
Appendix G

NATURAL SCIENCE REPORT

New Dundee Water Supply System Iron and Manganese Upgrades

for:

R.V. Anderson Associates Limited

by:

**LGL Limited
environmental research associates**


**September 2021
LGL File TA8978**



New Dundee Water Supply System Iron and Manganese Upgrades


Natural Sciences Report


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September 2021
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Table of Contents

1.0	Introduction.....	1
1.1	PROJECT SUMMARY	1
2.0	Background Information Records Review	3
3.0	Natural Heritage Existing Conditions	4
3.1	PHYSIOGRAPHY, SOILS, HYDROGEOLOGY	4
3.2	DESIGNATED NATURAL AREAS	4
3.2.1	<i>Lower Alder Creek Wetland Complex</i>	4
3.3	VEGETATION AND VEGETATION COMMUNITIES	4
3.3.1	<i>Vegetation Communities</i>	5
3.3.1.1	Flora	5
3.3.2	<i>Species at Risk</i>	5
3.3.3	<i>Tree Inventory</i>	5
3.4	WILDLIFE AND WILDLIFE HABITAT	8
3.4.1	<i>Background Information</i>	8
3.4.2	<i>Wildlife Surveys</i>	8
3.4.2.1	Breeding Bird Surveys.....	8
3.4.2.2	SAR Observations.....	10
3.4.3	<i>Wildlife Habitat</i>	10
3.4.4	<i>Species at Risk</i>	11
3.5	AQUATIC HABITAT AND COMMUNITIES	12
3.5.1	<i>Background Information</i>	12
3.5.2	<i>Species at Risk</i>	12
4.0	Species at Risk Summary	14
5.0	Recommendations for Selection of Preferred Alternatives	21
6.0	Impact Assessment.....	22
6.1	MITIGATION RECOMMENDATIONS.....	22
7.0	Summary	24
8.0	References	25

List of Tables

Table 1. Results of Breeding Bird Surveys conducted in the Study Area during 2021.	9
Table 2 Fish Resources in the Study Area.	13
Table 3 Species at Risk Screening for the Project.	15

List of Figures

Figure 1 Background Existing Conditions.	2
Figure 2 Vegetation Communities.	6
Figure 3 ELC of Alternatives	7
Figure 4 Impact Assessment.	20

List of Appendices

- Appendix A. Flora**
- Appendix B. Tree Resources.**
- Appendix C. Wildlife List**

1.0 Introduction

LGL Limited (LGL) has been retained by R.V. Anderson Associates Ltd (RVA) to provide natural sciences support for the Municipal Class Environmental Assessment (EA) of the New Dundee Water Supply System (WSS) Iron and Manganese Upgrades in the Township of Wilmot Ontario. The project is proceeding as a Schedule C Municipal EA.

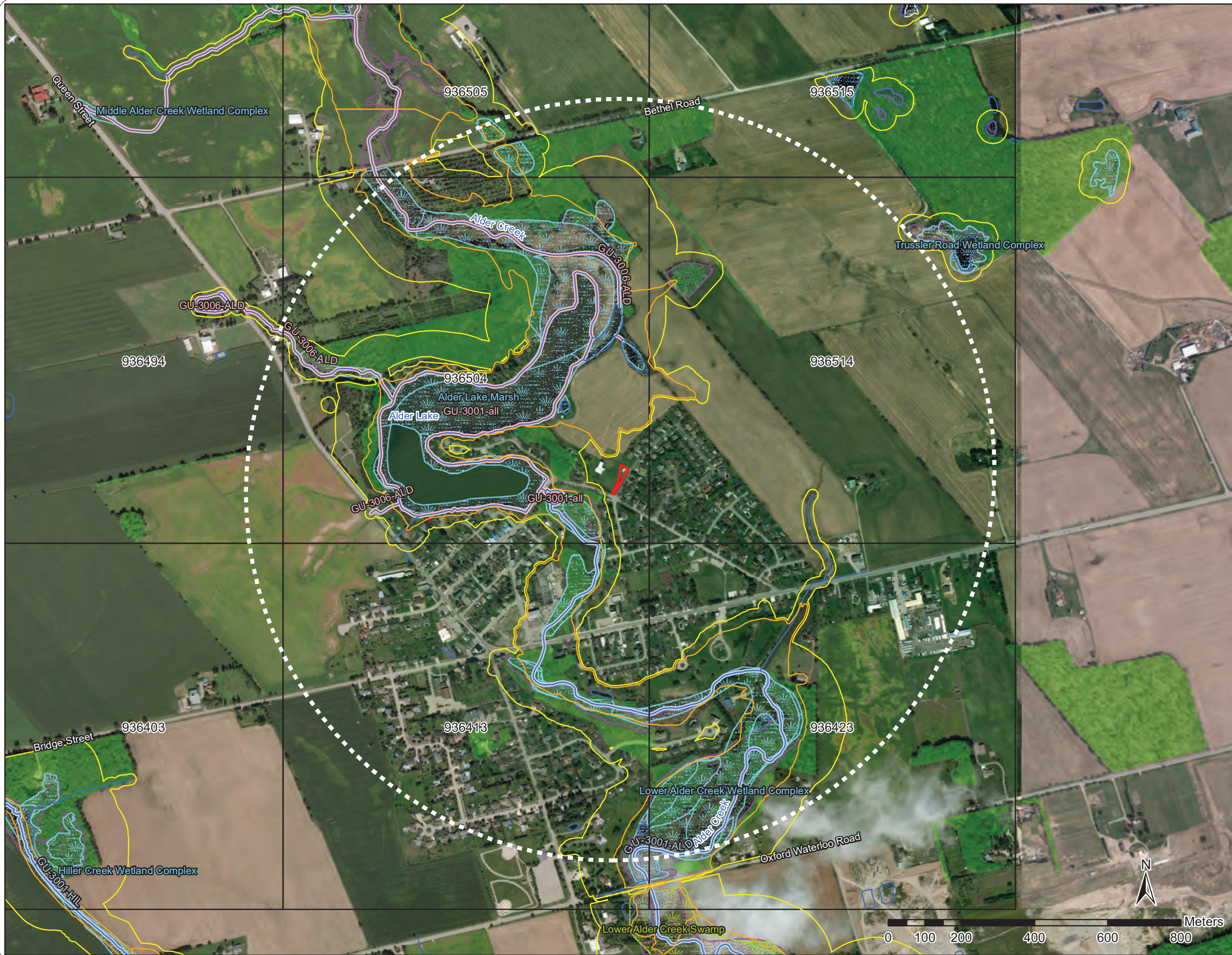
The study area is located at 156 Alderview Drive in New Dundee, Ontario. The main natural heritage features in the study area are Alder Lake, Alder Creek, Alder Lake Marsh, and the Alder Creek Wetland Complex. These features are in the greater study area, and are not found in the short list of alternatives (See Figure 1).

LGL's Natural Sciences Report (NSR) provides a summary of the environmental sensitivities present within the study area and provides direction on protecting these features. The NSR is for use by the Project Team and to aid in the selection of the preferred alternatives and to support the permit approval process. A short list of alternatives was evaluated for this version of the report.

Where the need for an Environmental Management Plan (EMP) is identified by the project team, LGL's technical input as provided in this NSR will be incorporated by RVA into the overall project EMP. LGL's NSR describes existing conditions for natural heritage as determined through background screening and includes primary data collected through field surveys. Once further details of design are available to LGL, new facility locations, the locations and limits of staging/laydown areas, erosion and sediment controls, etc. will be reviewed to identify potential impacts, and appropriate mitigation and management measures to protect natural heritage features such as aquatic habitat, vegetation, wetlands, and Species at Risk.

1.1 Project Summary

Upgrades to the New Dundee WSS are necessitated by potential changes to the aesthetic Ontario Drinking Water Standards for manganese. A location, footprint, and treatment process will be confirmed through the Class EA process. Options may include a new treatment facility filter on the existing property, adjacent to the existing property, or further east on Alderview Drive. Objectives of the Class EA are to determine to preferred treatment approach, preferred location for the treatment facility, and determine a conceptual layout and design.



- ### Legend
-  Subject Property
 -  1km Buffer around Property
 -  Provincially Tracked Species 1x1 km Square (LIO)
 -  Regulation Limit (GRCA)
 -  Regulatory Floodplain (GRCA)
 -  Provincially Significant Wetland (LIO)
 -  Other Wetland (LIO)
 -  Wetland (GRCA)
 -  Watercourse (LIO)
 -  Waterbody (LIO)
 -  Wooded Area (LIO)
- Aquatic Resource Area Summary (LIO)
Thermal Regime
-  Cold
 -  Warm

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Background Existing Conditions



Project	TA8978	Figure	1
Date	April 2020	Prepared By:	KC
Scale	1:10,000	Verified By:	DCO

2.0 Background Information Records Review

To characterize the study area, LGL has gathered information from available background sources. Information where available was requested or collected from:

- Region of Waterloo;
- Grand River Conservation Authority (GRCA);
- Land Information Ontario (LIO) database;
- Ministry of the Environment, Conservation, and Parks (MECP);
- Natural Heritage Information Centre (NHIC);
- Ministry of Natural Resources and Forestry (MNRF);
- Ontario Breeding Bird Atlas (OBBA); and,
- iNaturalist.

