Whistle Bare Campground
Environmental Impact Study

Prepared for:

Country Gardens RV
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NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Whistle Bare Campground Environmental Impact Study

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Table of Contents

List of Figures

List of Tables

Maps

List of Appendices

1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by Country Gardens RV to complete an Environmental Impact Study (EIS) for a proposed upgrade and expansion of the existing Whistle Bare RV Park. The subject property is located at 1898 Whistle Bare Road, Township of North Dumfries, Ontario, and is approximately 39ha in area. The subject property is bound to the north by the City of Cambridge limit and woodland, to the east by the Whistle Bear Golf Course, to the south by agricultural fields and Whistle Bare Road, and to the west by a cultural meadow, buffering Highway 401. The City of Kitchener limit is also located to the northwest of the subject property, outlined on Map 1.

1.1 Proposed Undertaking

The proposed plans include a redesign of the existing 80 seasonal-use trailer campsites and expansion to create 347 trailer campsites, 10 cabin sites and 26 overnight camping sites, totaling 383 lots. The trailer campground is proposed to extend into the southern agricultural fields up to the existing hydro corridor. In addition, the site plan proposes 2 recreation halls (one in the north near Pond 1, and one near Whistle Bare Road), a pool, court and playground near Pond 1, 2 bridges (one reconstruction and one new development), a workshop / office building and a garbage and recycling storage facility. The existing septic and servicing systems are outdated, and do not meet current standards. The redesign of the existing campground provides opportunity for improving the existing separated and degrading systems; this enhancement has been requested by the Town to be incorporated into the proposed plan. Due to this, leaving the existing lots in their current state is not an option for the proposed site plan. The proposal includes permanent underground water supply and wastewater servicing to each individual lot, which will link into the proposed sewage pumping station and on-site wastewater treatment facility with 4 septic beds. All permanent buildings and facilities listed, with the exception of the proposed bridges, are well outside of the natural areas and their buffers and all can be seen in Appendix I.

1.2 Terms of Reference

A Terms of Reference (TOR) was developed and scoped based on comments received from the Township of North Dumfries, the Region of Waterloo, and the GRCA, both

through pre-consultation documentation from September 11, 2018, and through continued correspondence, edits, and approval. The majority of field surveys were completed in the 2018 field season in anticipation of a finalized TOR. This approach was supported by agency staff provided that additional surveys be completed in 2019 if requested during review of the TOR. No additional surveys were requested.

The Region of Waterloo Ecological and Environmental Advisory Committee (EEAC) reviewed the TOR, which was discussed at an EEAC meeting on September 24, 2018, where it was approved with the following recommendations:

"1. Advise Community Planning staff that the Environmental Impact Statement required in support of the proposed development be scoped, as per Policies 7.B.12, 7.C.10, and 7.G.4(b) of the Regional Official Plan, to address the following:

> *a. confirmation of an ecologically appropriate boundary of Core Environmental Features within the subject lands;*
>
> *b. delineation and design of suitable buffers between the proposed development and Core Environmental Features;*
>
> *c. a biophysical survey to identify natural habitats and/or populations of Regionally significant plant and animal species on the subject lands that might be adversely affected by the proposed development;*
>
> *d. maintaining quantitative and qualitative aspects of hydrological and hydrogeological regimes sustaining Core Environmental Features through design and operation of a stormwater management system required to support the proposed development;*
>
> *e. analysis of how the proposed development meets the additional criteria of ROP Policies 7.B.9 and 7.B.12;*
>
> *f. content of a during-development and post-development monitoring program; and*
>
> *g. stewardship plan for the portion of Core Environmental Features on the subject property.*

2. That the previously established subcommittee review the scoped Environmental Impact Statement for the proposed expansion when it is submitted."

The GRCA reviewed and approved the TOR on July 24, 2019, with two comments; that *"the Blair Creek, Bechtel Creek, Bowman Creek Subwatershed Study, Functional Drainage Study, and the State of the watershed should all be reviewed and referenced to interpret the impacts of the proposed development."*, and "*the EIS should also address opportunities to reverse and restore historical intrusions and alterations to the*

watercourse and wetland features". These comments have been incorporated into this EIS.

Following review and edits, a final submission was approved by the Township on July 19, 2019. The final TOR, included in Appendix II, was submitted to the Township, Region, and GRCA on July 17, 2019.

1.3 Background Information Collection and Review

Existing natural heritage information for the study area was collected and reviewed. This information assisted in the identification of key habitats and species that are reported from, or have the potential to occur, within the study area. The background data collection followed the Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Request Guide (MNRF 2018) and the Client's Guide to Preliminary Screening for Species at Risk (Ministry of Environment, Conservation and Parks (MECP) 2019). Information was requested, but not yet received from the MNRF (Guelph District). Background information sources that were reviewed include:

- Natural Heritage Information Centre (NHIC) (Ontario Ministry of Natural Resources and Forestry (MNRF) 2020);
- GRCA Mapping;
- Region of Waterloo Official Plan (Region of Waterloo 2015);
- Township of North Dumfries Official Plan Consolidation (Township of North Dumfries 2018);
- Blair Creek, Bechtel Creek, Bowman Creek Subwatershed Study (CH2M Gore & Storrie Limited et al. 1996);
- State of the Watershed Report for Upper Blair Creek; (Aquafor Beech Ltd. 2016);
- Ontario Breeding Bird Atlas (Bird Studies Canada (BSC) et al. 2008);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019);
- Ontario Butterfly Atlas (MacNaughton et al. 2018);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Aquatic SAR Mapping (DFO 2019); and
- Ontario Odonata Atlas (Ontario Odonata Atlas Database 2019).

2.0 Relevant Policies, Legislation and Planning Studies

Information on the natural heritage features within the subject property was collected and assessed for significance by evaluating them against relevant policies, legislation, and planning studies as outlined in Table 1. Significant or sensitive features were identified to the study team to help inform suitable land-use concepts, guide the layout of development, and identify areas to be protected.

A portion of the subject property is within an Environmentally Sensitive Landscape, as outlined by the Region of Waterloo (Region of Waterloo 2015), which is a large-scale overlay that involves a geographically and ecologically definable landscape, distinguished by several factors; most notably Environmentally Sensitive Policy Areas (ESPAs), Provincially Significant Wetlands (PSWs), Significant Woodlands, and Environmentally Significant Valley Features. ESLs also consider associated natural features and ecological functions that may not be covered by any of the other above overlays or protections.

Within the subject property, the ESL contains a Core Environmental Feature, which includes an ESPA (Region of Waterloo 2016) classified by the Region, and the Blair, Bechtel and Bauman Creek PSW Complex regulated by the GRCA.

Core Environmental Feature is an umbrella term defined by the Region, and encompasses any lands identified as: PSWs, ESPAs, Regional Forests, Forests >4ha, and Significant Valley Features. In effect, the mapped PSW and ESPA layers on the subject property should also be considered Core Natural Feature.

Each of these layers are outlined on Map 1. Table 1 provides an overview of the policy legislation and planning studies that were considered and which informed the field program and analysis. ESL and Core Natural Features can also be referred to in the Region of Waterloo Official Plan, Map 4 (2015).

Table 1. Relevant Policies, Legislation and Planning Studies

Policy/Legislation	Description	Project Relevance
Provincial Policy Statement (OMMAH 2014)	• Issued under the authority of Section 3 of the Planning Act and came into effect on April 30, 2014, replacing the 2005 PPS (OMMAH 2005). • One of the key goals of the PPS is the *"effective use of land and resources, with development primarily focused in settlement areas."* • Section 2.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as 'significant'. This section also identifies that natural features are to be protected for the long term. • Section 2.1.5 of the PPS identifies that development and site alteration shall not be permitted within the area outlined in sub-sections a) – f) *"unless it has been demonstrated that there will be no negative impacts on the natural features or their functions."* • The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (OMNR 2000, MNRF 2015a) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.	• Based on the background review, pre-construction monitoring reports and SAR/SCC screening, several natural features afforded consideration within the PPS have been identified in the study area, including: o Significant Wetland, o Significant Woodland, o Significant Wildlife Habitats, o Fish Habitat, and o Habitat for endangered and threatened species
Regional Municipality of Waterloo Tree By-Law Number 08-026 (2008)	• The by-law regulates the destruction or injuring of trees within woodlands, • Enactment of this by-law is aimed at sustaining a healthy natural environment within the Region, while also having regard for good forestry practices, • Statutes of protection aims that no person shall destroy or injure a tree, or cause another person to destroy or injure a tree, of a protected species that is located in a woodland	• The proposed development area encroaches into an adjacent plantation in the northeast section. This will need approval under the Regions By-Law, • Aside from the plantation the development proposal will be maintained outside of the adjacent natural feature containing any woodland habitat.
Regional Municipality of Waterloo Official Plan (2015)	• The updated Regional Official Plan (ROP) includes policies related to the natural environment. • It provides a much more detailed policy framework than the previous ROP that protects environmental features; therefore, the ROP 2015 is referred to throughout this report as the most current guidance for delineating and protecting Core	• The Region's OP identifies the natural features within the central and western portions of the subject property to be part of the Blair Swamp 'Environmentally Sensitive Policy Area' (ESPA), and part of the Greenlands Network. • The Region's OP also indicates that approximately the northern half of the subject property falls within an

Policy/Legislation	Description	Project Relevance
	Environmental Features within the study area.	'Environmentally Sensitive Landscape' (ESL). • Blair Creek (or its tributaries), which flow through the central and eastern portions of the subject property as well as the wooded areas and PSW that surround it are associated with the ESPA. • The Region's OP permits development applications submitted in accordance with the policies in Chapter 6. • Conditions set forth in Section 7.B.9 and 7.B.12 of the OP must be appeased.
GRCA Ontario Regulation 150/06 (2013)	• Regulation issued under *Conservation Authorities Act,* R.S.O. 1990. • Through this regulation, the GRCA has the responsibility to regulate activities in natural and hazardous areas (i.e. areas in and near rivers, streams, floodplains, wetlands, and slopes). • GRCA requires that an EIS be undertaken in accordance with their *EIS Guidelines and Submission Standards for Wetlands* where development is proposed within 120m of PSW or 30m of non-PSW (GRCA 2005). • Section 7.0 of the Regulation identifies the general policies associated with the CA's 'Regulation Area'. • The Regulation identifies that Development, interference or alteration within a Regulated Area may be permitted, where it can be demonstrated, through an EIS that "*there are no negative or adverse hydrological or ecological impacts on the wetland."*	• The proposed development footprint location is adjacent to the GRCA regulated Blair, Bechtel and Bauman Creek PSW Complex (Map 1). • Regulated watercourses are present within the subject property. • A regulation limit of 120m from the GRCA confirmed wetland boundaries apply. • In accordance with this policy, the proposed development must demonstrate no negative impacts to the regulated natural features or their ecological functions.
Township of North Dumfries Official Plan (2018)	• Commits to protect, conserve or wherever feasible, enhance the natural environment within the township • To provide for the management of natural resources within the township in a manner that minimizes undesirable short- and long-term impacts on the natural environment, the quality and quantity of ground and surface water, and the quality of life for existing and future residents • The Township's environmental features consists of Landscape Level	• The subject property is comprised of Open Space as per map 2. • The natural features within the central, east and north portions of the property are designated as Open Space, containing Environmentally Sensitive Landscape, Environmental Constraint Areas, Hazard Lands, and Protected Countryside, which are afforded protection or cannot be developed under the Township's OP. • The Township's OP also indicates that approximately the northern half of the subject property falls within an

Policy/Legislation	Description	Project Relevance
	Systems, Core Environmental Features, Fish Habitat, Supporting Environmental Features and the linkages among these elements, and lands designated within the Provincial Greenbelt Plan Natural Heritage System. These environmental features form part of the broader Greenlands Network identified through the Region of Waterloo Official Plan. • As outlined in Section 6.1 of the OP, development or site alteration may occur on lands contiguous to the Natural System if it is demonstrated through an EIS that there will be no adverse impacts on the feature or its ecological functions.	'Environmentally Sensitive Landscape' (ESL). • The Township's OP permits development applications submitted in accordance with the policies in Section 6.1.3.
Blair, Bechtel, and Bauman (BBB) Creeks Subwatershed Plan (CH2M Gore & Storrie Limited et al. 1996)	• The subwatershed study outlines the hydrogeology, geomorphology of the area, including the general groundwater and aquifer intricacies unique to the area.	• The sensitivities and recharge value outlined for the larger area should be considered when analyzing any impacts from proposed works. • The subwatershed plan largely identifies the subject property as Recreation – outlined for parks, picnic areas, golf etc., with portions of Woodland and Idle Agricultural Land (>10 years) in the northern portions of the property. Due to the publication date of the plan, these land uses were identified over 20 years ago, and may require closer review.
Upper Blair Creek (Kitchener) Functional Drainage Study (Stantec Consulting Ltd. 2009)	• The FDS is a technical document intended to provide the City, the RMOW, and the GRCA with an improved understanding of the potential environmental impacts of the future development within the Doon South (Phase 2) Community Plan and Upper Blair Creek subwatershed area (East Study Area), as well as the technical basis necessary to review the future development applications and proposed mitigation measures associated with fully serviced residential development across the subject lands	• The subject property is entirely outside of the Upper Blair Creek Functional Drainage Report, but is within the Blair Creek Watershed. • The GRCA recommends that this document is still considered during the development of this EIS, but the property is not bound by the findings in the Watershed Report.
State of the Watershed (SOW) Report – Upper Blair Creek (Aquafor Beech Ltd. 2016))	• Most relevant to this study, is the understanding that the overall plan, monitoring and mitigation strategies of the BBB will continually evolve in response to an improved understanding of the environmental response to development and as our	• The subject property is entirely outside of the Upper Blair Creek SOW Report, but is within the Blair Creek Watershed. • The GRCA recommends that this document is still considered during the development of this EIS, but the

Policy/Legislation	Description	Project Relevance
	knowledge of the science responsible for these changes evolves and is better understood.	property is not bound by the findings in the Watershed Report.
Endangered Species Act (Government of Ontario 2007)	• The original ESA, written in 1971, underwent a year-long review which resulted in a number of changes which came into force in 2007. • The ESA prohibits killing, harming, harassing, or capturing Endangered or Threatened and protects their habitats from damage and destruction.	• Based on information available through background documents and field surveys, including the SAR/SCC screening, several SAR were identified as having suitable habitat within the study area.
Migratory Birds Convention Act (Canadian Wildlife Service (CWS) 2017)	• The MBCA protects migratory game birds, insectivorous birds, and several other migratory non-game birds from persecution in the form of harassment. • The schedule of on-site work must consider MBCA windows, with timing of breeding bird season typically occurring between May 1 and July 31, however, this is a guideline, since the MBCA applies to nesting bird species. • "Incidental take" is considered illegal, with the exception of a permit obtained by the Canadian Wildlife Service (CWS).	• The timing of construction activities, especially vegetation clearing and site grading must have consideration for the MBCA timing windows.
Fish and Wildlife Conservation Act (Government of Ontario 1997)	• The FWCA provides protection for certain bird species, not protected under the MBCA (e.g., raptors), as well as furbearing mammals and their dens or habitual dwellings, asides from the Red Fox (*Vulpes vulpes*) and Striped Skunk (*Mephitis mephitis*).	• The timing of construction activities, especially vegetation clearing and site grading must have consideration for bird nesting and den sites for fur-bearing mammals.
The Canadian Fisheries Act (Government of Canada 1985)	• Under the updated federal Fisheries Act, fish are protected through two core prohibitions: Section 34.4(1) the death of fish by means other than fishing, and Section 35(1) the harmful alteration, disruption, or destruction (HADD) of fish habitat (Government of Canada 2019). Any proposed work, undertaking, or activity should aim to avoid causing the death of fish, or the harmful alteration, disruption or destruction of fish habitat through the course or as a result of any proposed undertaking. Fish habitat is defined as "spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes".	• If any work is to be completed in the vicinity of a watercourse or pond feature within the subject property, a proponent-led DFO assessment will be required (once design is known) to ensure that no residual effects are present that can impact fish or fish habitat. • If assessment indicates a request for review is required, DFO should be consulted as early within the process as feasible (once a detailed design is known). • Pending the works and result of review (if required), an Authorization may be required. This will result in offsetting being needed and a Letter of Credit.

3.0 Field Methods

Field surveys were undertaken within the subject property to characterize natural features and identify significant and sensitive natural heritage features and species that have potential to be adversely affected by the proposed development. A total of 12 field visits were completed between April 2018 and February 2019. A variety of field surveys were undertaken which are described in detail below. Surveys conducted were undertaken in accordance with provincial and local guidance documents as indicated below. Table 2 provides details on all site visits including survey type, protocols, weather, and participating biologists.

Table 2. Field Survey Summary

Survey Type	Protocol	Date	Start and End Time (24 hrs)	Temp. (°C)	Wind Speed (Beaufort Scale)	Cloud Cover (%)	Precipitation	Observers
Ecological Land Classification and Community Description	Lee et. al (1998)	June 1, 2018	08:15 – 16:00	23	15	80	None	J. Bannon A. Dean
		July 20, 2018	12:30 – 16:30	29	1	40	None	J. Bannon
		August 20, 2018	09:00 – 15:15	26	1	0	None	J. Bannon K. Ellis
Anuran Call Survey	(BSC 2009)	April 29, 2018	20:40 – 21:50	6	1	0	None	E. Gosnell
		May 24, 2018	21:15 – 22:00	22	0	40	None	J. Bannon K. Martin
		June 21, 2018	21:40 – 22:15	16	2	40	None	J. Lance A. Reinert
SWH Screening	MNRF 2015	June 1, 2018	08:15 – 16:00	23	15	80	None	J. Bannon A. Dean
Breeding Bird Survey	OBBA 2001	June 15, 2018	06:00 – 09:15	12	1	30	None	K. Martin
		June 25, 2018	07:00 – 09:00	11	2	0	None	K. Martin T. Larking
Herpetofauna Area Search	N/A	June 15, 2018	06:00 – 09:15	12	1	30	None	K. Martin
		July 13, 2018	10:00 – 14:00	24	1	60	None	G. MacVeigh T. Larking C. Poulson
Pond Habitat Survey	N/A	July 13, 2018	10:00 – 14:00	24	1	60	None	G. MacVeigh T. Larking C. Poulson
Dripline and Wetland Delineations	Lee at al (1998)	September 4, 2018	09:10 – 17:30	21	1	40	None	J. Bannon E. Gosnell H. Manoharan
Winter Wildlife Survey	Greenlands Network Implementation Guidelines (Region of Waterloo 2016)	February 1, 2019	12:00 – 15:00	-13	1	0	None	J. Bannon K. MacLellan
		Feb 14, 2019	12:00 – 16:00	-3	2	60	None	J. Bannon N. Miller

3.1 Terrestrial Field Surveys

3.1.1 Vegetation Surveys

A preliminary community delineation was completed using aerial photography and thorough investigations in the field on June 1, 2018. The standard Ecological Land Classification (ELC) System for southern Ontario was applied (Lee et al. 1998). Details of vegetation communities were recorded including species composition, dominance, uncommon species or features, evidence of human impact, and surficial soil characterization. ELC communities were refined following each vegetation inventory throughout the field season, and finally updated to reflect confirmed dripline and wetland delineations, discussed in Section 5.1. Vegetation communities are outlined on Map 2.

Significant vascular flora was recorded during all field surveys, with detailed and targeted inventories of all observed vascular flora conducted on June 1, July 20, and August 20. The woodland dripline and wetland limits within the subject property were flagged, approved and surveyed throughout the week of September 3, as shown on all maps and discussed in Section 5.1.

