegetation), substrate, depth/turbulence, aquatic vegetation, undercut banks, and woody debris as a percentage of total area within each habitat unit.
- Type and amount of overhead cover and riparian vegetation composition within each habitat unit.
- Fish habitat potential for each critical life history stage: spawning (i.e., areas where fish reproduce and lay eggs), rearing (i.e., areas where juvenile fish find food and shelter), and overwintering (i.e., areas with depths greater than 1 m and dissolved oxygen levels for fish to overwinter), as well as potential to support fish migration.
- Presence of potential fish passage barriers, including the type, height, and permanency of the barrier.
- Evidence of sensitive features present (e.g., watercress, groundwater seepage/springs, or iron staining).

- Presence of potential pollution point sources and/or existing infrastructure.
- Supporting environmental information (e.g., weather conditions, such as air temperature, wind direction, precipitation type, and percent cloud cover) and access notes.

Representative photographs were taken along the surveyed reach and included sensitive features, pollution point sources, upstream, downstream, right and left downstream banks, and substrate at each habitat unit. Habitat mapping depicted flow direction, tributaries/side channels, islands, beaver dams and key habitat or features that would affect stream habitat availability or potential fish use. Locations of habitat units, barriers, and sensitive features were recorded in Universal Transverse Mercator (UTM) coordinates, North American Datum (NAD) 83.

## 4.4 Assessment of Significance and Impact Assessment

An assessment was conducted to determine if any significant environmental features or SAR exist, or have moderate or high potential to exist, in the study areas and assess whether the Project would negatively impact surrounding significant natural heritage features or SAR.

# 5.0 EXISTING CONDITIONS

## 5.1 Regional Context

The study areas are located in Ecoregion 6E (Lake Simcoe – Rideau) which covers 6.4% (6,311,957 ha) of Ontario and extends from Lake Huron in the west to the Ottawa River in the east (Crins et al. 2009). Ecoregion 6E is underlain by Paleozoic dolomite and limestone and is characterized by gently undulating to rolling terrain of ice-laid materials deeply covering the bedrock, although limestone plains with shallow soils occur in a few areas. Soils are predominantly mineral material (95%) comprised of gray brown luvisols (43%) and melanic brunisols (27%). The region is largely in agricultural use, with much of the land cover constituting cropland (44%) and pasture and abandoned fields (13%). Forests are primarily deciduous (16%), with some coniferous (5%) and mixed forests (9%) present.

The plant study area is located within the Crowe Lake Dam – Trent River watershed, whereas Plato Creek in the discharge study area is on the border of the Crowe Lake Dam – Trent River and Crowe Lake – Crowe River watersheds.

## 5.2 Vegetation

### 5.2.1 Plant Communities

Based on desktop mapping and field verification, the site is characterized by seven plant communities or land classification categories: mineral cultural meadow, mineral cultural woodland, cattail organic shallow marsh, open water aquatic, mineral meadow marsh, dry-fresh white pine coniferous forest, and sewage and water treatment. Off-site, the plant study area is characterized by nine plant communities or land classification categories: dry-fresh poplar mixed forest / mixed swamp, dry oak – pine mixed forest, fresh-moist sugar maple deciduous forest / deciduous swamp, deciduous swamp, silver maple mineral deciduous swamp, white pine coniferous plantation, dry-fresh white pine coniferous forest, open agriculture, and cultural savannah. The plant communities/land classification categories present on the site and in the plant study area are shown on Figure 3 and described in Table 1. Photos of land cover on the site are provided in Appendix A (Photos 1-4).

**Table 1: Plant Communities and Land Classification Categories on the Site and in the Plant Study Area**

| ELC Code | ELC Ecosite Name | Description | SRANK[a] |
|---|---|---|---|
| OAO | Open Water Aquatic | Open water aquatic community located in the north portion of the west sewage lagoon on the site. No macrophyte vegetation or tree/shrub cover. | n/a |
| MAS3-1 | Cattail Organic Shallow Marsh | Cattail organic shallow marsh community located in both lagoons on the site (in the south portion of the west sewage lagoon, and in the north portion of the east sewage lagoon). Dominated by common cattail (Typha latifolia). The predominant aquatic community on site. | S5 |
| MAM2-2 | Reed-Canary Grass Mineral Meadow Marsh | Reed-canary grass mineral meadow marsh community located in the south portion of the east sewage lagoon on the site. Dominated by reed canary grass (Phalaris arundinacea). | n/a |
| FOM5-2 / SWM | Dry-Fresh Poplar Mixed Forest / Mixed Swamp | Off site, a mixed forest with areas of mixed swamp located south of the site, dominated by trembling aspen (Populus tremuloides), white spruce (Picea glauca) and eastern white pine (Pinus strobus). Sugar maple (Acer saccharum), white birch (Betula papyrifera), alternate leaved dogwood (Cornus alternifolia), and riverbank grape (Vitis riparia) are also present. Common duckweed (Lemna minor) is also present in the small pond in the northwest section of the ecosite. | S5 |
| FOM1 | Dry Oak – Pine Mixed Forest | Off site, a mixed forest west of the site, dominated by red oak (Quercus rubrum) and eastern white pine (Pinus strobus). Red maple (Acer rubrum), white birch, black walnut (Juglans nigra), apple (Malus pumilia) and American elm (Ulmus americana) are also present. | n/a |
| FOD6 / SWD | Fresh-Moist Sugar Maple Deciduous Forest Ecosite / Deciduous Swamp | Off site, a deciduous forest with areas of deciduous swamp located northwest of the site, dominated by sugar maple. Silver maple (Acer saccharinum), American beech (Fagus grandifolia), white ash (Fraxinus americana), eastern cottonwood (Populus deltoides), American elm, ostrich fern (Matteuccia struthiopteris) and bracken fern (Pteridium aquilinum) are also present. | S5 |
| SWD | Deciduous Swamp | Off site, a deciduous swamp located north of the site, bordered by Old Norwood Road to the north, and the WWTP access road to the west. Dominated by silver maple and American elm; however, tamarack (Larix laricina) and eastern white cedar (Thuja occidentalis) are also present. | n/a |
| SWD3-2 | Silver Maple Mineral Deciduous Swamp | Off site, a deciduous swamp located north of the site dominated by silver maple. Sugar maple, white birch, eastern white pine, eastern cottonwood, American elm and Canada anemone (Anemonastrum canadense) are also present. | S5 |
| CUP3-2 | White Pine Coniferous Plantation | Off site, a mature white pine plantation northeast of the site. | n/a |
| FOC1-2 | Dry-Fresh White Pine Coniferous Forest | Both off site and on site, a coniferous forest east of the site dominated by white pine. Sugar maple, red pine, bur oak (Quercus macropara) and poison ivy (Toxicodendron radicans) are also present. | S4 |

| ELC Code | ELC Ecosite Name | Description | SRANK[a] |
|---|---|---|---|
| OAGM | Open Agriculture | Off site, open agricultural land, west, northwest and northeast of the site. | n/a |
| CUW1 | Mineral Cultural Woodland | Mineral cultural woodland located along the northern edge of the site. Dominated by trembling aspen and balsam poplar. | n/a |
| CUM1 | Mineral Cultural Meadow | Mineral cultural meadow located throughout the site, including all decommissioned roads specifically around the sewage lagoons and up to the WWTP (CVI-3). Dominated by graminoids and forbs. The predominant terrestrial community on site. | n/a |
| CUS | Cultural Savannah | Off site, a cultural savannah located east of the site. White spruce, eastern white pine, Scots pine (Pinus sylvestris), trembling aspen, bur oak, red oak, wild prickly rose (Rosa acicularis), crack willow (Salix x fragilis), narrow-leaved meadowsweet (Spirea alba), eastern white cedar and lance-leaved figwort (Scrophularia lanceolata) are present in the savannah, extending into the white pine coniferous forest (FOC1-2) surrounding the savannah. | n/a |
| CVI-3 | Sewage and Water Treatment | Sewage and water treatment facility in the western corner of the site, with various one- and two-story buildings, a large cylindrical water tank, and associated gravel parking lot and driveway. Common milkweed (Asclepias syriaca) is present behind the cylindrical water tanks. | n/a |

[a] SRANK is a provincial level rank indicating the conservation status of a species or plant community and is assigned by the NHIC in Ontario (MNRF 2020). SRANKs are not legal designations but are used to prioritize protection efforts in the Province. SRANKs for plant communities in Ontario are defined in the Significant Wildlife Habitat Technical Guide (MNR 2000). Ranks 1-3 are considered extremely rare to uncommon in Ontario; Ranks 4 and 5 are considered to be common and widespread. n/a indicates a community that has not been ranked, which often applies to anthropogenic, culturally influenced or high-level ELC communities (i.e., FOD).

### 5.2.2 Vascular Plants

A total of 91 vascular plant species (including hybrids) were identified on the site and accessible portions of the plant study area during the botanical inventory (Appendix B), consisting of 42 species of trees, shrubs and woody vines, 37 forbs (all herbaceous flowering plants that are not graminoids), seven graminoids, and five species of ferns and allies. No vascular plant SAR were observed.

## 5.3 Wildlife

### 5.3.1 Breeding Birds

Forty-four (44) bird species were recorded in the plant study area during breeding bird surveys. The most abundant species were red-winged blackbird (*Agelaius phoeniceus*), American crow (*Corvus brachyrhynchos*) and song sparrow (*Melospiza melodia*). Most of the bird species identified during surveys are secure and common, widespread and abundant in Ontario and globally (S4 or S5; G5) or are ranked SNA (not applicable – species is not a target for conservation). A female mallard (*Anas platyrhynchos*) with eight young was observed in the cattail marsh (MAS3-1) on site. This species is not of conservation concern.

Three of the bird species observed during field surveys are designated under the ESA and SARA: bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (*Sturnella magna*) and eastern wood-pewee (*Contopus virens*).

Bobolink and eastern meadow lark are both sensitive grassland bird species and designated threatened under the ESA and SARA. Both species breed in pastures, hayfields, meadows and old fields. During breeding bird surveys, bobolink and meadowlark were observed singing in the open agricultural field (OAGM) in the west portion of the plant study area (Figure 1), which represents suitable breeding habitat for these species. To note, bobolink was only observed singing during the first round of breeding bird surveys, while eastern meadowlark was observed singing during both rounds of breeding bird surveys. Both bobolink and eastern meadowlark are discussed further in Section 6.5.

Eastern wood-pewee, designated special concern under the ESA and SARA, breeds in 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. During both rounds of breeding bird surveys, eastern wood-pewee was observed singing in the forest (SWD) in the northern portion of plant study area (Figure 1), which represents suitable nesting habitat for this species. Eastern wood-pewee is discussed further in Section 6.6.4.

A complete list of bird species observed in the plant study area is provided in Appendix C.

### 5.3.2 Other Wildlife

A monarch (*Danaus plexippus*) butterfly was observed in the cultural meadow (CUM) on the site during field surveys. Additionally, three caterpillars were observed feeding on common milkweed (*Asclepias syriaca*) in the cultural meadow (CUM) on site (Appendix A, Photo 5). Monarch is listed as special concern under the ESA and SARA. Monarch is discussed further in Section 6.3.4.

Two green frogs (*Lithobates clamitans*) were observed near the sewage lagoons on the site. One leopard frog (*Lithobates pipiens*) was observed near the deciduous swamp (SWD) north of the site in the terrestrial study area. Neither of these amphibian species is of conservation concern. Amphibian surveys were not conducted; however, the sewage lagoons on the site and treed swamps in the plant study area may support other species of frogs and toads.

An unidentified predated turtle nest was observed in the cultural meadow (CUM) on the site during field surveys (Appendix A, Photo 6). The cultural meadow surrounding the sewage lagoons on the site may provide suitable nesting habitat for turtles and lagoons themselves may provide suitable aquatic and overwintering habitat. Turtle habitat is discussed further in Section 6.6.

One skunk (*Mephitis mephitis*), one eastern cottontail rabbit (*Sylvilagus floridanus*) and coyote (*Canis latrans*) scat were observed in the cultural meadow (CUM) on the site during field surveys. None of these mammals are of conservation concern.