This background review was used to identify the known constraints present within the study area. From there, field surveys will be completed to verify the limits and extent of features identified through background review.

3.0 Natural Heritage Existing Conditions

3.1 Physiography, Soils, Hydrogeology

The study area is located in the south end of Waterloo County. The area was subject to many glacier advancements and retreats from various locations during the Pleistocene ice age (Presant and Wicklund, 1971). As a result of these ice lobes, the formation of massive moraine deposits developed as well as many unsorted or poorly sorted mixtures of clay, silt, sand, gravel and boulder glacial till. Waterloo moraine bisects a large portion of the county and found within the study area. The moraine contains sandy and silty deposits with occasional layers of clay and gravel. The soils within the study area are from the Grand-Kirkland, Burford-Fox, Bennington-Bookington, and Brant-Waterloo series and are developed on range of gravel loam to loamy sand over clay (Presant and Wicklund, 1971).

3.2 Designated Natural Areas

Natural areas designated as Regional Core Environmental Features are found within the study area (Map 4 of Regional Official Plan 2015). The Natural area associated with Alder Lake and Alder Marsh are part Core Environmental Features.

Alder Lake and Alder Lake Marsh

Alder Lake is an artificial reservoir created by the New Dundee Dam. Associated with the lake is the Alder Lake Marsh, which contains wetland habitat. The marsh is not designated locally or provincially, though it is regulated by the GRCA. Regulation limits are shown in yellow on Figure 1.

3.2.1 Lower Alder Creek Wetland Complex

The Lower Alder Creek Wetland Complex is associated with Alder Creek, south of the lake, and north of Oxford Waterloo Road. This wetland is comprised of swamp and marsh habitat. This wetland complex is not designated locally or provincially, though it is regulated by the GRCA. Regulation limits are shown in yellow on Figure 1.

3.3 Vegetation and Vegetation Communities

The composition, structure and function of vegetation communities within the greater study area were identified through air photo interpretation (see Figure 2). Air photos were interpreted to determine the limits and characteristics of the vegetation communities in the greater study area. A site specific survey was conducted on June 23, 2021 to complete an Ecological Land Classification of the proposed alternatives (See Figure 3).

3.3.1 Vegetation Communities

The existing property is surrounded by residential and agricultural properties. Natural vegetation communities within the study area is limited. The proposed sites are generally maintained either through moving, grazing or active agriculture. Hedgerows and ornamental trees are the dominant features (Figure 3).

3.3.1.1 Flora

A total of 52 vascular plant species have been recorded within the study area. Forty four percent (or 23) of the total flora species are identified as native to Ontario while the 29 are considered introduced and non-native to Ontario. The vascular plant list of species identified during the field investigation is presented in Appendix A.

There were no species regulated under the Ontario Endangered Species Act, 2007 documented during site investigations of the proposed alternatives.

Four plant species considered significant within the Region of Waterloo were observed within the study area (Figure 3). They are considered common and secure in Ontario.

3.3.2 Species at Risk




No plant species that are regulated under the Ontario Endangered Species Act (ESA) or the Canada Species at Risk Act (SARA) as Endangered or Threatened were found in the background screening within the project area through the MNR Natural Heritage Information Centre. Records for Butternut (*Juglans cinerea*) are known in the Region. Butternut are endangered in Ontario. No Butternut were observed during the field study.

3.3.3 Tree Inventory

A tree inventory was conducted on June 23, 2021, by LGL ISA Certified Arborist according industry standards within the various proposed for the water supply system. A total of 45 trees were surveyed consisting of 19 species (Appendix B and Figure 3). Surveyed trees ranged in size between 10 and 75 cm diameter at breast height. Many of the trees are ornamental tree planted along fences or within residential yards.



LEGEND

-  Subject Property
-  1km Buffer around Property
-  ELC Communities Boundary
- FOC** Coniferous Forest
- FOD** Deciduous Forest
- FOM** Mixed Forest
- MAM** Meadow Marsh
- MAM2** Mineral Meadow Marsh
- MAM2-2** Reed-canary Grass Mineral Meadow Marsh
- SWD** Deciduous Swamp
- SWM** Mixed Swamp
- SWT** Thicket Swamp
- OAO** Open Aquatic
- CUM** Cultural Meadow
- CUM1-1** Dry-Moist Old Field Meadow
- CUP** Plantation
- CUP3** Coniferous Plantation
- AG** Agricultural
- H** Hedgerow
- M** Manicured

Data Source: LGL Limited field investigations.
 Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




Vegetation Communities






Project	TA8978	Figure	2
Date	September 2021	Prepared By:	KC
Scale	1:10,000	Verified By:	DCO



LEGEND

-  Potential Barn Swallow Nest(s)
-  Tree ID
-  ELC Communities Boundary
- FOC** Coniferous Forest
- FOD** Deciduous Forest
- SWD** Deciduous Swamp
- CUM1-1** Dry-Moist Old Field Meadow
- AG** Agricultural
- H** Hedgerow
- M** Manicured

**Regional Municipality of Waterloo
Significant Species**

-  Black Walnut
-  Moonseed
-  Red Cedar
-  Virginia Creeper

Data Source: LGL Limited field investigations.

Vegetation Communities



Project	TA8978	Figure	3
Date	September 2021	Prepared By:	KC
Scale	1:1,200	Verified By:	DCO

3.4 Wildlife and Wildlife Habitat

3.4.1 Background Information

Available background information from the Ontario Breeding Bird Atlas (OBBA 2020) and eBird was reviewed for the broader project area. A summary of the database searches is provided in Appendix C. Data from these sources provide data for an area 10km², therefore, while these species have some potential to be found in a larger area, there may not be available habitat for them on site within the properties associated with the proposed alternatives.

3.4.2 Wildlife Surveys

3.4.2.1 Breeding Bird Surveys

A Breeding Bird Survey was conducted to characterize the nature, extent and significance of breeding bird use of habitats within the study area and was conducted according to the Ontario Breeding Bird Atlas (OBBA) protocol (Cadman et al. 2007). Two 10-minute point counts were surveyed, one at the corner of Alderview Dr and Main St adjacent to the existing facility, and a second at the end of Alderview Dr where it ends at an agricultural field. Point counts were surveyed on May 27th and June 16th, 2021, beginning at dawn and ending within five hours of daybreak. Weather conditions on the morning of May 27th included clear skies with light wind (~ 5 km/hr) and a temperature of 4°C. Weather conditions on the morning of June 16th included clear skies with light wind (~ 5 km/hr) and a temperature of 7°C.

Following the OBBA protocol, point count surveys documented the bird species observed or heard within a 10 minute period. Evidence of breeding was categorized according to the OBBA survey methodology (Cadman et al. 2007). Territorial songs, along with direct observations of breeding bird behaviour and presence of bird nests and fledged young, were used to record breeding bird evidence (BBE) within the project limits. Incidental observations of any wildlife species encountered while in the study area were recorded, including birds heard outside of the 10-minute point count.

A total of 23 wildlife species were encountered in the study area including 21 bird species and 2 mammals species. Mammal species encountered during the surveys included Eastern Chipmunk (*Tamias striatus*) and Eastern Gray Squirrel (*Sciurus carolinensis*).

The breeding bird survey documented 21 bird species and found breeding bird evidence (BBE) for 18 of them (Table 1). Breeding evidence was confirmed for American Robin, an adult was seen carrying food on June 16th. Eight species were determined to be 'probable' breeders based on evidence such as a permanent breeding territory, a pair observed in their breeding season in suitable nesting habitat, or a breeding display (in this case a male Ruby-throated Hummingbird was observed in a breeding flight display

on June 16th). Nine species were determined to be ‘possible’ breeders, recorded through evidence such as observations of a male singing or an individual located in suitable breeding habitat.

Of the 21 bird species documented, 15 are regulated under the Migratory Bird Convention Act (MBCA), and one species: Blue Jay (*Cyanocitta cristata*) is protected under the FWCA (Table 1). The remaining five bird species are not under any legislative protection: American Crow (*Corvus brachyrhynchos*), Brown-headed Cowbird, Common Grackle (*Quiscalus quiscula*), European Starling (*Sturnus vulgaris*), and Red-winged Blackbird (*Agelaius phoeniceus*).

Most species recorded within the study area are generally considered tolerant of urban/anthropogenic influence and representative of urban habitats, with some species representative of forested habitats. Species that are generally found in forested habitats include Black-capped Chickadee (*Poecile atricapillus*), Eastern Wood-pewee (*Contopus virens*), Downy Woodpecker (*Picoides pubescens*), and Red-bellied Woodpecker (*Melanerpes carolinus*).

Table 1. Results of Breeding Bird Surveys conducted in the Study Area during 2021.

