

**Appendix 'B'
Ecological Survey and Environmental Impact Study**



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TOWN OF THE BLUE MOUNTAINS WATER SUPPLY MASTER PLAN ENVIRONMENTAL ASSESSMENT

Environmental Impact Study

Submitted to:

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by J.L. Richards & Associates Limited (J.L. Richards) to complete an Environmental Impact Study (EIS) to support the Schedule B Municipal Class Environmental Assessment (EA) for the Town of The Blue Mountains (the Town) Water Supply Master Plan, County of Grey, Ontario (the Project). The Project involves identifying the preferred solutions to modify the Town's water distribution system to address deficiencies and satisfy growth needs. The purpose of the EIS is to identify potential issues or constraints within the study area to support Phase 2 (Identify and Evaluate Alternative Solutions) of the Project.

1.1 Study Area Description

The study area for the Project is based on the Water Distribution Improvements figure provided by J.L. Richards in December 2017 (Figure 1). The study area generally extends along Highway 26 from Christie Beach Road to Highway 21, and includes the communities of Clarksburg and Thornbury, as well as residential and commercial areas on Blue Mountain. The study area also extends along Highway 21 between Highway 26 and Regional Road 19, and west along Regional Road 19 to 3rd Line.

The study area is located within a mixed developed and rural setting consisting primarily of suburban residential subdivisions, public parks, some commercial and institutional uses, and large tracts of natural areas. There are natural areas, including wetlands, watercourses, woodlands and valleylands throughout the study area, and are discussed further in Section 5.0.

2.0 POLICY CONTEXT

2.1 Provincial Policy Statement (PPS)

The PPS was issued under Section 3 of *The Planning Act* and came into effect on April 30, 2014.

The natural heritage policies of the PPS (MMAH 2014) indicate that:

- 2.1.1 Natural features and areas shall be protected for the long-term;
- 2.1.2 The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features;
- 2.1.3 Natural heritage systems shall be identified in Ecoregions 6E and 7E, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas;
- 2.1.4 Development and site alteration shall not be permitted in:
 - a) significant wetlands in Ecoregions 5E, 6E and 7E; and
 - b) significant coastal wetlands.



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

2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.3, 2.1.4 and 2.1.5 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

2.2 Species at Risk

2.2.1 Species at Risk Act (SARA)

At a federal level, species at risk (SAR) designations for species occurring in Canada are initially determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment and Climate Change, species are added to the federal List of Wildlife Species at Risk (Canada 2002). Species that are included on Schedule 1 as endangered or threatened are afforded protection of critical habitat on federal lands under the *Species at Risk Act* (SARA). On private or provincially-owned lands, only aquatic species listed as endangered, threatened or extirpated and migratory birds are protected under SARA, unless ordered by the Governor in Council.

2.2.2 Endangered Species Act (ESA)

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



Subsection 9(1) of the ESA prohibits the killing, harming or harassing of species identified as ‘endangered’ or ‘threatened’ in the various schedules to the Act. Subsection 10(1) (a) of the ESA states that “*No person shall damage or destroy the habitat of a species that is listed on the SARO list as an endangered or threatened species*”.

General habitat protection is provided, by the ESA, to all threatened and endangered species. Species-specific habitat protection is only afforded to those species for which a habitat regulation has been prepared and passed into law as a regulation of the ESA. The ESA has a permitting process where alterations to the habitat of protected species may be considered.

2.3 Fisheries Act

The purpose of the *Fisheries Act* (Canada 1985) is to maintain healthy, sustainable and productive Canadian fisheries through the prevention of pollution, and the protection of fish and their habitat. In 2012, changes were made to the *Fisheries Act* to enhance Fisheries and Oceans Canada’s (DFO) ability to manage threats to Canada’s commercial, recreational and Aboriginal (CRA) fisheries. Revised project screening, reporting and mitigation tools were implemented in 2013 to make regulatory requirements clear and consistent and improve compliance (DFO 2013a).

Projects affecting waterbodies supporting Canada’s CRA fisheries must comply with the provisions of the *Fisheries Act*. The proponent is responsible for determining if the project is likely to cause impacts to CRA fisheries and if these impacts can be avoided or mitigated. The proponent must gather information on the type and scale of impact on the fishery and determine if the impacts will result in serious harm to fish. Proponents have a duty to maintain records of self-assessments completed for projects they undertake and need to provide this information to DFO upon request. Serious harm to fish is defined as: the death of fish; and/or any permanent alteration to, or destruction of, fish habitat. If it is determined that the impacts cannot be avoided or mitigated and will result in serious harm to fish, an application for authorization must be submitted to the DFO. Projects that have the potential to obstruct fish passage or affect flows needed by fish also require an authorization; even if these occur outside of CRA fishery areas (DFO 2013a).

2.4 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) (Canada 1994) prohibits the killing or capturing of migratory birds, as well as any damage, destruction, removal or disturbance of active nests. It also allows the Canadian government to pass and enforce regulations to protect various species of migratory birds, as well as their habitats. While Environment and Climate Change Canada (ECCC) can issue permits allowing the destruction of nests for scientific or agricultural purposes, or to prevent damage being caused by birds, it does not typically allow for permits in the case of industrial or construction activities.

2.5 Grey Sauble Conservation Authority

The majority of the study area is located within the jurisdiction of Grey Sauble Conservation Authority (GSCA). Any development or activities proposed within the regulation limit as governed by O. Reg. 151/06 GSCA: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses under the *Conservation Authorities Act* (2011) may require a permit.

The GSCA also has an agreement with the DFO to administer the *Fisheries Act* within the watershed (GSCA 2013).



2.6 Nottawasaga Valley Conservation Authority

The southeastern portion of the study area is located within the jurisdiction of Nottawasaga Valley Conservation Authority (NVCA). Any development or activities proposed within the regulation limit as governed by O. Reg. 172/06 NVCA: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses under the *Conservation Authorities Act* (2011) may require a permit.

2.7 Town of The Blue Mountains Official Plan

Appendix 1 of the Town's Official Plan (OP) maps known constraint areas within the Town boundary, which are primarily associated with natural features. Significant woodlands, Areas of Natural and Scientific Interest (ANSI), Provincially Significant Wetlands (PSW), other wetlands and karst are all mapped within the study area according to Appendix 1 (Blue Mountains 2016). These features are discussed in more detail in Section 4 and 5.

According to Schedule A of the Town's OP (Blue Mountains 2016), land uses within the study area are a mixture of residential, rural, major open space, developed (i.e., commercial, institutional and employment areas), and resort/recreational. There are also hazard lands associated with watercourses, and a harbour area at the lakeshore in the community of Thornbury.

The Town's OP states that the Town will endeavor to obtain all necessary approvals for the required future expansion of existing municipal water and sewage service facilities in order to keep pace with development demands (Blue Mountains 2016).