## 5.4 Fish and Fish Habitat

### 5.4.1 Fish Habitat

Plato Creek is classified as a permanent watercourse. The thermal regime is classified as warm water based on the fish species historically present (MNRF 2021c); however, based on the water temperatures measured, species observed during the field surveys (e.g., Brook Trout [*Salvelinus fontinalis*]), and the presence of substantial amounts of watercress (typically considered an indicator of groundwater presence) the thermal regime is more aligned with a cool or cold water thermal regime. As such, the thermal regime for this watercourse has been considered coldwater for the purposes of this report. The creek borders the Crowe Lake – Crowe River and Crowe Lake Dam – Trent River watersheds and is a tributary of Trent River. Within the assessed reach of Plato

Creek, the watercourse had high flow, a meandering, neutral and unconfined channel morphology, and predominately low gradient flat habitat. Riparian features within the discharge study area include wetlands and deciduous forest with low relief and gentle slopes. A detailed summary of the fish habitat results for the assessed reach is presented in Appendix D, Table D-1, and a photo log is provided in Appendix E. One area of point source pollution was observed, at the discharge for treated effluent (Appendix E, Photos 31 to 32). Watercress was also observed throughout the surveyed reach (Appendix E, Photos 14, 20 and 21).

The proposed discharge location is within a low gradient flat habitat (Appendix E, Photo 1 to 4). Average bankfull width and depth were 3.5 m and 0.57 m, respectively. Wetted width averaged 3.1 m, and water depth averaged 0.42 m. Instream substrate consisted primarily of sand and organics, with some gravel. Instream and overhead cover were moderate and were provided by emergent and submergent vegetation, and some overhanging vegetation. The right and left downstream banks consisted of silt and had moderate stability. The surrounding riparian vegetation was grasses, with some shrubs on the left downstream bank. At the time of the field survey, water temperature was 21.6°C, and dissolved oxygen (DO) and pH measured were within the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life (i.e., DO = 5.5 to 9.5 mg/L and pH = 6.5 to 9.0) (Appendix D, Table D-1).

Upstream of the discharge location, the surveyed reach was flat habitat (Appendix E, Photos 6 to 10). The low gradient flat habitat had mean bankfull widths and depths of 2.7m and 0.58 m, respectively. Wetted width average 2.7 m and wetted depth averaged 0.32 m. Substrate was predominately sand with some organics. Moderate to high instream cover for fish was provided by overhanging vegetation, emergent and submergent vegetation, and some woody debris and undercut banks. The right and left banks had moderate stability and high slope (i.e., 100%) and were predominately silt. The surrounding riparian vegetation on both banks were grasses.

Similar to the upstream reach, the downstream reach consisted of flat habitats (Appendix E, Photos 15 to 30). The flat habitats had an average bankfull width of 5.3 m and average bankfull depth of 0.62 m. Wetted width and depth averaged 5.0 m and 0.39 m, respectively. Instream substrate consisted of sand and organics. Moderate to high instream cover for fish was provided by an abundance of emergent and submergent vegetation, overhanging vegetation, and some woody debris and undercut banks. The surrounding riparian vegetation throughout the downstream reach consisted primarily of grasses and shrubs. The right and left downstream banks had moderate stability, with no signs of slumping, and were comprised of silt. At the time of the field survey, temperature in the downstream reach averaged 18.3°C, and dissolved oxygen (DO) and pH measured within the CCME CWQG for the protection of aquatic life (i.e., DO = 5.5 to 9.5 mg/L and pH = 6.5 to 9.0) (Appendix D, Table D-1).

### 5.4.2 Fish Community

The fish communities of Plato Creek consist of a variety of native/introduced sport, forage, and bait fish species (Appendix D, Table D-2). Plato Creek provides habitat for several sport fish, including Brook Trout, Muskellunge (*Esox masquinongy*), Rainbow Trout (*Oncorhynchus mykiss*), Rock Bass (*Ambloplites rupestris*), and Yellow Perch (*Perca flavescens*). During the field survey, Brook Trout and Creek Chub (*Semotilus atromaculatus*) were observed at the discharge location. Additionally, several different mussel and fingernail clam shells were observed at the flat habitats downstream of the discharge location (Appendix E, Photos 15 to 17). None of the species identified from desktop sources or the field survey are considered SAR provincially or federally.

There were no fish barriers observed in the assessed reach of Plato Creek and there was suitable water quality, depth and connectivity to Crowe Lake and Trent River to provide moderate potential for migratory habitat for all fish species (e.g., salmonids, trout, and suckers). The surveyed reach provided moderately suitable

rearing/nursery, and foraging habitat, through the presence of suitable water quality (i.e., in-situ and water clarity), depth, and instream cover to support refugia and rearing/nursey habitat for a variety of fish species including salmonid and trout species. Potential for spawning, rearing and foraging habitat for forage and bait fish species was found throughout the assessed reach, water depth in some of the pool habitat would provide summer temperature refuge habitat but was limited in depth to provide suitable overwintering habitat.

# 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 areas. The following sources were used during the assessment of features:

- Natural Heritage Reference Manual (NHRM; MNR 2010)
- Significant Wildlife Habitat Technical Guide (SWHTG; MNR 2000)
- Significant Wildlife Habitat Mitigation Support Tool (SWHMiST; MNRF 2014)
- Significant Wildlife Habitat Criteria Schedule for Ecoregion 6E (MNRF 2015)

## 6.1 Wetlands

Provincially significant wetlands (PSWs) are identified by the MNRF 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 2021e). In general, wetlands smaller than 2 ha are not evaluated. However, wetlands less than 2 ha in size that are within 750 m of other wetlands and provide important ecological benefits may be evaluated as a PSW complex. No development is permitted in PSWs (MMAH 2020a). Development adjacent to a PSW may be permitted where it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions. There are no PSWs on the site or in the plant study area. A PSW overlaps the discharge study area but not the assessed reach of Plato Creek (Figure 1).

All wetlands, regardless of provincial designation, are recognized by the Township as important for enhancing and protecting the natural environment (Havelock-Belmont-Methuen 2015). According to provincial mapping layers (MNRF 2021b), there are no unevaluated wetlands on the site, but four unevaluated wetlands are mapped in the plant study area (Figure 1). Field surveys confirmed the lack of wetlands on the site. Provincial wetland mapping generally aligns with ELC mapping completed in the plant study area (Figure 3). It is possible that the wetland in the south portion of the plant study area could be evaluated as provincially significant based on size (>2 ha). Although the other wetlands in the plant study area are small (<2 ha), they are located within 750 m of each other and other wetlands in the broader region and may be included as part of a PSW complex. There is also an unevaluated wetland spanning most of the discharge study area and abutting the PSW. It is possible that the wetland could be complexed with the adjacent PSW.

Because there are wetlands in the study areas, wetlands are carried forward to the impact assessment (Section 7.1).

## 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).

Significant woodlands are included in the Environmental Protection designation in the Township OP. According to Schedule B1 of the Township OP, there are no Environmental Protection designated areas that overlap the plant study area, and the Environmental Protection designation in the discharge study area applies to the PSW (Havelock-Belmont-Methuen 2015). Further analysis is not warranted.

## 6.3 Significant Valleylands

Significant valleylands should be defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the NHRM for Policy 2.3 of the PPS (MNR 2010). 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.

Significant valleylands are included in the Environmental Protection designation in the Township OP. According to Schedule B1 of the Township OP, there are no Environmental Protection designated areas that overlap the plant study area, and the Environmental Protection designation in the discharge study area applies to the PSW (Havelock-Belmont-Methuen 2015). Further analysis is not warranted.

## 6.4 Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSI) are designated by the MNRF 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.

ANSI are included in the Environmental Protection designation in the Township OP. According to Schedule B1 of the Township OP, there are no Environmental Protection designated areas that overlap the plant study area, and the Environmental Protection designation in the discharge study area applies to the PSW (Havelock-Belmont-Methuen 2015). Further analysis is not warranted.

## 6.5 Habitat for Threatened or Endangered Species

General habitat protection is provided by the ESA to all threatened and endangered species. General habitat is defined as the area on which a species depends directly or indirectly to carry out life processes, including reproduction, rearing, hibernation, migration or feeding. 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. A habitat regulation outlines specific habitat features and associated buffers that are protected, and also specifies the geographic area(s) of the province where the habitat regulation applies. In some cases, a General Habitat Description (GHD) may also be prepared to help define and refine the area of protected habitat in advance of a habitat regulation.

Development is not permitted within significant habitat of threatened or endangered species except in accordance with the ESA. Development must always be in compliance with the ESA, even after the site plans have been approved.

Based on the SAR screening, 14 species designated threatened or endangered under the ESA have moderate or high potential to occur on the site and/or in the plant study area: bank swallow (*Riparia riparia*), barn swallow (*Hirundo rustica*), bobolink, eastern meadowlark, eastern whip-poor-will (*Contopus virens*), eastern small-footed myotis (*Myotis leibii*), little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), tri-colored bat (*Perimyotis subflavus*), Blanding's turtle (*Emydoidea blandingii*), spotted turtle (*Clemmys guttata*), eastern hog-nosed snake (*Heterodon platirhinos*), American ginseng (*Panax quinquefolius*) and butternut (*Juglans cinerea*) (Appendix F). Three species designated threatened or endangered under the ESA have moderate or high potential to occur in the discharge study area: little brown myotis, northern myotis and tri-colored bat.

### Bank Swallow

The bank swallow GHD (MNR 2013a) defines habitat by three categories:

- Category 1 - Bank swallow breeding colony, including the congregation of burrows and the substrate between and around them
- Category 2 - The area within 50 m in front of the breeding colony bank face to allow bank swallows to enter and exit burrows
- Category 3 - The area of suitable foraging habitat within 500 m of the outer edge of the breeding colony

There is no suitable habitat for nesting on the site or in the plant study area. Open habitats on site (meadow, lagoons) and in the plant study area off site (agricultural fields) may provide suitable foraging habitat (i.e., Category 3 habitat). However, this species was not observed during breeding bird surveys. Further analysis is not warranted.

### Barn Swallow

The barn swallow GHD (MNR 2013b) defines habitat by three categories:

- Category 1 - Nest
- Category 2 - The area within 5 m of the nest (representing area by the male)
- Category 3 - The area between 5 m and 200 m of the nest (i.e., foraging habitat)

The plant buildings on the site would not provide suitable nesting habitat, but the buildings off site, in the southeast and northeast portion of the plant study area may provide suitable nesting habitat. Open habitats on site (meadow, lagoons) and in the plant study area off site (agricultural fields) may provide suitable foraging habitat (i.e., Category 3 habitat). However, this species was not observed during breeding bird surveys. Further analysis is not warranted.

### Bobolink

The bobolink GHD (MNRF 2018a) defines habitat by three categories:

- Category 1 - Nest and the area within 10 m of the nest
- Category 2 - The area between 10 m and 60 m of the nest or centre of approximated defended territory

- Category 3 - The area of continuous suitable habitat between 60 m and 300 m of the nest or approximated centre of defended territory

The cultural meadow on site and agricultural fields in the plant study area off site may provide suitable nesting habitat for this species. Bobolink was not observed on site during breeding bird surveys but was observed off site in the agricultural field to the west of the access road during field surveys. This species is carried forward to the impact assessment in Section 7.2.

### Eastern Meadowlark

The eastern meadowlark GHD (MNRF 2018b) defines habitat by three categories:

- Category 1 - Nest and the area within 10 m of the nest
- Category 2 - The area between 10 m and 100 m of the nest or centre of approximated defended territory
- Category 3 - The area of continuous suitable habitat between 100 m and 300 m of the nest or approximated centre of defended territory

The cultural meadow on site and agricultural fields in the plant study area off site may provide suitable nesting habitat for this species. Eastern meadowlark was not observed on site during breeding bird surveys but was observed off site in the agricultural field to the west of the access road during field surveys. This species is carried forward to the impact assessment in Section 7.2.