Common Name	Scientific Name	SARA/ ESA	Legal Status	BBE
American Crow	<i>Corvus brachyrhynchos</i>		-	Observed (X)
American Robin	<i>Turdus migratorius</i>		MBCA	Confirmed (CF)
Baltimore Oriole	<i>Icterus galbula</i>		MBCA	Possible (S)
Barn Swallow	<i>Hirundo rustica</i>	THR	MBCA	Possible (H)
Black-capped Chickadee	<i>Poecile atricapillus</i>		MBCA	Possible (S)
Blue Jay	<i>Cyanocitta cristata</i>		FWCA(P)	Possible (H)
Brown-headed Cowbird	<i>Molothrus ater</i>		-	Possible (S)
Canada Goose	<i>Branta canadensis</i>		MBCA	Observed (X)
Chipping Sparrow	<i>Spizella passerina</i>		MBCA	Possible (S)
Common Grackle	<i>Quiscalus quiscula</i>		-	Probable (T)
Downy Woodpecker	<i>Picoides pubescens</i>		MBCA	Probable (P)
Eastern Wood-Pewee	<i>Contopus virens</i>	SC	MBCA	Possible (S)
European Starling	<i>Sturnus vulgaris</i>		-	Probable (T)
House Wren	<i>Troglodytes aedon</i>		MBCA	Probable (T)
Mallard	<i>Anas platyrhynchos</i>		MBCA	Observed (X)
Mourning Dove	<i>Zenaida macroura</i>		MBCA	Probable (T)
Northern Cardinal	<i>Cardinalis cardinalis</i>		MBCA	Probable (T)
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>		MBCA	Possible (H)
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		-	Possible (S)
Ruby-throated Hummingbird	<i>Archilochus colubris</i>		MBCA	Probable (D)
Song Sparrow	<i>Melospiza melodia</i>		MBCA	Probable (T)

Legend:

Abbreviation Description

SARA/ESA

THR Threatened; a wildlife species likely to become endangered if limiting factors are not reversed

Abbreviation	Description
SC	Designated Special Concern under Ontario <i>Endangered Species Act</i> and Canada <i>Species at Risk Act</i>

Legal

Status:

- *Not protected*

MBCA *Migratory Bird Convention Act*

FWCA *Fish and Wildlife Conservation Act*

FWCA(P) *Fish and Wildlife Conservation Act Protected Species*

BBE: Breeding Bird Evidence

Observed:

X Species observed in its breeding season (no evidence of breeding).

Possible Breeding:

H Species observed in its breeding season in suitable nesting habitat.

S Singing male present in its breeding season in suitable nesting habitat.

Probable Breeding:

D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation

P Pair observed in their breeding season in suitable nesting habitat.

T Permanent territory presumed through registration of territorial song, or the occurrence of an adult bird at the same place, on at least two days, a week or more apart, during its breeding season.

Confirmed Breeding:

CF Adult carrying food for young.

3.4.2.2 SAR Observations

Two SAR were recorded within the study area during breeding bird surveys: Eastern Wood-pewee and Barn Swallow (*Hirundo rustica*). Eastern Wood-pewee is considered 'Special Concern' under the Ontario *Endangered Species Act* (ESA) and the Canada *Species at Risk Act* (SARA), this species was heard singing near BBS station 1 on May 27th, it was not detected on June 16th and was classified as a possible breeder in the study area. Barn Swallow is regulated as 'Threatened' under the Ontario ESA and is afforded habitat protection, and is also listed as 'Threatened' on Schedule 1 of the Canada SARA. Barn Swallows were observed flying in and out of the barn on the property located north of the existing facility(north of BBS1) on June 16th and were classified as possible breeders. It is likely the barn provides suitable nesting habitat for this species.

3.4.3 Wildlife Habitat

With the study area being located in a predominantly residential and agricultural setting, wildlife habitat in the immediate vicinity of the proposed alternative locations is somewhat limited. Wildlife habitat is limited to the Alder Creek corridor, including Alder Lake and associated woodlands and wetlands. These areas provide habitat for a variety of wildlife species including birds, mammals, amphibians, and reptiles. During BBS visits it was noted that the agricultural fields to the north and east of the existing

facility had been planted with corn. There was some grassland habitat on the property on the northern corner of Alderview Dr and Main St surrounding the barn where Barn Swallows were observed flying in and out, but this was a fairly small area and no grassland bird SAR (Eastern Meadowlark or Bobolink) were observed.

3.4.4 Species at Risk

Through background research, and knowledge of the study area there is potential for the following wildlife Species at Risk (SAR):

- Butternut (*Juglans cinerea*);
- Bald Eagle (*Haliaeetus leucocephalus*);
- Barn Swallow (*Hirundo rustica*), observed during BBS;
- Bobolink (*Dolichonyx oryzivorus*);
- Chimney Swift (*Chaetura pelagica*);
- Eastern Meadowlark (*Sturnella magna*);
- Eastern Wood-Pewee (*Contopus virens*), observed during BBS;
- Grasshopper Sparrow (*Ammodramus savannarum*);
- Horned Grebe (*Podiceps auritus*);
- Red-headed Woodpecker (*Melanerpes erythrocephalus*);
- Wood Thrush (*Hylocichla mustelina*);
- Blanding's Turtle (*Emydoidea blandingii*);
- Eastern Ribbonsnake (*Thamnophis sauritus sauritus*);
- Northern Map Turtle (*Graptemys geographica*);
- Snapping Turtle (*Chelydra serpentina*);
- Eastern Small-footed Bat (*Myotis leibii*);
- Little Brown Bat (*Myotis lucifugus*);
- Northern Long Eared Bat (*Myotis septentrionalis*); and,

- Tri-Colored Bat (*Perimyotis subflavus*).

A summary of all potential species at risk identified through screening, their habitat requirements, and their potential to be onsite is provided in Section 4.0.

3.5 Aquatic Habitat and Communities

3.5.1 Background Information

There is no aquatic habitat in the vicinity of the current property, however there are several aquatic habitat features in the greater study area, namely Alder Lake to the north west, and Alder Creek to the south east. Alder Creek flows into Alder Lake in the northern portion of the study area and flows south from the Alder Lake Outlet to the Nith River further south. North of the lake, Alder Creek is managed as a warmwater system, however south of the lake, it is managed as a coldwater system and supports various coldwater species such as a Brook Trout (*Salvelinus fontinalis*) (see Table 2).

Given the subject site's distance from these features, aquatic impacts are not anticipated with appropriate site selection and the implementation of best management practices for erosion and sediment controls.

3.5.2 Species at Risk

Alder Creek provides habitat for Silver Shiner (*Notropis photogenis*), which is listed as threatened under the provincial Endangered Species Act. Section 4.0 elaborates on Species at Risk in the study area. They prefer to live in medium to large streams with clean cobble and boulders.

Table 2 Fish Resources in the Study Area.

Common Name	Scientific Name	Thermal Regime	Alder Creek (ARA)	Alder Creek (DFO)	Alder Lake (ARA)
Black Crappie	<i>Pomoxis nigromaculatus</i>	Coolwater	x		
Blackside Darter	<i>Percina maculata</i>	Coolwater	x		
Bluntnose Minnow	<i>Pimephales notatus</i>	Warmwater			x
Brassy Minnow	<i>Hybognathus hankinsoni</i>	Coolwater	x		
Brook Stickleback	<i>Culaea inconstans</i>	Coolwater	x		
Brook Trout	<i>Salvelinus fontinalis</i>	Coldwater	x		
Brown Bullhead	<i>Ameiurus nebulosus</i>	Warmwater			x
Brown Trout	<i>Salmo trutta</i>	Coldwater	x		
Central Mudminnow	<i>Umbra limi</i>	Coolwater	x		
Common Carp	<i>Cyprinus carpio</i>	Warmwater	x		x
Common Shiner	<i>Luxilus cornutus</i>	Coolwater	x		x
Creek Chub	<i>Semotilus atromaculatus</i>	Coolwater	x		
Fathead Minnow	<i>Pimephales promelas</i>	Warmwater	x		
Golden Redhorse	<i>Moxostoma erythrurum</i>	Warmwater	x		
Golden Shiner	<i>Notemigonus crysoleucas</i>	Coolwater	x		x
Hornyhead Chub	<i>Nocomis biguttatus</i>	Coolwater	x		
Largemouth Bass	<i>Micropterus salmoides</i>	Warmwater	x		x
Longnose Dace	<i>Rhinichthys cataractae</i>	Coolwater	x		
Northern Hogsucker	<i>Hypentelium nigricans</i>	Warmwater	x		
Pumpkinseed	<i>Lepomis gibbosus</i>	Warmwater	x		x
Rainbow Trout	<i>Oncorhynchus mykiss</i>	Coldwater	x		
Rockbass	<i>Ambloplites rupestris</i>	Coolwater	x		
Rosyface Shiner	<i>Notropis rubellus</i>	Warmwater	x		
Silver Shiner	<i>Notropis photogenis</i>	Coolwater		x	
Smallmouth Bass	<i>Micropterus dolomieu</i>	Coolwater	x		
Stonecat	<i>Noturus flavus</i>	Warmwater	x		
Striped Shiner	<i>Luxilus chrysocephalus</i>	Coolwater	x		
White Sucker	<i>Catostomus commersonii</i>	Coolwater	x		x

4.0 Species at Risk Summary

The *Endangered Species Act* (2007) is administered by the ministry of the Environment, Conservation, and Parks (MECP). A table of potential SAR species (see Table 3) has been compiled using information from various sources such as NHIC, OBBA, Ontario Nature, DFO Aquatic SAR Mapping. Several SAR species have the potential to be in the study area. Two SAR were confirmed during BBS field visits: Barn Swallow and Eastern Wood-pewee.