2.8 County of Grey Official Plan

Appendixes A and B of the County of Grey's (the County) OP (Grey 2013) map known constraint areas in the County. Significant woodlands, ANSIs, PSWs, other wetlands and karst are all mapped within the study area. These features are discussed in more detail in Sections 4 and 5.

According to Schedule A of the County's OP (Grey 2013), land uses within the study area are primarily Recreational Resort Area, Primary Settlement Area and Escarpment Recreation Area. There are also hazard land use areas associated with watercourses, and Niagara Escarpment Development Control Area south of Blue Mountain.

3.0 METHODS

3.1 Background Review

The investigation of existing conditions in the study area included a background information search and literature review to gather data about the local area and provide context for the evaluation of the natural features. A number of resources were used, including:

- Natural Heritage Information Centre (NHIC) database, maintained by the MNRF (NHIC 2017);
- Land Information Ontario (LIO) geospatial data (MNRF 2017a);
- Species at Risk Public Registry (ECCC 2017);
- Species at Risk in Ontario (SARO) List (MNRF 2017b);



- Breeding Bird Atlas of Ontario (OBBA) (Cadman et al. 2007);
- Atlas of the Mammals of Ontario (Dobbyn 1994);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2017);
- Bat Conservation International (BCI) range maps (BCI 2017);
- Ontario Butterfly Atlas (Jones et al. 2017);
- eBird species maps (eBird 2012);
- Town of The Blue Mountains Official Plan (2016);
- Grey County Official Plan (2013);
- Environmental Impact Assessment (EIA) for the Comprehensive Environmental Study Report (ESR) for the Lora Bay, Clarksburg, Thornbury, and Camperdown Service Areas Phase 2 Report (LGL 2001);
- Fish ON-Line Ontario (MNRF 2016a); and
- Aerial imagery.

To develop an understanding of the drainage patterns, ecological communities and potential natural heritage features that may be affected by the proposed Project, MNRF LIO data were used to create base layer mapping for the study area. A geographic query of the NHIC database was conducted to identify element occurrences of any natural heritage features, including wetlands, ANSIs, life science sites, rare vegetation communities, rare species (i.e., species ranked S1-S3 by NHIC), threatened or endangered species designated under the ESA or SARA, and other natural heritage features within the study area.

3.2 SAR Screening

SAR considered for this report include those species listed in the ESA and SARA. An assessment was conducted to determine which SAR had potential habitat in the study area. A screening of all SAR which have the potential to be found in the vicinity of the study area was conducted first as a desktop exercise using the sources listed in Section 3.1. Species with ranges overlapping the study area, or recent occurrence records in the vicinity, were screened by comparing their habitat requirements to habitat conditions in the study area.

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

Searches were conducted during the site reconnaissance for suitable habitats and signs of all SAR identified through the desktop screening. If the potential for the species to occur in the study area was moderate or high, the screening was refined based on the site reconnaissance (i.e., habitat assessment). Any habitat identified during



the site reconnaissance with potential to provide suitable conditions for additional SAR not already identified through the desktop screening was also assessed and recorded.

3.3 Field Investigation

The habitats and plant communities in the study area, were characterized through a site reconnaissance conducted on September 21-22, and 27-28, 2017. The following sections outline the methods used for each of the field surveys.

3.3.1 Ecological Land Classification and Botanical Inventory

Plant communities in the study area were first delineated at a desktop level using high-resolution aerial imagery, then ground-truthed in the field (where access was possible) using the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998). During the site reconnaissance, information on plant community structure and composition was recorded in order to better define and refine the plant community polygons.

The botanical inventory included a combination of area searches in publicly accessible areas and roadside assessments in naturally-occurring habitats. Where access was possible, area searches were conducted by systematically walking through the habitat, in a meandering fashion, generally paralleling the principal (long) axis of a natural area, where feasible. For roadside assessments, all plant species visible from the edge were documented. A list of all plant species identified during all field surveys was compiled.

3.3.2 General Wildlife Surveys

General wildlife surveys (visual encounter surveys) included track and sign surveys, area searches, and incidental observations, concurrent with other field surveys.

The full range of habitats in the study area were searched, where access was possible, with special attention paid to edge habitats and other areas where mammals might be active. Areas of exposed substrate such as sand or mud were located and examined for any visible tracks. Any wildlife (including mammals, birds, butterflies, and dragonflies) seen and identified were recorded. When encountered, tracks and other signs (e.g., tracks, scats, hair, tree scrapes, etc.) were identified to a species, if possible, and recorded. Observations of wildlife species or signs during all field surveys were recorded.

A habitat assessment for bats, including both maternity and hibernacula habitats, was also conducted, where possible. Treed communities were surveyed for large snag or cavity trees with potential to function as maternity roosts. Any anthropogenic structures, such as sheds or barns, or bedrock ridges with potential to function as hibernacula were also documented. Visual encounter surveys for turtles and snakes as well as turtle and snake habitat (with a focus on SAR) were conducted in the study area. Suitable habitat for reptiles were also searched where accessible (e.g., carefully flipping logs and other types of cover objects, observations in piles of rocks) and all reptiles and amphibians observed were identified and recorded.

Searches were also conducted to document the presence or absence of suitable habitat, based on habitat preferences, for those species identified in the desktop SAR screening described above.

3.3.3 Fish and Aquatic Habitat Assessment

A qualitative assessment of surface water features in the study area was completed to document the presence of fish and to assess the quality of fish habitat. Surveys were completed by collecting measurements for accessible watercourses (i.e., at road or trail crossings) and parameters recorded include wetted and bankfull width, bank



height, and water depth. Other habitat parameters, such as substrate type, cover features, instream and riparian vegetation were also recorded. Fisheries data collected by LGL to support the ESR for the Lora Bay, Clarksburg, Thornbury, and Camperdown Service Areas Phase 2 Report (LGL 2001), and MNR data (MNR 2015a) was also used to supplement the field data.

3.4 Analysis of Significance and Sensitivity

An assessment was conducted to determine if any significant environmental features or SAR exist, or have moderate or high potential to exist, in the study area and whether or not these features may constrain the proposed Project.

4.0 EXISTING CONDITIONS

4.1 Ecosystem Setting and Regional Context

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

The study area is located in the Lake Huron Basin and overlaps portions of five subwatersheds, including Little Beaver River, Beaver River, Indian Brook, Mill Creek and the Blue Mountains. Outside of the urban areas and the developed lakeshore, forest cover in the study area is high.

4.2 Surface Water Resources

There are several surface water features in the study area, including permanent and intermittent streams, ponds and a lake. Major watercourses in the study area include the Little Beaver Creek, Beaver River, Indian Brook, Mill Creek, Silver Creek, and Black Ash Creek (Figures 1A-1F). The northern portion of the study area is immediately adjacent to the Georgian Bay shoreline.