### Eastern Whip-poor-will

The eastern whip-poor-will GHD (MNR 2013c) defines habitat by three categories:

- Category 1 - Nest and the area within 20 m of the nest
- Category 2 - The area between 20 m and 170 m from the nest or centre of approximated defended territory
- Category 3 - The area of suitable habitat between 170 m and 500 m of the nest or centre of approximated defended territory

Open and semi-open habitats on site (meadow, lagoons, woodland) and in the plant study area off site (savannah, agricultural fields) may provide suitable foraging habitat for this species. Drier forested areas on site and in the plant study area off site may provide suitable nesting and roosting habitat for this species. This species is carried forward to the impact assessment in Section 7.2.

### Eastern Small-footed Myotis

There is no GHD for eastern small-footed myotis. Therefore, the habitat is defined as the specific features that support critical life processes for this species (i.e., maternity roosting and hibernation). There are no rock piles or crevices on site that would provide suitable maternity roosting habitat. However, there may be rock piles or crevices in the forested areas and wooded wetlands within the plant study area off site that may provide suitable maternity roost habitat. There are no caves or abandoned mines on site or in the plant study area that would provide suitable hibernacula. This species is carried forward to the impact assessment in Section 7.2.

### Little Brown Myotis, Northern Myotis and Tri-colored Bat

There is no GHD for little brown myotis, northern myotis or tri-colored bat. Therefore, the habitat is defined by the specific features that support critical life processes for these bat species (i.e., maternity roosting and hibernation).

There is no suitable roosting habitat on site for these species. The forests and swamps within the plant study area off site and in the discharge study area may provide suitable roosting habitat for all three species. There are no caves or abandoned mines on site or in either study area that would provide suitable hibernacula. These species are carried forward to the impact assessment in Section 7.2.

### Blanding's Turtle

The Blanding's turtle GHD (MNR 2013d) defines habitat by three categories:

- Category 1 - Nest and the area within 30 m or overwintering sites and the area within 30 m
- Category 2 - The wetland complex (i.e., all suitable wetlands or waterbodies within 500 m of each other) that extends up to 2 km from an occurrence, and the area within 30 m around those suitable wetlands or waterbodies
- Category 3 - Area between 30 m and 250 m around suitable wetlands/waterbodies identified in Category 2, within 2 km of an occurrence

The two sewage lagoons on site and open water areas in the swamps in the plant study area may provide suitable aquatic and overwintering habitat. The meadow and woodland on site, and drier forest and savannah in the plant study area off site may provide suitable nesting habitat. No individuals were observed during field surveys. However, an unidentified predated turtle nest was observed in the cultural meadow on the site. This species is carried forward to the impact assessment in Section 7.2.

### Spotted Turtle

There is no GHD for spotted turtle. Therefore, the habitat is defined by the specific features that support critical life processes for this turtle species (i.e., nesting and hibernation). The two sewage lagoons on site contain abundant aquatic vegetation that may provide suitable aquatic and overwintering habitat. The meadow and woodland on site, and drier forest and savannah in the plant study area off site may provide suitable nesting habitat. No individuals were observed during field surveys. However, an unidentified predated turtle nest was observed in the cultural meadow on the site. This species is carried forward to the impact assessment in Section 7.2.

### Eastern Hog-Nosed Snake

There is no GHD for eastern hog-nosed snake. Therefore, the habitat is defined by the specific features that support critical life processes for this snake species (i.e., nesting and hibernation). The meadow, savannah, woodland and dry forest habitats on the site and in the plant study area off site, all in proximity to water (lagoons, wetlands) may provide suitable foraging habitat. No mammal burrows that would provide suitable nest locations or hibernacula were identified on site. However, forests in the plant study area off site may contain suitable mammal burrows. This species is carried forward to the impact assessment in Section 7.2.

### American Ginseng

The American ginseng GHD (MNR 2018c) defines habitat by two categories:

- Category 1 - The area occupied by American ginseng and the area of forest or treed swamp ELC community classes within 100 m of the occupied area
- Category 2 - The area of forest or treed swamp ELC community classes between 100 m and 150 m of the occupied area, and contiguous with Category 1

There is no suitable habitat on site for American ginseng. However, the deciduous forest dominated by sugar maple (FOD6) in the plant study area off site may provide suitable habitat for this species. American ginseng was not observed during field surveys, but not all areas of the plant study area were accessible. This species is carried forward to the impact assessment in Section 7.2.

### Butternut

There is no GHD for butternut. Therefore, the habitat is defined by the plant communities that support critical life processes for this species (i.e., growth and reproduction). There is no suitable habitat on site for butternut. However, the deciduous and mixed forests in the plant study area off site may provide suitable habitat for this species. No butternut trees were observed during field surveys, but not all areas of the plant study area were accessible. This species is carried forward to the impact assessment in Section 7.2.

## 6.6 Significant Wildlife Habitat

Provincial policy requires that proposed developments must demonstrate there are no negative impacts to significant wildlife habitat (SWH), including its ecological function (MMAH 2020a). SWH is one of the more complicated natural heritage features to identify and evaluate. The NHRM includes criteria and guidelines for designating SWH. There are two other documents, the Significant Wildlife Habitat Technical Guide (SWHTG) and the Significant Wildlife Habitat Mitigation Support Tool (SWHMiST) (MNR 2000 and MNRF 2014), that can be used to help decide what areas and features should be considered significant wildlife habitat. These documents were used as reference material for this evaluation. SWH should be evaluated in the context of the entire planning authority's jurisdiction; where habitat representation in a planning area is high, though the habitat may be valuable to wildlife, the likelihood of it being significant is reduced (MNR 2000).

There are four general categories of SWH: seasonal concentration areas, migration corridors, rare or specialized habitats, and habitat for species of conservation concern. These general categories each contain one or more specific habitat types. The specific habitats considered in this report are evaluated based on the criteria outlined in the Ecoregion 6E criteria schedules (MNRF 2015). Based on the desktop review and field surveys, three types of SWH were assessed to have potential to occur on the site or in the plant study area and were evaluated for potential significance: bat maternity colonies, amphibian breeding habitat (woodlands), and habitat of special concern and rare wildlife species. Although the lagoons on site and adjacent cultural meadow may provide turtle overwintering and nesting opportunities, respectively, anthropogenic ponds and cultural meadows are excluded from the list of qualifying criteria for these types of SWH (MNRF 2015).

### Bat Maternity Colonies

The forests and swamps within the plant study area off site and in the discharge study area may provide suitable roosting habitat for bat maternity colonies. However, suitable roosting habitat for bat maternity colonies appears well-represented throughout the broader region. In the context of the entire planning authority's jurisdiction, the likelihood of roosting habitat for bat maternity colonies on the site and study areas being significant is low. Further analysis is not warranted.

### Amphibian Breeding Habitat (Woodlands)

The wetlands in the plant study area off site and in the discharge study area may provide suitable woodland amphibian breeding habitat. However, suitable woodland amphibian breeding habitat appears well-represented throughout the broader region. In the context of the entire planning authority's jurisdiction, the likelihood of woodland amphibian breeding habitat on the site and study areas being significant is low. Further analysis is not warranted.

### Habitat of Special Concern and Rare Wildlife Species

Special concern and rare wildlife species include species listed as special concern under the ESA; species identified as endangered or threatened by COSEWIC; species that are rare, whose populations are significantly declining, or have a high percentage of their global population in Ontario (i.e., ranked S1-S3 by NatureServe); and species designated as rare by municipalities (MNR 2000). This category excludes species listed as endangered or threatened under the ESA (see Section 6.5). Habitat of special concern and rare wildlife species falls under the habitat for species of conservation concern category of SWH.

Based on the SAR screening and field surveys, potential habitat was identified on the site or in the plant study area for eight special concern or rare wildlife species: monarch, yellow-banded bumblebee, common nighthawk, eastern wood-pewee, western chorus frog, eastern ribbonsnake, snapping turtle, and eastern musk turtle (Appendix F). Potential habitat was identified in the discharge study area for five special concern or rare wildlife species: monarch, eastern wood-pewee, western chorus frog, eastern ribbonsnake, and snapping turtle.

Monarch (both adults and caterpillars) was observed in the cultural meadow on site. Open habitats and roadsides in the plant study area and open wetland areas in the discharge study area may also have potential to provide suitable foraging and breeding habitat for monarch. The cultural meadow on site and open habitats and roadsides in the plant study area were also assessed to have potential to provide suitable habitat for yellow-banded bumblebee. The deciduous woodland in the western portion of the study area may support nesting sites for yellow-banded bumble bee. However, suitable habitat for both species is well-represented throughout the broader region. In the context of the entire planning authority's jurisdiction, the likelihood of habitat on the site and study areas being significant for these species is low. Further analysis is not warranted.

The cultural meadow on the site and the open agricultural land off site may provide suitable nesting and foraging habitat for common nighthawk. However, suitable habitat for this species is well-represented throughout the broader region. In the context of the entire planning authority's jurisdiction, the likelihood of habitat on the site and study areas being significant for this species is low. Further analysis is not warranted.

The forests and swamps off site in the plant study area may provide suitable habitat for eastern wood-pewee. During breeding bird surveys, eastern wood-pewee was observed in the deciduous swamp in the north portion of the plant study area. However, suitable habitat for this species is well-represented throughout the broader region. In the context of the entire planning authority's jurisdiction, the likelihood of habitat on the site and study areas being significant for this species is low. Further analysis is not warranted.

The wetlands in the plant study area off site may provide suitable aquatic habitat for western chorus frog, eastern ribbonsnake, snapping turtle and eastern musk turtle. The wetlands in the drainage study area may provide suitable aquatic habitat for western chorus frog and eastern ribbonsnake, and Plato Creek may provide suitable aquatic habitat for snapping turtle. However, suitable habitat for these species is well-represented throughout the broader region. In the context of the entire planning authority's jurisdiction, the likelihood of habitat on the site and study areas being significant for these species is low. Further analysis is not warranted.

## 6.7 Fish Habitat

Provincial policy requires that proposed developments or activities must demonstrate there are no negative impacts to fish habitat (MMAH 2020a). Available data sources and the field survey confirm Plato Creek supports various species of fish and mussels in the vicinity of the discharge location. Fish habitat is carried forward to the impact assessment in Section 7.3.

# 7.0 IMPACT ASSESSMENT

## 7.1 Wetlands

Physical disturbance from Project activities regardless of which capacity expansion scenario is chosen will be confined to the site and no direct impacts to the wetlands in the plant study area are anticipated.

According to the ACS results (Golder 2022a, b), capacity expansion scenario 1 would result in increased flow in Plato Creek throughout the year, whereas scenario 2 would result in increased flow in the creek from October to July, but decreased flow in August and September when wastewater is diverted to the lagoons. In both scenarios, the increase in flow is not expected to extend beyond the existing bankfull width of the creek, thereby not likely having an effect on channel forming flows and in turn not likely substantially increasing erosion or substantially changing natural sediment transport characteristics. Impacts to the form and function of wetlands in the drainage study area are expected to be negligible.

## 7.2 Habitat for Threatened or Endangered Species

### Bobolink and Eastern Meadowlark

Bobolink and eastern meadowlark were both observed in the agricultural field to the west of the access road, off site in the plant study area. No direct disturbance to the occupied habitat will result from the Project. Depending on the timing of Project activities, birds occupying the agricultural field may be subject to sensory disturbance, but the impact is expected to be negligible given the current land use in the plant study area including existing industry and agriculture, and the temporary nature of the disturbance.

### Eastern Whip-poor-will

Potential nesting, roosting and foraging habitats were identified for eastern whip-poor-will on the site and in the plant study area. No direct disturbance to potential nesting and roosting habitat will result from the Project, and Project activities on site will not preclude foraging by this species. Depending on the timing of Project activities, whip-poor-wills potentially present on site or off site in the plant study area may be subject to sensory disturbance, but the impact is expected to be negligible given the current land use in the plant study area including existing industry and agriculture, and the temporary nature of the disturbance.

### Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tri-colored Bat

Suitable roosting habitat for these bat species may be present off site in the plant study area, and for the three tree-roosting species (little brown myotis, northern myotis and tri-colored bat) in the discharge study area. No direct disturbance to potential roosting habitat will result from the Project. Depending on the timing of Project activities, bats potentially present off site in the plant study area may be subject to sensory disturbance, but the impact is expected to be low given the current land use in the plant study area including existing industry and agriculture, and the temporary nature of the disturbance.