Barn Swallow habitat is defined in three categories (mapped on Figure 4):

Category 1 habitat include the nests. These nests are often reused year after year. Disturbance of the nests has the highest intolerance.

Category 2 habitat includes the 5m perimeter around the nest that is guarded by the males. Category 2 habitat is more tolerant to disturbance than Category 1.

Category 3 habitat includes the area 5-200m from an active nest. This area is used for feeding, rearing, and resting. This area is most tolerant to disturbance. Open areas near nests serve as sources of flying insects, such as waterbodies, pastures with livestock and woodland edges.

Alternatives 1-3 are all within Category 3 habitat for Barn Swallow (see Figure 4). The Government of Ontario defines the habitat description and indicates that “Development activities that result in significant fragmentation or removal of large tracts of suitable habitat” are generally not compatible with Barn Swallow habitat.

Table 3 Species at Risk Screening for the Project.

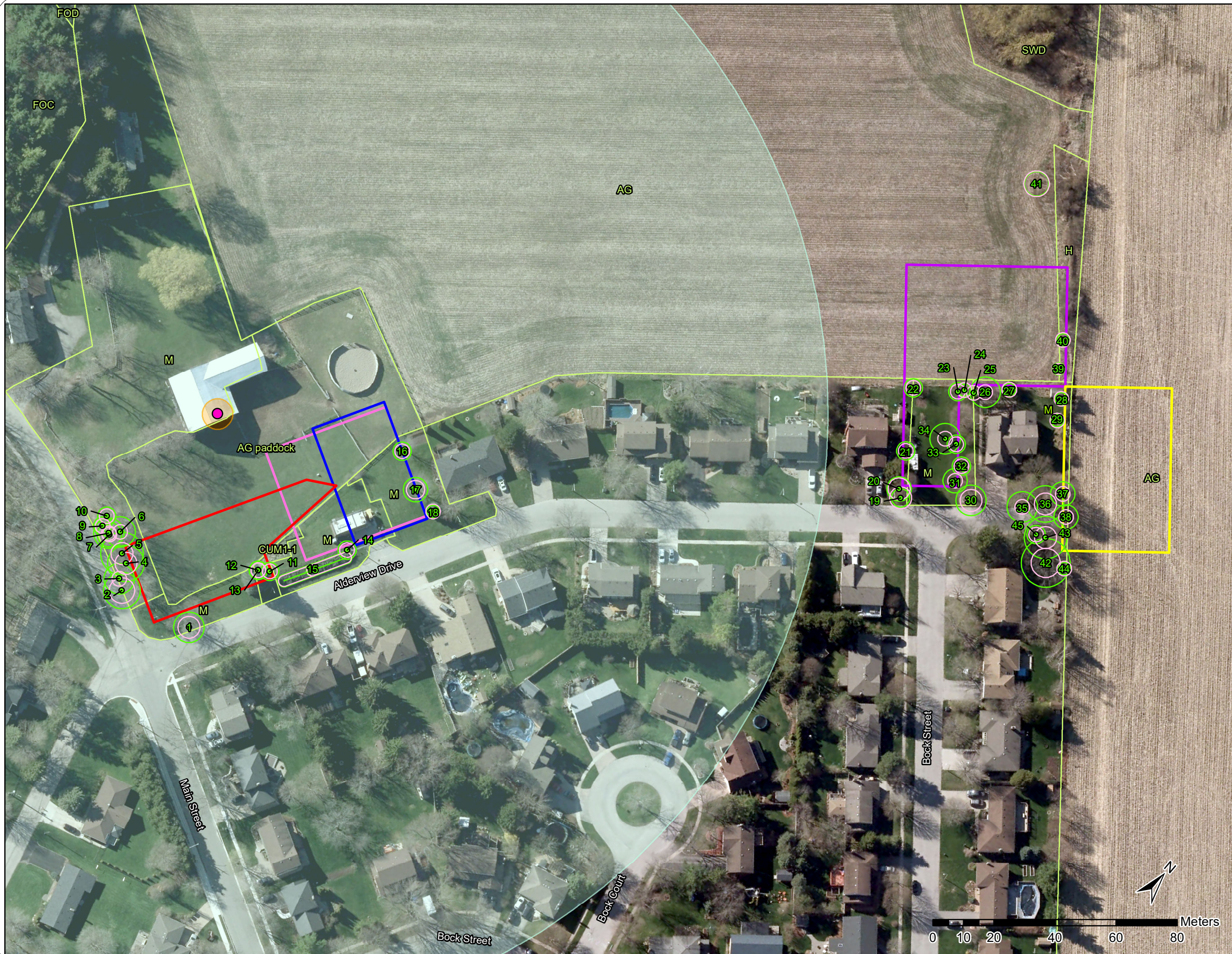
Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Butternut (<i>Juglans cinerea</i>)						Endangered	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldom, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Potential habitat found in study area within woodlands. None observed during field visit in June 2021	No further recommendations.
Bald Eagle (<i>Haliaeetus leucocephalus</i>)				X		Special Concern	Nests in a variety of habitats, usually forests near open water where they can hunt for fish.	Potential habitat in woodlands near Alder Lake. None observed in study area.	No further recommendations.
Bank Swallow (<i>Riparia riparia</i>)			X			Threatened	Nests in the vertical surfaces of silt and sand substrates. Often these surfaces are found on the banks of waterbodies or gravel pits.	No nesting habitat in study area. None observed during BBS.	No further recommendations.
Barn Swallow (<i>Hirundo rustica</i>)			X	X		Threatened	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Habitat for this species is abundant in the study area. Possibly breeding in barn to the north west of the existing facility, outside of proposed locations.	No removal of built structures with the potential to function as nesting habitat are anticipated at this time. Recommend the submission of an IGF if preferred alternative is found in Category 3 habitat.
Bobolink (<i>Dolichonyx oryzivorus</i>)			X	X		Threatened	This species occurs in tallgrass prairies, open meadows, and fallow agricultural fields. It is also often found in hay fields.	Preferred habitat for this species may be found in study area if agricultural fields are hay or pasture. None observed during BBS.	No further recommendations.
Canada Warbler (<i>Wilsonia canadensis</i>)				X		Special Concern	Nests in deciduous and mixed conifer forests with shrubs and mosses frequently near water.	Potential habitat for this species in the study area. None observed during BBS.	No further recommendations.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Chimney Swift (<i>Chaetura pelagica</i>)				X		Threatened	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys.	Potential habitat for this species in the study area. None observed during BBS.	No further recommendations.
Common Nighthawk (<i>Chordeiles minor</i>)				X			Open habitats with little to no plants. Examples included rock barrens, forest clearings, and logged areas.	Preferred habitat for this species not found in study area. None observed during BBS.	No further recommendations.
Eastern Meadowlark (<i>Sturnella magna</i>)				X		Threatened	This species occurs in tallgrass prairies, open meadows, and fallow agricultural fields.	Preferred habitat for this species may be found in study area if agricultural fields are hay or pasture. None observed during BBS.	No further recommendations.
Eastern Wood-Pewee (<i>Contopus virens</i>)			X	X		Special Concern	Mixed and deciduous forests in the mid-canopy layer near forest clearings and edges. The forests usually have little understory vegetation.	Potential habitat found in study area within woodlands. Observed during BBS.	Tree and vegetation clearing shall ensure compliance of the Migratory Bird Convention Act which identifies timing restrictions for clearing during breeding bird season (avoid clearing from April 1- August 31) for nesting Zone C2.
Grasshopper Sparrow (<i>Ammodramus savannarum</i>)				X		Special Concern	This species occurs in tallgrass prairies, open meadows, and fallow agricultural fields. It is also often found in hay fields.	Preferred habitat for this species may be found in study area if agricultural fields are hay or pasture. None observed during BBS.	No further recommendations.
Horned Grebe (<i>Podiceps auritus</i>)				X		Special Concern	This species nests in ponds, marshes, and bays with emergent vegetation. It prefers natural habitat rather than reservoirs and man-made ponds.	Potential habitat found in the study area associated with Alder lake. None observed during BBS.	No further recommendations.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>)				X		Special Concern	Open woodlands and woodland edges. Sometimes found in cemeteries, parks and golf courses.	Potential habitat found in study area within woodlands. None observed during BBS.	No further recommendations.
Wood Thrush (<i>Hylocichla mustelina</i>)						Special Concern	Mature deciduous and mixed woods. Nests regularly in Sugar Maple and American Beech.	Potential habitat found in study area within woodlands. None observed during BBS.	No further recommendations.
Silver Shiner (<i>Notropis photogenis</i>)					X	Threatened	Habitat includes large streams with swift currents and gravel or boulder substrates	Habitat for this species in Alder Creek within greater study area, but outside of alternative locations	No further recommendations.
Blandings Turtle (<i>Emydoidea blandingii</i>)						Threatened	Found in shallow aquatic habitat such as wetlands, rivers, and lakes	Habitat for this species available in the greater study area, but outside of alternative locations.	No further recommendations.
Northern Map Turtle (<i>Graptemys geographica</i>)						Special Concern	They inhabit rivers and lakes that support molluscs (for prey).	Habitat for this species available in the greater study area, but outside of alternative locations.	No further recommendations.
Snapping Turtle (<i>Chelydra serpentina</i>)	X					Special Concern	Aquatic setting such as lakes, ponds, bays and inlets. This is a highly aquatic species but may leave the water to seek out new aquatic habitats or to lay eggs.	Habitat for this species available in the greater study area, but outside of alternative locations.	No further recommendations.
Eastern Ribbonsnake (<i>Thamnophis sauritus</i>)						Special Concern	They are a semi aquatic species. Their habitat is forests near water, particularly marsh habitat within a forest.	Habitat for this species available in the greater study area, but outside of alternative locations.	No further recommendations.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Eastern Small-footed Bat (<i>Myotis leibii</i>)						Endangered	Overwintering habitat: Caves and mines Maternal Roosts: Caves, tree cavities, rock outcrops, bridges and buildings	Potential habitat occurs for Maternal roosting sites within the woodlands/forests and in individual trees with suitable cavities. No potential for hibernacula identified.	While not specifically observed, SAR bat species have high potential to occur in woodland communities and may also occur in open grown trees. Consultation for mitigation associated with pruning or tree removal within woodland (no works April 15 to September 30) should be discussed with MECP to ensure compliance under the ESA if tree removals are required.
Little Brown Bat (<i>Myotis lucifugus</i>)						Endangered	Overwintering habitat: Caves and mines that remain above 0°C. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	Potential habitat occurs for Maternal roosting sites within the woodlands/forests and in individual trees with suitable cavities. No potential for hibernacula identified.	While not specifically observed, these SAR bat species have high potential to occur in woodland communities and may also occur in open grown trees. Consultation for mitigation associated with pruning or tree removal within woodland (no works April 15 to September 30) should be discussed with MECP to ensure compliance under the ESA if tree removals are required.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Northern Long Eared Bat (<i>Myotis septentrionalis</i>)						Endangered	Overwintering habitat: Caves and mines that remain above 0°C. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh) with cavities and crevices. Occasionally found in structures (attics, barns etc.)	Potential habitat occurs for Maternal roosting sites within the woodlands/forests and in individual trees with suitable cavities. No potential for hibernacula identified.	While not specifically observed, these SAR bat species have high potential to occur in woodland communities and may also occur in open grown trees. Consultation for mitigation associated with pruning or tree removal within woodland (no works April 15 to September 30) should be discussed with MECP to ensure compliance under the ESA if tree removals are required.
Tri-Colored Bat (<i>Perimyotis subflavus</i>)						Endangered	Overwintering habitat: Caves and mines that remain above 0°C. Maternal Roosts: Often associated with clusters of dead leaves in large diameter Oak or Maple trees	Potential habitat occurs for Maternal roosting sites within the woodlands and in individual trees on property. No potential for hibernacula identified.	While not specifically observed, these SAR bat species have high potential to occur in woodland communities and may also occur in open grown trees. Consultation for mitigation associated with pruning or tree removal within woodland (no works April 15 to September 30) should be discussed with MECP to ensure compliance under the ESA.