Lake of the Clouds, in the southeast corner of the study area (Figure 1F), is fed by the Main and Middle Springs of the adjacent karst feature (Ford and Worthington 2004). There are also several small ponds scattered throughout the study area, primarily associated with stormwater management or recreational purposes. There are also three sewage lagoon ponds at the south end of Bay Street, in the community of Thornbury (Figure 1B).

In the southwestern portion of the study area, the Beaver River is controlled by the Clendenan Dam and associated Clendenan Reservoir, located 170 m east of the study area. The Beaver River flows northeast through the community of Clarksburg into a large waterbody known as Mill Pond, just south of Bridge Street. From the Mill Pond, the river flows through the Thornbury dam and into Georgian Bay (Figure 1A).

4.3 Vegetation

4.3.1 Regional Setting

The study area is located in the Great Lakes – St. Lawrence Forest Region and the Huron-Ontario subregion (Rowe 1972). The natural upland forest cover in this region is dominated by sugar maple (*Acer saccharum*),



American beech (*Fagus grandifolia*), basswood (*Tilia americana*), white ash (*Fraxinus americana*), white oak (*Quercus alba*), bur oak (*Quercus macrocarpa*), eastern hemlock (*Tsuga canadensis*) and eastern white pine (*Pinus strobus*). The lowland areas are characterized by forests of silver maple (*Acer saccharinum*), white elm (*Ulmus americana*), red elm (*Ulmus rubra*), black ash (*Fraxinus nigra*) and eastern white cedar (*Thuja occidentalis*).

4.3.2 Plant Communities

Overall, natural communities in the study area are primarily composed of mixed and deciduous forests and swamp, coniferous forest, and open meadow, in addition to anthropogenic communities (e.g. agricultural fields). During the site reconnaissance, 12 plant communities were surveyed in detail and classified based on the ELC system (Lee et al. 1998). These communities are shown on Figures 1A-1F and are briefly described in Table 1.



TOWN OF THE BLUE MOUNTAINS WATER MASTER PLAN EIS

Table 1: Plant Communities in the Town of The Blue Mountains Study Area

ELC Community	Field Description	SRANK ^a
Deciduous Forest		
FOD4-2 Dry-Fresh White Ash Deciduous Forest	<p>Located in the northwest corner of the study area, along the western portion of the Georgian Trail between Christie Beach Road and Lora Bay Drive. The forest is immature, with a dense canopy cover dominated by white ash and trembling aspen (<i>Populus tremuloides</i>) in association with black walnut (<i>Juglans nigra</i>), red oak (<i>Quercus rubra</i>), white cedar and apple (<i>Malus pumila</i>). Trees are young, immature and generally less than 20 cm in diameter-at-breast-height (DBH). The understory is moderate and dominated by common buckthorn (<i>Rhamnus cathartica</i>) and gray dogwood (<i>Cornus foemina</i>) with staghorn sumac (<i>Rhus typhina</i>), willow sp. (<i>Salix</i> sp.), and riverbank grape (<i>Vitis riparia</i>). Common buckthorn is particularly dense on the south side of the Georgian Trail. The ground cover is sparse and composed of milkweed (<i>Asclepias syriaca</i>), goldenrods, wild carrot (<i>Daucus carota</i>), common teasel (<i>Dipsacus fullonum</i>) and ferns. Based on the age and species composition, this forest has likely been previously disturbed and/or cleared.</p>	S5
FOD5-8 Dry-Fresh Sugar Maple – White Ash Deciduous Forest	<p>Located in the northwest corner of the study area, along the central portion of the Georgian Trail between Christie Beach Road and Lora Bay Drive. This forest is mature and characterized by larger, older trees than the FOD4-2 and FOC4 on either side of it. Canopy cover is dense and dominated by sugar maple and white ash, in association with trembling aspen, basswood, red maple (<i>Acer rubrum</i>), white birch (<i>Betula papyrifera</i>), bitternut hickory (<i>Carya cordiformis</i>) and white cedar. The understory is also dense and dominated by common buckthorn and gray dogwood with red raspberry (<i>Rubus idaeus</i>) and riverbank grape. The ground layer is sparse and composed of forb species such as milkweed, goldenrods, wild carrot, and common teasel. This community has occasional standing snags, abundant small deadfall (i.e., less than 25 cm DBH) and occasional larger deadfall (i.e., between 25-50 cm DBH).</p>	S5
FOD6-1 Sugar Maple – Lowland Ash Deciduous Forest	<p>A large deciduous forest along the Beaver River in Clarksburg, located east of Marsh Street. Although the overall community was classified as FOD6-1, there is a mosaic of upland forest and swamp pockets. Canopy cover is dense and dominated by white and green ash (<i>Fraxinus pennsylvanica</i>) with willow, sugar maple, and Freeman's maple (<i>Acer x freemanii</i>). The understory is moderate and dominated by the same species as the canopy, in addition to riverbank grape, red raspberry, and Virginia creeper (<i>Parthenocissus inserta</i>). The ground layer is moderate and composed of species such as enchanter's nightshade (<i>Circaea canadensis</i>), white avens (<i>Geum canadense</i>), Canada anemone (<i>Anemone canadensis</i>), ostrich fern (<i>Matteuccia struthiopteris</i>), wild geranium (<i>Geranium maculatum</i>), trillium (<i>Trillium</i> sp.) and goldenrods. The community is mature with abundant snags and deadfall of all sizes.</p>	S5



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ELC Community	Field Description	SRANK ^a
Coniferous Forest		
FOC4 Fresh-Moist White Cedar Coniferous Forest	Located in the northwest corner of the study area, along the eastern portion of the Georgian Trail between Christie Beach Road and Lora Bay Drive. The forest is composed almost exclusively by white cedar, with infrequent associates of white birch and white ash.	S5
Mixed Forest		
FOM4-2-A Dry-Fresh White Cedar – Poplar Mixed Forest	Located along the Georgian Trail between Highway 26 and Lake Shore Road at the northern edge of the study area. Canopy cover is moderate and dominated by trembling aspen, white cedar and sugar maple. The understory is also moderate and dominated by white cedar and common buckthorn. The ground layer is sparse and composed of species such as wild carrot, bracken fern (<i>Pteridium aquilinum</i>), New England aster (<i>Symphotrichum novae-angliae</i>), grey goldenrod (<i>Solidago nemoralis</i>) and terrestrial grasses. This community is immature and dominated by small trees less than 25 cm DBH. Standing snags are rare and deadfall is dominated by small diameter twigs and branches.	S5
FOM4-2-B Dry-Fresh White Cedar – Poplar Mixed Forest	Located along the Georgian Trail between Highway 26 and County Road 40 at the northern edge of the study area. Canopy cover is dense and dominated by white cedar and trembling aspen, in association with white birch, white ash, sugar maple, balsam fir (<i>Abies balsamea</i>) and basswood. The understory is moderate and dominated by white cedar with associates of juniper (<i>Juniperus communis</i>), common buckthorn, staghorn sumac and gray dogwood. Ground cover is sparse and composed of species such as bracken fern, Canada anemone, milkweed, goldenrods, herb-robert (<i>Geranium robertianum</i>), and false Solomon's seal (<i>Maianthemum racemosum</i>). In the marshy ditches along the trail, there are species such as cattail (<i>Typha latifolia</i>), marsh horsetail (<i>Equisetum palustre</i>), joe-pye weed (<i>Eutrochium maculatum</i>), spotted jewelweed (<i>Impatiens capensis</i>) and ferns. A small stream appears to flow in the ditch along the northern side of the trail, and seeps may be present in this forest community, which is located at the base of the Blue Mountains.	S5
FOM8-1 Fresh-Moist Poplar Mixed Forest	Located along the lakeshore in the northwestern corner of the study area, north of Cameron Street. This forest community is on a hill that slopes down towards Georgia Lake. Canopy cover is dense and dominated by trembling aspen with sugar maple, white ash, white cedar, white spruce (<i>Picea glauca</i>) and hemlock. The understory is moderate and dominated by common buckthorn, dogwoods, riverbank grape and staghorn sumac.	S5
Deciduous Swamp		
SWD2-2 Green Ash Mineral Deciduous Swamp	A large community along the Beaver River in Clarksburg, south of Clark Street. Canopy cover is dense and dominated by green ash in association with black walnut, black locust (<i>Robinia pseudoacacia</i>) and sugar maple. The understory is moderate and dominated by common buckthorn, dogwoods, and saplings of the canopy species. The ground cover is sparse and composed of periwinkle (<i>Vinca minor</i>), ferns, garlic mustard (<i>Alliaria petiolata</i>), and goldenrods.	S5