### Blanding's Turtle and Spotted Turtle

The sewage lagoons on site may provide suitable aquatic and overwintering habitat for these turtle species. The meadow and woodland on site and drier forest and savannah off site in the plant study area may provide suitable nesting habitat. Although no turtles were observed during field surveys, a predated turtle nest was observed in the meadow on site.

Capacity expansion scenario 2 would result in the temporary loss of potential aquatic and overwintering habitat while the sewage lagoons are drained and resurfaced, and possibly for a few years afterwards as aquatic and

riparian vegetation re-establishes. Under both capacity expansion scenarios, activities on site could interfere with turtle nesting activities or result in nest destruction.

Visual encounter surveys and nesting surveys will be conducted in the active season ahead of planned activities to determine whether turtles are present and, if so, which species. An information gathering form (IGF) will be submitted to the MECP should Blanding's turtle or spotted turtle be confirmed present on the site, and appropriate mitigative actions will be taken to avoid impacts in consultation with the MECP. Draining of the lagoons will be scheduled for September before turtles go into hibernation, allowing for relocation should any individuals be present in the lagoons.

### Eastern Hog-nosed Snake

Potential foraging habitat for this snake species may be present in the meadow, savannah, woodland and dry forest habitats on site. No mammal burrows that would provide suitable nest locations or hibernacula were identified. Most potential habitats on site (savannah, woodland, dry forest) will not be directly disturbed by Project activities. Visual encounter surveys will be conducted in the active season ahead of planned activities to determine whether snakes, sign (e.g., shed skin) or habitat features suitable for critical life processes (e.g., mammal burrows) are present in planned disturbance areas. Should the presence of eastern hog-nosed snake be confirmed or strongly suspected, an IGF will be submitted to the MECP, and appropriate mitigative actions will be taken to avoid impacts in consultation with the MECP.

### American Ginseng and Butternut

Forests off site in the plant study area may provide suitable habitat for these plant species. No direct disturbance to potential habitat or individuals, if present, will result from the Project. Under both capacity expansion scenarios, activities on site are expected to generate some dust that may drift to adjacent habitats off site in the plant study area. Dust that falls directly on plants can have a physical effect by smothering plant leaves or blocking stomata openings (Farmer 1993). Dust generation is not expected to be substantial enough to warrant mitigation. However, if conditions are very dry at the time activities are scheduled, dust suppression mitigation will be applied (e.g., spraying access routes with water).

## 7.3 Fish Habitat

According to the ACS results (Golder 2022a, b) and as described in Section 7.1, capacity expansion scenario 1 would result in increased flow in Plato Creek throughout the year, whereas scenario 2 would result in increased flow in the creek from October to July, but decreased flow in August and September when wastewater is diverted to the lagoons. In both scenarios, the increase in flow is not expected to extend beyond the existing bankfull width of the creek thereby not likely affecting channel forming flows and in turn not likely substantially increasing erosion or substantially changing natural sediment transport characteristics which could result in changes to fish habitat characteristics.

Assuming a discharge temperature of 8°C, water in the creek is expected to be slightly warmer in winter and slightly cooler in summer in both scenarios. The increase in temperature during winter is expected to be larger in scenario 2 resulting from greater discharge at that time relative to scenario 1, and the decrease in temperature during summer is expected to be larger in scenario 1 resulting from greater discharge at that time relative to scenario 2. No measurable changes to water quality in the creek are expected in either capacity expansion scenario.

Based on the ACS results, there will not likely be significant impacts to fish habitat related to channel forming flows and sediment transport as discussed above. Decreases in water temperature during the summer (Scenario 1) have the potential to positively affect fish and fish habitat, specifically the presence of coldwater indicator species such as Brook Trout. Temperature moderation during the summer would likely be a positive effect and would reduce the likelihood of harm or mortality of Brook Trout due to temperatures beyond their tolerance range. Given that WSP Golder's field results indicate Plato Creek is a coldwater watercourse, it is likely that the winter discharge temperature of 8°C will not substantially affect sensitive species such as Brook Trout because it is not only within their temperature tolerance range, but also within their preferred temperature range.

# 8.0 MITIGATION

## 8.1 General Best Management Practices

Standard Best Management Practices to be followed during Project activities to mitigate disturbance to natural features on site and adjacent areas include the following:

- Clearly demarcate and maintain the site boundaries during Project activities.
- Implement sediment/erosion controls adjacent to natural features during Project activities.
- Implement dust control measures in dry conditions.
- Avoid removal or disturbance to vegetation during the migratory bird nesting period (April 5 – August 26 in Zone C2; ECCC 2018). If vegetation removal or disturbance during this period cannot be avoided, conduct a pre-clearing nesting survey by a qualified biologist.
- Avoid activities resulting in major noise and vibration levels during the migratory bird nesting period (April 5 – August 26 in Zone C2; ECCC 2018), where feasible.
- Avoid the storage of construction materials or equipment adjacent to sensitive natural features (e.g., woodland) to minimize disturbance to these features and resident wildlife.
- Ensure all equipment is cleaned prior to transportation and use on the site to avoid the spread or introduction of invasive species on the site.

## 8.2 Other Project Specific Mitigation

Mitigation specific to the Project will include:

- Scheduling draining of the lagoons in September, timed to avoid the migratory bird nesting period and amphibian breeding season, and before turtles, if present, go into hibernation.
- Conducting turtle relocation if any individuals are present in the lagoons (and assuming approvals are received from the MECP should threatened or endangered species be present).
- Conducting a fish salvage if fish are identified in the lagoons, in consultation with the MNRF to ensure all permitting and management requirements (e.g., euthanization) are met. Summer fish sampling in the lagoons should be completed to determine the presence of fish.

## 8.3 Habitat for Threatened or Endangered Species

Habitat potential for threatened or endangered species identified through this assessment is mostly off site in the plant study area or in areas of the site that will not be directly disturbed by the Project. Additional surveys will be conducted for turtles and snakes to determine whether mitigation is required, and the MECP will be consulted should threatened or endangered species be confirmed or highly suspected on site and potentially impacted by Project activities.

# 9.0 CONCLUSIONS

The Project has been assessed for potential direct and indirect ecological impacts under the PPS, the policies of the Township of Havelock-Belmont-Methuen and Peterborough County OPs, as well as other relevant legislation, including the ESA and *Fisheries Act*.

Based on these analyses and the implementation of appropriate mitigation measures, it is expected that there will be no residual negative impacts to the significant natural features and functions on the site and in the study areas. These conclusions are based on the assumption that mitigation measures detailed in Section 8.0 will be implemented.

# 10.0 CLOSURE

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

# Signature Page

**Golder Associates Ltd.**

***DRAFT***

Barbara Bleho, MNRM, RPBio
*Ecologist*

***DRAFT***

Heather Melcher, MSc
*Principal, Senior Ecologist*

***DRAFT***

Mark Pomeroy, HBSc
*Aquatic Biologist*

BB/HM/mp

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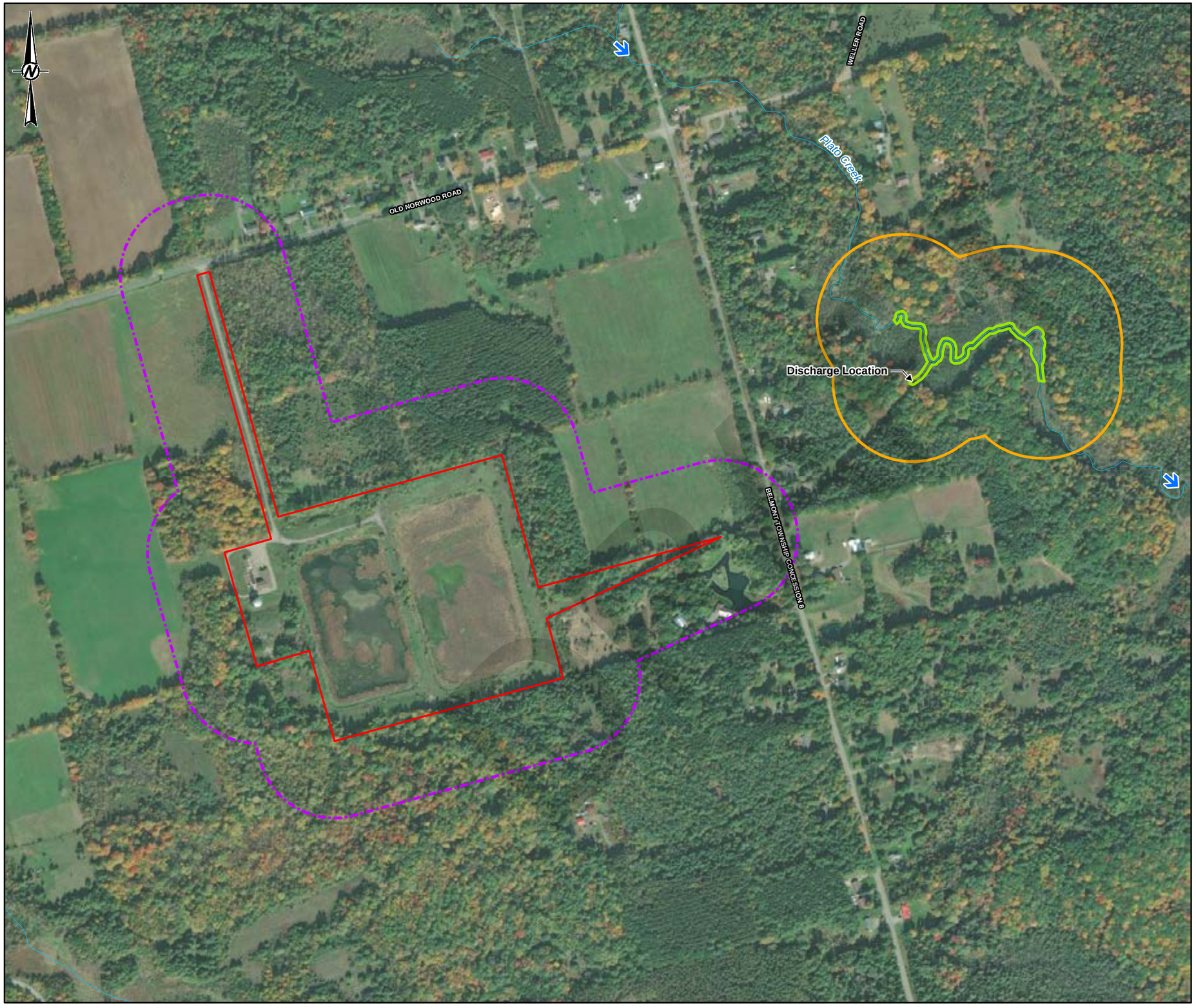
# FIGURES




KEY MAP


SCALE 1:325,000

LEGEND

- SURFACE WATER FLOW DIRECTION
- AQUATIC SURVEY AREA
- DISCHARGE STUDY AREA
- SITE BOUNDARY
- PLANT STUDY AREA

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2021
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COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28

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CLIENT
CIMA+

PROJECT
HAVELOCK WASTEWATER TREATMENT PLANT (WWTP)

TITLE
**STUDY AREAS**

CONSULTANT
wsp GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2022-06-27 |
| DESIGNED | SB |
| PREPARED | RRD |
| REVIEWED | BB |
| APPROVED | ---- |

| PROJECT NO. | CONTROL | REV. | MAP |
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**KEY MAP**


SCALE 1:325,000

**LEGEND**

- BREEDING BIRD SURVEY
- SITE BOUNDARY
- PLANT STUDY AREA

**NOTE(S)**

1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**

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3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28

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CIMA+

PROJECT
HAVELOCK WASTEWATER TREATMENT PLANT (WWTP)

TITLE
**BREEDING BIRD SURVEY LOCATIONS**

CONSULTANT
wsp GOLDER

| | |
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| YYYY-MM-DD | 2022-05-04 |
| DESIGNED | SB |
| PREPARED | RRD |
| REVIEWED | BB |
| APPROVED | ---- |