LEGEND

- Alternative 1
- Alternative 2
- Alternative 3
- Alternative 4
- Alternative 5

- Barn Swallow Habitat**
- Category 1 (nest)
- Category 2
- Category 3

- 16 Tree ID
- Dripline
- Tree Protection Zone
- ELC Communities Boundary

- FOC** Coniferous Forest
- FOD** Deciduous Forest
- SWD** Deciduous Swamp
- CUM1-1** Dry-Moist Old Field Meadow
- AG** Agricultural
- H** Hedgerow
- M** Manicured

Data Source: LGL Limited field investigations.

Impact Assessment of Alternatives



Project	TA8978	Figure	4
Date	September 2021	Prepared By:	KC
Scale	1:1,200	Verified By:	DCO

5.0 Recommendations for Selection of Preferred Alternatives

Alder Creek, its floodplain and associated wetlands are regulated by the GRCA under Ontario Regulation 150/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. Avoidance of these areas was recommended early in the project planning in order to reduce potential impacts to these natural heritage communities. LGL will provide further detail with regard the recommended mitigation measures for the preferred alternative.

The short list of alternatives are shown on Figure 4. They include;

1. Upgrade of existing facility within property boundaries, with some additional lands to the north and east;
2. Upgrade of existing facility within property boundaries, with some additional lands to the north, west and east;
3. Upgrade of existing facility within property boundaries, with some additional lands to the west to Main Street;
4. New facility at the well property at Alderview Drive and Brock Street, with some additional land to the north; and,
5. New facility at the east end of Alderview Drive.

The proposed sites are generally maintained either through moving, grazing or active agriculture, and avoid much of the natural heritage features identified through background review. Hedgerows and ornamental trees are found in all alternatives proposed. No aquatic habitat extends in or near to the alternatives. Alternatives 1-3 are within Category 3 Barn Swallow habitat.

6.0 Impact Assessment

Potential terrestrial impacts may be in the form of vegetation and tree removals. Wildlife and wildlife habitat in the project area is mainly associated with the Alder Creek corridor, and is largely avoided by the 5 alternatives.

Potential impacts for SAR birds can be mitigated by avoiding construction in their habitat if possible or construction outside of the breeding window. LGL recommends the project be screened with the MECP as it may require approvals under the Endangered Species Act, 2007. Once a preferred alternative is selected, an Information Gathering Form can be submitted to the MECP to determine if further approvals are required for construction in Category 3 habitat for Barn Swallow.

Impacts to aquatic habitat are not anticipated as it is assumed that avoidance of aquatic habitat will be achieved through appropriate site selection as well as mitigation measures such as setbacks, and erosion and sediment control measures. Species associated with the aquatic habitat (mussels, fish, turtles) are not expected to be impacted at this time.

6.1 Mitigation Recommendations

LGL has reviewed the information available for the project against the natural heritage information compiled above to make the following recommendations to reduce impacts on natural features through project design and mitigation. Mitigation through site selection was achieved early in the project where all 5 alternatives considered avoid much of the existing Natural Heritage System.

A standalone Erosion and Sediment Control (ESC) Plan should be developed and implemented for the site that minimizes risk of sediment transport into adjacent retained vegetation communities or to the aquatic habitat of Alder Creek during all phases of the project. This plan should include:

- Methods to isolate the construction area;
- Timing of effective ESC measures, where ESCs shall be installed before starting work to prevent the entry of sediment into the watercourse or adjacent areas. Inspect regularly during the course of construction and conduct regular maintenance and repairs as necessary;
- Clearly identified stockpiling and staging areas; and,

- A plan to dispose of any water accumulated onsite from dewatering or pooled stormwater.

Other mitigation measures should include:

- Minimize vegetation and tree removals through facility design;
- Minimize construction area to the extent possible;
- Use appropriate tree protection measures for any work around tree resources within the project area to help protect trees identified to be retained;
- Use previously disturbed areas for construction laydown and staging to the extent possible;
- No vegetation removal should occur between April 1 and August 30 of any given year in order to protect birds afforded protection under the Migratory Birds Convention Act;
- Locate site maintenance, vehicle washing and refuelling stations where contaminants are handled off site, and outside of the wellhead protection area; and,
- Ensure that a Spills Management Plan (including materials, instructions regarding their use, education of contract personnel, emergency contact numbers) is on-site at all times for implementation in event of an accidental spill during construction. An emergency spill kit shall be kept on site. A response plan shall also be developed that is to be implemented immediately in the event of a sediment release.
- SAR Mitigation may include no tree removal or pruning should occur during the bat maternal roosting period for bats (April 15th to September 30th of any given year). Note, this timing window is weather dependant and should be confirmed by MECP once further project details are known.
- Further SAR mitigation may be required pending IGF submission of Barn Swallow and SAR bats to the MECP to confirm if approvals are required.