TOWN OF THE BLUE MOUNTAINS WATER MASTER PLAN EIS

ELC Community	Field Description	SRANK ^a
Mixed Swamp		
SWM1-1 White Cedar – Hardwood Mineral Mixed Swamp	Located at the Peasemarsch Nature Preserve at the northern edge of the study area. Canopy cover is dense and dominated by white cedar and green ash. The understory is sparse and dominated by buckthorn. Groundcover is also sparse and dominated by false Solomon’s-seal and ferns. The trees are generally small, less than 25 cm DBH, and few standing snags or deadfall was observed. There is also a small thicket swamp inclusion dominated by green ash and red osier dogwood (<i>Cornus stolonifera</i>), with a dense ground layer of ferns. The thicket swamp has a pit and mound topography with numerous vernal pools.	S5
Cultural Communities		
REST Restoration Area	Located in Clarksburg, west of 10 th Line. A regenerating area of the floodplain lined with boulders and cobble. The majority of the community is characterized by colonizing meadow species, such as wild carrot, white sweet clover (<i>Melilotus alba</i>), bird’s-foot trefoil (<i>Lotus corniculatus</i>), spotted knapweed (<i>Centaurea stoebe</i>) and chicory (<i>Cichorium intybus</i>). Small shrubs and tree saplings are scattered throughout, including dogwood, white cedar, and black locust.	n/a
CUP3/FOC Coniferous Plantation / Coniferous Forest	Located in Clarksburg, west of 10 th Line. A small planted hedgerow west of 10 th Line, composed of coniferous species including red pine (<i>Pinus resinosa</i>), Norway spruce (<i>Picea abies</i>), white pine and some white ash at the western edge.	n/a
CUM/CUW Cultural Meadow / Cultural Woodland	Located in Clarksburg, west of 10 th Line. A meadow / early successional woodland west of 10 th Line. The woodland is characterized by colonizing species such as white pine, trembling aspen, staghorn sumac, white ash and black locust. Trees are small and immature, measuring less than 15 cm in DBH. The meadow component is forb dominated with species such as wild carrot, red clover (<i>Trifolium pratense</i>), crown vetch (<i>Securigera varia</i>), alfalfa (<i>Medicago sativa</i>), aster sp., goat’s beard (<i>Tragopogon dubius</i>) and goldenrods. The meadow may be flooded in the spring.	n/a

^a An SRank is a provincial –level rank indicating the conservation status of a species or plant community and is assigned by the NHIC in Ontario (NHIC 2015). SRanks are not legal designations but are used to prioritize protection efforts in the Province. SRanks for plant communities in Ontario are defined in the Significant Wildlife Habitat Technical Guide (MNR 2000). Ranks 1-3 are considered extremely rare to uncommon in Ontario; Ranks 4 and 5 are considered to be common and widespread. n/a indicates a community that has not been ranked, which often applies to anthropogenic, culturally-influenced or high-level ELC communities (i.e., FOD).



4.3.3 Vascular Plants

A total of 95 vascular plant species were observed during the botanical survey completed in the study area (Appendix A). Of these, 59 (63%) are native species, and 30 (32%) are exotic. The remaining 5% were unable to be identified to the species level due to plant condition or seasonal timing (i.e., not flowering).

Significant and Sensitive Species

The majority of the plant species identified during the botanical inventory are secure and common in Ontario and globally (S4 or S5; G4 or G5), or are ranked SNA (i.e., non-native species) (Appendix A). Two species designated endangered under the ESA, American chestnut (*Castanea dentata*) and butternut (*Juglans cinerea*), were observed in the study area during the site reconnaissance.

One American chestnut tree was observed planted on a residential property along Hillcrest Drive in Clarksburg. Although this species receives individual and general habitat protection under the ESA, the recovery strategy (Boland et al. 2012) recommends that trees planted for horticulture, landscaping or research be exempt from protection.

One butternut was observed along the Georgian Trail between County Road 40 and Highway 26 (Figure 1B). The individual was immature, measuring approximately 10 cm DBH, and was growing on the gravel embankment of the trail. The tree appeared to be in good health and no evidence of canker was observed. Butternut, and the habitat within 50 m around the tree, is protected under the ESA. If the butternut will be removed or harmed, or development is proposed within 50 m, a butternut health assessment by a qualified assessor is required. Depending on the results of the health assessment, a permit or registration through the Notice of Activity process may be required.

No other plant SAR identified in the desktop SAR screening were identified during the site reconnaissance (Appendix B).

4.4 Wildlife

4.4.1 General Wildlife Survey

A total of two arthropods, 35 birds, five mammals and one amphibian species were observed during the site reconnaissance (Appendix C). Because the site reconnaissance was completed outside of the active period for most wildlife, the list of wildlife for the study area is not considered complete. In addition, the bird community observed is likely composed of a high proportion of migrant species and may not necessarily reflect the species that would be breeding in the study area.

Significant and Sensitive Species

The majority of wildlife species observed during the site reconnaissance are secure and common in Ontario and globally (S4 or S5; G5) (Appendix C).

One species designated special concern under both the ESA and SARA, monarch (*Danaus plexippus*), was observed during the site reconnaissance. Monarch is found wherever there are milkweed (*Asclepius* spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, and roadsides, but also in city gardens and parks (COSEWIC 2010). There is abundant suitable foraging habitat in the study area, contained in field edges, roadsides, gardens and parks, and open meadows. These habitats may also provide suitable host plants for larvae.