3.1.2 Anuran Call Surveys

Anuran call surveys were completed on April 29, May 24, and June 21, with data collected across 9 Anuran Call Stations for each visit. Observers recorded site conditions and instances of frog calls in the vicinity of each station following the Marsh Monitoring Protocol (BSC 2009).

3.1.3 Breeding Bird Surveys

A breeding bird survey was completed on June 15, and June 25, 2018. Data was recorded using breeding bird evidence codes (OBBA 2001). Surveys consisted of area searches throughout the subject property, documented by habitat type (ELC community). These surveys occurred between dawn and 0915hrs. All visual and auditory observations of birds were recorded as well as the highest level of breeding evidence exhibited for each species.

3.1.4 Reptile Area Searches

Reptile area searches were completed on June 15 and July 13, 2018. The area searches comprised of targeted searches in suitable habitat during ideal, sunny conditions to observe snake and turtle species. Species, number of individuals, and behavior were recorded if reptiles were observed.

3.1.5 Significant Wildlife Habitat Screening

Wildlife habitat field data was originally collected on June 1, 2018, and refined throughout the field season. This involved the observations of habitat features including presence of water, field types, substrates and topography, anthropogenic features, evidence of wildlife, outstanding trees, and rare communities or species.

3.1.6 Winter Wildlife

Winter wildlife surveys were completed on February 1 and 14, 2019 to determine habitat use during the winter months. The surveys were conducted according to the Greenlands Network Implementation Guidelines (Region of Waterloo 2016). These surveys consisted of two visits during appropriate timing and weather conditions to document overwintering use by resident wildlife.

3.1.7 Additional Wildlife

All incidental observations of species were documented on all field visits. This included actual direct observations of individuals, as well as signs of wildlife presence (i.e. tracks, scats, dens, nests etc.).

3.2 Aquatic Surveys

3.2.1 Aquatic Habitat Characterization Survey

An aquatic habitat characterization survey, was conducted on July 13, 2018. Ponds and watercourses in the project area were thoroughly described and assessed based on their surrounding areas, morphology, substrate composition, types of potential fish habitats, vegetation, and water quality. Observers also created site drawings and documented photographs of the subject areas. The channels between the ponds were also assessed to determine barriers, potential constraints and opportunities.

4.0 Existing Conditions

The existing conditions have been mapped using ELC protocol (Lee et al. 1998), SWH screening (Ontario Ministry of Natural Resources and Forestry (MNRF) 2015), and detailed aquatic habitat assessments. The Blair Creek PSW and ESPA have also been delineated and approved, as discussed in Section 5.1. These communities are described below, and delineated on Map 2 and Map 3.

4.1 Soil, Terrain and Drainage

The study area is located in the physiographic region known as the Ingersoll Moraine or the Thames Spillway (Chapman and Putnam 1984), and the Blair-Bechtel-Bauman Subwatershed. This region is characterized by loose, loamy, or sandy till with areas of large trains of gravel and sections of swampy trough. These soils were deposited over the course of numerous advances and retreats of glacial ice lobes during the Wisconsonian glacial period (Chapman and Putnam 1984). As the glacial ice melted and retreated, waterways swelled, which resulted in material deposition by spillways. Modern action and erosion by watercourses and the deposition of wetland organic soils further created a complex pattern of surficial soils in the study area.

The existing campground is situated in a former aggregate extraction area. The soils in the study area are dominated by sand, silt and loam with areas of organic deposits encompassing the PSW. Soil samples were analyzed during Ecological Land Classification surveys and described as having moderate to good drainage. Site test pits completed by Chung & Vander Doelen Engineering Ltd. (2019) indicates an underlaying deposit almost exclusively of sand and gravel.

The study area has a relatively specific hydrogeological setting, which is identified in the Hydrogeological Assessment (Chung & Vander Doelen Engineering Ltd. 2019) as comprising of an upper aquifer zone, a low-permeability clayey aquitard, and a deeper aquifer zone. This double-layer of aquifers on-site represents a unique situation to be addressed in the hydrogeological report, and the EIS, and at the Site Plan Application stage.

4.2 Vegetation

4.2.1 Vegetation Communities

The ELC communities are described in detail below and shown on Map 2.

Table 3. Summary of Vegetation Communities

ELC Ecosite Type	ELC Description	Environmental Characteristics
Natural		
FOC4-2	Fresh - Moist White Cedar - Hemlock Coniferous Forest Type	This community is present on the adjacent north and northeast properties, and slightly extends onto the property. It is dominated by Eastern White Cedar (*Thuja occidentalis*), with Eastern Hemlock (*Tsuja canadensis*). The understorey contains some European Buckthorn (*Rhamnus cathartica*) and Glossy Buckthorn (*Frangula alnus*), particularly along the forest edges, with Choke Cherry (*Prunus virginiana* ssp. *virginiana*). The groundcover is relatively sparse, due to the dense cedar canopy, but includes localized pockets of Sensitive Fern (*Onoclea sensibilis*) and Bulblet Fern (*Cystopteris bulbifera*).
FOD3-1	Dry - Fresh Poplar Deciduous Forest Type	This successional forest type is located just off-property along the north and northwest boundaries. The canopy contains Trembling Aspen (Populus tremuloides) and Scots Pine (Pinus sylvestris). The understorey is relatively underdeveloped, with some European Buckthorn and Tartarian Honeysuckle (*Lonicera tatarica*). The groundcover is dominated by cultural meadow species including Canada Goldenrod (*Solidago canadensis*).
FOD5-2	Dry - Fresh Sugar Maple - Beech Deciduous Forest Type	This forest community extends east of the mixed wetland and forest complex, largely along a west-facing and south-facing slope. The canopy is dominated by Sugar Maple (Acer saccharum ssp. saccharum), with American Beech (Fagus grandifolia), White Pine (Pinus strobus), and Black Cherry (Prunus serotina). The understorey includes some Chokecherry, Alternate Leaved Dogwood (Cornus alternifolia) and Eastern White Cedar. The ground cover represents a relatively healthy community including White Trillum (Trillium grandoflorum), White Dog's Tooth Violet (Erythronium albidum), Cut-leaved Toothwort (Cardamine concatenate), Blue-stem Goldenrod (*Solidago caesia*) and Bloodroot (*Sanguinaria canadensis*).
SWC3-2	White Cedar - Organic Coniferous Swamp Type	Dominated by Eastern White Cedar, this community is nearly entirely off-property to the east, with a small portion extending past the eastern boundary. This community is very simple, with an undeveloped groundlayer due to the dense cedar canopy and sub-canopy. Limited European Buckthorn and Glossy Buckthorn are present in the understorey.
FOD3-1 / CUP3-2	Dry - Fresh Poplar Deciduous Forest Type / White Pine Coniferous Plantation Type	Located to the northwest of the subject property, this regenerating cultural area contains some remaining planted Eastern White Pine (*Pinus strobus*), with colonizing Trembling Aspen and Balsam Poplar (*Populus balsamifera*). Scots Pine and Staghorn Sumac (*Rhus typhina*) are scattered throughout. Cultural meadow species represent the groundcover, including Canada goldenrod, Wild Teasel (*Dipsacus fullonum* ssp. *sylvestris*), and aster species (*Symphyotrichum* spp.)
FOM6-2 / SWM6-1 Complex	Fresh - Moist Hemlock - Hardwood Mixed Forest Type / Birch -	This complex represents the heart of the ESPA within the subject property, and contains a diverse canopy of Eastern Hemlock, Sugar Maple, White Birch (*Betula papyrifera*),

	Conifer Organic Mixed Swamp Type	Yellow Birch (*Betula allegheniensis*), Eastern White Cedar, and Black Cherry. Chokecherry, limited European Buckthorn, and Alternate-leaved Dogwood (*Cornus alternifolia*) are present in the understorey. The Groundcover contains Sensitive Fern, Bulblet Fern (*Cystopteris bulbifera*), Canada Mayflower (*Maianthemum canadense*) and Jack-in-the-Pulpit (*Arisaema triphyllum*).
Aquatic		
SAS	Submerged Shallow Aquatic	Some limited milfoil species (*Myriophyllum* sp.) were observed within these ponds, representing some vegetative food sources for aquatic species.
Cultural		
CUM1	Mineral Cultural Meadow Ecosite	A small cultural meadow is present to the north of the subject property. This is mapped within the Subwatershed Study (CH2M Gore & Storrie Limited et al. 1996) as "Idle Agriculture", which has continued to naturalize into a meadow community. Golenrods, Asters, and other common meadow species dominate.
CUP3	Coniferous Plantations	This cultural plantation is dominated by Eastern White Pine, with Red Pine and Eastern White cedar. Black Walnut is colonizing throughout the edges of the community. European Buckthorn and Glossy Buckthorn are present in more open areas. Groundcover includes Canada Mayflower, Calico Aster (*Symphyotrichum lateriflorum* var. *lateriflorum*) and Common Helleborine (*Epipactis helleborine*).
CUW1	Mineral Cultural Woodland Ecosite	Located on a steep slope encircling the central pond, this community contains a diverse cultural assortment of tree and shrub species, and is notably more disturbed and open than the delineated ESPA. No particular species dominates throughout, but common species include Eastern White Cedar, Black Walnut, Freeman's Maple, Staghorn Sumac, European Buckthorn, Glossy Buckthorn, Common Reed (*Phragmites australis*), and Canada Goldenrod. Mowed grass areas are present along the existing road.
Ag	Agriculture	Annual row crop is present in the southern portion of the subject property, which consisted of a rotation of soy and corn during surveys.

4.2.2 Vascular Flora

A total of 212 vascular flora species were recorded during vegetation inventories within the subject property in 2018. A list of all vascular flora species can be found in Appendix IV.

The majority of species observed were native, with 42 non-native species recorded during vascular flora surveys, comprising approximately 20% of all vascular plant species observed.

Background information and the SAR/SCC screening assessment (Appendix III) indicates that 1 SCC plant species; Chinese Hemlock-parsley (*Conioselinum chinense*), is reported from the

vicinity of the study area (MNRF 2019b). This species was not documented during detailed vascular plant inventories, and is not expected to be present within the subject property.

One vascular plant species considered to be locally significant; Common Hackberry (*Celtis occidentalis*), was observed within the subject property. A seedling was found within the Birch - Conifer Organic Mixed Swamp and Hemlock - Hardwood Mixed Forest (SWM6-1) complex in the center of the property and is shown on Map 2.

4.3 Wildlife

4.3.1 Birds

According to the Ontario Breeding Bird Atlas (OBBA) (BSC et al. 2008), 102 bird species are reported from the vicinity of the subject property including 46 species that are regionally significant in the Waterloo Region (Martin 1996). NRSI biologists observed 38 bird species during breeding bird surveys and field visits, 33 of which showed evidence of breeding. Of the total, 13 bird species are classified as priority species by the Grand River Conservation Authority (GRCA) and 4 are regionally significant in the Region of Waterloo. The bird species most commonly observed throughout the subject property were: Blue Jay (*Cyanocitta cristata*), American Robin (*Turdus migratorius*), American Goldfinch (*Spinus tristis*), and Northern Cardinal (*Cardinalis cardinalis*), followed closely by Baltimore Oriole (*Icterus galbula*), House Wren (*Troglodytes aedon*), and Black-Capped Chickadee (*Poecile atricapillus*). The highest diversity of birds was found in the trailer park area (Map 2). A complete list of bird species reported from the study area, based on background information and observations is included in Appendix V.

The results of the SAR/SCC screening (Appendix III) and 2018 field surveys conducted by NRSI biologists indicate that 2 bird species; Eastern Wood-pewee (*Contopus virens*) (SCC) and Barn Swallow (*Hirundo rustica*) (SAR) have or may have suitable breeding and/or foraging habitat within the subject property.

Eastern Wood-pewee is listed as Special Concern by the SARO. Several singing males were observed within the following communities: SWC3-2, SWM6-1/FOM6-2, and FOD5-2 (Map 2). Breeding evidence for Eastern Wood-pewee is considered ‘Probable’ due to the presence of multiple singing males on multiple breeding bird surveys indicating territorial behaviour. Further details are discussed in Section 5.2.3 regarding the significance of breeding Eastern Wood-pewee in the subject property.

Barn Swallow, which is listed as Threatened in Ontario, was observed foraging in the manicured lawn area along the eastern edge of the subject property (Map 2). It is possible that this species is nesting within man-made structures on the property, but no evidence of breeding was observed. Further details are discussed in Section 5.3.1 regarding the significance of Barn Swallow in the subject property.

4.3.2 Herpetofauna

According to the Ontario Amphibian and Reptile Atlas (Ontario Nature 2019), 17 species of herpetofauna are reported from the vicinity of the subject property. Through field surveys, NRSI biologists identified 8 species of herpetofauna in the subject property comprising; Midland Painted Turtle (*Chrysemys picta marginata*), American Toad (*Anaxyrus americanus*), Spring Peeper (*Pseudacris crucifer*), American Bullfrog (*Lithobates catesbeiana*), Northern Green Frog (*Lithobates clamitans melanota*), Northern Leopard Frog (*Lithobates pipiens*), Gray Tree Frog (*Hyla versicolor*), and Eastern Garter Snake (*Thamnophis sirtalis sirtalis*). A complete list of herpetofauna species reported from the study area, based on background information and observations is included in Appendix V.

Midland Painted Turtle is listed as Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). A total of 15 individuals were observed incidentally or during targeted reptile area search surveys conducted by NRSI biologists in 2018. Turtles were observed in Ponds 1, 2 and 5 as shown on Map 2 and 3. Further discussion is provided in Section 5.2.3 regarding significance of Midland Painted Turtle in the subject property.

4.3.3 Mammals

According to the Mammal Atlas of Ontario (Dobbyn 1994), 33 mammal species are reported from the vicinity of the subject property. NRSI biologists identified a total of 9 mammal species in the subject property through winter wildlife surveys and incidental observations. The observed species are known to be fairly common in the area: Eastern Cottontail (*Sylvilagus floridanus*), Woodchuck (*Marmota monax*), Eastern Gray Squirrel (*Sciurus carolinensis*), Red Squirrel (*Tamiasciurus hudsonicus*), Eastern Chipmunk (*Tamias striatus*), Ermine (*Mustela erminea*), Northern Raccoon (*Procyon lotor*), Coyote (*Canis latrans*), and White-tailed Deer (*Odocoileus virginianus*). A complete list of mammal species reported from the study area, based on background information and observations is included in Appendix V.

Several endangered bat species are known to occur in suitable forested areas in southern Ontario; Little Brown Myotis (*Myotis lucifungus*) and Northern Myotis (*Myotis septentrionalis*). Suitable habitat and natural features such as trees, buildings, forest edges and wetland habitats are present in the subject property for these species of bats. Further information is provided in detail in Section 5.3.2 regarding the potential presence of endangered bat species in the subject property.

4.3.4 Butterflies

According to the Ontario Butterfly Atlas (Macnaughton et al. 2019), 75 butterfly species are reported to occur within the vicinity of the subject property. NRSI biologists observed three species of butterfly incidentally; Monarch *(Daunaus plexippus*), Cabbage White (*Pieris rapae*), and Giant Swallowtail (*Papilio cresphontes*). A complete list of butterfly species reported from the study area, based on background information and observations is included in Appendix V.

A single Monarch was observed foraging along the bank of Pond 5. Monarch host plants; Common Milkweed (*Asclepias syriaca*) and Swamp Milkweed (*Asclepias incarnata* ssp. *incarnata*) were both documented within the subject property. Further discussion is provided in Section 5.2.3 regarding significance of Monarch in the subject property.

4.3.5 Odonata

According to the Ontario Odonata Atlas Database (OOAD) (Ontario Odonata Atlas Database 2019), 7 odonata (dragonfly and damselfly) species are reported from the vicinity of the subject property. NRSI biologists identified 8 common species of odonata during site visits. A complete list of odonata species reported from the study area, based on background information and observations is included in Appendix V.

4.4 Aquatic Habitat

The aquatic features within the subject property are headwater tributaries to Blair Creek that have been modified in the past by aggregate extraction, channel alignment and the creation of ponds. The main channel of Blair Creek is located approximately 125m from the northeast corner of the subject property. Blair Creek is identified as having a cold-cool thermal regime through this section (near Dickie Road) (Irvine and Ivey 2018).

Within the subject property, Tributary A begins at Pond 1 flows in a southeast direction to its confluence with the Tributary B. Tributary B is the main branch, flowing from Pond 2 in a north

to northeast direction through the subject property. The ponds and tributaries are discussed in more detail below.

ELC vegetation communities characterize Pond 1, 4, and 5 as Open Water (OA), and Ponds 2, and 3 as Submerged Shallow Aquatic (SAS) communities (See Table 2 and Map 2).

4.4.1 Pond Characterization

The subject property contains 5 ponds, with varying connections, tributaries, and flows. These details are outlined for each individual pond below. Ponds 1, 2 and 3 are remnant from the previous aggregate extraction that occurred on-site prior to its use as a campground. Ponds are shown on Map 3.

Pond 1

Pond 1 is currently used as a swimming and recreational area for the campground. The depth of the middle of the pond appeared to be between 0.2 to 2.0m in depth. The shoreline material was comprised of sand and concrete; the majority of the shoreline has been hardened, with a ramp installed for recreation. A fountain feature and two large inflatable platforms were also present within this pond at the time of the assessment. Substrates within the pond were primarily sand, with some gravel, cobble, silt and muck (where muck refers to decomposed organic material). Aquatic vegetation was minimal, as clearing likely occurs within the pond through recreational swimming practices. The vegetation within the pond was made up of algae and pondweed species (*Potamogeton* ssp.). No shading occurs around this pond. Fish habitat and cover was provided through the limited vegetation and cobble, the fountain, and the inflatables. Although no upwellings were observed, the colour and clarity of the water indicates that groundwater is likely feeding the pond. At the outlet of the pond at on July 13, 2018 at 1030hrs, the water and air temperature were 25.6ºC and 24ºC, respectively. These temperatures reflect the warming effect of the pond. Water quality was documented concurrently, with dissolved oxygen being 103% and 8.34mg/L, pH being 8.43, conductivity being 769µS, and total dissolved solid (TDS) being 384 parts per million (ppm). Fish species, including Pumpkinseed (*Lepomis gibbosus*) and Smallmouth Bass (*Micropterus dolomieu*), were observed within the pond, with the Pumpkinseed also nesting in the substrates.

Pond 1 outlets into Tributary A along the eastern edge of the pond. A stop-log feature is located under a pedestrian bridge. The logs were documented to be fully functional, and only a base flow amount of water was seen exiting into the defined channel at the time of the assessment.

Pond 2

Pond 2 is located within the middle of the property, and a 0.2m PVC pipe along the northwest corner of the pond allows for water to outlet into the Tributary B during higher water events. The PVC pipe outlets to a 1m drop into the channel of the tributary. Water was flowing from the culvert at the time of the assessment. This small, perched culvert would act as a barrier to fish moving up or downstream during all seasons. Pond 2 is more naturalized than Pond 1, with more natural vegetation surrounding the majority of it. Depth was not taken within the pond due to the size and impracticality of using suitable equipment (i.e. a boat). The shoreline was stable with natural sand and soil, with vegetation including shrubs and conifers. Substrates within the pond included sand, silt and muck. Aquatic vegetation was abundant throughout the pond including submergent, emergent and floating species. Invasive Common Reed (*Phragmites australis* ssp*. australis*) is locally present along the northern shore. This vegetation, along with a dock, woody debris, and the overhanging vegetation around the shoreline provide fish habitat and cover. Surface water and air temperature were 27.7ºC and 29ºC, respectively, on July 13, 2018 at 1155hrs and were taken near the outlet approximately one meter from shore.