7.0 Summary

LGL has completed a Natural Heritage investigation in support of the Schedule C Class EA for the New Dundee Manganese Upgrades. We completed a review of features at the desktop level from a records review, and have completed site specific investigations for the 5 preferred alternatives under consideration. All alternatives avoid the larger Natural Heritage System associated with Alder Creek. However, 3 of 5 alternatives occur within the habitat for Barn Swallow and all alternatives have the potential to impact candidate SAR Bat Maternal Roosting habitat where tree removals may be required. The potential for approvals under the ESA has been identified at this time. LGL recommends the submission of an IGF to confirm approvals required in consultation with the MECP upon selection of the preferred alternative.

8.0 References

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Appendix A. Flora

	<i>Scientific Name</i>	Common Name	GRank	SRank	MNR	COSEWIC	Local Status
	PINACEAE	PINE FAMILY					
*	<i>Picea pungens</i>	Colorado spruce	G5	SE 1			
*	<i>Pseudotsuga menziesii var. glauca</i>	douglas-fir	G5	SE?			
	CUPRESSACEAE	CEDAR FAMILY					
	<i>Juniperus communis</i>	common juniper	G5	S5			x
	<i>Thuja occidentalis</i>	eastern white cedar	G5	S5			
	MENISPERMACEAE	MOONSEED FAMILY					
	<i>Menispermum canadense</i>	moonseed	G5	S4			x
	ULMACEAE	ELM FAMILY					
	<i>Ulmus americana</i>	white elm	G5?	S5			
	JUGLANDACEAE	WALNUT FAMILY					
	<i>Juglans nigra</i>	black walnut	G5	S4			x
	CARYOPHYLLACEAE	PINK FAMILY					
*	<i>Saponaria officinalis</i>	bouncing-bet	G?	SE 5			
	POLYGONACEAE	SMARTWEED FAMILY					
*	<i>Rumex crispus</i>	curly-leaf dock	G?	SE 5			
	TILIACEAE	LINDEN FAMILY					
*	<i>Tilia cordata</i>	small leaf linden	G?	SE 1			
	VIOLACEAE	VIOLET FAMILY					
	<i>Viola sp.</i>	violet					
	CUCURBITACEAE	GOURD FAMILY					
	<i>Echinocystis lobata</i>	prickly cucumber	G5	S5			
	SALICACEAE	WILLOW FAMILY					
	<i>Populus tremuloides</i>	trembling aspen	G5	S5			
*	<i>Salix X rubens</i>	reddish willow	HYB	SE 4			
	BRASSICACEAE	MUSTARD FAMILY					
*	<i>Alliaria petiolata</i>	garlic mustard	G5	SE 5			
*	<i>Hesperis matronalis</i>	dame's rocket	G4G5	SE 5			
	ROSACEAE	ROSE FAMILY					
	<i>Crataegus sp.</i>	hawthorn					
*	<i>Malus pumila</i>	common apple	G5	SE 5			

*	<i>Potentilla recta</i>	rough-fruited cinquefoil	G?	SE 5			
	FABACEAE	PEA FAMILY					
	<i>Gleditsia triacanthos var. inermis</i>	'shade master' honey locust		SE?			
*	<i>Medicago lupulina</i>	black medick	G?	SE 5			
*	<i>Melilotus alba</i>	white sweet-clover	G?	SE 5			
*	<i>Robinia pseudo-acacia</i>	black locust	G5	SE 5			
*	<i>Trifolium hybridum ssp. elegans</i>	alsike clover		SE 5			
	CELASTRACEAE	STAFF-TREE FAMILY					
*	<i>Euonymus europaea</i>	spindle tree	G?	SE 2			
	RHAMNACEAE	BUCKTHORN FAMILY					
*	<i>Rhamnus cathartica</i>	common buckthorn	G?	SE 5			
	VITACEAE	GRAPE FAMILY					
	<i>Parthenocissus quinquefolia</i>	five-leaved Virginia-creeper	G5	S4 ?			x
	<i>Vitis riparia</i>	riverbank grape	G5	S5			
	ACERACEAE	MAPLE FAMILY					
	<i>Acer negundo</i>	Manitoba maple	G5	S5			
*	<i>Acer platanooides</i>	Norway maple	G?	SE 5			
	<i>Acer rubrum</i>	red maple	G5	S5			
	<i>Acer saccharinum</i>	silver maple	G5	S5			
	<i>Acer saccharum var. saccharum</i>	sugar maple	G5T?	S5			
	ANACARDIACEAE	SUMAC FAMILY					
	<i>Rhus hirta</i>	staghorn sumac	G5	S5			
	SOLANACEAE	POTATO FAMILY					
*	<i>Solanum dulcamara</i>	bitter nightshade	G?	SE 5			
	CONVOLVULACEAE	MORNING-GLORY FAMILY					
*	<i>Convolvulus arvensis</i>	field bindweed	G?	SE 5			
	PLANTAGINACEAE	PLANTAIN FAMILY					
*	<i>Plantago lanceolata</i>	ribgrass	G5	SE 5			
*	<i>Plantago major</i>	common plantain	G5	SE 5			
	OLEACEAE	OLIVE FAMILY					
	<i>Fraxinus americana</i>	white ash	G5	S5			

*	<i>Syringa reticulata</i>	japanese tree lilac					
	RUBIACEAE	MADDER FAMILY					
	<i>Galium aparine</i>	cleavers	G5	S5			
	<i>Mitchella repens</i>	creeping partridge-berry	G5	S5			
	ASTERACEAE	ASTER FAMILY					
*	<i>Cirsium arvense</i>	Canada thistle	G?	SE 5			
	<i>Erigeron annuus</i>	daisy fleabane	G5	S5			
	<i>Solidago canadensis</i>	canada goldenrod	G5	S5			
*	<i>Sonchus arvensis ssp. arvensis</i>	field sow-thistle	G?T?	SE 5			
*	<i>Tanacetum vulgare</i>	common tansy	G?	SE 5			
*	<i>Taraxacum officinale</i>	common dandelion	G5	SE 5			
*	<i>Tragopogon dubius</i>	doubtful goat's-beard	G?	SE 5			
	POACEAE	GRASS FAMILY					
*	<i>Bromus inermis ssp. inermis</i>	awnless brome	G4G5T ?	SE 5			
*	<i>Dactylis glomerata</i>	orchard grass	G?	SE 5			
	<i>Poa pratensis ssp. pratensis</i>	Kentucky bluegrass	G5T	S5			

Legend

1) G-Rank Global Rank

Global ranks are assigned by a consensus of the network of Conservation Data Centres, scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies or variety.

G1=

Extremely rare; usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.

G2 = Very rare; usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.

G3 = Rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

G4 = Common; usually more than 100 occurrences; usually not susceptible to immediate threats.

G5 = Very common; demonstrably secure under present conditions.

GH = Historic, no records in the past 20 years.

GU = Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.

GX = Globally extinct. No recent records despite specific searches.

? = Denotes inexact numeric rank (i.e. G4?).

G" " = A "G" (or "T") followed by a blank space means that the NHIC has not yet obtained the Global Rank from The Nature Conservancy.

G? = Unranked, or, if following a ranking, rank tentatively assigned (e.g. G3?).

Q = Denotes that the taxonomic status of the species, subspecies, or variety is questionable.

T = Denotes that the rank applies to a subspecies or variety.

2) S-Rank Provincial Rank

Provincial (or Sub-national) ranks are used by the Ontario Ministry of Natural Resources Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for the global ranks, but consider only those factors within the political boundaries of Ontario. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be ascertained. The NHIC evaluates provincial ranks on a continual basis and produces updated list at least annually.

S1 = Critically imperiled in Ontario because of extreme rarity (often 5 or fewer occurrences) or because of some factor (s) such as very steep declines making it especially vulnerable to extirpation.

S2 = Imperiled in Ontario because of rarity due to very restricted range, very few populations (often 20 or fewer occurrences) steep declines or other factors making it very vulnerable to extirpation.

S3 = Vulnerable in Ontario due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 = Apparently secure - uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 = Secure - common, widespread, and abundant in Ontario.

- SX = Presumed Extirpated - specie or community is believed to be extirpated from Ontario.
- SNR = Unranked - conservation status in Ontario not yet assessed
- SU = Unrankable - currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- SNA = Not applicable - a conservation status rank is not applicable because the species is not a suitable target for conservation activities.
- S#S# = Range rank - a numeric range rank (e.g. S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g. SU is used rather than S1S4).

3) COSEWIC Committee On The Status Of Endangered Wildlife in Canada

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species that are considered to be at risk in Canada.

- Extinct (X) A wildlife species that no longer exists.
- Extirpated (XT) A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
- Endangered (E) A wildlife species facing imminent extirpation or extinction.
- Threatened (T) A wildlife species likely to become endangered if limiting factors are not reversed.
- Special Concern (SC) A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
- Not at Risk (NAR) A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
- Data Deficient (DD) A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

4) COSSARO/OMNR Committee On The Status Of Species At Risk In Ontario/Ontario Ministry Of Natural Resources

The Committee on the Status of Species at Risk in Ontario (COSSARO)/Ontario Ministry of Natural Resources (OMNR) assess the provincial status of wild species that are considered to be at risk in Ontario.