No other wildlife SAR identified in the desktop SAR screening were identified during the site reconnaissance (Appendix B).

4.4.2 Bat Habitat

Based on the preliminary habitat assessment, it was determined that there are several forests with potential suitable habitat for SAR bats, including little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), and tri-colored bat (*Perimyotis subflavus*), in the study area. In particular, the following communities were noted as having large, mature trees with standing snags or trees with peeling bark and/or cavities (Figures 1A-1F):

- FOD5-8 along the Georgian Trail in the northwest corner of the study area;
- FOM east of Christie Beach Road (between Sunset Boulevard and 39th Sideroad);
- FOM8-1 along Cameron Street in the northwestern corner of the study area;
- Riparian FOD along Little Beaver Creek between 10th Line and Arthur Street West;
- FOD6-1 and SWD2-2 along the Beaver River in Clarksburg;
- FOM4-2 along the Georgian Trail between Highway 26 and County Road 40;
- FOD along Arlberg Crescent and the FOD, FOM and SWM along Monterra Road on the mountain;
- FOD and FOM east of County Road 19 and south of Snowbridge Way in the northeast corner of the study area;
- FOD and FOM south of County Road 19, and the large SWD west of County Road 34 in the northeast corner of the study area;
- The large FOD surrounding the proposed elevated tank off Scandia Lane;
- The FOD between the two ends of Salzburg Place;
- Sugar maple FOD west of the lake at Castle Glen Estates in the southeast corner of the study area; and
- FOD east of 3rd Line in the southeast corner of the study area.

Little brown myotis, northern myotis, and tri-colored bat are all designated endangered under the ESA. All three bat species are tree-roosting species that prefer large snag and cavity trees. Little brown myotis will roost in both natural and man-made structures. They require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. Northern myotis usually roost in hollows, crevices, and under loose bark of mature trees, while tri-colored bat roosts in foliage, in clumps of old leaves, and in hanging moss or squirrel nests. Tri-colored bat may roost in foliage, in clumps of old leaves, hanging moss or squirrel nests (Environment Canada 2015a). Proximity to water and open fields for foraging may increase the suitability of certain forests as preferred habitat.

Eastern small-footed myotis (*Myotis leibii*) is also designated endangered under the ESA. This species is not known to roost within trees, but there is very little known about its roosting habits. The species is generally found roosting on the ground under rocks, in rock crevices, talus slopes and rock piles, and occasionally inhabits



buildings (Humphrey 2017). This species is thought to roost in the same general area as hibernacula, so proximity to suitable landscape features such as bedrock ridges and karst topography may increase suitability of maternity roost features as habitat (Humphrey 2017). Suitable rock piles may occur in the study area, particularly along the bottom slopes of the Blue Mountains where talus is likely (Figure 1C).

There is known karst in the southern portion of the study area that may provide suitable hibernacula for all four endangered bat species (MNDM 2017).

4.5 Aquatic Habitat and Fish

4.5.1 Aquatic Habitat

Aquatic habitat in the study area was assessed at seven locations (Table 2).



TOWN OF THE BLUE MOUNTAINS WATER MASTER PLAN EIS

Table 2: Aquatic Habitat Conditions in Watercourses Sampled in the Town of The Blue Mountains Study Area

Location	Feature Name	Bankfull		Wetted		Instream / Aquatic Conditions	Riparian Conditions	Stream Type	Fish Habitat
		Width (m)	Depth (m)	Width (m)	Depth (m)				
WC#1	Beaver River	18	5	15	0.4	A meandering watercourse with high flow, and areas of riffles and runs. Substrates are characterized by cobble, gravel, boulder and a small amount of sand. Water temperature was measured as 20°C. No instream or aquatic vegetation was observed during field surveys. Instream cover is low and provided by boulders (10%), woody debris, such as logs (2%) and bridge cover (2%). There is a dam barrier upstream of the survey location, at the Highway 26 overpass.	Riparian cover is low, with 5% canopy cover and 2% understory cover. Riparian plant species include willow, white ash, trembling aspen, American elm, black walnut and gray dogwood.	Permanent	Yes Potential for large fish
WC#2	Little Beaver River	3	0.5	2	0.1	The channel is meandering to straight with no flow. Substrates are characterized primarily by gravel and cobble with a smaller sand component. No instream or aquatic vegetation was observed during field surveys. Instream cover is moderate and provided by cobble (10%), floating leaves and detritus (25%), and undercut banks (2%).	Riparian cover is high, with 70% canopy cover, 10% understory cover and 5% ground cover. The riparian plant community is defined by a deciduous forest, and riparian plant species include willow, white spruce, white ash, American elm, Manitoba maple, basswood, burdock, staghorn sumac and terrestrial grasses.	Permanent	Yes Potential for medium fish
WC#3	Indian Brook	7	2	5	0.1	A meandering watercourse with low flow. Substrates are characterized by cobble and gravel, with small components of sand and boulder. No instream or aquatic vegetation was observed during field surveys. Instream cover is moderate and provided by undercut banks (15%), boulders (10%) and woody debris (5%). Several exposed gravel islands were observed in the channel, indicating the watercourse may have been at a low flow period.	Riparian cover is low, with 10% canopy cover and 3% understory cover. The riparian plant community is defined by a white cedar coniferous forest. Riparian plant species include white cedar, sugar maple, white ash, gray dogwood, staghorn sumac, raspberry, riverbank grape, common milkweed, and goldenrods.	Permanent	Yes Potential for large fish
WC#4	Unnamed tributary	5	1	2.5	0.6	The channel is meandering with no flow. Substrates are characterized primarily by gravel and cobble with a smaller sand and boulder component. Aquatic grasses and submerged aquatic vegetation was observed instream. Instream cover is moderate to high and provided by algae and leaf litter (40%), woody debris (10%), and undercut banks (10%). There is a large concrete block culvert beneath Lake Shore Road, measuring approximately 7 m in width.	Riparian cover is high, with 60% canopy cover, 5% understory cover and 1% ground cover. Riparian plant species include white ash, white cedar, gray dogwood, willow, goldenrods, common milkweed and blue flag (<i>Iris versicolor</i>).	Permanent	Yes Potential for medium fish
WC#5	Unnamed tributary	0.5	0.3	—	—	Channel was dry at the time of the survey. There is a round culvert beneath the Georgian Trail measuring approximately 1 m wide and 0.5 m tall.	Riparian cover is high, with 80% canopy cover and 5% understory cover. The riparian plant community is defined by an immature deciduous forest, and riparian plant species include white ash, trembling aspen, common buckthorn and gray dogwood.	Intermittent	No
WC#6	Unnamed tributary	1	0.2	—	—	Channel was dry at the time of the survey. There is a doublet concrete culvert beneath the Georgian Trail, each measuring approximately 1 m wide and 0.5 m tall. The channel banks are reinforced with boulders at the culvert, and the channel is vegetated through with riparian shrubs and forbs.	Riparian cover is high, with 80% canopy cover and 5% understory cover. The riparian plant community is defined by an immature deciduous forest, and riparian plant species include white ash, trembling aspen, common buckthorn and gray dogwood.	Intermittent	No
SWMP	Stormwater pond	—	—	—	—	Pond measures approximately 45 m at the widest point and is of an unknown depth, although likely shallow. No instream or aquatic vegetation was observed. Substrates are characterized primarily by muck/organics, silt and sand. Instream cover is low to non-existent.	Surrounded by a forb-dominated cultural meadow providing low riparian cover (<1%). Riparian plant species include red osier dogwood, staghorn sumac, terrestrial grasses, wild carrot, white sweet clover, goldenrods and New England aster.	Permanent	No