Although the pond is supported by groundwater, the warmer surface water temperature is not surprising due to the warm weather, lack of cover surrounding the pond, and limited water entering the pond. Water quality was documented concurrently with dissolved oxygen being 207.8% and 15.52mg/L, pH being 8.89, conductivity being 403µS, and TDS being 202ppm. The water was relatively clear, although slightly tea coloured, which may be from the breakdown of detritus at the bottom of the pond. Pumpkinseed and Smallmouth Bass were observed, including some male Pumpkinseeds guarding nests.

Pond 3

Pond 3 outlets to Pond 2 through a 0.6m corrugated steel pipe (CSP) culvert with a closed gate attached to stop water flow. When closed, this culvert would act as a barrier to fish. Pond 3 is similar to Pond 2; in that it has natural vegetation, stable shorelines, similar substrates, and overhanging vegetation surrounding the majority of the pond. An island is present within the pond, and an old failing wooden bridge connects the island and shoreline. A small section of the shoreline has been hardened with concrete, where an old dock may have been, and the concrete is beginning to fail. Floating and submergent algae and pondweed species were abundant throughout the pond, which provide good cover and habitat for fish. The old bridge and downed trees are expected to also provide fish habitat and cover. Smallmouth Bass and

Pumpkinseed were observed within this pond as well. Water and air temperature were 25.4ºC and 29ºC, respectively, on July 13, 2018 at 1300hrs and were taken off the concrete shoreline structure. Water quality was documented concurrently with dissolved oxygen being 128% and 10.9mg/L, pH being 8.49, conductivity being 546µS, and TDS being 273ppm.

Pond 4

Pond 4 is located along the east subject property boundary, to the east of the internal road. Background mapping indicates that this pond connects to Pond 3 under the road, although no inlet or outlet culvert was observed by NRSI biologists at the time of the assessment. It is likely that some seepage occurs from pond to pond, or that the culvert was buried at the time of the assessment. A narrow strip of riparian vegetation was present around this pond, including Willow species (Salix spp.), a variety of shrubs, and Spotted Jewelweed (*Impatiens capensis*). This vegetation provides minimal shading to the pond, but does provide stable banks. Manicured lawn was present around the narrow vegetative area. This pond is part of the PSW complex on the property. Depth within the pond was less than 1m and the substrates were primarily muck and detritus. Lesser Duckweed (*Lemna minor*) was abundant and covered approximately 75% of the surface of the pond. Fish habitat and cover was limited due to the depth and lack of flow, but would be provided through the vegetation and woody debris. No fish were observed within the pond. Water and air temperature were 25.6ºC and 29ºC, respectively, on June 13, 2018 at 1320hrs. Water quality was documented concurrently with dissolved oxygen being 110.3% and 8.59mg/L, pH being 8.84, conductivity being 228µS, and TDS being 106ppm.

Pond 5

Pond 5 borders the east subject property boundary and extends onto the neighbouring golf course. It is also part of the PSW complex on-site. Background mapping indicates that a tributary connects Pond 5 to Pond 4, but field surveys concluded that no connection is present. A culvert may be present on the golf course lands that would direct runoff to this pond. A very narrow strip of vegetation is present immediately surrounding the pond, followed by manicured lawn and golf course greens. Limited shade is afforded to the pond though the coniferous and deciduous trees. The banks appeared stable at the time of assessment. The pond substrates were comprised of muck, detritus and sand. Algae covered 100% of the pond surface and there was also a minimal amount of Lesser Duckweed present. No fish were observed at the time of the assessment, although habitat could be provided through the overhanging vegetation,

aquatic vegetation, and woody debris. Water and air temperature were 28.2ºC and 29ºC, respectively, at 1345hrs. Water quality was documented concurrently with dissolved oxygen being 171.4% and 13.15mg/L, pH being 8.81, conductivity being 1383µS, and TDS being 685ppm.

4.4.2 Tributary Characterization

The subject property contains 2 tributaries, Tributary A and B, which carry flow from the on-site wetlands, and Pond 1, 2 and 3 to the eastern property boundary and into Blair Creek. Tributaries can be seen on Map 3.

Tributary A

Tributary A begins at the controlled outlet of Pond 1 and was documented to have minimal flow at the time of the assessment. The channel has defined banks and appears to have been straightened as it runs along the back of trailer lots and into the forested wetland area. This natural area provides excellent shading to the feature. Within the wetland, the substrates are primarily muck and organic material, and the defined channel meanders naturally. Watercress (*Nasturtium* ssp.), which is a groundwater indicator, was noted in abundance in multiple locations along with a few areas of upwellings where sand was observed. Fish were observed in small numbers within this Tributary, and no barriers were observed.

Tributary B

Tributary B arises within the forested wetland feature, which provides excellent shading. Similar to Tributary A, it has substrates comprised of muck, organic material and some sand. It meanders naturally within the forested wetland area. Watercress was observed throughout. The tributary exits the central wetland and flows through the campground for a short section where it has been modified and there are multiple stop-log structures which are barriers to fish. The channel has also been straightened and concrete lined through this section. The tributary returns to a naturalized form where it enters the forested wetland and then exits the subject property flowing to the east and to join Blair Creek. Fish were observed within the channel.

Water temperature within the tributary at the road crossing was 17.1ºC with air temperature being 29.4 ºC on June 13, 2018 at 1430hrs. This water is significantly cooler than that in the on-site ponds indicating that there is significant cooling occurring within the forested wetland area through groundwater inputs and shading.

5.0 Significance and Sensitivity of Natural Features

This section of the report provides an overview of the important natural heritage features identified in the subject property. Based on available background information and the results of original field surveys of terrestrial and wetland habitats, significant natural features known from the study area include: PSW, Fish Habitat, Significant Woodland, ESPA, ESL, Significant Wildlife Habitat, and Habitat of Endangered and Threatened Species. The natural features have been assessed to outline their significance and their potential sensitivity to the proposed development.

5.1 Designated Natural Areas

5.1.1 Site-Specific Hydrogeological Sensitivities

In order to comprehensively assess impacts of the proposed development on the below listed natural communities, special understanding of the site hydrogeological system is required. As mentioned in Section 4.1, the study area contains two separate aquifers, separated by a clayey aquitard layer. Understanding impacts to the water table from proposed water-taking must is contingent on this information. The Hydrogeological Assessment (Chung & Vander Doelen Engineering Ltd. 2019) confirms that the tributary within the subject property *"receives shallow groundwater discharge during the 'low-flow' summer period and less consistently along all reaches during the spring season, when there is expected to be larger amounts of surface water runoff"*. These groundwater sources must be maintained to avoid impacts to the cold-cool water stream feature.

5.1.2 Provincially Significant Wetlands

The subject property contains portions of the larger Blair Creek PSW Complex that extends off-site to the north and west of the property along the Blair Creek corridor. The boundaries of the PSW within the subject property are shown on Map 4 and comprise the following communities: Birch - Conifer Organic Mixed Swamp/ Hemlock - Hardwood Mixed Forest (SWM6-1/FOM6-2), and White Cedar Coniferous Forest (FOC4). Tributaries A and Bflow through this feature, and are cold-cool water streams, fed in-part through groundwater upwelling that occurs within the wetland.

5.1.3 Significant Woodlands

A Significant Woodland is located within the central and eastern portion of the subject property, and is approximately 6.3ha in area. The feature is part of the ESPA and is part of a larger

Environmentally Sensitive Landscape as identified in the Greenlands Network of the Region of Waterloo Official Plan (2015). The significant woodland extends off-property and exceeds the 4ha criteria requirement for woodland significance as listed in Section 7.C.6 of the Region of Waterloo OP.

5.1.4 Environmentally Sensitive Policy Area (ESPA)

The woodland and wetland communities on the subject property are part of a larger ESPA known as the Blair Swamp. This feature has been designated in the Regional Greenlands system due to its ecological significance, sensitivity, uncommon nature in the Region and/or its ecological quality. The ESPA boundary on the subject property coincides with the PSW and Significant Woodland boundaries. The delineated ESPA can be seen on Map 4, as approved by the Region and Township on September 4, 2018.

5.1.5 Environmentally Sensitive Landscape (ESL)

ESLs have been identified as part of the Greenlands Network within the Region of Waterloo Official Plan (2015) and are carried forward into the North Dumfries Official Plan (Township of North Dumfries 2018) An ESL is a broad area with distinct geographical and ecological characteristics and compositions which support and sustain a range of ecological functions. Approximately the northern half of the subject property falls within the Blair-Bechtel-Cruikston ESL, as shown on Map 4. The ESL boundary on the subject property encompasses the ESPA, PSW and Significant Woodland boundaries.

5.2 Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (SWHTG) outlines the types of habitats that the MNRF considers significant in Ontario, and criteria to identify these habitats are outlined in the specific Ecoregion Schedules (OMNR 2000; MNRF 2015). The SWHTG groups SWH into 4 broad categories: seasonal concentration areas; rare vegetation communities and specialized wildlife habitat; habitats of Species of Conservation Concern; and animal movement corridors.

NRSI conducted a screening exercise based on the evaluation criteria set out in the Ecoregion 6E Criterion Schedule (Ontario Ministry of Natural Resources and Forestry (MNRF) 2015), to identify the presence of candidate SWH within the subject property. Based on the background information review, desktop analysis, and field studies, 1 SWH type is confirmed for the subject property: Habitat for Special Concern and Rare Wildlife Species (Eastern Wood-pewee, Midland

Painted Turtle and Monarch). As well, 5 SWH types were maintained as candidate for the subject property: Bat Maternity Colonies, Turtle Wintering Area, Snake Hibernaculum, Turtle Nesting Area and Habitat for Special Concern and Rare Species.. All other candidate SWH types have been confirmed absent within the subject property based on field survey results. Refer to the final SWH screening exercise (Appendix III) for an analysis of each SWH type assessed within the subject property. Candidate and confirmed SWH types are discussed in detail below. SWH types are present within the natural areas and not the developed areas of the campground or the agricultural fields. The proposed development is located entirely outside of these areas, with limited encroachment only proposed in the north east corner of the property where cultural plantation is present, which does not provide SWH habitat.

5.2.1 Seasonal Concentration Areas

Wildlife seasonal concentration areas are defined as areas where animals occur in relatively high densities for all, or portions, of their life cycle (OMNR 2000). These areas are generally small in size, particularly when compared to areas used by these species during other times of the year.

While no confirmed seasonal concentration areas were observed and confirmed, suitable habitat was observed for 4 candidate SWH types as described below.

Candidate: Bat Maternity Colonies

Several species of SAR bats are known to roost in tree cavities, hollows, or under loose bark, as well as within buildings (OMNR 2000). Bat maternity colonies require very large mature trees and/or an assemblage of several cavity trees. Although no suitable cavities were observed, not all trees within the natural areas were assessed. The potential for cavities to be present throughout the proposed footprint is possible and therefore this SWH type is considered candidate.

Candidate: Turtle Wintering Area

Several turtle species require shallow aquatic habitat with muddy substrates within their core habitat areas for overwintering (OMNR 2000). Wetlands with soft bottoms that are deep enough to not freeze provide suitable habitat for wintering turtles (OMNR 2000).

Several Midland Painted Turtles were observed in June and July within the Ponds 2, 3, 4 and 5 which supports the potential for Turtle Wintering Area SWH. These ponds may provide soft

muddy substrates of suitable depths to be wintering features for turtles. Pond 1 contains hardened shores and is therefore unlikely to provide suitable wintering habitat. Based on the habitat and species observations, it is anticipated that Midland Painted Turtle may overwinter within Ponds 2, 3, 4, and 5.

Candidate: Snake Hibernaculum

Snake hibernaculum habitat can be found in any ecosite type as long as suitable features are present below the frost line (OMNR 2000).

Candidate Snake Hibernaculum SWH is documented in the subject property because of the potential for burrows, and presence of debris piles, old structures and other natural features that may provide subterranean hibernacula. Due to the inconspicuous nature of this SWH type, it is very difficult to confirm absence. If this habitat type is present on the subject property, it is likely contained within the natural areas; not the proposed campground footprint.

5.2.2 Specialized Wildlife Habitat

Some species with specialized habitat for breeding require large areas of suitable habitat for their long-term survival. The largest and least fragmented habitats within a localized area will support the most significant populations of wildlife.

Specialized habitats include those that support wildlife species with highly specific habitat requirements, areas with exceptionally high species diversity, and/or areas that provide habitat that greatly enhances a species' chance of survival (OMNR 2000). The SWHTG indicates that most specialized habitats have not been formally identified or mapped by any agency (OMNR 2000). Examples of specialized wildlife habitat include sites supporting area-sensitive species, old growth or mature forest stands, turtle nesting habitats, seeps/springs and cliffs.

No confirmed specialized wildlife habitat types were observed and confirmed, however suitable habitat was observed for 3 candidate SWH types as described below.

Candidate: Turtle Nesting Area

Suitable turtle nesting areas are close to water, away from roads and removed from high traffic areas where predation has a higher potential to occur (OMNR 2000). Open sunny areas of mineral sand or gravel soils excluding municipal roadsides are high quality nesting areas (OMNR 2000).

Candidate Turtle Nesting Area SWH is present around Pond 2, 3, 4, and 5 in the subject property due to the presence of observed mineral sands and several Midland Painted Turtles. In total, 15 Midland Painted Turtles were observed in the subject property on June 15, June 25, and July 13, 2018, combined. No nests or evidence of nests was observed during the 2018 field season, however, this SWH type is maintained as candidate.

5.2.3 Habitat for Species of Conservation Concern

Habitat for Special Concern and Rare Wildlife Species was identified as a confirmed SWH type during 2018 and 2019 field surveys. These species include Barn Swallow, Eastern Wood-pewee, Monarch, and Painted Turtle.

Confirmed: Special Concern and Rare Wildlife Species

Special Concern and Rare Wildlife Species SWH is confirmed by the presence of SCC, where those SCC have suitable breeding habitat in the subject property. Background information reviews and screening exercises identified 14 potential SCC in the vicinity of the subject property. During field visits and targeted surveys, NRSI biologists observed 3 SCC in the subject property comprising; Eastern Wood-pewee, Midland Painted Turtle and Monarch. Refer to Appendix III for all identified SCC and rare wildlife species in the vicinity of the subject property during the background review.

Eastern Wood-pewee

Eastern Wood-pewee is listed as Special Concern provincially under COSSARO and federally by COSEWIC. Suitable habitat is noted as a variety of vegetation communities which include open, deciduous, mixed or coniferous forest; forest clearings and edges; farm woodlots and parks (MNRF 2015). Eastern Wood-Pewee has been confirmed within the subject property where a singing male was recorded on June 15, 2018, and two singing males were recorded on June 25, 2018. Breeding evidence for Eastern Wood-Pewee is considered ‘Probable’ due to the presence of multiple singing males on multiple breeding bird surveys. This species is expected to use the ESPA feature and internal woodland communities.

Midland Painted Turtle

Midland Painted Turtle is not listed provincially, but is listed as Special Concern federally under COSEWIC. Wetlands containing warm, shallow water with abundant aquatic vegetation such as ponds, large pools, streams, ditches, swamps, and meadow marshes are all areas of

suitable habitat (OMNR 2000). Midland Painted Turtle was observed on the subject property on June 13, June 15, and June 25 2018, in Pond 1, 2 and 5.

Monarch

Monarch is listed as Special Concern provincially and Endangered federally. Suitable Monarch habitat requirements are open areas, roadsides, or waste places where its host plants; Milkweed (*Asclepias spp.),* are found. Both Common Milkweed (*Asclepias syriaca*) and Swamp Milkweed (*Asclepias incarnata*) were observed throughout the subject property during vegetation surveys conducted by NRSI biologists. A single Monarch was observed incidentally on July 13, 2018 in open areas adjacent to the pond community along the eastern edge of the subject property. Habitat for this species is very limited, but present. Suitable hostplants were not observed within the proposed development areas.

5.3 Habitat of Endangered and Threatened Species

Background information reviews and screening exercises identified 9 potential SAR in the vicinity of the subject property. Based on field investigations, Barn Swallow is the only species observed and documented within the subject property.

5.3.1 Barn Swallow

Barn Swallow are regulated SAR listed as Threatened provincially and federally, affording individuals and their habitat protection under the ESA. This species is an aerial insectivore, requiring large open areas for foraging (OMNR 2000). Suitable breeding habitat includes buildings such as barns, sheds, homes and other man-made structures in proximity to open fields and water (OMNR 2000). An individual Barn Swallow was observed during a breeding bird survey on June 15, 2018. No breeding evidence was recorded as the individual was observed foraging in the manicured lawn area in the southeast portion of the subject property. No nests were observed within the subject site, and no suitable nesting structures are proposed to be removed or impacted during development.

5.3.2 Endangered Bat Species

Both Little Brown Myotis and Northern Myotis are regulated SAR listed as Endangered provincially and federally which affords individuals and their habitats protection under the ESA. Suitable habitat includes forest edge and treed habitats where appropriate cavity and roosting features are present (MNRF 2015). Both species use hollow trees, buildings and manmade

structures for roosting and forage over wetlands or at the edge and within treed areas (MNRF 2015). Suitable roosting and foraging habitat may be present in the forested areas of the subject property where trees containing suitable cavities are present. The development is located outside of the forested areas of the site, but individual trees in the campground area may be removed.

5.4 Fish Habitat

Ponds 1, 2 and 3 provide habitat to fish as directly observed by NRSI biologists, including nesting of Pumpkinseed. Although these are man-made/altered ponds, they are, or can be connected to the tributaries. The two species of fish observed within the ponds, Pumpkinseed and Smallmouth Bass, are considered cool to warmwater species (Eakins 2019), and were most likely introduced into the man-made ponds. Ponds 4 and 5 are shallow wetlands and do not represent fish habitat under the *Fisheries Act* as they are not connected to any watercourses at any time of the year.

Tributaries A and B also provide direct and indirect fish habitat and would receive protection under the *Fisheries Act*. These are small cool-coldwater streams that contribute clean cold water to downstream habitats and into Blair Creek. The *Fisheries Act* protects fish and fish habitat (as identified within the Act) up to the high-water mark. If work is proposed within the tributaries, a DFO proponent driven assessment should be completed, and if there is potential for impacts to fish and fish habitat then a Request for Review should be completed once design details are known.

6.0 Impact Analysis

6.1 Proposed Undertaking

The proposed undertaking includes a redesign and expansion of the existing 80 trailer campsites to create 347 trailer campsites, 10 cabin sites and 26 overnight sites, totaling 383 lots, as shown on the Concept Plan prepared by GSP Group (2019) and on Map 4. The trailer campground is proposed to extend into the southern agricultural fields up to the existing hydro corridor. The existing trailer sites and road network will be re-configured for more efficient use of space. In addition, the site plan proposes 2 recreation halls (one in the north near Pond 1, and one near Whistle Bare Road), a pool, court and playground near Pond 1, 2 bridges (one reconstruction and one new development), a workshop and office building and a garbage and recycling storage facility. Servicing will include individual underground lot services, which will link into the proposed sewage pumping station and wastewater treatment facility with 4 septic beds. All buildings and facilities listed, with the exception of the proposed bridges, are well outside of the natural areas and their buffers and all can be seen on the Concept Plan in Appendix I.

6.2 Approach to Impact Analysis

The potential impacts are determined by comparing the characteristics of the existing natural features and their functions to typical residential and construction processes. Where a development proposal overlaps or is adjacent to natural features, impacts may arise. The following is a description of the types of impacts that have been assessed.