- Extinct (EXT) A species that no longer exists anywhere.
- Extirpated (EXP) A species that no longer exist in the wild in Ontario but still occurs elsewhere.
- Endangered (Regulated) (END-R) A species facing imminent extinction or extirpation in Ontario which has been regulated under Ontario's *Endangered Species Act*.
- Endangered (END) A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's *Endangered Species Act*.
- Threatened (THR) A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
- Special Concern (SC) A species with characteristics that make it sensitive to human activities or natural events.
- Not at Risk (NAR) A species that has been evaluated and found to be not at risk.
- Data Deficient (DD) A species for which there is insufficient information for a provincial status recommendations.

5) Local Status - Toronto

x Species status was cross-referenced with the Region of Waterloo status list to determine vascular plant status for the study area (2009).

Appendix B. Tree Resources.

S Shear Plane

Category City of Toronto By-law Code

- ¹ Trees with diameters of 30 cm or more, situated on private property on the subject site.
- ² Trees with diameters of 30 cm or more, situated on private property, within 6 m of the subject site
- ³ Trees of all diameters situated on City owned parkland within 6 m of the subject site.
- ⁴ On lands designated under the City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection, trees of all diameters situated within 10 meters of any construction activity
- ⁵ Trees of all diameters situated within the City road allowance adjacent to the subject site.

Reason for Removal

- ¹ Trees interfere with proposed development (100%)
- ² greater than 25% of canopy or roots are in conflict with development
- ³ trees are dead, dying or hazardous

Appendix C. Wildlife List.

Scientific Name	Common Name	G-Rank	S-Rank	SARA Schedule	COSEWIC	SARA	SARO	FWCA	MBCA	GRCA	Waterloo Region	Priority Species Waterloo	OBBA 2001-2005	eBird (2020)	BBS visits (2021)
<i>Anas rubripes</i>	American Black Duck	G5	S4						X	CP	RS			x	
<i>Corvus brachyrhynchos</i>	American Crow	G5	S5B										x	x	x
<i>Carduelis tristis</i>	American Goldfinch	G5	S5B						X	CP		level 3	x		
<i>Falco sparverius</i>	American Kestrel	G5	S4					P		CP		level 2		x	
<i>Turdus migratorius</i>	American Robin	G5	S5B						X				x	x	x
<i>Spizella arborea</i>	American Tree Sparrow	G5	S4B						X					x	
<i>Anas americana</i>	American Widgeon	G5	S4								RS			x	
<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S2N,S4B		NAR		SC	P						x	
<i>Icterus galbula</i>	Baltimore Oriole	G5	S4B						X					x	x
<i>Riparia riparia</i>	Bank Swallow	G5	S4B	Schedule 1	THR		THR		X	CP		level 2		x	
<i>Hirundo rustica</i>	Barn Swallow	G5	S4B	Schedule 1	THR		THR		X	CP		level 3	x	x	x
<i>Strix varia</i>	Barred Owl	G5	S5					P		CP	RS	level 1		x	
<i>Ceryle alcyon</i>	Belted Kingfisher	G5	S4B					P			RS			x	
<i>Dendroica fusca</i>	Blackburnian Warbler	G5	S5B						X	CP		level 3		x	
<i>Poecile atricapillus</i>	Black-capped Chickadee	G5	S5						X	CP		level 4	x	x	x
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	G5	S3B,S3N						X		RS	level 1		x	
<i>Dendroica virens</i>	Black-throated Green Warbler	G5	S5B						X	CP	RS	level 1		x	
<i>Cyanocitta cristata</i>	Blue Jay	G5	S5					P					x	x	x
<i>Dolichonyx oryzivorus</i>	Bobolink	G5	S4B	Schedule 1	THR		THR		X	CP		level 2	x	x	
<i>Certhia americana</i>	Brown Creeper	G5	S5B						X	CP	RS	level 2		x	
<i>Toxostoma rufum</i>	Brown Thrasher	G5	S4B						X	CP	RS	level 1		x	
<i>Molothrus ater</i>	Brown-headed Cowbird	G5	S4B										x	x	x
<i>Branta canadensis</i>	Canada Goose	G5	S5						X					x	x
<i>Wilsonia canadensis</i>	Canada Warbler	G5	S4B	Schedule 1	THR	THR	SC		X	CP	RS	level 2		x	
<i>Bombycilla cedrorum</i>	Cedar Waxwing	G5	S5B						X				x	x	
<i>Spizella passerina</i>	Chipping Sparrow	G5	S5B						X				x	x	x
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	G5	S4B						X	CP		level 3		x	
<i>Quiscalus quiscula</i>	Common Grackle	G5	S5B										x	x	x
<i>Mergus merganser</i>	Common Merganser	G5	S5B,S5N						X		RS			x	
<i>Chordeiles minor</i>	Common Nighthawk	G5	S4B	Schedule 1	THR	THR	SC		X	CP	RS	level 1		x	
<i>Corvus corax</i>	Common Raven	G5	S5					P						x	
<i>Carduelis flammea</i>	Common Redpoll	G5	S4B						X					x	
<i>Geothlypis trichas</i>	Common Yellowthroat	G5	S5B						X				x	x	
<i>Accipiter cooperii</i>	Cooper's Hawk	G5	S4		NAR			P		CP	RS	level 3		x	
<i>Junco hyemalis</i>	Dark-eyed Junco	G5	S5B						X	CP				x	
<i>Picoides pubescens</i>	Downy Woodpecker	G5	S5						X					x	x
<i>Sialia sialis</i>	Eastern Bluebird	G5	S5B		NAR				X	CP	RS	level 1		x	

Scientific Name	Common Name	G-Rank	S-Rank	SARA Schedule	COSEWIC	SARA	SARO	FWCA	MBCA	GRCA	Waterloo Region	Priority Species Waterloo	OBBA 2001-2005	eBird (2020)	BBS visits (2021)
<i>Tyrannus tyrannus</i>	Eastern Kingbird	G5	S4B						X	CP		level 3		x	
<i>Sturnella magna</i>	Eastern Meadowlark	G5	S4B	Schedule 1	THR		THR		X	CP		level 2		x	
<i>Sayornis phoebe</i>	Eastern Phoebe	G5	S5B						X	CP		level 3		x	
<i>Megascops asio</i>	Eastern Screech-Owl	G5	S4		NAR			P						x	
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	G5	S4B						X	CP		level 2		x	
<i>Contopus virens</i>	Eastern Wood Pewee	G5	S4B	Schedule 1	SC		SC		X				x	x	x
<i>Sturnus vulgaris</i>	European Starling	G5	SNA										x	x	x
<i>Spizella pusilla</i>	Field Sparrow	G5	S4B						X	CP		level 3	x	x	
<i>Passerella iliaca</i>	Fox Sparrow	G5	S4B						X	CP		level 3		x	
<i>Regulus satrapa</i>	Golden-crowned Kinglet	G5	S5B						X	CP	RS	level 3		x	
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	G5	S4B						X	CP	RS	level 3		x	
<i>Dumetella carolinensis</i>	Gray Catbird	G5	S4B						X	CP		level 4	x	x	
<i>Ardea herodias</i>	Great Blue Heron	G5	S4						X		RS			x	
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	G5	S4B						X				x	x	
<i>Ardea alba</i>	Great Egret	G5	S2B						X					x	
<i>Bubo virginianus</i>	Great Horned Owl	G5	S4					P						x	
<i>Tringa melanoleuca</i>	Greater Yellowlegs	G5	S4B,S4N						X					x	
<i>Butorides virescens</i>	Green Heron	G5	S4B							CP	RS	level 4		x	
<i>Picoides villosus</i>	Hairy Woodpecker	G5	S5						X		RS			x	
<i>Catharus guttatus</i>	Hermit Thrush	G5	S5B											x	
<i>Larus argentatus</i>	Herring Gull	G5	S5B, S5N											x	
<i>Podiceps auritus</i>	Horned Grebe	G5	S1B,S4N	No Schedule	SC		SC		X					x	
<i>Eremophila alpestris</i>	Horned Lark	G5	S5B						X	CP		level 3	x	x	
<i>Carpodacus mexicanus</i>	House Finch	G5	SNA						X					x	
<i>Passer domesticus</i>	House Sparrow	G5	SNA											x	
<i>Troglodytes aedon</i>	House Wren	G5	S5B						X				x	x	x
<i>Passerina cyanea</i>	Indigo Bunting	G5	S4B						X				x	x	
<i>Charadrius vociferus</i>	Killdeer	G5	S5B,S5N						X				x	x	
<i>Empidonax minimus</i>	Least Flycatcher	G5	S4B						X	CP	RS	level 3	x		
<i>Dendroica magnolia</i>	Magnolia Warbler	G5	S5B						X	CP	RS	level 2		x	
<i>Anas platyrhynchos</i>	Mallard	G5	S5						X				x	x	x
<i>Falco columbarius</i>	Merlin	G5	S5B		NAR			P						x	
<i>Zenaidura macroura</i>	Mourning Dove	G5	S5						X				x	x	x
<i>Oporornis philadelphia</i>	Mourning Warbler	G5	S4B						X	CP	RS	level 2		x	
<i>Vermivora ruficapilla</i>	Nashville Warbler	G5	S5B						X	CP	RS	level 2		x	
<i>Cardinalis cardinalis</i>	Northern Cardinal	G5	S5						X				x	x	x
<i>Colaptes auratus</i>	Northern Flicker	G5	S4B						X					x	