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**KEY MAP**


SCALE 1:325,000

**LEGEND**

- WETLAND
- ELC COMMUNITY
- SITE BOUNDARY
- PLANT STUDY AREA

| ELC Code | ELC Community |
|---|---|
| OAO | Open Water Aquatic |
| MAS3-1 | Cattail Organic Shallow Marsh |
| MAM2-2 | Reed-Canary Grass Mineral Meadow Marsh |
| FOM5-2 / SWM | Dry-Fresh Poplar Mixed Forest / Mixed Swamp |
| FOM1 | Dry Oak – Pine Mixed Forest |
| FOD6 / SWD | Fresh-Moist Sugar Maple Deciduous Forest Ecosite / Deciduous Swamp |
| SWD | Deciduous Swamp |
| SWD3-2 | Silver Maple Mineral Deciduous Swamp |
| CUP3-2 | White Pine Coniferous Plantation |
| FOC1-2 | Dry-Fresh White Pine Coniferous Forest |
| OAGM | Open Agriculture |
| CUW1 | Mineral Cultural Woodland |
| CUM1 | Mineral Cultural Meadow |
| CUS | Cultural Savannah |
| CVI-3 | Sewage and Water Treatment |

**NOTE(S)**

1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**

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3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28

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CLIENT
CIMA+

PROJECT
HAVELOCK WASTEWATER TREATMENT PLANT (WWTP)

TITLE
**ECOLOGICAL LAND CLASSIFICATION**

CONSULTANT
wsp GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2022-05-04 |
| DESIGNED | SB |
| PREPARED | RRD |
| REVIEWED | BB |
| APPROVED | ---- |

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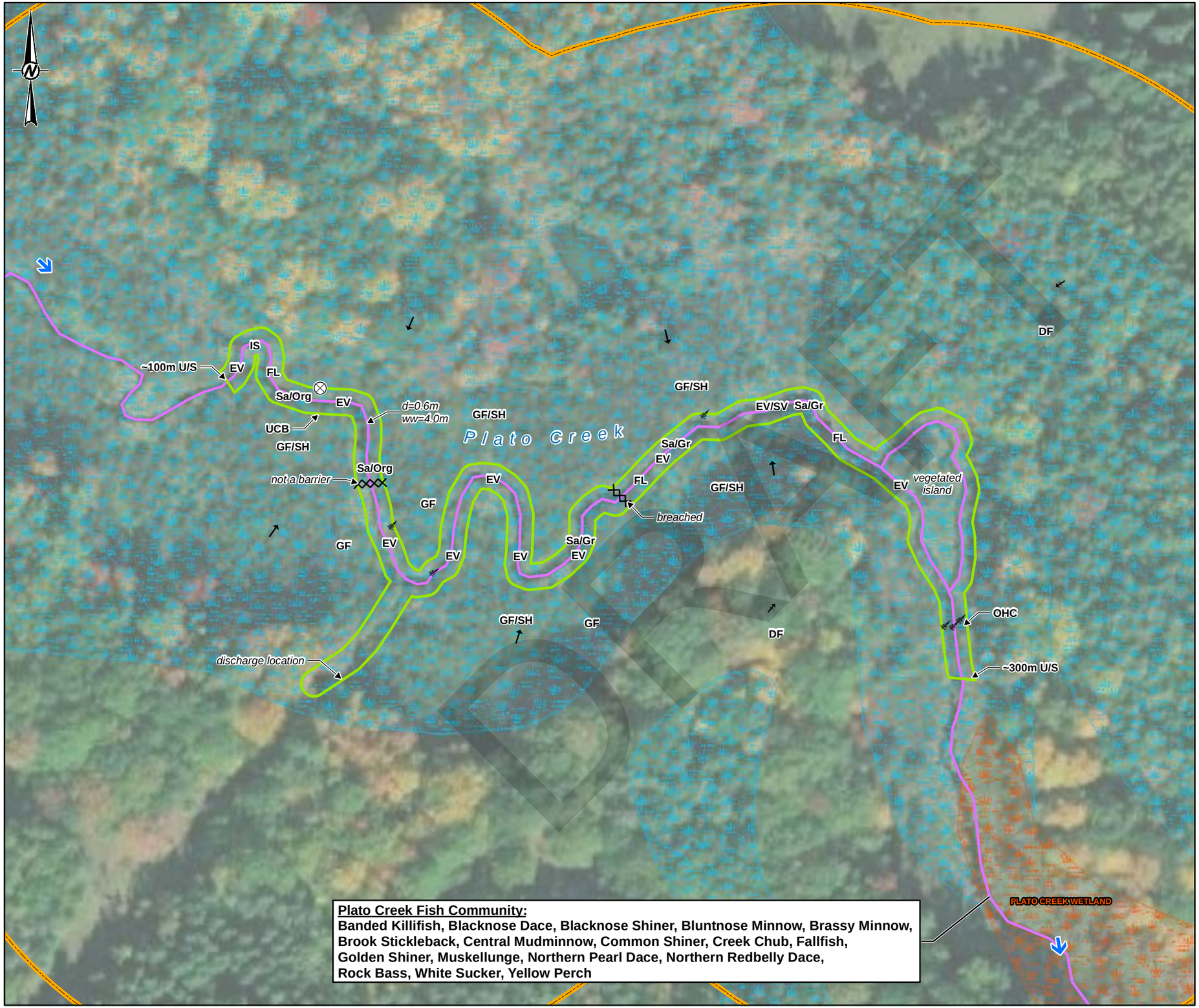


KEY MAP


SCALE 1:325,000

LEGEND

- Flow Direction
- Wetland
- Provincially Signigicant Wetland
- Warm Water Thermal Regime
- Discharge Study Area
- Aquatic Habitat Survey Area

*Bank Slope:*
- Shallow slope (0 to 5%)
- Intermediate slope (6 to 30%)

*Habitat Features:*
- - Woody debris
- ⊗ - Root Wad
- XXXX - Beaver dam
- IS - Island
- UCB - Undercut bank (fish cover)
- OHC - Overhead cover
- EV - Emergent vegetation
- SV - Submergent vegetation

*Channel Unit/Habitat Type:*
FL - Flat, low gradient, low velocity

*Substrate Particle Size:*
- Sa - Sand (0.06 - 2 mm)
- Gr - Gravel (2 - 64 mm)
- Org - Organic material

*Riparian Vegetation Type:*
- DF - Deciduous forest
- GF - Grass/Forbs
- SH - Shrubs

**NOTE(S)**
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**
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SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83,
COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28

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CLIENT
CIMA+

PROJECT
HAVELOCK WASTEWATER TREATMENT PLANT (WWTP)

TITLE
**AQUATIC HABITAT ASSESSMENT**

CONSULTANT
wsp GOLDER

| | |
|---|---|
| YYYY-MM-DD | 6/27/2022 |
| DESIGNED | SB |
| PREPARED | RRD |
| REVIEWED | EH |
| APPROVED | EH/BB |

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**APPENDIX A**

# Site Photo Log

**Photo 1:** View south down access road leading to the Wastewater Treatment Plant.

**Photo 2:** Open agricultural field west of access road.

**Photo 3:** Wastewater Treatment Plant and west lagoon.

**Photo 4:** East lagoon.

**Photo 5:** Monarch caterpillars feeding on milkweed on site.

**Photo 6:** Predated turtle nest on site.

**APPENDIX B**

# Botanical Inventory in the Terrestrial Study Area

**Vascular plants on site and within the terrestrial study area, based on 2021 field work**

| Scientific Name | Common Name | Location on Site or in Terrestrial Study Area[a] |
|---|---|---|
| **Trees, Shrubs and Woody Vines** | | |
| *Acer negundo* | Manitoba maple | On site |
| *Acer rubrum* | Red maple | On site, 2 |
| *Acer saccharinum* | Silver Maple | 1, 5, 7 |
| *Acer saccharum* | Sugar maple | On site, 1, 3, 4, 5 |
| *Betula papyrifera* | White birch | On site, 2, 3, 5 |
| *Cornus alternifolia* | Alternate leaved dogwood | 3 |
| *Cornus sericea* | Red osier dogwood | On site |
| *Crataegus spp.* | Hawthorn | On site |
| *Fagus grandifolia* | American beech | 1 |
| *Fraxinus americana* | White ash | 1 |
| *Fraxinus pennsylvanica* | Green ash | On site |
| *Juglans nigra* | Black walnut | 2 |
| *Juniperus communis* | Common juniper | On site |
| *Juniperus virginiana* | Eastern red cedar | On site |
| *Larix laricina* | Tamarack | 7 |
| *Lonicera tatarica* | Tartarian honeysuckle | On site |
| *Malus pumilia* | Apple | On site, 2 |
| *Morus alba* | White mulberry | On site |
| *Parthenocissus quinquefolia* | Virginia creeper | On site |
| *Picea glauca* | White spruce | **On site, 3, 4, 6** |
| *Pinus resinosa* | Red pine | On site, 4 |
| *Pinus strobus* | Eastern white pine | 2, 3, 5, 6 |
| *Pinus sylvestris* | Scots pine | On site, 6 |
| *Populus balsamifera* | Balsam poplar | On site |
| *Populus deltoides* | Eastern cottonwood | On site, 1, 5 |
| *Populus grandidentata* | Large-tooth aspen | On site |

| Scientific Name | Common Name | Location on Site or in Terrestrial Study Area[a] |
|---|---|---|
| *Populus tremuloides* | Trembling aspen | On site, 3, 6 |
| *Prunus pensylvanica* | Pin cherry | On site |
| *Prunus virginiana* | Choke cherry | On site |
| *Quercus macrocarpa* | Bur oak | 4, 6 |
| *Quercus rubra* | Red oak | On site, 2, 6 |
| *Rosa acicularis* | Prickly wild rose | On site, 6 |
| *Rubus allegheniensis* | Common blackberry | On site |
| *Salix × fragilis* | Crack willow | 6 |
| *Salix discolor* | Pussy willow | On site |
| *Spirea alba* | Narrow-leaved meadowsweet | On site, 6 |
| *Thuja occidentalis* | Eastern white cedar | 6, 7 |
| *Tilia americana* | Basswood | 1 |
| *Ulmus americana* | American elm | 1, 2, 5, 7 |
| *Viburnum trilobum* | Highbush cranberry | On site |
| *Vitis riparia* | Riverbank grape | On site, 3 |
| *Zanthoxylum americanum* | Common pricklyash | On site |
| **Forbs** | | |
| *Achillea millefolium* | Yarrow | On site |
| *Anemonastrum canadense* | Canada anemone | On site, 5 |
| *Apocynum androsaemifolium* | Spreading dogbane | On site |
| *Apocynum cannabinum* | Indian hemp | On site |
| *Apocynum cannabinum* | Yellow toadflax | On site |
| *Apocynum cannabinum* | Bull thistle | On site |
| *Aruncus dioicus* | Goat’s beard | On site |
| *Asclepias syriaca* | Common milkweed | On site |
| *Convolvulus arvensis* | Field bindweed | On site |
| *Daucus carota* | Wild carrot | On site |
| *Echium vulgare* | Blueweed | On site |

| Scientific Name | Common Name | Location on Site or in Terrestrial Study Area[a] |
|---|---|---|
| *Epipactis helleborine* | Broad-leaved helleborine | On site |
| *Erysimum inconspicuum* | Small-flowered wallflower | On site |
| *Euthamia graminifolia* | Grass-leaved goldenrod | On site |
| *Fragaria virginiana* | Wild strawberry | On site |
| *Hemerocallis fulva* | Orange day-lily | On site |
| *Hypericum perforatum* | Common St. John's wort | On site |
| *Lemna minor* | Common duckweed | On site, 3 |
| *Leucanthemum vulgare* | Ox-eye daisy | On site |
| *Lotus corniculatus* | Birdsfoot trefoil | On site |
| *Lythrum salicaria* | Purple loosestrife | On site |
| *Maianthemum canadense* | Canada mayflower | On site |
| *Melilotus albus* | White sweetclover | On site |
| *Oenothera biennis* | Evening primrose | On site |
| *Pilosella aurantiaca* | Orange hawkweed | On site |
| *Pilosella officinarum* | Mouse-ear hawkweed | On site |
| *Plantago lanceolata* | Narrowleaf plantain | On site |
| *Rubus pubescens* | Dwarf raspberry | On site |
| *Rudbeckia hirta* | Black-eyed susan | On site |
| *Scrophularia lanceolata* | Lance-leaved figwort | On site, 6 |
| *Silene vulgaris* | Bladder campion | On site |
| *Solidago canadensis* | Canada goldenrod | On site |
| *Toxicodendron radicans* | Poison ivy | On site, 4 |
| *Trifolium pratense* | Red clover | On site |
| *Typha latifolia* | Common cattail | On site |
| *Verbascum thapsus* | Mullein | On site |
| *Vicia cracca* | Bird vetch | On site |
| **Graminoids** | | |
| *Bromus inermis* | Smooth brome | On site |

| Scientific Name | Common Name | Location on Site or in Terrestrial Study Area[a] |
|---|---|---|
| *Carex flava* | Yellow sedge | On site |
| *Carex lupulina* | Hop sedge | On site |
| *Juncus spp.* | Juncus spp. | On site |
| *Phalaris arundinacea* | Reed canary grass | On site |
| *Poa pratensis* | Kentucky bluegrass | On site |
| *Scirpus atrovirens* | Black bulrush | On site |
| **Ferns and Allies** | | |
| *Comptonia peregrina* | Sweetfern | On site |
| *Equisetum arvense* | Field horsetail | On site |
| *Matteuccia struthiopteris* | Ostrich fern | 1 |
| *Onoclea sensibilis* | Sensitive fern | On site |
| *Pteridium aquilinum* | Bracken fern | On site, 1 |