- **Buffers** are first discussed as they relate to the Regional Official Plan (Region of Waterloo 2015). This section provides an overview of the proposed buffer strategy as it relates to the Official Plan and proposed development. Some impacts are discussed in this section, but are further divided and described in detail in the following sections.
- **Direct** impacts to the natural features on the subject property associated with disruption or displacement caused by any potential future ‘footprint’ of an undertaking.
- **Indirect** impacts associated with changes in site conditions such as drainage and water quantity/quality.

6.3 Buffers, Setbacks, and Stewardship

Given that the proposed undertaking is the reconfiguration and expansion of the existing seasonal camp sites, and continued recreational use of the property, a lower level of potential impact is expected rather than that which would typically accompany a permanent residential development. The impact of the campground should be considered differently based on a number of factors:

- Trailer sites are a less densely populated type of development,
- Limited hard surfaces are proposed,
- Grading is expected to be much more limited, and
- Vegetation removal is expected to be more minimal.

Based on these characteristics of the development, and recognizing the existing placement of lots, a variable approach to buffers and setbacks is proposed. The Regional Official Plan requires a minimum 10m buffer from Core Environmental Features. The purpose of this buffer is to:

1. Protect trees, vegetation, and their root zones, including hydrological changes due to impermeability and grading,
2. Mitigate disturbance to forest wildlife, and
3. Provide a separation distance between the natural feature and any disturbance and activity by residents.

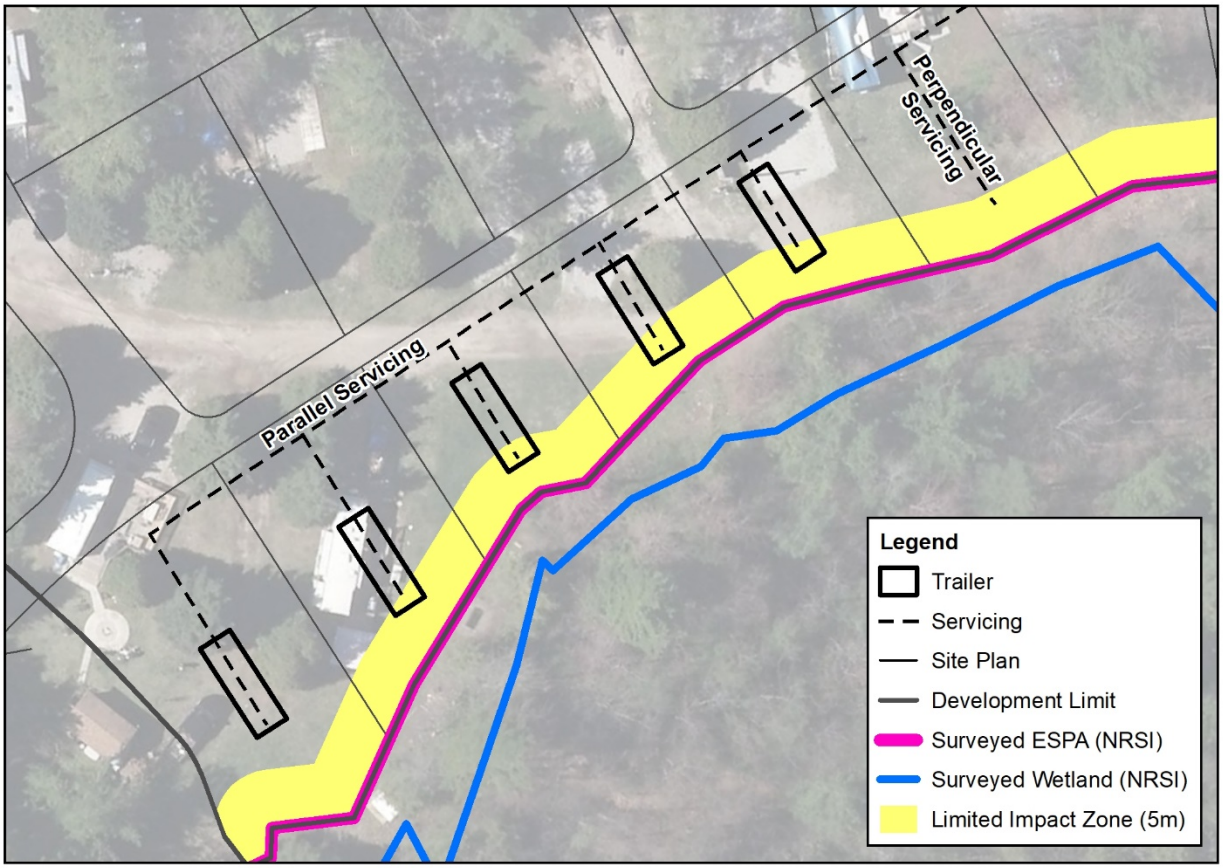
A modified approach to the buffer has been applied in this proposed undertaking. The proposed buffer strategy aims to achieve the above goals, while also accounting for the existing condition and use of the property and understanding that limited impact is expected as a result of the proposed “development footprint”. Current site conditions include encroachment into the delineated ESPA; these areas are shown on Map 4. In many areas, the existing trailer lots extend into the wooded area and trailers may be parked under the canopy of the forested dripline. The dripline was delineated using the outer edge of the woodland, but recognizing that the understory conditions are cultural uses. For example, the northern property boundary was assessed to be relatively cultural, and contains existing trailer lots and mowed lawn. These existing lots are proposed to remain at their current extent. A 5m interior limited impact zone has been proposed within these cultural areas such as the cultural plantation in the northeast corner of the subject property. This zone is currently maintained as lawn and doesn’t include

the stems of any of the trees assessed as part of the ESPA boundary. Existing uses will remain, but no new encroachments into the ESPA are proposed.

In these same areas, a 5m Limited Impact Zone is proposed from the ESPA feature in lieu of a 10m buffer (Map 4). This zone will also continue to contain existing uses, but will be subject to some limited impacts, namely servicing. To help illustrate this strategy, limited impact zones are shown schematically in Figure 1, and will have no construction or development activities outside of the following:

- Perpendicular servicing cuts to each trailer location for water, electrical and wastewater. The angle of these cuts minimizes root damage to trees, as shown in Figure 1;
- the placement of trailers, and
- lot maintenance, including personal lawn and yard care (with restrictions regarding invasive species, discussed in Section 7.4.

Figure 1. Proposed Servicing Strategy



The existing land use within and adjacent to the protected natural areas is largely trailer park and trailer storage. These uses are proposed to continue in these areas. In this way, the layout of the concept plan is not showing further encroachment than currently exists. Furthermore, the woodland edges will require enhancement through a planting plan and stewardship plan.

The separated wetlands/ponds on the eastern boundary of the subject property will have a 15m buffer, which is proposed to be planted and restored, and should be designed at the Site Plan Application stage.

Finally, a 10m buffer is proposed to be planted and restored along the watercourse features identified on Map 4. These features will require a new bridge and a bridge reconstruction to provide adequate access to the lands.

If the below mitigation measures are implemented, including those detailed throughout Section 6.4 and Section 6.5, this buffer management strategy is expected to result in negligible impacts to the natural areas.

Mitigation

- Natural areas should be enhanced through a planting and restoration plan, which should include both invasive species management and native plantings. This should be developed at the site plan application stage for 3 areas: below the dripline of the ESPA, for the wetland buffers in the east, and for the 10m watercourse buffers,
- Education of maintenance staff to advise on appropriate limits of grass mowing, tree cutting, pruning practices, wildlife protection, disposal of yard waste, etc.
- A stewardship plan should be designed by a qualified ecologist, and implemented by the landowner that ensures continued invasive species management, regulation of planted garden plants that can be aggressive or invasive, such as English Ivy, Norway Maple (*Acer platanoides*), Tartarian Honeysuckle (*Lonicera tatarica*), (*Hedera helix*) and Lily-of-the-Valley (*Convallaria majalis*), and
- The only permitted construction activities and long-term land use are those listed in this section, which are comprised of perpendicular servicing cuts, trailer placement, and yard maintenance. The final land use will not extend beyond that already existing.

6.4 Direct Impacts

6.4.1 Site Grading

Grading typically has the potential to result in lower infiltration rates while changing overland and underground flow patterns through the movement and compaction of soil. Grading also results in vegetation clearing and damage to nearby tree root zones.

Typical site plan developments require the grading of most or all of the development footprint. The development of this site will not be proposing grading throughout the majority of the campground; however, some grading will be required for servicing, building construction, road development, and the creation of bioswales for stormwater management. A grading plan (there is a preliminary plan?) has not been developed for the campground, and so the following mitigation recommendations should be implemented during the site plan application stage.

Mitigation

- Tree retention should be reviewed by a Certified Arborist, and retention should be maximized throughout. A Tree Protection Plan should be developed and maintained throughout all grading activities,
- A sediment and erosion control plan should be designed and implemented prior to any grading or earth moving. Any wetlands, ponds and watercourses should be protected from surface runoff from cleared areas,
- Heavy machinery access and staging should be limited to pre-defined areas, away from natural features. Any proposed bioswales should be planned with tree retention in mind, avoiding critical root zones, and
- Erosion Control Fencing and / or Tree Protection Fencing should be placed at the edge of grading impacts. The wetland, watercourses and natural areas should be completely fenced from any development activities.

6.4.2 Tree and Vegetation Removal

Many mature trees are present throughout the existing campground. Since these trees are not within a woodland, they are not protected under any regional policies, and the Township of North Dumfries does not have any by-law or policies regarding private tree removal. Regardless, these trees are important for shade, aesthetics and may provide suitable habitat for wildlife, including nesting birds and SAR bats.

According to the Canadian Wildlife Service (CWS), the peak breeding period for migratory birds that nest in open and forested habitats in southern Ontario, interpreted as the habitat conditions present within the areas of landscaped trees, is between early April and the end of August (Canadian Wildlife Service (CWS) 2017). During this period, the CWS recommends that no clearing of vegetation occur within these habitats. The *Migratory Birds Convention Act* (Government of Canada 1994) protects migratory birds, their eggs and nests from being harmed or destroyed at any time of the year. The CWS advises that nest searches, as a measure to mitigate impact to nesting birds during the core breeding period, not occur within 'complex' habitats such as treed areas where the likelihood of observing all nests and eggs is low while the potential to disturb nesting birds is high. However, nest searches, as a means of mitigation during the core breeding period, may be undertaken in 'simple' habitats, such as hedgerows, isolated trees, or constructed features (i.e. bridges or buildings) where the potential to observe all active nests is relatively high. The majority of trees and shrubs within the proposed development footprint qualify as 'simple' habitats.

Mitigation

- A Certified Arborist should be consulted during the Site Plan Application stage and Detailed Design stage, and a tree retention analysis should be completed by the Certified Arborist. A Tree Protection Plan should be developed and maintained throughout all construction activities,
- Vegetation removal should be minimized where possible.
- Any tree or brush removal should be completed outside of the active breeding bird season (April 5 to August 27),
- Any removal of trees with cavities suitable for bats should be completed outside of the active bat roosting season (April 1 to October 31),
- No tree or vegetation removal will be permitted within the ESPA or PSW features, and,
- Trees identified for protection at the Site Plan Application stage should be inspected following construction to identify any remaining hazards or damage that may not be safe following construction.

6.5 Indirect Impacts

6.5.1 Wildlife and Their Habitats

Potential indirect impacts to wildlife may arise from noise and dust associated with construction activities and unnatural lighting resulting from the development. Lighting is already present throughout the campground seasonally, and noise associated with construction is anticipated to be short term and temporary; therefore, significant effects on wildlife are not expected. Potential impacts to wildlife habitat are limited to the removal of isolated trees, and no natural areas are proposed for removal.

Mitigation

- The limitations set forth in Section 6.4.2 relating to tree removal should be adhered to,
- To reduce impacts to wildlife from noise and vibrations, daily construction activities should be restricted to between 7:00am and 7:00pm,
- As a general means to limit the extent of impacts to wildlife habitat during construction, efforts should be made to clearly demarcate the limits of development,

including vegetation cutting and grading boundaries, so as to prevent unnecessary encroachment into the surrounding natural features and their associated buffers,

- Education of maintenance workers, staff and residents about the values of wildlife and their habitats, as well as reminders to protect and avoid harassment or persecution of turtles, amphibians, snakes, mammals, birds and insects either by pets or people.

6.5.2 Surface Water Runoff Changes and Soil Compaction

Soil compaction occurs as a result of grading and construction activities and can reduce soil permeability, increasing runoff rates. The majority of the campground will remain ungraded and permeable vegetated (lawn) surfaces; however, the denser lots and road network is likely to result in slightly increased runoff.

Mitigation

- Low impact (LID) bioswales should be provided along the roads, but should be weighed against impacts to trees and wildlife habitat,
- No hardening or regrading of surfaces within 10m of the ESPA or PSW,
- A detailed planting plan of the ESPA edge area in order to clean and slow runoff from the lots, and
- The existing surface water drainage patterns are to be maintained where possible to maintain existing soil moisture regimes

6.5.3 Wastewater Treatment

The proposed wastewater treatment system includes on-site leaching and large system treatment units. The development of this treatment system will be created through consultation with the MECP, ensuring a high degree of environmental protection, monitoring and maintenance. It is anticipated that the proposed wastewater system will be an improvement over the existing ad-hoc individual treatment systems. Recommendations aimed at reducing any potential impacts due to wastewater and effluence are outlined in Section 4.1 of the Hydrogeological Assessment (Chung & Vander Doelen Engineering Ltd. 2019).

Mitigation

- The proposed upgrades to the wastewater management on site are expected to be an improvement over the existing condition,

6.5.4 **Water Supply**

The proposed upgrades include a new 30m deep well; significantly deeper than the current well of approximately 6m. Water taking tests completed by Chug & Vander Doelen Engineering Ltd. (2019) suggest that the well has an excellent ability to be pumped at high rates for short durations without an accumulated aquifer drawdown, also known as aquifer dewatering. This dewatering is limited to the lower aquifer feature, which is more separated from the wetland and water features throughout the study area. The perched aquifer is not expected to be largely affected by the proposed water taking. The water pumped from the deeper aquifer well will ultimately be returned to the shallow groundwater system via the sewage system leaching bed, or used for irrigation purposes across the property. This increase to water infiltration will result in greater local discharge to the Blair Creek, tributary, and PSW (Chung & Vander Doelen Engineering Ltd. 2019).

Mitigation

- The proposed water taking, as outlined in the hydrogeological assessment, is not anticipated to impact the natural communities.

6.5.5 **Injury to Trees**

Isolated mature trees are present throughout the campground, and are expected to have mature extensive root zones. Injury to tree limbs or their root systems from construction activities (e.g. grading, excavation, etc.) and machinery may occur. Trenching for servicing is likely to result in exposure and cutting of roots.

Mitigation

- Disturbance and installation of services to be outside of ESPA and 10m buffer wherever possible. Minimal intrusion into the 5m Limited Impact Zone is permitted only in areas as shown on Map 4,
- Servicing into individual lots in the Limited Impact Zone will be perpendicular to woodland dripline, minimizing cutting into root zones (as shown in Figure 1), and
- A Tree Protection Plan should be prepared and implemented prior to and throughout the construction process, as outlined in Section 6.4.2. Exposed roots as a result of

trenching or grading should be pruned using clean, sharp tools to reduce wound exposure and recovery times.

6.5.6 Erosion and Sedimentation

During construction, areas of bare soil will be exposed that have the potential to erode during rainfall events and impact adjacent natural features. In the event of a heavy rain or snow melt event, sediment laden runoff can enter adjacent natural areas by way of overland flow and damage vegetation and fish habitat.

Mitigation

- In order to protect natural features from potential impacts due to sediment, an ESC plan must be developed and implemented prior to any construction activities on the site, including any grading, vegetation removal and clearing,
- The ESC fencing should be combined with Tree Protection Fencing where possible, and
- The ESC is to be maintained in good working order by the developer and/or their representative for the entire construction phase, and be removed once all development is complete and exposed soils are stabilized.

6.6 *Fisheries Act* Assessment for Proposed Works

NRSI completed an assessment of the proposed works, based on the development plan provided November, 2019, as it relates to whether a review through the DFO's Fisheries Protection Program would be required. The assessment is to determine whether the measures to protect fish and fish habitat can be followed in their entirety to ensure there is no death to fish, or harmful alteration, disruption or destruction (HADD) of fish habitat in the proposed construction work, undertaking or activity. The development plan is still preliminary; no detailed grading plan has been developed, and no detailed designs are available for the proposed new and upgraded crossing locations. Preliminary grading plans have been used to inform the proponent-led assessment, which includes the works to Tributary A and Tributary B, as well as works related to Pond 1. The works for Tributary A includes a new road crossing location, which will involve both land- and in-water activities. The works for Tributary B includes upgrades to the road, which may include upgrades to the existing culverts (upstream and at the road). A pool is proposed adjacent to Pond 1.

As land-based construction activities outside of the high-water mark can still result in a cause-and-effect relationship that can ultimately affect fish and fish habitat, the proposed works for Pond 1 were reviewed under the following Pathways of Effects (PoE's):

- Excavation,
- Grading,
- Riparian planting,
- Use of industrial equipment, and
- Vegetation Clearing.

As there are no in-water works, or works within the high-water mark, and as long as the standard mitigation measures, as outlined within the direct and indirect impact section of this report are followed, fish and fish habitat should be protected for Pond 1. Further review may be required once details of grading plans are known for the proposed pool to determine if there are works within the high-water mark. As this is a man-made pond with regulated water levels, it is expected that the works could be completed without contravening the *Fisheries Act*.

Regarding Tributary A and Tributary B, it is difficult to determine if the new culvert crossing or upgrade to the existing crossing will result in impacts to fish and fish habitat without knowing the details of the design, construction method, schedule, etc. Once design details are known, NRSI recommends completing a more detailed review based on the Pathways of Effects for In-water Activities. If it is determined that the implementation of DFO's measures to protect fish and fish habitat cannot fully mitigate the potential of a HADD then the project works may need to be sent to the FPP for further review.

At this point, NRSI recommends the following to help ensure the protection of fish and fish habitat:

- Suitable construction timing windows should be confirmed with the MNRF to protect fish and fish habitat. Typical coldwater timing windows restrict construction activities from October 1 to May 31;
- Avoid tree removal and maintain riparian vegetation where possible;
- Carry-out the works in the dry while maintaining flow downstream;
- Maintain fish passage including properly sizing and installing culverts;

- Develop an ESC plan and ensure proper installation and maintenance of ESC measures;
- Prevent entry of deleterious substances into water; and
- Maintain all machinery on site in a clean condition, free of fluid leaks and ensure washing, refueling and servicing of machinery is done in such a way that no deleterious substances will enter the water.

7.0 Monitoring and Stewardship

Comments from EEAC on the TOR, outline that the EIS should include "*content of a during-development and post-development monitoring program; and stewardship plan for the portion of Core Environmental Features on the subject property*". Monitoring requirements for the proposed development will be required for several environmental factors:

1. Tree health and protection measures,
2. Sediment and Erosion Control measures, and
3. Establishment and maintenance of native plant communities.

The particulars of these items should be addressed at the Site Plan Application stage, and should be reviewed and approved by the appropriate agencies. Preliminary details regarding these monitoring plans are outlined below.

7.1 Tree Health and Protection Measures

The trees in the campground area are valuable and contribute to the existing land use. The proposed development intends to maximize tree retention throughout the re-development and installation of servicing, grading and other construction activities. To ensure trees can be retained wherever possible, a Certified Arborist should be involved in a detailed retention analysis and Tree Protection Fencing Plan. Monitoring of trees and tree protection measures should occur prior to the commencement of construction, during key construction activities (such as trenching), and following the completion of all construction works. Details regarding tree protection measures and monitoring should be developed at the Site Plan Application stage.