4.5.2 Fish

No fish were observed during the site reconnaissance. Based on publicly available data and data collected as part of other studies, the thermal regime and known fish species of each watercourse and major waterbody in the study area are shown in Table 3 and on Figures 1A-1F.

Table 3: Thermal Regime and Fish Species of Watercourses in the Town of The Blue Mountains Study Area

Location	Feature Name	Thermal Regime ^a	Fish Species ^{a,b}
WC#1	Beaver River	Cold	Brook trout (<i>Salvelinus fontinalis fontinalis</i>), rainbow trout (<i>Oncorhynchus mykiss</i>), bass and yellow perch (<i>Perca flavescens</i>) (Allerton 2015)
—	Mill Pond	Cool	Mottled sculpin (<i>Cottus bairdii</i>), brook stickleback (<i>Culaea inconstans</i>), johnny darter (<i>Etheostoma nigrum</i>), longnose dace (<i>Rhinichthys cataractae</i>), brown trout (<i>Salmo trutta</i>), brook trout, creek chub (<i>Semotilus atromaculatus</i>), central mudminnow (<i>Umbra limi</i>), northern brook lamprey (<i>Ichthyomyzon fossor</i>), smallmouth bass (<i>Micropterus dolomieu</i>), common shiner (<i>Luxilus cornutus</i>), rainbow trout, Chinook salmon (<i>Oncorhynchus tshawytscha</i>), yellow perch, white sucker (<i>Catostomus commersonii</i>), channel catfish (<i>Ictalurus punctatus</i>) (MNRF 2015; 2016)
WC#2	Little Beaver Creek	Unknown	Blacknose dace (<i>Rhinichthys atratulus</i>), common shiner, white sucker, creek chub (LGL 2001)
WC#3	Indian Brook	Unknown	Blacknose dace, bluntnose minnow (<i>Pimephales notatus</i>), brown trout, common shiner, creek chub, emerald shiner (<i>Notropis atherinoides</i>), longnose dace, rainbow trout, rosyface shiner (<i>Notropis rubellus</i>), white sucker (LGL 2001)
WC#4	Unnamed tributary	Unknown	Blacknose dace, bluntnose minnow, brook stickleback, central mudminnow, creek chub, fathead minnow (<i>Pimephales promelas</i>), johnny darter, northern redbelly dace (<i>Chrosomus eos</i>) (LGL 2001).
WC#5	Unnamed tributary	Unknown	Small, intermittent stream unlikely to support fish.
WC#6	Unnamed tributary	Unknown	Small, intermittent stream unlikely to support fish.
ESR#7	Unnamed tributary	Unknown	Blacknose dace, creek chub, rainbow trout (LGL 2001)
ESR#8/9	Unnamed tributary	Unknown	Blacknose dace, creek chub, bluntnose minnow, northern redbelly dace, rainbow trout (LGL 2001)
ESR#10	Unnamed tributary	Unknown	Brook trout (LGL 2001)
—	Silver Creek	Cool (with some areas of coldwater habitat)	White sucker, mottled sculpin, johnny darter, pearl dace (<i>Margariscus margarita</i>), common shiner, rainbow trout, northern redbelly dace, bluntnose minnow, fathead minnow, blacknose dace, longnose dace, brown trout, creek chub, central mudminnow, silver lamprey (<i>Ichthyomyzon unicuspis</i>), sculpins (MNRF 2015)
—	Lake of Clouds	Cold	Brook trout (MNRF 2015)



Location	Feature Name	Thermal Regime ^a	Fish Species ^{a,b}
—	Black Ash Creek	Cool (with some areas of coldwater habitat)	Blacknose dace, longnose dace, creek chub, ghost shiner (<i>Notropis buchanani</i>), sculpins, white sucker, brook stickleback, common carp (<i>Cyprinus carpio</i>), johnny darter/tesselated darter, brassy minnow (<i>Hybognathus hankinsoni</i>), emerald shiner, common shiner, mimic shiner (<i>Notropis volucellus</i>), rainbow trout, northern redbelly dace, bluntnose minnow, fathead minnow (MNRF 2015)

^a MNRF. 2015. Land Information Ontario, Aquatic Resources Area Layer. Fisheries Section, Species Conservation Policy Branch. Accessed January 10, 2018.

^b LGL Limited Environmental Research Associates (LGL). 2001. Environmental Impact Assessment.

MNRF. 2016. Fish ON-Line. Powered by Land Information Ontario. Queen’s Printer for Ontario. Accessed January 16, 2018.
 Allerton, M. 2015. Beaver River Watershed Report.

Overall, the Beaver River is classified as a coldwater system (Saugeen Conservation 2015). However, based on monitoring (Allerton 2015; D’Amelio and Imhof 2010), the lower reaches of Beaver River, including the portion that flows through the study area, have been classified as warmwater due to warming at Lake Eugenia, approximately 30 km upstream of the study area. As well, the two major dams (i.e., Clendenan and Thornbury) on the river within the study area, and inputs from urban runoff may also contribute to the warming effect in the lower reaches of the river (Allerton 2015). A “fish ladder” operated by MNRF at the Thornbury dam near the Beaver River outlet allows fish to migrate up the Beaver River and its tributaries for spawning (Katopodis Ecohydraulics 2013).

Although the upper reaches of Black Ash Creek, within the southeastern corner of the study area, are classified as warmwater / coolwater fisheries habitat by the MNRF (2015a), the middle reaches of the creek outside of the study area are classified as coldwater habitat (SGBLS SPR 2014; Skelton Brumwell and MacViro 2006). Similarly, although the MNRF (2015a) classifies Silver Creek as a coolwater thermal regime, the main branch is classified as coldwater (SGBLS SPR 2014; Skelton Brumwell and MacViro 2006; NVCA 2013).

There are two fish sanctuaries within the study area. There is one sanctuary on Indian Brook and its tributaries within Collingwood Township that prohibits fishing between the end of April and May 31, and a second sanctuary on Silver Creek and its tributaries within the Town of Collingwood and the townships of Collingwood and Nottawasaga that prohibits fishing between January 1 and May 31, and October 1 to December 31 (MNRF 2016a).