Scientific Name	Common Name	G-Rank	S-Rank	SARA Schedule	COSEWIC	SARA	SARO	FWCA	MBCA	GRCA	Waterloo Region	Priority Species Waterloo	OBBA 2001-2005	eBird (2020)	BBS visits (2021)
<i>Accipiter gentilis atricapillus</i>	Northern Goshawk	G5	S4		NAR			P		CP	RS	level 3		x	
<i>Circus cyaneus</i>	Northern Harrier	G5	S4B		NAR			P		CP	RS	level 4		x	
<i>Mimus polyglottos</i>	Northern Mockingbird	G5	S4						X	CP	RS	level 1		x	
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	G5	S4B						X	CP		level 2	x	x	
<i>Anas clypeata</i>	Northern Shoveler	G5	S4						X					x	
<i>Lanius excubitor</i>	Northern Shrike	G5	SNA						X					x	
<i>Seiurus noveboracensis</i>	Northern Waterthrush	G5	S5B						X	CP	RS	level 2		x	
<i>Icterus spurius</i>	Orchard Oriole	G5	S4B						X	CP	RS	level 3		x	
<i>Pandion haliaetus</i>	Osprey	G5	S5B					P		CP	RS	level 3		x	
<i>Seiurus aurocapilla</i>	Ovenbird	G5	S4B						X	CP	RS	level 4		x	
<i>Podilymbus podiceps</i>	Pied-billed Grebe	G5	S4B,S4N						X	CP	RS	level 1		x	
<i>Dryocopus pileatus</i>	Pileated Woodpecker	G5	S5						X	CP	RS	level 2		x	
<i>Pinicola enucleator</i>	Pine Grosbeak	G5	S4B						X					x	
<i>Dendroica pinus</i>	Pine Warbler	G5	S5B						X	CP	RS	level 3		x	
<i>Carpodacus purpureus</i>	Purple Finch	G5	S4B						X	CP	RS	level 2		x	
<i>Melanerpes carolinus</i>	Red-bellied Woodpecker	G5	S4						X	CP	RS	level 3		x	x
<i>Sitta canadensis</i>	Red-breasted Nuthatch	G5	S5						X	CP	RS	level 3		x	
<i>Vireo olivaceus</i>	Red-eyed Vireo	G5	S5B						X					x	
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	G5	S4B	Schedule 1	THR	THR	SC		X	CP	RS	level 1		x	
<i>Buteo lineatus</i>	Red-shouldered Hawk	G5	S4B	Schedule 3	NAR	SC		P		CP	RS	level 1		x	
<i>Buteo jamaicensis</i>	Red-tailed Hawk	G5	S5		NAR			P						x	
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	G5	S4										x	x	x
<i>Larus delawarensis</i>	Ring-billed Gull	G5	S5B,S4N						X					x	
<i>Columba livia</i>	Rock Dove (Pigeon)	G5	SNA										x	x	
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	G5	S4B						X					x	
<i>Buteo lagopus</i>	Rough Legged Hawk	G5	S1B,S4N		NAR		NAR	P						x	
<i>Archilochus colubris</i>	Ruby-throated Hummingbird	G5	S5B						X	CP	RS	level 3		x	x
<i>Passerculus sandwichensis</i>	Savannah Sparrow	G5	S4B						X	CP		level 1	x	x	
<i>Piranga olivacea</i>	Scarlet Tanager	G5	S4B						X	CP	RS	level 2		x	
<i>Accipiter striatus</i>	Sharp-shinned Hawk	G5	S5		NAR			P		CP	RS	level 2		x	
<i>Plectrophenax nivalis</i>	Snow Bunting	G5	SNA						X					x	
<i>Chen caerulescens</i>	Snow Goose	G5	S5B						X					x	
<i>Tringa solitaria</i>	Solitary Sandpiper	G5	S4B						X					x	
<i>Melospiza melodia</i>	Song Sparrow	G5	S5B						X				x	x	x
<i>Actitis macularius</i>	Spotted Sandpiper	G5	S5						X	CP		level 3		x	

Scientific Name	Common Name	G-Rank	S-Rank	SARA Schedule	COSEWIC	SARA	SARO	FWCA	MBCA	GRCA	Waterloo Region	Priority Species Waterloo	OBBA 2001-2005	eBird (2020)	BBS visits (2021)
<i>Melospiza georgiana</i>	Swamp Sparrow	G5	S5B						X	CP	RS	level 2		x	
<i>Tachycineta bicolor</i>	Tree Swallow	G5	S4B						X				x	x	
<i>Cygnus columbianus</i>	Tundra Swan	G5	S4						X					x	
<i>Cathartes aura</i>	Turkey Vulture	G5	S5B					P		CP	RS	level 4		x	
<i>Catharus fuscescens</i>	Veery	G5	S4B						X	CP	RS	level 2		x	
<i>Poocetes gramineus</i>	Vesper Sparrow	G5	S4B						X	CP	RS	level 2		x	
<i>Vireo gilvus</i>	Warbling Vireo	G5	S5B						X		RS			x	
<i>Sturnella neglecta</i>	Western Meadowlark	G5	S3B						X	CP	RS	level 2		x	
<i>Sitta carolinensis</i>	White-breasted Nuthatch	G5	S5						X					x	
<i>Zonotrichia albicollis</i>	White-throated Sparrow	G5	S5B						X	CP				x	
<i>Loxia leucoptera</i>	White-winged Crossbill	G5	S5B						X	CP	RS	level 1		x	
<i>Meleagris gallopavo</i>	Wild Turkey	G5	S5					G						x	
<i>Gallinago delicata</i>	Wilson's Snipe	G5	S5B							CP				x	
<i>Troglodytes troglodytes</i>	Winter Wren	G5	S5B						X		RS	level 3		x	
<i>Aix sponsa</i>	Wood Duck	G5	S5						X			level 4		x	
<i>Helmitheros vermivorum</i>	Worm-eating Warbler	G5	SNA						X					x	
<i>Dendroica petechia</i>	Yellow Warbler	G5	S5B						X				x	x	
<i>Dendroica coronata</i>	Yellow-rumped Warbler	G5	S5B						X			level 3		x	

Appendix C Wildlife List Definitions

G-Rank (Global Rank)

G1- extremely rare; usually 5 or fewer occurrences in the overall range or very few remaining individuals or because of some factor (s) making it especially vulnerable

G2-very rare; usually between 5-20 occurrences in the range or with many individuals in fewer occurrences or because of some factor (s) making it vulnerable to extinction

G3- rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences but with a large number of individuals in some populations or may be susceptible to large-scale disturbances

G4-common; usually more than 100 occurrences, usually not susceptible to immediate threats

G5-very common; demonstrably secure under present conditions

S-Rank (Provincial Rank)

S1-critically imperiled; critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor (s)

such as very steep declines making it especially vulnerable to extirpation from the state/province

S2-imperilled; imperilled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines

or other factors making it very vulnerable to extirpation from the nation or state/province

S3-vulnerable; vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines

or other factors making it vulnerable to extirpation

S4-apparently secure; uncommon but not rare; some cause for long-term concern due to declines or other factors

S5-secure; common, widespread and abundant in the nation or state/province

SNA- not applicable; a conservation status rank is not applicable because species is not a suitable target for conservation activities

SZB-breeding migrants/vagrants

SZN-non-breeding migrants/vagrants

COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

NAR- not at risk; a wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances

THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed

END-endangered; a wildlife species facing imminent extirpation or extinction

EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere

SC-special concern; a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats

DD-data deficient; a wildlife species for which there is inadequate information to make a direct, or indirect, assessment of its risk of extinction

SARA (Species at Risk Act)

Schedule 1- official list of wildlife species at risk

THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed

END-endangered; a wildlife species facing imminent extirpation or extinction

EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere

SC-special concern; a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats

SARO (Species at Risk in Ontario)

END-Endangered; a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA

EXP-Extirpated; a species that no longer exists in the wild in Ontario but exists elsewhere

THR-Threatened; a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed

SC-Special Concern; a species with characteristics that make it sensitive to human activities or natural events

FWCA (Fish and Wildlife Conservation Act)

P - protected species

G - game species

F- Furbearing

MBCA (Migratory Birds Convention Act)

X - Migrant species with afforded protection

SWH-TG (Significant Wildlife Habitat Technical Guide, 2000)

Conservation Priority

level 1-highest priority

level 4-lowest priority

Grand River Conservation Authority

CP= Conservation Priority

Region of Waterloo

RS=Regionally Significant