7.2 Erosion and Sediment Control Measures

Erosion and sediment, if left uncontrolled, can pose a major threat to the health of the ponds, tributaries, and wetland features on the subject property. A detailed Erosion and Sediment Control plan will be required at the Site Plan Application stage, and should be reviewed by a qualified environmental professional. Erosion and sediment control measures should be installed and inspected prior to any construction activities, and throughout the duration of construction.

7.3 Establishment of Native Plant Communities

Planting of buffers is proposed for several areas across the subject property; within the ESPA edge, within 15m of Ponds 4 and 5, and within 10m of the tributaries (Map 4). A Planting Plan will need to be established in detail at the Site Plan Application stage, and should include suitable shrub and tree species native to the area, along with herbaceous seed mix and removal strategies for of existing lawn or invasive species, aiding in a transition to a healthy, dense, native buffer community.

Vegetation should be inspected prior to planting to confirm appropriate species are being supplied and to ensure the initial health and condition of the material. Plantings should be monitored following installation to document condition and success. Any dead or poor material should be removed and replaced. NRSI recommends a 2-year warranty on nursery material.

7.4 Land Stewardship

The subject property contains portions of documented and delineated locally and provincially significant natural areas; PSW, ESPA, and ESL. Through the proposed development these habitats are retained and buffered and in some areas, enhancements are planned. Stewardship of these resources is the responsibility of the landowners, or a representative of the landowners, and should be practiced throughout the life of the campground. This EIS outlines measures to avoid and minimize impacts to the natural features as well as opportunities for restoration and enhancement. Map 4 shows areas where improvements can be made to existing trailer lots (Limited Impact Zone and Interior ESPA Setback) as well as areas to be set aside for buffers which are to be planted (ESPA Buffer, Wetland Buffer and Stream Restoration Setback). Stewardship of the property will include education opportunities for staff and visitors, as well as periodic invasive species management and removal, prohibitions on invasive or aggressive garden species, and ensuring adherence to the developed setbacks outlined in this report. Details for a Stewardship Management Plan should be developed at the Site Plan Application stage.

8.0 Summary

NRSI was retained by Country Gardens RV to complete an EIS for a proposed upgrade and expansion of the Whistle Bare RV Park. The upgrade and expansion include a new lot layout, expansion into the agricultural fields, and several buildings and recreation features. This EIS is in support of a Zone Change Application, and has been informed by preliminary servicing, grading, hydrogeological and stormwater management reports and information from the study team that are available at this stage. This EIS identifies an altered buffer strategy that reflects the reduced severity of impacts that are associated with this type of development, being a seasonal campground. The study shows that the on-site and adjacent ESPA and wetland features can be protected, with no major impacts, and enhanced through this development application, if the listed mitigation measures are carried out before, during, and following the development. A summary of the mitigation measures outlined throughout Section 6.0 are listed below.

- The Limited Impact Zones will only allow the following activities:
    - Perpendicular servicing cuts to each trailer location,
    - The placement of trailers, and
    - Lot maintenance, including personal lawn and yard care.
- No tree or vegetation removal will be permitted within the ESPA or PSW features,
- Efforts should be made to clearly demarcate the limits of development, including any tree or vegetation cutting and grading boundaries, so as to prevent unnecessary encroachment into the surrounding natural features and their associated buffers,
- Tree retention should be reviewed by a Certified Arborist, and retention should be maximized throughout. A tree protection fencing plan should be developed and maintained throughout all grading activities,
- Silt fencing and / or tree protection fencing should be placed at the edge of grading impacts. The wetland and natural areas should be completely fenced from any development activities,
- Exposed roots as a result of trenching or grading should be pruned using clean, sharp tools to reduce wound exposure and recovery times.
- Trees identified for protection at the Site Plan Application stage should be inspected following completion of construction to identify any remaining hazards or damage that may not be safe following construction,

- Any tree or brush removal should be completed outside of the active breeding bird season (April 5 to August 27),
- Any tree removal should be completed outside of the active bat roosting season (April 1 to October 31),
- To reduce impacts to wildlife from noise and vibrations, daily construction activities should be restricted to between 7:00am and 7:00pm,
- Low impact (LID) bioswales should be proposed along the road where feasible, but should be weighed against impacts to trees and wildlife habitat,
- No hardening or regrading of surfaces will be permitted within 10m of the ESPA or PSW,
- The existing surface water drainage patterns are to be maintained where possible to maintain existing soil moisture regimes,
- A detailed Erosion & Sediment Control Plan must be created at the Site Plan Application stage,
- The ESC fencing should be combined with Tree Protection Fencing where possible,
- The ESC is to be maintained in good working order by the developer and/or their representative for the entire construction phase, and be removed once all development is complete and exposed soils are stabilized,
- Natural areas should be enhanced through a planting and restoration plan, which should include both invasive species management and native plantings. This should be developed at the site plan application stage for 3 areas: below the dripline of the ESPA, for the wetland buffers in the east, and for the 10m watercourse buffers, and
- A stewardship plan should be designed by a qualified ecologist, and implemented by the landowner that ensures continued invasive species management and regulation of planted garden plants that can be aggressive or invasive, such as English Ivy (*Hedera helix*) and Lily-of-the-Valley (*Convallaria majalis*).

9.0 References

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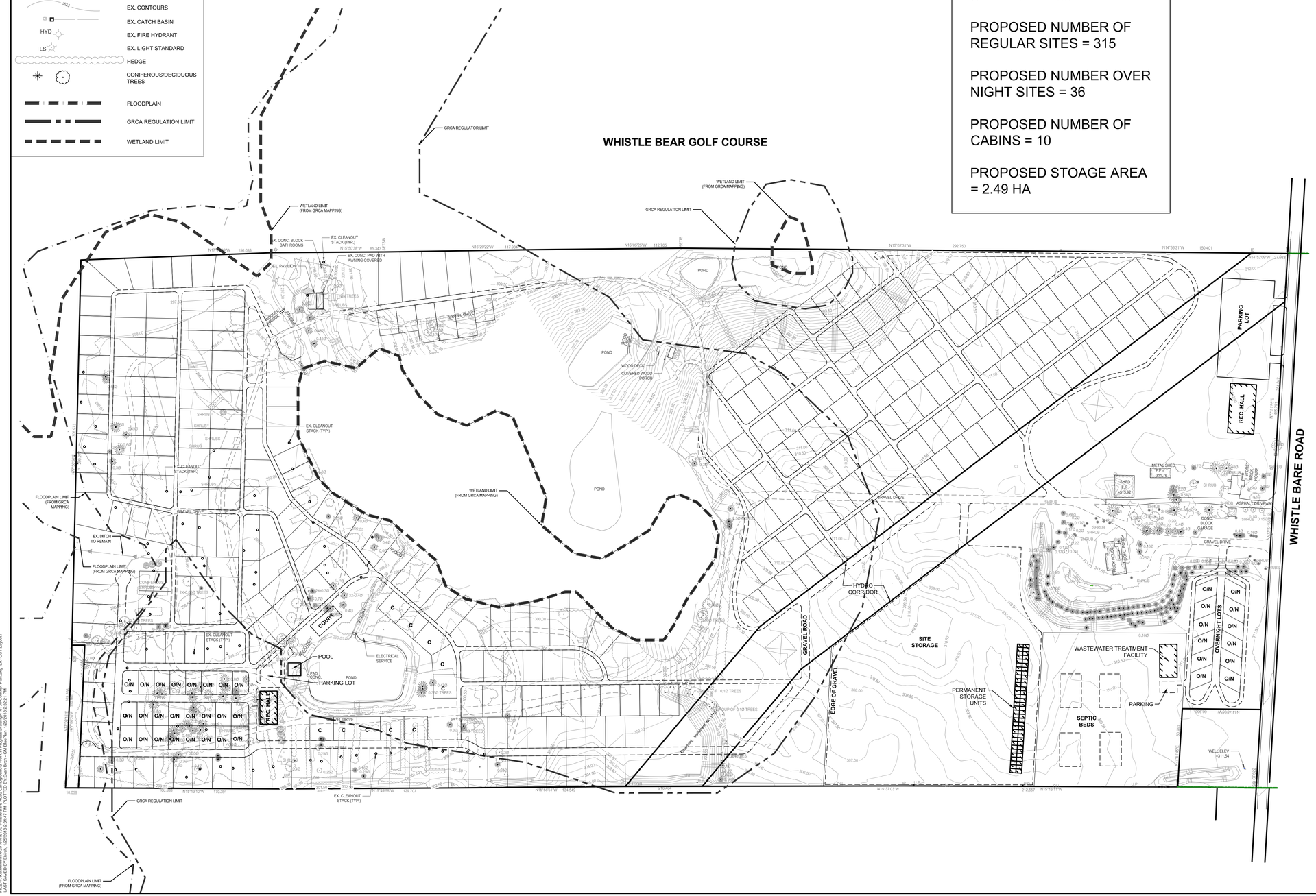
Maps

APPENDIX I Concept Plan

LEGEND

- PROPERTY LINE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. WATERMAIN
- EX. DITCH
- EX. BELL LINE
- EX. GAS LINE
- EX. FENCE LINE
- EX. CONTOURS
- EX. CATCH BASIN
- EX. FIRE HYDRANT
- EX. LIGHT STANDARD
- HEDGE
- CONIFEROUS/DECIDUOUS TREES
- FLOODPLAIN
- GRCA REGULATION LIMIT
- WETLAND LIMIT

WHISTLE BEAR GOLF COURSE



SITE STATISTICS

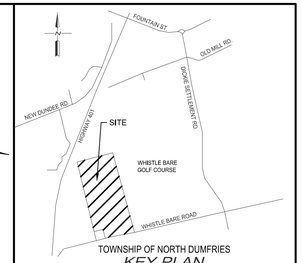
SITE AREA = 38.21 HA

PROPOSED NUMBER OF REGULAR SITES = 315

PROPOSED NUMBER OVER NIGHT SITES = 36

PROPOSED NUMBER OF CABINS = 10

PROPOSED STOAGE AREA = 2.49 HA



TOWNSHIP OF NORTH DUMFRIES

KEY PLAN

NOT TO SCALE

NOTES :

1. TOPOGRAPHICAL SURVEY COMPLETED BY ACI SURVEY CONSULTANTS DATED MAY 31, 2017

BENCH MARKS :

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM.

NO.	DATE	REVISION DESCRIPTION	CHKD
1.	-/-/-	ISSUED FOR REVIEW	S.J.P.

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WHISTLE BARE ROAD CAMPGROUNDS

1912 WHISTLE BARE ROAD

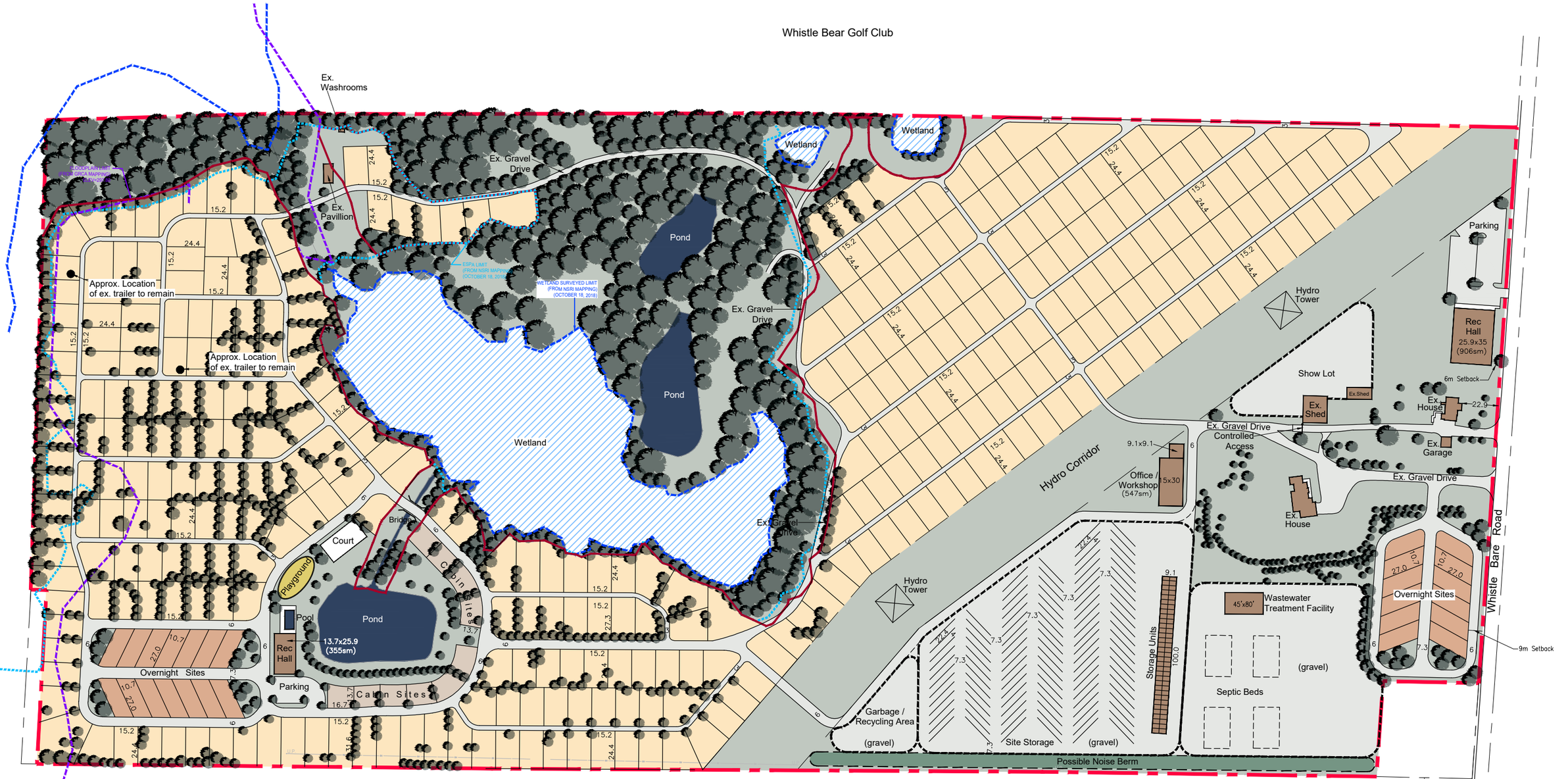
THE TOWNSHIP OF NORTH DUMFRIES (CAMBRIDGE)

CONCEPT PLAN

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
A.M.	S.J.P.	416130	1
DESIGNED BY :	DATE :	SCALE :	
S.J.P.	NOVEMBER 2017	1:1500	

FILE:W:\Kitchener\416-2016\416130 Whistle Bare Road Campground\5 Work In Progress\Drafting\416130-Concept Plan.dwg LAYOUT:Layout1
LAST SAVED BY:Chris 10/20/2018 2:23:47 PM PLOTTED BY:Evan Birch GM BluePlan 10/20/2018 2:23:21 PM

Whistle Bear Golf Club



Site Area: 38.2ha.
Development Area: 29.1ha.

Legend

- Floodplain (GRCA)
- ESPA Limit
- Wetland Boundary
- Development Limit

Regular Sites: 352
Cabin Sites: 10
Overnight Sites: 26
Total Sites: 388

0 10 50 150
5 25 Meters 100

NOTE: This concept has been prepared for general feasibility purposes only. Building code requirements and technical / architectural design have not been addressed.

Scale 1:2,500 | March 22, 2019 | Project No.: 18088 | Drawn By: SL

GSP group

Whistle Bare Campground

DEVELOPMENT CONCEPT

1912 Whistle Bare Road, Cambridge

APPENDIX II Terms of Reference

APPENDIX III SAR/SCC and SWH Screenings

Appendix III
Whistle Bare Campground, Township of North Dumfries
SAR/SCC and SWH Screening

Scientific Name	Common Name	S-Rank[1]	COSSARO[2]	COSEWIC[3]	SARA[3]	Background Source	Observed by NRSI	Habitat Preference[4,5]	Suitable Habitats within Subject Property	Carried Forward to EIS?	Rationale
Birds											
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	T	Schedule 1	BSC et al. 2008	No	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water.	Yes	No	The subject property contains open water and treed habitat which may provide suitable foraging habitat. Chimney Swift is reported from the vicinity of the subject property. However no suitable chimney or rock cliff habitat is present and no Chimney Swifts were observed during breeding bird surveys.
Chordeiles minor	Common Nighthawk	S4B	SC	T	Schedule 1	BSC et al. 2008	No	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	Yes	No	Marginal forest clearings and open woodlands exist in the subject property and suitable barren and rocky areas are not present. Common Nighthawk was not observed during breeding bird surveys.
Colinus virginianus	Northern Bobwhite	S1	END	E	Schedule 1	BSC et al. 2008	No	Grassland, prairie or hay fields with woody cover in form of thickets, tangles of vines, shrubs; fence rows or woodland edges; cropland growing corn, soybeans or small grains and clover or grass; well-drained sandy or loamy soil; pond edges.	No	No	Suitable grassland areas are not present within the subject property. Northern Bobwhite is reported from the vicinity of the study area but was not observed during breeding bird surveys. Northern Bobwhite is currently known only from a small population on Walpole Island in southwestern Ontario.
Contopus virens	Eastern Wood-pewee	S4B	SC	SC	-	BSC et al. 2008	Yes	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks.	Yes	Yes	Suitable open, deciduous forest and woodlots exist in the subject property. An individual singing male Eastern Wood-pewee was observed during breeding bird surveys and breeding evidence was recorded as possible.
Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	SC	T	Schedule 1	BSC et al. 2008	No	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40 cm dbh; require about 4 ha for a territory.	Yes	No	Suitable open, deciduous forest is present in the subject property which exceeds the required 4ha. Red-headed Woodpecker is reported from the vicinity of the subject property but was not observed during breeding bird surveys.
Riparia riparia	Bank Swallow	S4B	THR	T	-	BSC et al. 2008	No	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence.	No	No	The subject property does not include steep riverbank cliffs, lakeshore bluffs or significant sand/gravel features. Bank Swallow is reported from the vicinity of the subject property but was not observed during breeding bird surveys.
Hirundo rustica	Barn Swallow	S4B	THR	T	-	BSC et al. 2008; MNRF 2019b	Yes	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	Yes	Yes	Suitable buildings and man-made structures are present within the subject property. Barn Swallow is reported from the vicinity of the subject property and was observed incidentally by NRSI biologists during field site visits. No breeding evidence was recorded but suitable open country habitat is present within the subject property for foraging.
Hylocichla mustelina	Wood Thrush	S4B	SC	T	-	BSC et al. 2008	No	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m.	Yes	No	Suitable mature and mixed forests near ponds/wetlands is present in the subject property. Wood Thrush is reported from the vicinity of the subject property but was not recorded during breeding bird surveys.
Sturnella magna	Eastern Meadowlark	S4B	THR	T	No Schedule	BSC et al. 2008	No	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	Yes	No	Suitable farmland habitat of suitable size is present in the subject property. The proposed development is not expected to impact agricultural lands in the southern half of the portion. Eastern Meadowlark is reported from the vicinity of the study area but was not recorded during breeding bird surveys.