[a] Terrestrial study area location and ELC codes: 1 = Fresh-Moist Sugar Maple Deciduous Forest Ecosite / Deciduous Swamp (FOD6 / SWD); 2 = Oak-Pine Mixed Forest (FOM1); 3 = Dry-Fresh Poplar Mixed Forest / Mixed Swamp (FOM5-2 / SWM); 4 = White Pine Coniferous Forest (FOC1-2) / White Pine Coniferous Plantation (CUP3-2); 5 = Silver Maple Mineral Deciduous Swamp (SWD3-2); 6 = Cultural Savannah (CUS); 7 = Deciduous Swamp (SWD)

**APPENDIX C**

# Bird Species Observed in the Terrestrial Study Area

**Bird Species Observed in the Terrestrial Study Area**

| Common Name | Scientific Name | ESA[1] | COSEWIC[2] | SARA[3] | S RANK[4] | G RANK[4] |
|---|---|---|---|---|---|---|
| American redstart | *Setophaga ruticilla* | - | - | - | S5B | G5 |
| American crow | *Corvus brachyrhynchos* | - | - | - | S5B | G5 |
| American goldfinch | *Spinus tristis* | - | - | - | S5B | G5 |
| American robin | *Turdus migratorius* | - | - | - | S5B | G5 |
| Baltimore oriole | *Icterus galbula* | - | - | - | S4B | G5 |
| Black-capped chickadee | *Poecile atricapillus* | - | - | - | S5 | G5 |
| Blue jay | *Polioptila caerulea* | - | - | - | S5 | G5 |
| Bobolink | *Dolichonyx oryzivorus* | THR | THR | THR | S4B | G5 |
| Brown-headed cowbird | *Vermivora cyanoptera* | - | - | - | S4B | G5 |
| Cedar waxwing | *Spizella pallida* | - | - | - | S5B | G5 |
| Chestnut-sided warbler | *Setophaga pensylvanica* | - | - | - | S5B | G5 |
| Chipping sparrow | *Bombycilla cedrorum* | - | - | - | S5B | G5 |
| Common grackle | *Quiscalus quiscula* | - | - | - | S5B | G5 |
| Common yellowthroat | *Geothlypis trichas* | - | - | - | S5B | G5 |
| Eastern kingbird | *Tyrannus tyrannus* | - | - | - | S4B | G5 |
| Eastern meadowlark | *Sturnella magna* | THR | THR | THR | S4B | G5 |
| Eastern phoebe | *Sayornis phoebe* | - | - | - | S5B | G5 |
| Eastern wood-pewee | *Contopus virens* | SC | SC | SC | S4B | G5 |
| European starling | *Sturnus vulgaris* | - | - | - | SNA | G5 |
| Great blue heron | *Ardea herodias* | - | - | - | S4 | G5 |
| Great crested flycatcher | *Myiarchus crinitus* | - | - | - | S4B | G5 |
| Hairy woodpecker | *Picoides villosus* | - | - | - | S5 | G5 |
| House wren | *Troglodytes aedon* | - | - | - | S5B | G5 |
| Mallard | *Anas platyrhynchos* | - | - | - | S5 | G5 |
| Mourning dove | *Zenaida macroura* | - | - | - | S5 | G5 |
| Northern cardinal | *Cardinalis cardinalis* | - | - | - | S5 | G5 |
| Northern flicker | *Colaptes auratus* | - | - | - | S4B | G5 |
| Northern rough-winged swallow | *Stelgidopteryx serripennis* | - | - | - | S4B | G5 |
| Ovenbird | *Seiurus aurocapilla* | - | - | - | S4B | G5 |
| Pileated woodpecker | *Dryocopus pileatus* | - | - | - | S5 | G5 |
| Pine Warbler | *Setophaga pinus* | - | - | - | S5B | G5 |
| Red-breasted nuthatch | *Larus delawarensis* | - | - | - | S5 | G5 |
| Red-eyed vireo | *Sitta canadensis* | - | - | - | S5B | G5 |
| Red-winged blackbird | *Vireo olivaceus* | - | - | - | S4 | G5 |
| Rock pigeon | *Buteo jamaicensis* | - | - | - | SNA | G5 |
| Sedge wren | *Cistothorus platensis* | - | - | - | S4B | G5 |
| Song sparrow | *Melospiza melodia* | - | - | - | S5B | G5 |
| Sora | *Porzana carolina* | - | - | - | S4B | G5 |

| Common Name | Scientific Name | ESA[1] | COSEWIC[2] | SARA[3] | S RANK[4] | G RANK[4] |
|---|---|---|---|---|---|---|
| Swamp sparrow | *Catharus ustulatus* | - | - | - | S5B | G5 |
| Tree swallow | *Tachycineta bicolor* | - | - | - | S4B | G5 |
| Veery | *Catharus fuscescens* | - | - | - | S4B | G5 |
| Warbling vireo | *Vireo gilvus* | - | - | - | S5B | G5 |
| Wild turkey | *Empidonax traillii* | - | - | - | S5 | G5 |
| Yellow warbler | *Coccyzus americanus* | - | - | - | S5B | G5 |

[1] Endangered Species Act (ESA), 2007. General (O.Reg 242/08 last amended 29 June 2020 as O.Reg 328/20). Species at Risk in Ontario List (O.Reg 230/08 last amended 1 Aug 2018 as O. Reg 404/18, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

[2] Committee on the Status of Endangered Wildlife in Canada (COSEWIC) http://www.cosewic.gc.ca/

[3] Species at Risk Act (SARA), 2002. Schedule 1 (Last amended 23 April 2021); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)

[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 November 2019.

[5] Global Ranks (GRANK) are Rarity Ranks assigned to a species based on their range-wide status. GRANKS are assigned by a group of consensus of Conservation Data Centres (CDCs), scientific experts and the Nature Conservancy. These ranks are not legal designations. G1 (Extremely Rare), G2 (Very Rare), G3 (Rare to uncommon), G4 (Common), G5 (Very Common), GH (Historic, no record in last 20yrs), GU (Status uncertain), GX (Globally extinct), ? (Inexact number rank), G? (Unranked), Q (Questionable), T (rank applies to subspecies or variety). Last assessed August 2011

**APPENDIX D**

# Fish Survey Results

**Table D-1: Fish Habitat of Plato Creek, July 2021**

| Location | UTM Coordinates (NAD 83, Zone 18) | | Habitat Type | Mean Wetted Width (m) | Mean Wetted Depth (m) | | | Mean Bankfull Width (m) | Mean Bankfull Depth (m) | | | Bank Stability | | Bank Height (m) | | Bank Slope (%) | | Bank Composition Type (%) | | Undercut Bank (%) | | Evidence of Slumping | Bank with Riparian Vegetation (%) | | Riparian Vegetation Types (%) | | Overhead Cover Type (%) | In-water Vegetation Cover Type (%) | Aquatic Macrophytes Type (%) | Substrate Type(s)(%) | In-Situ Water Quality | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Easting | Northing | | | RMID | MID | LMID | | RMID | MID | LMID | LDB | RDB | LDB | RDB | LDB | RDB | LDB | RDB | LDB | RDB | | LDB | RDB | LDB | RDB | | | | | Temperature (°C) | pH | Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | Turbdity (NTU) |
| 100 m US | 271909 | 4923217 | FL | 2.7 | 0.40 | 0.29 | 0.26 | 2.7 | 0.58 | 0.54 | 0.62 | M | M | 0.45 | 0.66 | 100 | 100 | Si (100) | Si (100) | 25 | 40 | no | 100 | 100 | GF (100) | GF (100) | OHV (20) | WD (5)<br>EM (35)<br>UCB (5) | EM (90)<br>SM (10) | Sa (90)<br>Org (10) | - | - | - | - | - |
| at crossing | 271964 | 4923152 | FL | 3.1 | 0.37 | 0.54 | 0.36 | 3.5 | 0.52 | 0.69 | 0.51 | M | M | 0.15 | 0.35 | 5 | 5 | Si (100) | Si (100) | 0 | 0 | no | 100 | 100 | GF (85)<br>SH (15) | GF (100) | OHV (5) | EM (35) | EM (90)<br>SM (10) | Sa (60)<br>Gr (10)<br>Org (30) | 21.61 | 7.20 | 589.47 | 9.24 | 1.66 |
| 100 m DS | 272013 | 4923166 | FL | 3.7 | 0.30 | 0.26 | 0.28 | 4.0 | 0.62 | 0.52 | 0.54 | M | M | 0.56 | 0.48 | 100 | 90 | Si (100) | Si (100) | 50 | 50 | no | 100 | 100 | GF (95)<br>SH (5) | GF (95)<br>SH (5) | OHV (10) | EM (25)<br>UCB (1) | EM (50)<br>SM (50) | Sa (50)<br>Org (50) | 18.13 | 7.63 | 670.70 | 8.37 | 13.23 |
| 200 m DS | 272090 | 4923216 | FL | 7.6 | 0.28 | 0.33 | 0.29 | 7.9 | 0.61 | 0.58 | 0.61 | M | M | 0.46 | 0.35 | 20 | 20 | Si (100) | Si (100) | 0 | 0 | no | 100 | 100 | GF (40)<br>SH (60) | GF (60)<br>SH (40) | OHV (50) | WD (5)<br>EM (80) | EM (65)<br>SM (35) | Sa (50)<br>Org (50) | 18.35 | 7.49 | 665.09 | 8.44 | 6.29 |
| 300 m DS | 272141 | 4923126 | FL | 3.7 | 0.70 | 0.61 | 0.46 | 4.0 | 0.79 | 0.69 | 0.63 | M | M | 0.37 | 0.74 | 100 | 100 | Si (100) | Si (100) | 0 | 0 | no | 100 | 100 | GF (100) | GF (100) | OHV (60)<br>WD (1) | WD (2)<br>EM (70) | EM (90)<br>SM (10) | Sa (60)<br>Org (40) | 18.42 | 8.35 | 610.30 | 8.92 | 3.55 |

Note: All coordinates are provided as Universal Transverse Mercator's (UTM) in NAD 83 Zone 17T.

- = no data; LDB = left downstream bank; RDB = right downstream bank; RMID = right middle; MID = middle; LMID = left middle; L = low; M = moderate; H = high; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; US = upstream; DS = downstream; FL = flat; Sa = Sand; Si = Silt; Co = Cobble; Bo = Boulder; Gr = Gravel; Org = organics; OHV = Overhanging vegetation; UCB = undercut banks; OWD = Overhead woody debris; WD = woody debris; EM = emergent; SM = submergent; FL = floating.