Significant and Sensitive Species

One fish species designated special concern under the ESA and not designated under the SARA is known to occur in Silver Creek: silver lamprey (*Ichthyomyzon unicuspis*). Silver lamprey adults prefer the clear waters of large streams, rivers, and lakes. Adults migrate into streams and creeks with flowing water over stoney or gravelly bottom material for nesting. Larvae seek out slow flowing areas initially with thick organic layers where they will grow until moving out into predominantly sandy environments where they reside until they reach adulthood (COSEWIC 2011a). Silver lamprey have been recorded travelling up to 112 km upstream to spawn, although these extreme distances may not reflect the average for the species (COSEWIC 2011a).

No other aquatic (fish and mussel) SAR identified through the SAR screening were identified during field surveys or are known to occur in the watercourses in the study area based on the background review (Appendix B).



5.0 SIGNIFICANT NATURAL HERITAGE FEATURES

This section assesses the significant natural heritage features and functions (as outlined in Section 2.0) located within the study area.

5.1 Habitat of Endangered or Threatened Species

The MNR designates “significant” or critical habitat that is necessary for the maintenance, survival, and/or recovery of naturally occurring or reintroduced populations of endangered and threatened species, and where those areas of occurrence are occupied or habitually occupied by the species during all or any part(s) of their life cycles.

As discussed in Section 4.3.3, two species designated endangered under the ESA were observed during the site reconnaissance: butternut and American chestnut. Ten additional threatened or endangered species were assessed to have moderate or high potential to occur in the study area based on the presence of suitable habitat: barn swallow (*Hirundo rustica*), bank swallow (*Riparia riparia*), bobolink (*Dolichonyx oryzivorus*), chimney swift (*Chaetura pelagica*), eastern meadowlark (*Sturnella magna*), little brown myotis, northern myotis, tri-colored bat, eastern small-footed myotis, and American ginseng (*Panax quinquefolius*).

Little brown myotis, northern myotis, tri-colored bat, and eastern small-footed myotis were discussed in Section 4.4.2 and were assessed to have a moderate to high potential to occur in the study area.

Barn swallow is designated as threatened under the ESA and was assessed to have a moderate to high potential to occur in the study area. Barn swallow breeds in areas that contain a suitable nesting structure (e.g. barns, sheds, bridges or culverts), open areas for foraging (fields, lakes and wetlands), and a body of water (COSEWIC 2011b). There are numerous bridges, culverts and potentially suitable structures in the study area to provide suitable nesting habitat for barn swallow. Bridges over the Beaver River at 10th Line, Marsh Street, Bay Street East and the bridge between Mill Street and Bruce Street North were inspected in the field for nests, but none were observed. Although residential houses do not typically provide suitable nesting habitat, outbuildings such as sheds and garages, and barns or other agricultural structures for orchards in the study area may also provide suitable nesting habitat. Open fields, ponds and the Thornbury Sewage Lagoons within the study area may provide suitable foraging habitat. In addition, this species has been recorded in the study area (eBird 2012).

Bank swallow is designated as threatened under the ESA and was assessed to have a moderate potential to occur in the study area. Bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, river banks, and gravel pits. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, and wetlands (Garrison 1999). No suitable nesting sites (e.g. steep banks or exposed bluffs) were observed during the field surveys. However, suitable nesting habitat may occur in the nearby region (e.g., aggregate sites) and bank swallow may forage over open habitats in the study area. This species is mostly likely to occur along the lakeshore or over large waterbodies in the study area. In addition, this species has been recorded in the study area (eBird 2012).

Bobolink and eastern meadowlark are both designated threatened under the ESA and were assessed to have a moderate to high potential to occur in the study area. Both species breed in open grassland or graminoid-dominated habitats, such as pastures, hayfields and old fields (Renfrew et al. 2015; Hull 2003). Eastern meadowlark has a slightly higher tolerance for the presence of forbs and infrequent woody vegetation (Hull 2003). There are large grassland habitats, including meadows and hay fields, in the study area that may provide suitable



nesting habitat for these two bird species. In addition, both species have been recorded in the study area (eBird 2012).

Chimney swift is designated threatened under the ESA and was assessed to have a moderate to high potential to occur in the study area. Chimney swift is most commonly associated with towns and cities where they nest in unused chimneys. However, large diameter cavity trees are also used for nesting (COSEWIC 2007). There is a residential and urban component of the study area that may provide suitable chimneys for nesting. There are also suitable open habitats in the study area, including open fields, meadows and the Thornbury Sewage Lagoons that may provide suitable foraging habitat for this bird. In addition, this species has been recorded in the study area (eBird 2012).

American ginseng is designated endangered under the ESA and was assessed to have a moderate potential to occur in the study area. American ginseng is found in moist, undisturbed and relatively mature deciduous woods often dominated by sugar maple. It is commonly found on well-drained, south-facing slopes (COSEWIC 2000). The large deciduous forest (FOD6-1) along the Beaver River in Clarksburg may provide suitable habitat for this species. Other areas of deciduous forest in the study area do not typically represent the preferred habitat conditions or species composition to support growing conditions for American ginseng.

5.2 Significant Wetlands

The MNRF designates PSWs based on a standardized evaluation system known as the Ontario Wetland Evaluation System (OWES). Wetlands are assessed based on a range of criteria, including biology, hydrology, societal value and special features (MNRF 2016b).

There is one PSW in the northeast corner of the study area (Figure 1D), known as the Silver Creek Wetland Complex. The Silver Creek PSW is a coastal wetland. The boundaries of the PSW were re-evaluated in 2004 to reflect land use changes in the area (Skelton Brumwell and MacViro 2006).

Development is prohibited within PSWs according to both the Town and County's policies (Blue Mountains 2016; Grey 2013). Development may be permitted adjacent to a PSW (i.e., within 120 m) where it is demonstrated there will be no negative impacts to the feature or its function (Blue Mountains 2016; Grey 2013). Development adjacent to a PSW may also require a permit from the GSCA or NVCA (Grey 2013).

There are numerous other unevaluated wetlands in the study area (Figures 1A-1F), the majority of which appear to be swamps. Unevaluated wetlands in proximity to the Silver Creek PSW in the northeast corner of the study area have potential to be complexed into the PSW in the future. Development may be permitted in, and within 30 m of, unevaluated wetlands where it is demonstrated there will be no negative impacts to the feature or its function (Blue Mountains 2016; Grey 2013).

5.3 Fish Habitat

Several watercourses and two ponds within the study area were assessed to provide fish habitat, including Beaver River, Little Beaver Creek, Indian Brook, Silver Creek, Black Ash Creek, Lake of the Clouds, Mill Pond and several other unnamed tributaries (i.e., WC#4, ESR#7, ESR#8/9 and ESR#10) (Figures 1A-1F). If any works are proposed in, or within 30 m of fish habitat, a DFO self-assessment for impacts must be conducted as part of project permitting. If impacts are unavoidable, a DFO Project Review will be required.