Scientific Name	Common Name	S-Rank[1]	COSSARO[2]	COSEWIC[3]	SARA[3]	Background Source	Observed by NRSI	Habitat Preference[4,5]	Suitable Habitats within Subject Property	Carried Forward to EIS?	Rationale
Ammodramus savannarum	Grasshopper Sparrow	S4B	SC	SC	-	BSC et al. 2008	No	Well-drained grassland or prairie with low cover of grasses, taller weeds on sandy soil; hayfields or weedy fallow fields; uplands with ground vegetation of various densities; perches for singing; requires tracts of grassland > 10 ha.	No	No	Suitable grassland areas are not present within the subject property. Grasshopper Sparrow is reported from the vicinity of the study area but was not observed during breeding bird surveys.
Herpetofauna											
Chrysemys picta marginata	Midland Painted Turtle	S5	-	SC	-	Ontario Nature 2019	Yes	Quiet, warm, shallow water with abundant aquatic vegetation such as ponds, large pools, streams, ditches, swamps, marshy meadows; eggs are laid in sandy places, usually in a bank or hillside, or in fields; basks in groups; not territorial.	Yes	Yes	Suitable aquatic habitat is present in the subject property. Midland Painted Turtle is reported from the vicinity of the subject property and was observed during targetted herpetofauna search surveys conducted by NRSI biolgosts.
Chelydra serpentina serpentina	Common Snapping Turtle	S3	SC	SC	Schedule 1	Ontario Nature 2019	No	Permanent or semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddybanks or bottoms. The species often uses soft soil or clean dry sand on south-facing slopes for nest sites and may nest at some distance from water.	Yes	No	Suitable aquatic habitat is present in the subject property. Common Snapping Turtle is reported from the vicinity of the subject property but was not observed during targetted herpetofauna search surveys conducted by NRSI biolgosts.
Thamnophis sauritus septentrionalis	Eastern Ribbonsnake (Great Lakes population)	S3	SC	SC	Schedule 1	Ontario Nature 2019	No	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups.	Yes	No	Marginal suitable wetland edge habitat is present in the subject property. Eastern Ribbonsnake is reported from the vicinity of the subject property but was not observed during targetted herpetofauna search surveys conducted by NRSI biolgosts.
Ambystoma jeffersonianum	Jefferson Salamander	S2	END	E	Schedule 1	Ontario Nature 2019	No	Damp shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding; hides under leaf litter, stones or in decomposing logs.	Yes	No	Marginal suitable swamp and damp forest habitat is present in the subject property. Jefferson Salamander is reported from the vicinity of the subject property but was not observed during targetted herpetofauna search surveys conducted by NRSI biolgosts.
Ambystoma sp.	Jefferson/Blue-spotted Salamander Complex	S2	-	-	-	Ontario Nature 2019	No	Damp shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding; hides under leaf litter, stones or in decomposing logs.	Yes	No	Marginal suitable swamp and damp forest habitat is present in the subject property. Jefferson/Blue Spotted Salamander Complex is reported from the vicinity of the subject property but was not observed during targetted herpetofauna search surveys conducted by NRSI biolgosts.
Mammals											
Myotis lucifungus	Little Brown Myotis	S5	END	E	Schedule 1	Dobbyn 1994	No	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges.	Candidate	Yes	Trees, buildings, forest edges and wetlands are present in the subject property which may provide potential roosting and foraging habitat. Bat habitat assessments are to be conducted in areas where potential wildlife trees and bat cavity roosts may be present in forest edges and treed areas in the subject property.
Myotis septentrionalis	Northern Myotis	S3?	END	E	Schedule 1	Dobbyn 1994	No	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; roosts in houses, man-made structures but prefers hollow trees or under loose bark; hunts within forest, below canopy.	Candidate	Yes	Hollow trees and large trees with loose bark may provide potential roost and maternity colony habitat in the subject property. Bat habitat assessments are to be conducted in areas where potential wildlife trees and bat cavity roosts may be present in forest edges and treed areas in the subject property.

Scientific Name	Common Name	S-Rank[1]	COSSARO[2]	COSEWIC[3]	SARA[3]	Background Source	Observed by NRSI	Habitat Preference[4,5]	Suitable Habitats within Subject Property	Carried Forward to EIS?	Rationale
Insects											
Danaus plexippus	Monarch	S4	SC	E	-	Macnaughton et al. 2019	Yes	Open areas, roadsides, and waste places. Host plant is Milkweed species (*Asclepias spp.*).	Yes	Yes	Suitable open areas with milkweed species is present in the subject property. Host plants; Common Milkweed (*Asclepias syriaca*) and Swamp Milkweed (*Asclepias incarnata*) were both observed during vegetation surveys conducted by NRSI biologists. Monarch is reported from the subject property and was observed in the subject property by NRSI biologists.
Erynnis martialis	Mottled Duskywing	S2	END	E	-	Macnaughton et al. 2019	No	This species is usually seen nectaring or on wet sandy roads in the company of other species of Erynnis, and usually outnumbered by them. Found in habitats of its foodplants' requirements, usually dry sandy areas or limestone alvars. Host plants are New Jersey Tea (*Ceanothus americanus*) and Oval-leaved Redroot (*Ceanothus ovatus)* .	No	No	Suitable sandy dry areas or alvar habitat are not present in the subject property. Mottled Duskywing is reported from the vicinity of the subject property but was not observed during field surveys conducted by NRSI biologists.
Euphyes conspicua	Black Dash	S3	-	-	-	Macnaughton et al. 2019	No	Restricted to areas in or near sedge meadows in Ontario. Often found nectaring on flowers including Milkweed species and Thistles (*Cirsium spp* ., and *Carduus spp* .) Host plant is Tussock Sedge (*Carex stricta*).	Yes	No	Suitable sedge meadow habitat is present in the subject property. In total, 18 species in the Sedge Family (Cyperaceae) are observed from the subject property but its host plant was not recorded during vegetation surveys conducted by NRSI biologists. Black Dash is reported from the vicinity of the subject property but was not observed during field surveys conducted by NRSI biologists.
Pholisora catullus	Common Sootywing	S3	-	-	-	Macnaughton et al. 2019	No	Open habitat, mostly disturbed areas. Host plants are Amaranth species (*Amaranthaceae spp.*) and Goosefoot species (*Chenopodiaceae*) especially Lamb's Quarters (*Chenopodium album*).	Yes	No	Suitable open habitat is present in the subject property. However Common Sootywing host plants were not observed during vegetation surveys conducted by NRSI biologists. Common Sootywing was not observed during field surveys conducted by NRSI biologists.
Asterocampa clyton	Tawny Emperor	S2S3	-	-	-	Macnaughton et al. 2019	No	Similar habitat and lifecycle requirements to Hackberry Emporer (*Asterocampa celtis*). A woodland species in Canada, never straying far from the forest edge and its host plant. Host plant is Common Hackberry (*Celtis occidentalis*).	Yes	No	Suitable forest habitats that contain the host plant (Common Hackberry) are present in the subject property. Tawny Emperor is reported from the vicinity of the subject property but was not observed by NRSI biologists.
Plants											
Conioselinum chinense	Chinese Hemlock-parsley	S2	-	-	-	MNRF 2019b	No	Calcareous cedar swamps; wet borders of streams and rivers; seepage slopes in wet coniferous woods, swampy thickets, moist clearings and damp roadsides - in northern Ontario in Salix-Alnus thickets; moist Populus stands, moist sandy shorelines.	Yes	No	Marginal suitable swamp and wet thickets are present in the subject property. Chinese Hemlock-parsley is reported from the vicinity of the subject property but was not observed during vegetation surveys conducted by NRSI biologists.

[1]MNRF 2019a; [2]MECP 2019; [3]Government of Canada 2019; [4]OMNR 2000; [5]Government of Canada 2014

Legend
SRank[1]
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
COSSARO[2]
SC Special Concern
THR Threatened
END Endangered
COSEWIC[3]
SC Special Concern
T Threatened
E Endangered
SARA Schedule[4]
Schedule 1 Officially Protected

Significant Wildlife Habitat Assessment Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)					
Rationale: Habitat important to migrating waterfowl.	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	Fields with sheet water during Spring (mid March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available[exlviii.] Information Sources • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (CAs) • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Field Naturalist Clubs • Ducks Unlimited Canada • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • Any mixed species aggregations of 100 or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat[cxlviii]. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWHMiST[cxlix] Index #7 provides development effects and mitigation measures.	No fields with spring sheet water were observed on or adjacent to the subject property during spring surveys. **Not SWH.**
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)					
Rationale: Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked Duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). Information Sources • Environment Canada • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100[i] or more of listed species for 7 days[i], results in > 700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH[cxlix] • The combined area of the ELC ecosites and a 100m radius area is the SWH[cxlviii] • Wetland area and shorelines associated with sites identified within the SWHTG[cxlviii] Appendix K[cxlix] are significant wildlife habitat. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWHMiST[cxlix] Index #7 provides development effects and mitigation measures.	The subject property contains a several ponds and a small, largely treed watercourse feature. The open water communities within the subject property may provide limited suitable stopover habitat for waterfowl to congregate. However, no waterfowl were observed on-site during breeding bird surveys. **Not SWH.**

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Shorebird Migratory Stopover Area					
Rationale: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin Whimbrel	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. Information Sources • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area[cxlviii] • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #8 provides development effects and mitigation measures.	There area no suitable shorelines of lakes, wetlands, and beach areas located within or adjacent to the study area. No listed species have been documented in the vicinity of the subject lands. **Not SWH.**
Wildlife Habitat: Raptor Wintering Area					
Rational: Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl Special Concern: Short-eared Owl Bald Eagle	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class: Forest: FOD, FOM, FOC Upland: CUM, CUT, CUS, CUW	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering sites need to be > 20 ha[cxlviii, cxlix] with a combination of forest and upland.[xvi, xvii, xviii, xix, xx, xxi] Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands[cxlix] Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water, large trees and snags available for roosting Information Sources • OMNRF Ecologist or Biologist • Field Natural Clubs • Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Reports and other information available from Conservation Authorities CAs.	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years)[cxlix] for a minimum of 20 days by the above number of birds • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #10 and #11 provides development effects and mitigation measures.	No observations of raptors have been documented in the vicinity of the subject property. The subject property provides a combination of fields and woodlands, that is close to open water within the surrounding area. These raptor species have the potential to occur despite not being observed during field surveys. **Candidate SWH.**

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Bat Hibernacula					
Rationale Bat hibernacula are rare habitats in Ontario landscapes.	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH • The locations of bat hibernacula are relatively poorly known. Information Sources • OMNRF for possible locations and contact for local experts • Natural Heritage Information Center (NHIC) Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts. • Clubs that explore caves (eg. Sierra Club) • University Biology Departments with bat experts.	• All sites with confirmed hibernating bats are SWH. • The habitat area includes a 200m radius around the entrance of the hibernaculum[cxlviii, ccvii] for most. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv] • SWHMiST[cxlix] Index #1 provides development effects and mitigation measures.	There are no caves, mine shafts, underground foundations or Karsts found within or adjacent to the subject property. **Not SWH.**
Wildlife Habitat: Bat Maternity Colonies					
Rationale: Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	Maternity colonies can be found in tree cavities, vegetation and often in buildings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii] • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii] • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3[ccxiv] or class 1 or 2[ccxii] • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx] Information Sources • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts.	• Maternity Colonies with confirmed use by: • >10 Big Brown Bats • >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for wind Power Projects[ccv] • SWHMiS T[cxlix] Index #12 provides development effects and mitigation measures.	The subject property contains deciduous forest and swamp forest communities. As the forested communities are not proposed to be directly impacted in the proposed development, this habitat type will be assumed significant for the purposes of this EIS. **Candidate SWH.**

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Turtle Wintering Area					
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles - ELC Community Classes: SW, MA, OA and SA; ELC Community Series: FEO and BOO Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxviii]. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. Information Sources • EIS studies carried out by Conservation Authorities. • Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • OMNRF ecologist or biologist • Natural Heritage Information Center (NHIC)	• Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May)[cvii] • Congregation of turtles is more common where wintering areas are limited and therefore significant[cix, cx, cxi, cxii]. • SWHMiST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	The subject property contains shallow aquatic habitat that may provide suitable habitat for wintering. Midland Painted Turtle was observed in very low abundance using the ponds within the subject property. These ponds may provide soft muddy substrates. **Candidate SWH.**
Wildlife Habitat: Snake Hibernaculum					
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Special Concern: Milksnake Eastern Ribbonsnake Lizard: Special Concern (Southern Shield population): Five-lined Skink	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. The existence of features that go below the frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line[xliv, l, li, lii, cxii.] • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. • Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures cciii. Information Sources • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells). • Reports and other information from CAs. • Local Field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. clubs • Natural Heritage Information Center (NHIC) • OMNRF ecologist or biologist may be aware of locations of wintering skinks	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct). • Note: If there are Special Concern Species present, then site is SWH • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWH[i] • SWHMiST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for skink is significant. • SWHMiST[cxlix] Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.	Snake hibernaculum habitat can be found in any ecosite. Due to the inconspicuous nature of this habitat type, it is very difficult to confirm absence. If this habitat type is present on the subject property, it is likely contained within the natural areas; not the proposed development footprint. **Candidate SWH.**

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)					
Rationale: Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow populations are declining in Ontario.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. Information Sources • Reports and other information available from CAs • Ontario Breeding Bird Atlas [ccv] • Bird Studies Canada; *NatureCounts* http://www.birdscanada.org/birdmon/ • Field Naturalist clubs	Studies confirming: • Presence of 1 or more nesting sites with 8[cxlvix] or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests[ccvii] • Field surveys to observe and count swallow nests are to be completed during the breeding season Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #4 provides development effects and mitigation measures	The subject property does not contain exposed soil banks that are undisturbed or naturally eroding. Suitable habitat has not been identified within the subject property. **Not SWH**
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)					
Rationale: Large Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15m from ground, near the top of the tree. Information Sources • Ontario Breeding Bird Atlas[ccv], colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNR). • NHIC Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries • Reports and other information available from CAs • MNRF District Offices • Local naturalist clubs	Studies confirming: • Presence of 5[i] or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH [cc, ccvii] • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWHMiST[cxlix] Index #5 provides development effects and mitigation measures.	The subject property contains a Birch Conifer Mixed Swamp (SWM6) with adjacent wetlands. Green Heron has was observed during breeding bird surveys, but no active nests were observed. **Not SWH.**

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Ground)					
Rationale: Colonies are important to local bird populations, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6 MAS1 – 3 CUM CUT CUS	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. Information Sources • Ontario Breeding Bird Atlas[ccv], rare/colonial species records. • Canadian Wildlife Service • Reports and other information available from CAs • Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area • MNRF District Offices • Field naturalist clubs	Studies confirming: • Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern[í]. • Presence of 5 or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. • The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH[cc, ccvii] • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #6 provides development effects and mitigation measures.	Islands or peninsula are not present within subject property. **Not SWH.**
Wildlife Habitat: Migratory Butterfly Stopover Areas					
Rationale: Butterfly stopovers areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral Special Concern: Monarch	Combination of ELC Community Series: Need to have present one Community Series from each landclass: Field: CUM CUS CUT Forest: FOC FOM FOD CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario[cxlix]. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south[xxxii, xxxiii, xxxiv, xxxv, xxxvi.] • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat cxlviii, cxlix. • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes[xxxvii, xxxviii, xxxix, xl, xli.] Information Sources • OMNRF (NHIC) • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs • Toronto Entomologists Association • Conservation Authorities	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur [xl, xlii]. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. • SWHMiST[cxlix] Index #16 provides development effects and mitigation measures.	The subject property is not within 5 km of Lake Ontario. **Not SWH.**

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Landbird Migratory Stopover Areas					
Rationale: Sites with a high diversity of species as well as high number are most significant	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	Woodlots need to be >10 ha[í] in size and within 5km [iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Ontario. • If multiple woodlands are located along the shoreline, those woodlands <2km from Lake Ontario are more significant[cxlix] • Sites have a variety of habitats; forest, grassland and wetland complexes[cxlix]. • The largest sites are more significant[cxlix] • Woodlots and forest fragments are important habitats to migrating birds[ccxviii], these features located along the shore and located within 5km of Lake Ontario are Candidate SWH[cxlviii]. Information Sources • Bird Studies Canada • Ontario Nature • Local birders and naturalist club • Ontario Important Bird Areas (IBA) Program	Studies confirm: • Use of the woodlot by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Apr/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #9 provides development effects and mitigation measures.	The subject property is not within 5 km of Lake Ontario. **Not SWH.**
Wildlife Habitat: Deer Yarding Areas					
Rationale: Winter habitat for deer is considered to be the main factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.	White-tailed Deer	Note: OMNRF to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include: FOM, FOC, SWM and SWC. Or these ELC Ecosites: CUP2 CUP3 FOD3 CUT	• Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. • The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%[cxciv]. • OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual"[cxcv] • Woodlots with high densities of deer due to artificial feeding are not significant.	No Studies Required: • Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH[lvi, lvii, lviii, lix, lx, í]. • Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO). • Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations[cxcv]. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST[cxlix] Index #2 provides development effects and mitigation measures.	Deer yarding habitat has not been identified by the MNRF within or adjacent to the subject property and is therefore not present. A winter wildlife study was completed in 2019, with very limited documented deer activity. **Not SWH.**

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Deer Winter Congregation Areas					
Rationale: Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions[cxlviii]	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50ha may also be used.	• Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on MNRF studies or assessment. • Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands[cxlviii]. • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha[ccxxiv]. • Woodlots with high densities of deer due to artificial feeding are not significant. Information Sources • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF[cxlviii]. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNR[l]. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv] , ground or road surveys, or a pellet count deer density survey[ccxxv]. • If a SWH is determined for Deer Wintering Area of if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST[cxlix] Index #2 provides development effects and mitigation measures.	Deer overwintering habitat has not been identified within the subject property by the MNRF. A winter wildlife study was completed in 2019, with very limited documented deer activity. **Not SWH.**

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes[1]	Habitat Description[1]	Detailed Information and Sources[1]	Defining Criteria[1]	Assessment Details
Cliff and Talus Slopes					
Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	Most cliff and talus slopes occur along the Niagara Escarpment. Information Sources • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF District • Natural Heritage Information Center (NHIC) has location information on their website • Local naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii] • SWHMiST[cxlix] Index #21 provides development effects and mitigation measures.	This vegetation community is not present within the subject property. **Not SWH.**
Sand Barrens					
Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	Any sand barren area, >0.5ha in size. Information Sources • OMNRF Districts. • Natural Heritage Information Center (NHIC) has location information on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens[lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[i]. • SWHMiST[cxlix] Index #20 provides development effects and mitigation measures.	This vegetation community is not present within the subject property. **Not SWH.**

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes[1]	Habitat Description[1]	Detailed Information and Sources[1]	Defining Criteria[1]	Assessment Details
Alvar					
Rationale: Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregion 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 Five Alvar Indicator Species: 1) Carex crawei 2) Panicum philadelphicum 3) Eleochairs compressa 4) Scutellaria parvula 5) Trichostema branchiatum These indicator species are very specific to Alvars within Ecoregion 6E	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoo geographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover[lxxviii].	An Alvar site > 0.5 ha in size[lxxv]. Information Sources • Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi]. • Ontario Nature – Conserving Great Lakes Alvars[ccviii]. • Natural Heritage Information Center (NHIC) has location information on their website • Field Naturalist clubs • Conservation Authorities	Field studies identify four of the five Alvar indicator species[lxxv, cxlix] at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv]. • SWHMiST[cxlix] Index #17 provides development effects and mitigation measures.	This vegetation community is not present within the subject property. **Not SWH.**
Old Growth Forest					
Rationale: Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland Stands areas 30ha or greater in size or with at least 10 ha interior habitat assuming 100m buffer at edge of forest Í. Information Sources • OMNRF Forest Resource Inventory mapping • OMNRF Forester, Ecologist or Biologist • Field Local naturalist clubs • Conservation Authorities • Sustainable Forestry License (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat[cxlviii] • The stand will have experienced no recognizable forestry activities[cxlviii] • The area of Forest Ecosites combined to make up the stand is the SWH. • Determine ELC Vegetation Type for forest stand[lxxviii] • SWHDSS[cxlix] Index #23 provides development effects and mitigation measures.	This vegetation community is not present within the subject property. **Not SWH.**

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes[1]	Habitat Description[1]	Detailed Information and Sources[1]	Defining Criteria[1]	Assessment Details
Savannah					
Rationale: Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.	• No minimum size to site Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • Natural Heritage Information Center (NHIC) has location information on their website • OMNRF Ecologists • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in[lxxv] Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used[cxlviii]. • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics sp.). • SWHMiST[cxlix] Index #18 provides development effects and mitigation measures.	This vegetation community is not present within the subject property. **Not SWH.**
Tallgrass Prairie					
Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.	• No minimum size to site Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNR Districts • Natural Heritage Information Center (NHIC) has location information available on their website • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in[lxxv] Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used[cxlviii]. • Area of the ELC Ecosite is the SWH • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMiST[cxlix] Index #19 provides development effects and mitigation measures.	This vegetation community is not present within the subject property. **Not SWH.**

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.