**Table D-2: Fish Species of Plato Creek**

| Common Name | Latin Name | S Rank[(a)] | G Rank[(b)] | Ecological Orgin [(c)] | Tolerance to Environmental Disturbances[(c)] | Identified in Background Records | Observed During Field Survey, July 2021 |
|---|---|---|---|---|---|---|---|
| Banded Killifish | *Fundulus diaphanus* | S5 | G5 | Native | Tolerant | X | |
| Blacknose Dace | *Rhinichthys atratulus* | S5 | G5 | Native | Intermediate | X | |
| Blacknose Shiner | *Notropis heterolepis* | S5 | G5 | Native | Intolerant | X | |
| Bluntnose Minnow | *Pimephales notatus* | S5 | G5 | Native | Intermediate | X | |
| Brassy Minnow | *Hybognathus hankinsoni* | S5 | G5 | Native | Intermediate | X | |
| Brook Stickleback | *Culaea inconstans* | S5 | G5 | Native | Intermediate | X | |
| Brook Trout | *Salvelinus fontinalis* | S5 | G5T5 | Native/Introduced | Intolerant | | X |
| Central Mudminnow | *Umbra limi* | S5 | G5 | Native | Tolerant | X | |
| Common Carp | *Cyprinus carpio* | SNA | G5 | Invasive | Tolerant | X | |
| Common Shiner | *Luxilus cornutus* | S5 | G5 | Native | Intermediate | X | |
| Creek Chub | *Semotilus atromaculatus* | S5 | G5 | Native | Intermediate | X | X |
| Fallfish | *Semotilus corporalis* | S4 | G5 | Native | Intermediate | X | |
| Finescale Dace | *Chrosomus neogaeus* | S5 | G5 | Native | Intermediate | X | |
| Golden Shiner | *Notemigonus crysoleucas* | S5 | G5 | Native | Intermediate | X | |
| Johnny Darter | *Etheostoma nigrum* | S5 | G5 | Native | Tolerant | X | |
| Muskellunge | *Esox masquinongy* | S4 | G5 | Native | Intermediate | X | |
| Northern Pearl Dace | *Margariscus nachtriebi* | S5 | G5 | Native | Intermediate | X | |
| Northern Redbelly Dace | *Chrosomus eos* | S5 | G5 | Native | Intermediate | X | |
| Rainbow Trout | *Oncorhynchus mykiss* | SNA | G5 | Introduced/Invasive | Intolerant | X | |
| Rock Bass | *Ambloplites rupestris* | S5 | G5 | Native | Intermediate | X | |
| Tessellated Darter | *Etheostoma olmstedi* | S4 | G5 | Native | Intermediate | X | |
| White Sucker | *Catostomus commersonii* | S5 | G5 | Native | Tolerant | X | |
| Yellow Perch | *Perca flavescens* | S5 | G5 | Native | Intermediate | X | |

(a) 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 November 2019.

(b) Global Ranks (GRANK) are Rarity Ranks assigned to a species based on their range-wide status. GRANKS are assigned by a group of consensus of Conservation Data Centres (CDCs), scientific experts and the Nature Conservancy. These ranks are not legal designations. G1 (Extreemly Rare), G2 (Very Rare), G3 (Rare to uncommon), G4 (Common), G5 (Very Common), GH (Historic, no record in last 20yrs), GU (Status uncertain), GX (Globally extinct), ? (Inexact number rank), G? (Unranked), Q (Questionable), T (rank applies to subspecies or variety). Last assessed August 2011

(c) Eakins, R. J. 2020. Ontario Freshwater Fishes Life History Database. Version 4.86. Online database. Available at: http://www.ontariofishes.ca Accessed July 2021

Notes: X = current records from background data

Sources:

MNRF. 2020. Fish ON-Line Availabel at: https://www.gisapplication.lrc.gov.on.ca/FishONLine/Index.html?site=FishONLine&viewer=FishONLine&locale=en-US. Accessed: Accessed June 2021

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EDD Maps. 2021.

**APPENDIX E**

# Plato Creek Photo Log

Photo 1: Looking upstream at flat habitat at discharge location

Photo 2: Looking downstream at flat habitat at discharge location

Photo 3: Looking at left downstream bank at discharge location

Photo 4: Looking at right downstream bank at discharge location

Photo 5: Beaver dam 30 m upstream from discharge location, not a fish barrier

Photo 6: Looking upstream at flat habitat 100 m upstream of discharge location

Photo 7: Looking downstream at flat habitat 100 m upstream of discharge location

Photo 8: Looking at left downstream bank at 100 m upstream of discharge location

Photo 9: Looking at right downstream bank at 100 m upstream of discharge location

Photo 10: Substrate at flat habitat 100 m upstream of discharge location

Photo 11: Unknown mussel species observed during field assessment

Photo 12: Unknown mussel species observed during field assessment

Photo 13: Unknown mussel species observed during field assessment

Photo 14: Watercress 10 m downstream of discharge location

Photo 15: Looking upstream 50 m downstream from discharge location

Photo 16: Looking downstream 50 m downstream from discharge location

Photo 17: Looking upstream at flat habitat 100 m downstream of discharge location

Photo 18: Looking downstream at flat habitat 100 m downstream of discharge

Photo 19: Looking at left downstream bank 100 m downstream of discharge location

Photo 20: Looking at right downstream bank 100 m downstream of discharge

Photo 21: Substrate at flat habitat 100 m downstream of discharge location

Photo 22: Beaver dam 125 m downstream of discharge location, breached, not a

Photo 23: Looking upstream at flat habitat 200 m downstream of discharge location

Photo 24: Looking downstream at flat habitat 200 m downstream of discharge

Photo 25: Looking at left downstream bank 200 m downstream of discharge location

Photo 26: Looking at right downstream bank 200 m downstream of discharge location

Photo 27: Looking upstream at flat habitat 300 m downstream of discharge location

Photo 28: Looking downstream at flat habitat 300 m downstream of discharge location

Photo 29: Looking at left downstream bank 300 m downstream of discharge location

Photo 30: Looking at right downstream bank 300 m downstream of discharge location

Photo 31: Looking at discharge structure

Photo 32: Looking downstream from discharge structure

**APPENDIX F**

# Species at Risk Screening

| Taxon | Common Name | Scientific Name | Endangered Species Act[1] | Species at Risk Act (Sch 1)[2] | COSEWIC[3] | Provincial (SRank)[4] | Habitat Requirements[5] | Potential to Occur on Site and Rationale | Potential to Occur in the Plant Study Area and Rationale | Potential to Occur in the Discharge Study Area and Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| Amphibian | Western chorus frog - Great Lakes St. Lawrence / Canadian Shield population | *Pseudacris triseriata* | — | 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). | Moderate<br>The two lagoons on site may provide suitable breeding habitat. | Moderate<br>There are several wooded wetlands in the north, southwest, and east portion of the study area that may provide suitable foraging and hibernation habitat. As well, the ponds in the southeast and west portion of the study area may provide suitable breeding habitat. | Moderate<br>The wetland surrounding Plato Creek may provide breeding and foraging habitat and the wooded areas in the study area may provide hibernation habitat. |
| Arthropod | Gypsy cukoo bumble bee | *Bombus bohemicus* | END | END | END | S1S2 | In Ontario, gypsy cuckoo bumble bee is a habitat generalist and is found in several different types of habitats, including open meadows, agricultural fields, urban areas, boreal forest and other woodlands. Gypsy cuckoo bumble bee is a parasitic bee and uses the underground nests of the subgenus *Bombus senso stricto*. This bee is a generalist forager but is often associated with flowering plants close to wooded areas and blueberry fields. Currently this species is only known to occur in Pinery Provincial Park (COSEWIC 2014a). | Low<br>The open grasses around the two wastewater ponds and around the building in the west corner of the site may provide suitable foraging habitat. However, gypsy cuckoo bumble bees are only known to occur in Pinery Provincial Park. | Low<br>The wooded wetlands, open grasslands and agricultural fields in the study area may provide suitable foraging habitat. However, gypsy cuckoo bumble bees are only known to occur in Pinery Provincial Park. | Low |
| Arthropod | Monarch | *Danaus plexippus* | 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 is milkweed (*Asclepias* 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<br>The roadsides in the northwest portion of the site and the open grasses around the two ponds may provide suitable habitat for foraging or host plant. In 2018, two monarchs were observed along the roadside that heads north on site (iNaturalist 2021). | High<br>The open meadows in the east portion, the farmland in the west portion, and the roadsides in the study area may provide suitable habitat for foraging or host plant. Three caterpillars were observed on site during 2021 field work. | Moderate |
| Arthropod | Nine-spotted lady beetle | *Coccinella novemnotata* | END | — | END | SH | In Ontario, nine-spotted lady beetle is a habitat generalist that may occur in both natural and anthropogenic landscapes, including agricultural fields, suburban gardens and parks, forests, prairie, meadow, riparian areas and isolated natural areas. Distribution of this species is driven primarily by prey abundance rather than habitat type. Adults overwinter together in well-ventilated microhabitats, including under stones, rock crevices, in grass tussocks and leaf litter, or in tree bark (COSEWIC 2016a). Species may be extirpated from province. | Low<br>The open grasses around the two wastewater ponds and around the building in the west corner of the site may provide suitable foraging habitat. However, this species has not been observed in Ontario since the mid-1990s and may be extirpated. | Low<br>The open meadows in the east portion and the farmland in the west portion of the study area may provide suitable habitat. However, this species has not been observed in Ontario since the mid-1990s and may be extirpated. | Low |
| Arthropod | Transverse lady beetle | *Coccinella transversoguttata* | END | — | SC | SH | This species only occurs in Canada in southwestern Ontario, and only at Point Pelee and Pelee Island can it be expected regularly. The most northerly record in Ontario is from Goderich in Huron County (NYNHP 2016). | Low<br>The open grasses around the building in the west corner of the site and the riparian area around the two ponds may provide suitable foraging habitat. However, this species has not been observed in Ontario since 1990 despite targeted search efforts. | Low<br>The forested areas and wooded wetlands, open grasslands, and agricultural fields in the study area may provide suitable foraging habitat. However, this species has not been observed in Ontario since 1990 despite targeted search efforts. | Low |

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| Arthropod | Yellow-banded bumble bee | *Bombus terricola* | SC | SC | SC | S2 | Yellow-banded bumblebee is a forage and habitat generalist, occupying open woodlands, meadows, grasslands, farmlands and urban parks, and taking nectar from various flowering plants (COSEWIC 2015). It is an early emerging species, making it likely an important pollinator of early blooming wild flowering plants (e.g. wild blueberry) and agricultural crops (e.g., apple). Nest sites are often in abandoned rodent burrows in old fields and queens overwinter by burrowing into loose soil or rotting trees (COSEWIC 2015). | Moderate<br>The open grasses around the two wastewater ponds and around the building in the west corner of the site may provide suitable foraging habitat. | Moderate<br>The open grasslands and farmlands in the east and west portion of the study area may provide suitable foraging and nesting habitat. The forested areas and wooded wetlands may have rotting trees that provide suitable overwintering habitat. | Low |
| Bird | Bank swallow | *Riparia riparia* | THR | THR | THR | S4B | In Ontario, bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and riverbanks, 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). | Moderate<br>Open grasses surrounding the ponds and the building in the west corner of the site may provide suitable foraging habitat. The banks along the two ponds on site would not provide suitable nesting habitat. From 2012 to 2020 there have been 113 sightings of bank swallows at the two ponds on site (eBird 2021). | Moderate<br>The wooded wetlands, grasslands and agricultural fields in the study area may provide suitable foraging habitat. The banks along the ponds in the east and west portion of the study area would not provide suitable nesting habitat. | Low |
| Bird | Barn swallow | *Hirundo rustica* | THR | 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 2019). | Moderate<br>The riparian areas of the two ponds may provide suitable foraging habitat. The building and man-made structures in the west corner of site would not provide suitable nesting habitat. There have been a total of 171 sightings of barn swallow on site at the two ponds from 2012 to 2020 (eBird 2021). | Moderate<br>The buildings in the southeast and northeast portion of the study area may provide suitable nesting habitat. As well, there may be suitable foraging habitat in the grassy fields, agricultural fields, and wooded wetlands in the study area. | Low |
| Bird | Black tern | *Chlidonias niger* | 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). | Low<br>The two ponds on site would likely not provide suitable habitat as they are surrounded by wooded areas and agricultural fields in the study area. | Low<br>The wooded wetlands in the study area would not provide suitable habitat for black tern has the wetlands are surrounded by forests and agricultural fields. | Low |
| Bird | Bobolink | *Dolichonyx oryzivorus* | 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 | Moderate<br>The riparian grasses surrounding the two ponds may have suitable grass and forb component that would provide suitable nesting habitat. There have been 13 sightings of bobolinks at the two ponds on site from 2013 to 2020 (eBird 2021). | High<br>The grasslands and agricultural fields in the east and west portion of the study area may have suitable forb and grass components that would provide suitable nesting and foraging habitat. This species was observed during 2021 field work. | Low |

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| | | | | | | | vegetation, usually under the cover of one or more forbs (Renfrew et al. 2015). | | | |
| Bird | Canada warbler | *Cardellina canadensis* | 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<br>The two ponds and the riparian grasses surrounding them may provide suitable nesting and foraging habitat. | Low<br>The wooded wetlands in the north, southwest, and east portion of the study area may provide suitable nesting and foraging habitat. | Low |
| Bird | Chimney swift | | | | | | | Low | Low | Low |
| Bird | Common nighthawk | *Chordeiles minor* | SC | THR | 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<br>The openness of the site, specifically the two ponds, the riparian areas around the ponds, and the building in the west corner of site may provide suitable foraging habitat. In 2014, there was 21 sightings of common nighthawks at the two ponds on site (eBird 2021). | Moderate<br>The open grasslands and agricultural fields in the east and west side of the study area may provide suitable habitat. | Low |
| Bird | Eastern meadowlark | *Sturnella magna* | 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 2019). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970). | Moderate<br>The open grasses around the two ponds and building on site may have suitable proportions of grasses and forbs that would provide nesting and foraging habitat. There have been 19 sightings of eastern meadowlark at the two ponds and along the roadway that heads north on site from 2012 to 2021 (eBird 2021). | High<br>The grasslands and agricultural fields in the east and west portion of the study area may have suitable forb and grass components that would provide suitable nesting and foraging habitat. This species was observed during 2021 field work. | Low |
| Bird | Eastern whip-poor-will | *Antrostomus vociferus* | 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). | Moderate<br>The open areas on site that are adjacent to forest may provide suitable foraging habitat for this species. | Moderate<br>The drier forested areas in the plant study area may have a degree of openness and structure that may provide suitable breeding habitat. | Low |
| Bird | Eastern wood-pewee | *Contopus virens* | 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 (COSEWIC 2012a). | Moderate<br>The wooded area along the west and south edge of the site has a degree of openness that may provide suitable nesting habitat. The ponds and the riparian areas around them may provide suitable foraging habitat. From 2013 to 2020 there has been 52 sightings of eastern wood-pewee on site at the two ponds (eBird 2021). | High<br>The wooded wetlands and forested areas in the north and south portion of the study area may have a degree of openness that would provide suitable foraging and nesting habitat. This species was observed during 2021 field work. | Moderate |

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| Bird | Golden-winged warbler | *Vermivora chrysoptera* | 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<br>There may be suitable shrubs or leafy plants around the perimeter of site and the two ponds that may provide suitable nesting site, as these areas have anthropogenic disturbance and are surrounded by forests in the study area | Low<br>There may be suitable nesting habitat in shrubs or leafy plants in the field along the forested edges of the east and west side of the study area. | Low |
| Bird | Grasshopper sparrow *pratensis* subspecies | *Ammodramus savannarum* (pratensis subspecies) | 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). | Low<br>The grass portions on site are likely not large enough to provide suitable habitat, and more suitable habitat exists in the study area and surrounding area. | Low<br>The large open grasslands and agricultural fields in the east and west side of the study area may provide suitable foraging and nesting habitat. | Low |
| Bird | Least bittern | | | | | | | Low | Low | Low |
| Bird | Wood thrush | *Hylocichla mustelina* | SC | THR | 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 2012b). | Low<br>The two ponds and the riparian areas may provide suitable foraging habitat as they are surrounded by mixed forests in the study area. In 2020, there was two sightings of wood thrush at the two ponds on site (eBird 2021). | Low<br>The forested areas and wooded wetlands in the study area have a degree of openness and may have suitable canopy cover, shrub density, and deciduous tree species that would provide suitable nesting habitat. | Low |
| Mammal | Eastern small-footed myotis | *Myotis leibii* | END | — | — | S2S3 | In Ontario, eastern small-footed myotis is not known to roost in 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, but it occasionally inhabits buildings. Entrances of caves or abandoned mines where humidity is low, and temperatures are cool and sometimes subfreezing may be used as hibernacula (Humphrey 2017). | Low<br>There are no rock piles or rock crevices on site that would provide suitable roosting habitat. There are also no caves or abandoned mines on site to provide hibernacula habitat. | Moderate<br>There may be rock piles or rock crevices in the forested areas and wooded wetlands on site that may provide suitable roosting habitat. | Low |
| Mammal | Little brown myotis | *Myotis lucifugus* | 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. Roosting colonies 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 as hibernacula, but high humidity and stable above freezing temperatures are required (ECCC 2018a). | Low<br>The building and man-made structures in the west corner of site would not provide suitable roosting habitat, as there were no noticeable access/egress points. | Moderate<br>The buildings in the north and east portion of the study area, and the wooded wetlands and forested areas may have large dead trees that would provide roosting habitat. The buildings may have attics that provide suitable nursery habitat, as they are in close proximity to Plato Creek and various ponds. | Moderate |
| Mammal | Northern myotis | *Myotis septentrionalis* | 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 as hibernacula, but high humidity and | Low<br>The few trees on site are likely not large enough to provide suitable roosting habitat. There are also no caves or abandoned mines on site to provide hibernacula habitat. | Moderate<br>The forested areas and wooded wetlands may have large mature trees or dead trees with loose bark that may provide suitable roosting habitat. | Moderate |

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| | | | | | | | stable above freezing temperatures are required (ECCC 2018). | | | |
| Mammal | Tri-colored bat | *Perimyotis subflavus* | 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 (ECCC 2018). | Low<br>The few trees on site likely do not provide suitable roosting habitat and there are no caves or mines to provide hibernation habitat. | Moderate<br>The forested areas and wooded wetlands are in close proximity to Plato Creek and may have hanging moss or squirrel nests that could provide suitable roosting habitat. | Moderate |
| Reptile | Blanding's turtle - Great Lakes / St.Lawrence population | *Emydoidea blandingii* | 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 2016b). | Moderate<br>The two ponds on site are surrounded by mixed forests and wooded wetlands and may provide suitable nesting and hibernation habitat. | Moderate<br>The ponds in the north, east and west portion of the study area and the wooded wetlands may provide suitable nesting, foraging, and hibernation habitat. | Low |
| Reptile | Eastern hog-nosed snake | *Heterodon platirhinos* | THR | THR | THR | S3 | In Ontario, eastern hog-nosed snake can be classified as a habitat generalist as it uses a variety of habitats across its range. This snake typically uses habitat with open vegetation cover, including open woodlands, wetlands, fields, forest edges, beaches and dunes, and disturbed sites, most often near water. In the Georgian Bay area, disturbed fields, rock barrens and forests appear to be preferred habitats. This species relies on sandy well drained soils. Hibernation occurs in sandy soils below the frost line. This species has been observed excavating hibernation sites in mixed intolerant upland forests. Nesting and oviposition have been noted in upland sandy areas and rock outcrops under large flat rocks. The majority of their diet is comprised of American toad and Fowler's toad (Kraus 2011). | Moderate<br>The two ponds, the open grass riparian area, and the south forested edges of the site may provide suitable foraging habitat. | Moderate<br>The wooded wetland and the numerous ponds in the study area may provide suitable foraging habitat. | Low |
| Reptile | Eastern ribbonsnake - Great Lakes population | *Thamnophis sauritius* | SC | SC | SC | S4 | 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 2012c). | Moderate<br>The two ponds on site may provide suitable habitat for eastern ribbonsnake. | Moderate<br>The wooded wetlands and the ponds in the study area may provide suitable breeding habitat. The wooded wetlands may have mammal burrows that could provide hibernation habitat. | Moderate |
| Reptile | Midland painted turtle | *Chrysemys picta marginata* | — | 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). | Moderate<br>The two ponds on site may provide suitable breeding and hibernation habitat. | Moderate<br>The ponds in the north, east and west portion of the study area may provide suitable breeding and hibernation habitat. | Moderate |

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| Reptile | Milksnake | *Lampropeltis triangulum* | NAR | 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 2014b). | Moderate<br>The two ponds on site and the grasses in the riparian area may provide suitable habitat. As well, the building in the west corner of the site may have old foundations that may provide suitable hibernation. | Moderate<br>The wooded wetlands, the ponds, the grasslands and agricultural fields in the study area may provide suitable habitat. There may be hibernation habitat in the buildings that are in the east and north portion of the study area, or in hollow logs or banks in the wetland and ponds. | Moderate |
| Reptile | Northern map turtle | *Graptemys geographica* | SC | SC | SC | S3 | In Ontario, 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 2012d). | Low<br>There are no large waterbodies or rivers on site that would provide suitable habitat. | Low<br>There are no large waterbodies or rivers in the study area that would provide suitable habitat. | Low |
| Reptile | Snapping turtle | *Chelydra serpentina* | SC | SC | SC | S4 | 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). | Moderate<br>The two ponds on site may provide suitable habitat, as well the roadways in the north and west portion of site may provide suitable nesting habitat. | Moderate<br>The ponds in the north, west and east side of the study area, and the wooded wetlands may provide suitable nesting and foraging habitat. The roadways along the east side of the study area are near a large pond and may provide suitable nesting habitat. | Moderate |
| Reptile | Spotted turtle | *Clemmys guttata* | 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 2014c). | Moderate<br>The two ponds on site contain plenty of aquatic vegetation and may provide suitable aquatic habitat for this species. | Moderate<br>The wooded wetland and the numerous ponds in the study area may provide suitable foraging and nesting habitat. | Low |
| Reptile | Stinkpot<br>or<br>Eastern musk turtle | *Sternotherus odoratus* | SC | THR | SC | S3 | In Ontario, eastern musk turtle is very rarely out of water and prefers permanent bodies of water that are shallow and clear, with little or no current and soft substrates with abundant organic materials. Abundant floating and submerged vegetation is preferred. Hibernation occurs in soft substrates under water. Eggs are sometimes laid on open ground, or in shallow nests in decaying vegetation, shallow gravel or rock crevices (COSEWIC 2012e). | Moderate<br>The two ponds on site are permanent and have no current, if suitable vegetation is present, they may provide foraging, nesting and hibernation habitat. | Moderate<br>The pond on the east side and the pond on the west side of the study area may be permanent and have no current. If abundant vegetation is present, they may provide suitable foraging, nesting, and hibernation habitat. | Low |
| Vascular Plant | American ginseng | *Panax quinquefolius* | 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 well-drained soils of glacier origin that have a neutral pH (ECCC 2018b). | Low<br>There are no mature deciduous woods on the site. | Moderate<br>The mixed forests in the study area may have suitable soils and mature deciduous tree species (i.e., sugar maple, white ash, and American basswood). | Low |

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| Vascular Plant | Butternut | *Juglans cinerea* | END | END | END | S2? | 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<br>There are no deciduous or mixed forests on site. | Moderate<br>The mixed forest edges in the study area may have suitable soils and openness for butternut. | Low |

[1] *Endangered Species Act* (ESA), 2007. General (O.Reg 242/08 last amended 29 June 2020 as O.Reg 328/20). Species at Risk in Ontario List (O.Reg 230/08 last amended 1 Aug 2018 as O. Reg 404/18, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

[2] *Species at Risk Act* (SARA), 2002. Schedule 1 (Last amended 23 April 2021); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)

[3] Committee on the Status of Endangered Wildlife in Canada (COSEWIC) http://www.cosewic.gc.ca/

[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 November 2019.

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