Rare Vegetation Community[1]	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes[1]	Habitat Description[1]	Detailed Information and Sources[1]	Defining Criteria[1]	Assessment Details
Other Rare Vegetation Communities					
Rationale: Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii]. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M[cxlviii] The OMNR/NHIC will have up to date listing for rare vegetation communities. Information Sources • Natural Heritage Information Center (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii]. • Area of the ELC Vegetation Type polygon is the SWH. • SWHMiST[cxlix] Index #37 provides development effects and mitigation measures.	No other rare vegetation communities are present within the subject property. **Not SWH.**

Significant Wildlife Habitat Assessment Tables

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Waterfowl Nesting Area					
Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends 120m[cxlix] from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur[cxlix]. • Upland areas should be at least 120m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. Information Sources • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMiST[cxlix] Index #25 provides development effects and mitigation measures.	No potential or confirmed nesting pairs of waterfowl were observed within the subject property. **Not SWH.**
Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat					
Rationale: Nest sites are fairly uncommon in Eco-region 6E are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey Special Concern: Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). Information Sources • Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data. • OMNRF Districts • Sustainable Forestry License (SFL) companies will identify additional nesting locations through field operations. • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented • Reports and other information available from CAs. • Field naturalists clubs	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area[cxlviii]. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the SWHccvii, maintaining undisturbed shorelines with large trees within this area is important[cxlviii]. • For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH[cvi], ccvii. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat[cvi]. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant[ccvii] • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #26 provides development effects and mitigation measures	The watercourse and open water communities are very minimal habitat for these species. No stick nests were observed on site. **Not SWH**

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Woodland Raptor Nesting Habitat					
Rationale: Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat[lxxxviiii, lxxxix, xc, xci, xciii, xciv, xcv, xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii]. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Cooper's hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. Information Sources • OMNRF • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from CAs	Studies confirm: • Presence of 1 or more active nests from species list is considered significant[cxlviii]. • Red-shouldered Hawk and Northern Goshawk – a 400m radius around the nest or 28ha area of habitat is the SWH[ccvii]. • Barred Owl – a 200m radius around the nest is the SWH[ccvii]. • Broad-winged Hawk and Coopers Hawk – a 100m radius around the nest is the SWH[ccvii]. • Sharp-shinned Hawk – a 50m radius around the nest is the SWH[ccvii]. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMiST[cxlix] Index #27 provides development effects and mitigation measures.	Suitable treed community types are present within the subject property. None of these communities provide >10ha of interior habitat. None of the listed species were observed during field surveys. **Not SWH.**
Wildlife Habitat: Turtle Nesting Area					
Rationale: These habitats are rare and when identified will often be the only breeding site for local populations of turtles	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m)[cxlviii] or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. Information Sources • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Center (NHIC) • Field Naturalist clubs and landowners	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[i] • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH[cxlviii]. • Travel routes from wetland to nesting area are to be considered within the SWH[cxlix]. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWHMiST[cxlix] Index #28 provides development effects and mitigation measures for turtle nesting habitat.	Midland Painted Turtle was observed within the pond communities on the east side of the subject property. There are mineral substrates present along the edges of the ponds that may provide minimal suitable habitat as described in the pond habitat characterization study. **Candidate SWH.**

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Seeps and Springs					
Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system[cxvii, cxlix]. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species[cxix, cxx, cxxi, cxxii, cxiii, cxiv] Information Sources • Topographical Map • Thermography • Hydrological surveys conducted by CAs and MOE • Field naturalists clubs and landowners • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.	Field Studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat[cxlviii] • SWHMiST[cxlix] Index #30 provides development effects and mitigation measures	Subject property is not located within the headwaters of a stream or river system, and no seeps or springs were documented. **Not SWH.**
Wildlife Habitat: Amphibian Breeding Habitat (Woodland)					
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond or woodland pool (including vernal pools) >500m^2 (about 25m diameter) [ccvii] within or adjacent (within 120m) to a woodland (no minimum size)[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx] Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat[cxlviii] Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF District • OMNRF wetland evaluations • Field naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses)[lxxi] or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys[cviii] will be required during the spring March-June when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the woodland area plus a 230m radius of woodland area[lxiii,lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi] if a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is the be included in the habitat. • SWHMiST[cxlix] Index #14 provides development effects and mitigation measures.	Several suitable treed community types are present within the subject property. Tetraploid Gray Treefrog and Spring Peeper were documented during anuran call surveys. However, they were not observed exceeding 20 individuals or having a Call Level Code of 3. There is still the possibility of salamander breeding in the natural areas as some are documented from the study area. **Candidate SWH.**

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Wetland)					
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Tree frog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands.	• Wetlands >500m2 (about 25m diameter)[ccvii] supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats[clxxxiv]. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation. Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations • Reports and other information available from CAs.	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species and with at least 20 -individuals (adults or eggs masses)[lxxi, lxxiii], or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys[cviii] will be required during spring March to June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST[cxlix] Index #15 provides development effects and mitigation measures.	Suitable wetland communities are present within the subject property. American Toad, Tetraploid Gray Treefrog, Northern Leopard Frog, and Northern Green Frog were documented during anuran call surveys. However, they have not been documented as exceeding 20 individuals or having a Call Level Code of 3. . However, they were not observed exceeding 20 individuals or having a Call Level Code of 3. There is still the possibility of salamander breeding in the natural areas as it some are documented from the study area. **Candidate SWH.**
Woodland Area-Sensitive Bird Breeding Habitat					
Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.	Yellow-Bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Special Concern: Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha.[cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxv, cxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvii, clviii, clix] • Interior forest habitats are at least 200m from forest edge habitat. Information Sources • Local bird clubs • Canadian Wildlife Service (CWS) for the location of forest bird monitoring. • Bird studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to greatest value to interior species • Reports and other information available from CAs.	• Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. • Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #34 provides development effects and mitigation measures.	None of the listed sensitive species were observed during breeding bird surveys, and interior habitat >200m from the forest edge is not present. **Not SWH**

Significant Wildlife Habitat Assessment Tables

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Marsh Bird Breeding Habitat					
Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan Special Concern: Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present[cxxiv]. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources • Contact OMNRF, wetland evaluations are a good source of information. • Field naturalist clubs • Natural Heritage Information Center (NHIC) Records • Reports and other information available from CAs. • Ontario Breeding Bird Atlas[ccv]	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species[i]. • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH[i]. • Area of the ELC ecosite is the SWH • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]. • SWHMiST[cxlix] Index #35 provides development effects and mitigation measures	A single Green Heron was observed during breeding bird surveys within one of the open ponds on the subject property. However, no emergent aquatic vegetation is present within the communities. Possible breeding evidence recorded for 1 individual Green Heron does not meet the minimal criteria for this habtiat type due to absence of emergent aquatic vegetation. **Not SWH.**
Wildlife Habitat: Open Country Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow Special Concern: Short-eared Owl	CUM1 CUM2	Large grassland areas (includes natural and cultural fields and meadows) >30 ha [clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix]. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years)[i]. Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Ask local birders • Ontario Breeding Bird Atlas[ccv] • Reports and other information available from CAs.	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owl is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]. • SWHMiST[cxlix] Index #32 provides development effects and mitigation measures.	The subject property does not contain a cultural meadow >30ha. **Not SWH.**

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix.	Indicator spp.: Brown Thrasher Clay-coloured Sparrow Common spp.: Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher Special Concern: Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	Large field areas succeeding to shrub and thicket habitats>10ha[clxiv] in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years)[j]. Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species [clxxiii]. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Agricultural land classification maps Ministry of Agriculture Local bird clubs • Ontario Breeding Bird Atlas[ccv] • Reports and other information available from CAs	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species[j]. • A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #33 provides development effects and mitigation measures.	Brown Thrasher and Eastern Towhee were observed during the breeding season, but were not in applicable communities (OA, FOD5-2). The minimal criteria of individual species were not observed. The subject property does not contain any cultural thicket, savanna or woodland >10ha. **Not SWH.**
Wildlife Habitat: Terrestrial Crayfish					
Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. [ccii]	Chimney or Digger Crayfish: (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish: (*Cambarus Diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM	Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites[cci] • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH • Surveys should be done April to August during in temporary or permanent water Note the presence of burrows or chemistry are often the only indicator of presence, observance or collection of individuals is very difficult[cci] • SWHMiST[cxlix] Index #36 provides development effects and mitigation measures.	The subject property contains wet edges surrounding the Mixed Swamp community (SWM6-1) that may provide suitable habitat. **Candidate SWH.**

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Special Concern and Rare Wildlife Species					
Rationale: These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites[lxxviii]. Information Sources • Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website: "Get Information": http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas[ccv] • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWHMiST[cxlix] Index #37 provides development effects and mitigation measures.	Several special concern species were identified through NHIC and atlas data, and are summarized in the SAR/SCC screening tables. NRSI staff observed Eastern Wood-pewee, Midland Painted Turtle, and Monarch in the subject property. **Confirmed SWH**

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E.

	Wildlife Species[1]	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes[1]	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
Wildlife Habitat: Amphibian Movement Corridors					
Rationale: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	Movement corridors between breeding habitat and summer habitat [clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi]. Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule[í]. Information Sources • MNRF District Office • Natural Heritage Information Center NHIC • Reports and other information available from CAs • Field Naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Cooridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant[cxlix]. • Corridors should have at least 15m of vegetation on both sides of waterway [cxlix] or be up to 200m wide[cxlix] of woodland habitat and with gaps <20m [cxlix]. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat[cxlix]. • SWHMiST[cxlix] Index #40 provides development effects and mitigation measures.	Amphibian breeding habitat was confirmed to be not present through this screening and anuran call surveys. Therefore, this habitat type is also not present. **Not SWH**
Wildlife Habitat: Deer Movement Corridors					
Rationale: Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.	White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule[í]. • A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion [clxxxii, clxxxiii, cxlix, cxciv]. • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges). Information Sources • MNRF District Office • Natural Heritage Information Center (NHIC) • Reports and other information available from CAs • Field Naturalist Clubs	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. • Corridors that lead to a deer wintering yard should be unbroken by roads and residential areas. • Corridors should be at least 200m wide[cxlix] with gaps <20m[cxlix] and if following riparian area with at least 15m of vegetation on both sides of waterway[cxlix] . Shorter corridors are more significant than longer corridors[cxlix] • SWHMiST[cxlix] Index #39 provides development effects and mitigation measures.	Deer overwintering habitat has not been identified within the subject property by the MNRF. A winter wildlife study was completed in 2019, no deer were observed on site, only tracks, and scat. It is estimated that only a few individuals are using the area. **Not SWH.**

Significant Wildlife Habitat Assessment Tables

Table 6. Exceptions for Ecodistricts within Ecoregion 6E.

	Wildlife Habitat and Species	Candidate SWH		Confirmed SWH	Study Area
		Ecosites	Habitat Criteria and Information Sources[1]	Defining Criteria[1]	Assessment Details
EcoDistrict: 6E-14					
Rationale: The Bruce Peninsula has an isolated and distinct population of black bears. Maintenance of large woodland tracks with mast producing tree species is important for bears. clxxxvi, ccxvii	**Mast Producing Areas** Black Bear	All Forested habitat represented by ELC Community Series: FOM FOD	Woodland ecosites >30ha with mast-producing tree species, either soft (cherry) or hard (oak and beech), Information Sources Important forest habitat for black bears may be identified by OMNRF. • Black bears require forested habitat that provides cover, winter hibernation sites, and mast producing tree species. clxxxv, clxxxvii, clxxxviii, clxxxix, cxc, cxci, cxcii, cxciii, ccxvii • Forested habitats need to be large enough to provide cover and protection for black bears ccxvii.	• All woodlands > 30 ha with a 50% composition of these ELC Vegetation Types are considered significant: FOM1-1 FOM2-1 FOM3-1 FOD1-1 FOD1-2 FOD2-1 FOD2-2 FOD2-3 FOD2-4 FOD4-1 FOD5-2 FOD5-3 FOD5-7 FOD6-5 • SWHMiST cxlix Index #3 provides development effects and mitigation measures.	The subject property is not located in the Bruce Peninsula. **Not SWH.**
EcoDistrict: 6E-17					
Rationale: Sharp-tailed grouse only occur on Manitoulin Island in Ecoregion 6E, Leks are an important habitat to maintain their population	**Lek** Sharp-tailed Grouse	CUM CUS CUT	Grasslands (field/meadow) are to be >15ha when adjacent to shrubland and >30ha when adjacent to deciduous woodland ccxix. • Grasslands are to be undisturbed with low intensities of agriculture (light grazing or late haying) • Leks will be used annually if not destroyed by cultivation or invasion by woody plants or tree planting ccxix Information Sources • OMNRF district office • Bird watching clubs • Local landowners • Ontario Breeding Bird Atlas • The lek or dancing ground consists of bare, grassy or sparse shrubland. There is often a hill or rise in topographyccxix. • Leks are typically a grassy field/meadow >15h with adjacent shrublands and >30ha with adjacent deciduous woodland. Conifer trees within 500m are not tolerated. ccxix	Studies confirming lek habitat are to be completed from late March to June. • Any site confirmed with sharp-tailed grouse courtship activities is considered significant • The field/meadow ELC ecosites plus a 200 m radius area with shrub or deciduous woodland is the lek habitat • SWHMiST cxlix Index #32 provides development effects and mitigation measures	The subject property is not located on Manitoulin Island. **Not SWH.**

APPENDIX IV Vascular Flora Species Recorded in the Study Area

APPENDIX V Wildlife Species Lists Reported from the Study Area

Appendix V
Whistle Bare Campground, Township of North Dumfries
Bird Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Grand River Watershed Conservation Priority[4]	Region of Waterloo Status[5]	OBBA[6] 17NJ40	NHIC Data[7] 17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	NRSI Observed
Anatidae	**Ducks, Geese & Swans**									
Branta canadensis	Canada Goose	S5						CO		
Aix sponsa	Wood Duck	S5					√*	CO		
Anas rubripes	American Black Duck	S4				√	√	CO		
Anas platyrhynchos	Mallard	S5						CO		
Mergus merganser	Common Merganser	S5B, S5N					√	PR		
Odontophoridae	**New World Quails**									
Colinus virginianus	Northern Bobwhite	S1	END	E	Schedule 1	√	√	PO		
Phasianidae	**Partridges, Grouse & Turkeys**									
Meleagris gallopavo	Wild Turkey	S5						CO		
Columbidae	**Pigeons & Doves**									
Columba livia	Rock Pigeon	SNA						CO		PO
Zenaida macroura	Mourning Dove	S5						CO		PR
Cuculiformes	**Cuckoos & Anis**									
Coccyzus erythropthalmus	Black-billed Cuckoo	S5B				√	√	PO		
Caprimulgidae	**Goatsuckers**									
Chordeiles minor	Common Nighthawk	S4B	SC	SC	Schedule 1	√	√*	PO		
Apodidae	**Swifts**									
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	T	Schedule 1			PO		
Trochilidae	**Hummingbirds**									
Archilochus colubris	Ruby-throated Hummingbird	S5B				√	√	PR		
Rallidae	**Railes, Gallinules & Coots**									
Rallus limicola	Virginia Rail	S5B				√	√	PR		
Porzana carolina	Sora	S4B				√	√	PO		
Charadriidae	**Plovers**									
Charadrius vociferus	Killdeer	S5B, S5N						CO		
Scolopacidae	**Waders**									
Scolopax minor	American Woodcock	S4B				√		PO		X
Actitis macularia	Spotted Sandpiper	S5				√		CO		
Ardeidae	**Herons & Bitterns**									
Ardea herodias	Great Blue Heron	S4B					√	CO		
Butorides virescens	Green Heron	S4B				√	√	PO		PR
Cathartidae	**Vultures**									
Cathartes aura	Turkey Vulture	S5B				√	√	CO		

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Grand River Watershed Conservation Priority[4]	Region of Waterloo Status[5]	OBBA[6] 17NJ40	NHIC Data[7] 17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	NRSI Observed
Accipitridae	**Hawks, Kites, Eagles & Allies**									
Circus cyaneus	Northern Harrier	S4B	NAR	NAR		√	√	PR		
Accipiter striatus	Sharp-shinned Hawk	S5	NAR			√	√	PR		
Accipiter cooperii	Cooper's Hawk	S4	NAR	NAR		√	√	CO		
Buteo jamaicensis	Red-tailed Hawk	S5	NAR	NAR				CO		
Strigidae	**Typical Owls**									
Megascops asio	Eastern Screech-Owl	S4	NAR	NAR				PR		
Bubo virgianus	Great Horned Owl	S4						CO		
Alcedinidae	**Kingfishers**									
Megaceryle alcyon	Belted Kingfisher	S4B					√	CO		PO
Picidae	**Woodpeckers**									
Melanerpes erythrocephalus	Red-headed Woodpecker	S4B	SC	END	Schedule 1	√	√	PR		
Melanerpes carolinus	Red-bellied Woodpecker	S4				√	√	CO		
Sphyrapicus varius	Yellow-bellied Sapsucker	S5B				√	√	PR		
Picoides pubescens	Downy Woodpecker	S5						CO		PO
Picoides villosus	Hairy Woodpecker	S5						CO		
Colaptes auratus	Northern Flicker	S4B						CO		PO
Dryocopus pileatus	Pileated Woodpecker	S5				√	√	PR		X
Falconidae	**Caracaras & Falcons**									
Falco sparverius	American Kestrel	S4				√		PR		
Tyrannidae	**Tyrant Flycatchers**									
Contopus virens	Eastern Wood-Pewee	S4B	SC	SC				PR		PR
Empidonax alnorum	Alder Flycatcher	S5B				√	√	PO		
Empidonax traillii	Willow Flycatcher	S5B						CO		
Empidonax minimus	Least Flycatcher	S4B				√	√	CO		
Sayornis phoebe	Eastern Phoebe	S5B				√		CO		PO
Myiarchus crinitus	Great Crested Flycatcher	S4B						CO		PO
Tyrannus tyrannus	Eastern Kingbird	S4B				√		CO		X
Vireonidae	**Vireos**									
Vireo gilvis	Warbling Vireo	S5B						PR		
Vireo olivaceus	Red-eyed Vireo	S5B						CO		
Corvidae	**Crows & Jays**									
Cyanocitta cristata	Blue Jay	S5						CO		PR
Corvus brachyrhynchos	American Crow	S5B						CO		PO
Alaudidae	**Larks**									
Eremophila alpestris	Horned Lark	S5B				√		PR		PR
Hirundinidae	**Swallows**									
Tachycineta bicolor	Tree Swallow	S4B						CO		PO
Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B				√		CO		
Riparia riparia	Bank Swallow	S4B	THR	T		√		CO		
Petrochelidon pyrrhonota	Cliff Swallow	S4B				√	√*	CO		
Hirundo rustica	Barn Swallow	S4B	THR	T		√		CO	X	X

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Grand River Watershed Conservation Priority[4]	Region of Waterloo Status[5]	OBBA[6] 17NJ40	NHIC Data[7] 17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	NRSI Observed
Paridae	**Chickadees & Titmice**									
Poecile atricapillus	Black-capped Chickadee	S5				√		CO		PR
Baeolophus bicolor	Tufted Titmouse	S4				√	√	PR		
Sittidae	**Nuthatches**									
Sitta canadensis	Red-breasted Nuthatch	S5				√	√	CO		
Sitta carolinensis	White-breasted Nuthatch	S5						CO		X
Certhiidae	**Creepers**									
Certhia americana	Brown Creeper	S5B				√	√	CO		
Troglodytidae	**Wrens**									
Troglodytes aedon	House Wren	S5B						CO		PR
Thryothorus ludovicianus	Carolina Wren	S4				√	√	PR		
Polioptilidae	**Gnatcatchers**									
Polioptila caerulea	Blue-gray Gnatcatcher	S4B				√	√	PO		
Regulidae	**Kinglets**									
Regulus satrapa	Golden-crowned Kinglet	S5B				√	√	CO		
Mussciciapidae	**Old world Flycatchers**									
Turdidae	**Thrushes**									
Sialia sialis	Eastern Bluebird	S5B	NAR	NAR		√	√	CO		
Catharus fuscescens	Veery	S4B				√	√	PO		
Hylocichla mustelina	Wood Thrush	S4B	SC	T				PR		
Turdus migratorius	American Robin	S5B						CO		PR
Mimidae	**Mockingbirds, Thrashers & Allies**									
Dumetella carolinensis	Gray Catbird	S4B				√		CO		PR
Toxostoma rufum	Brown Thrasher	S4B				√	√	CO		PO
Sturnidae	**Starlings**									
Sturnus vulgaris	European Starling	SNA						CO		PR
Bombycillidae	**Waxwings**									
Bombycilla cedrorum	Cedar Waxwing	S5B						CO		PR
Passeridae	**Old World Sparrows**									
Passer domesticus	House Sparrow	SNA						CO		PO
Fringillidae	**Finches & Allies**									
Carpodacus mexicanus	House Finch	SNA						CO		PO
Spinus pinus	Pine Siskin	S4B					√	PR		
Spinus tristis	American Goldfinch	S5B				√		CO		PR
Calcariidae	**Longspurs & Snow Buntings**									
Plectrophenax nivalis	Snow Bunting	SNA								X
Parulidae	**Wood Warblers**									
Seiurus aurocapillus	Ovenbird	S4B				√	√	CO		

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Grand River Watershed Conservation Priority[4]	Region of Waterloo Status[5]	OBBA[6] 17NJ40	NHIC Data[7] 17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	NRSI Observed
Parkesia noveboracensis	Northern Waterthrush	S5B				√	√	PR		
Vermivora cyanoptera	Blue-winged Warbler	S4B				√	√	PO		
Geothylpis philadelphia	Mourning Warbler	S4B				√	√	PO		
Geothylpis trichas	Common Yellowthroat	S5B						PR		
Setophaga ruticilla	American Redstart	S5B				√	√	PR		
Setophaga petechia	Yellow Warbler	S5B						CO		
Setophaga pensylvanica	Chestnut-sided Warbler	S5B				√	√	CO		
Setophaga pinus	Pine Warbler	S5B				√	√	PR		PO
Setophaga coronata	Yellow-rumped Warbler	S5B				√	√	PR		
Emberizidae	**New World Sparrows & Allies**									
Pipilo erythrophthalmus	Eastern Towhee	S4B				√		PO		PR
Spizella passerina	Chipping Sparrow	S5B						CO		PR
Spizella pusilla	Field Sparrow	S4B				√		CO		
Pooecetes gramineus	Vesper Sparrow	S4B				√	√	PR		
Passerculus sandwichensis	Savannah Sparrow	S4B				√		CO		PR
Ammodramus savannarum	Grasshopper Sparrow	S4B	SC	SC		√	√	PR		
Melospiza melodia	Song Sparrow	S5B						CO		PR
Melospiza georgiana	Swamp Sparrow	S5B				√		PR		
Zonotrichia albicollis	White-throated Sparrow	S5B				√	√	PR		
Cardinalidae	**Cardinals, Grosbeaks & Allies**									
Piranga olivacea	Scarlet Tanager	S4B				√	√	PR		
Cardinalis cardinalis	Northern Cardinal	S5						CO		PR
Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B						CO		
Passerina cyanea	Indigo Bunting	S4B						CO		
Icteridae	**Blackbirds**									
Agelaius phoeniceus	Red-winged Blackbird	S4						CO		PR
Sturnella magna	Eastern Meadowlark	S4B	THR	T	No Schedule	√		CO		
Quiscalus quiscula	Common Grackle	S5B						CO		PR
Molothrus ater	Brown-headed Cowbird	S4B						CO		
Icterus galbula	Baltimore Oriole	S4B						CO		PR
							Total	102	1	38

[1]MNRF 2019a; [2]MECP 2019; [3]Government of Canada 2019; [4]Couturier 1999; [5]Martin 1996; [6]BSC et al. 2008; [7]MNRF 2019b

Legend	
SRank[1]	**Conservation Priority[4]**
S1 Critically Imperiled	√ Priority Species
S4 Apparently Secure	**Waterloo Region[5]**
S5 Secure	√ Regionally Significant
SNA Unranked	√* Significant when nesting in natural circumstances
COSSARO[2] / COSEWIC [3]	**Breeding Evidence Codes[6]**
END / E Endangered	X Observed
THR / T Threatened	PO Possible
SC / SC Special Concern	PR Probable
NAR / NAR Not at Risk	CO Confirmed
SARA Schedule[3]	
Schedule 1 Officially Protected under SARA	

Appendix V
Whistle Bare Campground, Township of North Dumfries
Reptile and Amphibian Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Region of Waterloo Status[4]	ORAA[5] 17NJ40	NHIC Data[6] 17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	NRSI Observed
Turtles									
Chelydra serpentina serpentina	Snapping Turtle	S3	SC	SC	Schedule 1	C	X		
Chrysemys picta marginata	Midland Painted Turtle	S5		SC		C	X		X
Trachemys scripta elegans	Red-eared Slider	SNA					X		
Snakes									
Opheodrys vernalis	Smooth Greensnake	S4				√	X		
Nerodia sipedon sipedon	Northern Watersnake	S5	NAR	NAR		√	X		
Thamnophis sauritus septentrionalis	Eastern Ribbonsnake	S3	SC	SC	Schedule 1	√	X		
Thamnophis sirtalis sirtalis	Eastern Gartersnake	S5				C	X		X
Salamanders									
Ambystoma jeffersonianum	Jefferson Salamander	S2	END	E	Schedule 1	√	X		
Ambystoma sp.	Jefferson/Blue-spotted Salamander Complex	S2				√	X		
Ambystoma maculatum	Spotted Salamander	S4				√	X		
Plethodon cinereus	Eastern Red-backed Salamander	S5				C	X		
Toads and Frogs									
Anaxyrus americanus	American Toad	S5				C	X		X
Hyla versicolor	Tetraploid Gray Treefrog	S5				C			X
Pseudacris crucifer	Spring Peeper	S5				C	X		X
Lithobates catesbeiana	American Bullfrog	S4				√	X		X
Lithobates clamitans melanota	Northern Green Frog	S5				C			X
Lithobates palustris	Pickerel Frog	S4	NAR	NAR		√	X		
Lithobates pipiens	Northern Leopard Frog	S5	NAR	NAR		C	X		X
Lithobates sylvaticus	Wood Frog	S5				C	X		
						Total	17	0	8

[1]MNRF 2019a; [2]MECP 2019; [3]Government of Canada 2019; [4]Regional Municipality of Waterloo 1985; [5]Ontario Nature 2019; [6]MNRF 2019b

Legend	
Srank	**COSEWIC**
S2 Imperiled	E Endangered
S3 Vulnerable	SC Special Concern
S4 Apparently Secure	NAR Not at Risk
S5 Secure	**SARA Schedule**
SNA Unranked	Schedule 1 Officially Protected under SARA
COSSARO	**Region of Waterloo Status**
END Endangered	C Common
SC Special Concern	√ Significant
NAR Not at Risk	

Appendix V
Whistle Bare Campground, Township of North Dumfries
Mammal Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Region of Waterloo Status[4]	Ontario Mammal Atlas[5]	NHIC Data[6] 17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	NRSI Observed
Didelphimorphia	**Opossums**								
Didelphis virginiana	Virginia Opossum	S4				R	X		
Insectivora	**Shrews and Moles**								
Blarina brevicauda	Northern Short-tailed Shrew	S5					X		
Condylura cristata	Star-nosed Mole	S5					X		
Sorex cinereus	Masked Shrew	S5				G	X		
Sorex fumeus	Smoky Shrew	S5				R	X		
Chiroptera	**Bats**								
Eptesicus fuscus	Big Brown Bat	S4					X		
Myotis lucifugus	Little Brown Myotis	S4	END	E	Schedule 1		X		
Myotis septentrionalis	Northern Myotis	S3	END	E	Schedule 1		X		
Lagomorpha	**Rabbits and Hares**								
Lepus americanus	Snowshoe Hare	S5				S	X		
Lepus europaeus	European Hare	SNA					X		
Sylvilagus floridanus	Eastern Cottontail	S5					X		X
Rodentia	**Rodents**								
Castor canadensis	Beaver	S5				S	X		
Erethizon dorsatum	Porcupine	S5				S	X		
Marmota monax	Woodchuck	S5					X		X
Microtus pennsylvanicus	Meadow Vole	S5					X		
Mus musculus	House Mouse	SNA					X		
Napaeozapus insignis	Woodland Jumping Mouse	S5					X		
Ondatra zibethicus	Muskrat	S5					X		
Peromyscus leucopus	White-footed Mouse	S5					X		
Peromyscus maniculatus	Deer Mouse	S5					X		
Rattus norvegicus	Norway Rat	SNA					X		
Sciurus carolinensis	Eastern Gray Squirrel	S5					X		X
Tamiasciurus hudsonicus	Red Squirrel	S5					X		X
Tamias striatus	Eastern Chipmunk	S5					X		X
Zapus hudsonius	Meadow Jumping Mouse	S5					X		
Carnivora	**Carnivores**								
Canis latrans	Coyote	S5				S	X		X
Mephitis mephitis	Striped Skunk	S5					X		
Mustela erminea	Ermine	S5					X		X
Mustela frenata	Long-tailed Weasel	S4				S	X		
Mustela vison	American Mink	S4				S	X		
Procyon lotor	Northern Raccoon	S5					X		X
Vulpes vulpes	Red Fox	S5					X		
Artiodactyla	**Deer and Bison**								
Odocoileus virginianus	White-tailed Deer	S5					X		X
					Total	16	33	0	9

[1]MNRF 2019a; [2]MECP 2019; [3]Government of Canada 2019; [4]Regional Municipality of Waterloo 1985; [5]Dobbyn 1994; [6]MNRF 2019b

Legend
SRank
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SNA Unranked
COSSARO
END Endangered
COSEWIC
E Endangered
SARA Schedule
Schedule 1 Officially Protected under SARA
Region of Waterloo Status
G General
S Scarce
R Rare

Appendix V
Whistle Bare Campground, Township of North Dumfries
Butterfly Species Reported From the Study Area

Scientific Name	Common Name	SRANK[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Region of Waterloo Status[4]	TEA Atlas[5] 17NJ40	NHIC Data[6] 17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	NRSI Observed
Hesperiidae	**Skippers**								
Anatrytone logan	Delaware Skipper	S4				C	X		
Ancyloxypha numitor	Least Skipper	S5				UC	X		
Carterocephalus palaemon	Arctic Skipper	S5				R	X		
Epargyreus clarus	Silver-spotted Skipper	S4				UC	X		
Erynnis baptisiae	Wild Indigo Duskywing	S4				UK	X		
Erynnis icelus	Dreamy Duskywing	S5				R	X		
Erynnis juvenalis	Juvenal's Duskywing	S5				R	X		
Erynnis lucilius	Columbine Duskywing	S4				R	X		
Erynnis martialis	Mottled Duskywing	S2	END	E			X		
Euphyes bimacula	Two-spotted Skipper	S4				R	X		
Euphyes conspicua	Black Dash	S3				UC	X		
Euphyes dion	Dion Skipper	S4				R	X		
Euphyes vestris	Dun Skipper	S5				VC	X		
Pholisora catullus	Common Sootywing	S3				R	X		
Poanes hobomok	Hobomok Skipper	S5				C	X		
Poanes viator	Broad-winged Skipper	S4				C	X		
Polites mystic	Long Dash Skipper	S5				UC	X		
Polites origenes	Crossline Skipper	S4				R	X		
Polites peckius	Peck's Skipper	S5				VC	X		
Polites themistocles	Tawny-edged Skipper	S5				C	X		
Pompeius verna	Little Glassywing	S4				UC	X		
Thymelicus lineola	European Skipper	SNA				VC	X		
Wallengrenia egeremet	Northern Broken Dash	S5				C	X		
Papilionidae	**Swallowtails**								
Papilio cresphontes	Giant Swallowtail	S4				UC	X		X
Papilio glaucus	Eastern Tiger Swallowtail	S5				VC	X		
Papilio polyxenes	Black Swallowtail	S5				VC	X		
Pieridae	**Whites and Sulphurs**								
Colias eurytheme	Orange Sulphur	S5				VC	X		
Colias philodice	Clouded Sulphur	S5					X		
Pieris oleracea	Mustard White	S4				PE	X		
Pieris rapae	Cabbage White	SNA				VC	X		X
Pontia protodice	Checkered White	SNA				R	X		
Pyrisitia lisa	Little Yellow	SNA				R	X		
Lycaenidae	**Harvesters, Coppers, Hairstreaks, Blues**								
Callophrys niphon	Eastern Pine Elfin	S5				R	X		
Celastrina lucia	Northern Spring Azure	S5					X		
Celastrina neglecta	Summer Azure	S5				VC	X		
Cupido comyntas	Eastern Tailed Blue	S5				UC	X		
Feniseca tarquinius	Harvester	S4				R	X		
Glaucopsyche lygdamus	Silvery Blue	S5					X		
Lycaena hyllus	Bronze Copper	S5				VC	X		
Satyrium acadica	Acadian Hairstreak	S4				UC	X		
Satyrium calanus	Banded Hairstreak	S4				UC	X		
Satyrium caryaevorus	Hickory Hairstreak	S4				R	X		
Satyrium liparops	Striped Hairstreak	S5				UC	X		

Scientific Name	Common Name	SRANK[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Region of Waterloo Status[4]	TEA Atlas[5] 17NJ40	NHIC Data[6] 17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	NRSI Observed
Satyrium titus	Coral Hairstreak	S5				UC	X		
Nymphalidae	**Brush-footed Butterflies**								
Aglais milberti	Milbert's Tortoiseshell	S5				UC	X		
Asterocampa clyton	Tawny Emperor	S2S3				UC	X		
Boloria bellona	Meadow Fritillary	S5				VC	X		
Boloria selene	Silver-bordered Fritillary	S5				R	X		
Cercyonis pegala	Common Wood-Nymph	S5				VC	X		
Chlosyne nycteis	Silvery Checkerspot	S5				R	X		
Coenonympha tullia	Common Ringlet	S5				C	X		
Danaus plexippus	Monarch	S2N, S4B	SC	END	Schedule 1	VC	X		X
Euphydryas phaeton	Baltimore Checkerspot	S4				R	X		
Junonia coenia	Common Buckeye	SNA				UC	X		
Lethe anthedon	Northern Pearly-Eye	S5				C	X		
Lethe appalachia	Appalachian Brown	S4				UC	X		
Lethe eurydice	Eyed Brown / Northern Eyed Brown	S5				VC	X		
Libytheana carinenta	American Snout	SNA				R	X		
Limenitis archippus	Viceroy	S5				VC	X		
Limenitis arthemis arthemis	White Admiral/Banded Purple	S5				C	X		
Limenitis arthemis astyanax	Red-spotted Purple	S5				C	X		
Megisto cymela	Little Wood-Satyr	S5				VC	X		
Nymphalis antiopa	Mourning Cloak	S5				VC	X		
Nymphalis l-album	Compton Tortoiseshell	S5				UC	X		
Phyciodes cocyta	Northern Crescent	S5				UC	X		
Phyciodes tharos	Pearl Crescent	S4				C	X		
Polygonia comma	Eastern Comma	S5				VC	X		
Polygonia interrogationis	Question Mark	S5				VC	X		
Polygonia progne	Grey Comma	S5				UC	X		
Speyeria atlantis	Atlantis Fritillary	S5				R	X		
Speyeria cybele	Great Spangled Fritillary	S5				VC	X		
Vanessa atalanta	Red Admiral	S5				VC	X		
Vanessa cardui	Painted Lady	S5				C	X		
Vanessa virginiensis	American Lady	S5				C	X		
						Total	**74**	**0**	**3**

[1]MNRF 2019a; [2]MECP 2019; [3]Government of Canada 2019; [4]Regional Municipality of Waterloo 1985; [5]Macnaughton et al. 2019; [6]MNRF 2019b

Legend	
SRank[1]	**SARA Schedule[3]**
S2 Imperiled	Schedule 1 Officially Protected under SARA
S3 Vulnerable	**Region of Waterloo Status[4]**
S4 Apparently Secure	VC Very Common
S5 Secure	C Common
SNA Unranked	UC Uncommon
COSSARO[2]	R Rare
SC Special Concern	UK Unknown
END Endangered	PE Possibly Extirpated
COSEWIC[3]	**TEA Atlas[5]**
E Endangered	X Reported

Appendix V
Whistle Bare Campground, Township of North Dumfries
Odonata Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[3]	Waterloo Status[4]	OOAD[5]	NHIC Data[6]	NRSI Observed
							17NJ40	17NJ4801, 17NJ4802, 17NJ4701, 17NJ4702	
Coenagrionidae	**Narrow-winged Damselflies**								
Amphiagrion saucium	Eastern Red Damsel	S4				X	X		
Argia apicalis	Blue-fronted Dancer	S4				X	X		
Argia fumipennis violacea	Violet Dancer	S5				X			X
Enallagma civile	Familiar Bluet	S5				X	X		
Enallagma exsulans	Stream Bluet	S5				X	X		
Ischnura verticalis	Eastern Forktail	S5				X	X		
Corduliidae	**Emeralds**								
Epitheca cynosura	Common Baskettail	S5				X	X		
Libellulidae	**Skimmers**								
Celithemis elisa	Calico Pennant	S5				Expected			X
Erythemis simplicicollis	Eastern Pondhawk	S5				X			X
Leucorrhinia intacta	Dot-tailed Whiteface	S5				X			X
Libellula incesta	Slaty Skimmer	S4				Expected			X
Libellula luctuosa	Widow Skimmer	S5				X			X
Libellula pulchella	Twelve-spotted Skimmer	S5				X			X
Pachydiplax longipennis	Blue Dasher	S5				X			X
Plathemis lydia	Common Whitetail	S5				X	X		
						Total	**7**		**8**

[1]MNRF 2019a; [2]MECP 2019; [3]Government of Canada 2019; [4]Regional Municipality of Waterloo 1985; [5]OOAD 2019; [6]MNRF 2019b

Legend
SRank[1]
S4 Apparently Secure
S5 Secure