Best management practices to avoid impacts (e.g. sedimentation and erosion) on fish habitat will be implemented and are described in Section 7.2.

5.4 Significant Woodlands

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

Both the Town and the County define significant woodlands as woodlands that are:

- 1) A minimum size of 40 ha outside of the settlement areas; or
- 2) A minimum size of 4 ha within the settlement area; or
- 3) A woodland smaller than 40 ha outside of the settlement area that meets two of the following criteria:
 - a. Is within 30 m of another significant woodland;
 - b. Overlaps another natural heritage feature (e.g., PSW or ANSI); and
 - c. Has a minimum interior habitat of 8 ha (measured as 100 m from the edge).

According to Appendix 1 of the Town's OP (Blue Mountains 2016), the majority of forests within the study area are mapped as significant woodlands. Many of these municipally-significant woodlands are also considered significant according to the PPS for meeting one or more of the following criteria:

- Woodland is 20 ha in size or larger (or greater than 50 ha along the lakeshore fringe);
- 2 ha or more of interior habitat;
- Located within 50 m of a watercourse or fish habitat;
- Located within a defined natural heritage system (i.e., Niagara Escarpment); and
- Located within the Grey Sauble Source Protection Area.

Development may be permitted within, and adjacent to, significant woodlands with the completion of an EIS demonstrating no adverse impacts to the feature or its function (Blue Mountains 2016; Grey 2013). The Town defines adjacent lands as the area within 120 m (Blue Mountains 2016), and the County defines adjacent lands as the area within 50 m (Grey 2013).

5.5 Significant Valleylands

Significant valleylands should be defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the NHRM for Policy 2.3 of the PPS (MNR 2010). Recommended criteria for designating significant valleylands under the PPS (MMAH 2014) include prominence a distinctive landform, degree of naturalness, importance of its ecological functions, restoration potential, and historical and cultural values.

Neither the Town or County have significant valleylands mapped, nor do they provide criteria to determine significance (Blue Mountains 2016; Grey 2013). Based on the PPS, the valleylands associated with the Beaver River, Silver Creek, Black Ash Creek, Little Beaver Creek and Indian Brook are considered significant for meeting one or more of the following criteria:



- Areas of water conveyance from catchment areas of 50 ha or greater, as defined by a stream channel conveying or holding water for at least two months of the year;
- Has associated wetlands important to water attenuation, storage and release;
- Valley morphology with an average width of 25 m or more;
- Has areas of contiguous woodland, wetland, and/or meadow;
- High proportion of natural riparian vegetation (greater than 30 m in width on each side); and
- Provides an aquatic linkage between two large waterbodies.

Development may be permitted within, and adjacent to, significant valleylands with the completion of an EIS demonstrating no adverse impacts to the feature or its function (Blue Mountains 2016; Grey 2013). The Town defines adjacent lands as the area within 120 m (Blue Mountains 2016), and the County defines adjacent lands as the area within 50 m (Grey 2013).

5.6 Significant Areas of Natural or Scientific Interest (ANSIs)

Areas of Natural and Scientific Interest (ANSI) are designated by the province according to standardized evaluation procedures.

There are two ANSIs in the northcentral portion of the study area: Blue Mountain Slopes Life Science ANSI and the Delphi Point Earth Science ANSI along the Georgian Bay shoreline (Figure 1C).

Development may be permitted within, and adjacent to, ANSIs with the completion of an EIS demonstrating no adverse impacts to the feature or its function (Blue Mountains 2016; Grey 2013). The Town defines adjacent lands as the area within 50 m of an Earth Science ANSI, and within 120 m of a Life Science ANSI (Blue Mountains 2016), and the County defines adjacent lands as the area within 50 m (Grey 2013).

5.7 Karst Landscape

In the southern portion of the study area there is a known area of karst with associated features including caves, sinkholes, karren, and disappearing streams (MNDM 2017). South of the known karst is a large area of potential karst which overlaps the proposed elevated tank at Scandia Lane and proposed watermain work at County Road 19 and 3rd Line. An extensive assessment of the potential karst area and associated constraints was conducted in 2004 as part of the Castle Glen development area studies (Ford and Worthington 2004).

According to both the Town and County's OP (Blue Mountains 2016; Grey County 2013), within the designated Karst Topography area, the proponent must assess the need of providing an EIS to determine if shallow overburden with karst topography does exist through the completion of test holes. If karst topography is confirmed, studies must be completed to assess the impacts and mitigation measures on the surface and groundwater supply, and assess hazards associated with unstable bedrock conditions. However, in areas where full municipal water and sewer services are already installed, the above requirements do not apply for new fully serviced development.

5.8 Designated Parks

There is one provincial park (Craigeith Provincial Park) and one nature preserve (Peasemarsch Nature Preserve) in the north-central portion of the study area (Figures 1B; 1C).



5.9 Significant Wildlife Habitat

Significant wildlife habitat (SWH) is one of the more complicated natural heritage features to identify and evaluate. The NHRM includes criteria and guidelines for designating SWH. There are two other documents, the Significant Wildlife Habitat Technical Guide (SWHTG) and the Significant Wildlife Habitat Mitigation Support Tool (SWHMIST) (MNR 2000 and MNRF 2014), that can be used to help decide what areas and features should be considered SWH. These documents were used as reference material for this study. SWH should be evaluated in the context of the entire planning authority's jurisdiction, and only the best examples are considered significant.

There are four general types of SWH: migration corridors, seasonal concentration areas, rare or specialized habitats, and habitat for species of conservation concern. The specific habitats considered in this report are evaluated based on the criteria outlined in the Ecoregion 6E Criterion Schedule (MNRF 2015b). All types of SWH are discussed below in relation to the site and the Project.

5.9.1 Seasonal Concentration Areas

Seasonal concentration areas are those areas where large numbers of a species congregate at one particular time of the year. Examples include deer yards, bird nesting colonies, bat hibernacula, raptor roosts, and passerine migration concentrations. If a species is at risk, or if a large proportion of the population may be lost if significant portions of the habitat are altered, all examples of certain seasonal concentration areas may be designated.

The SWHTG (MNR 2000) and Ecoregion 6E Criterion Schedule (MNRF 2015b) identifies the following 12 types of seasonal concentrations of animals that may be considered SWH:

- winter deer yards and congregation areas;
- colonial bird nesting sites;
- waterfowl stopover and staging areas;
- shorebird migratory stopover areas;
- landbird migratory stopover areas;
- raptor winter feeding and roosting areas;
- reptile hibernacula;
- turtle wintering areas;
- bat hibernacula;
- bat maternity colonies;
- bat migratory stopover areas; and
- migratory butterfly stopover areas.

No waterfowl stopover or staging areas were identified in the study area. Because the study area is further than 5 km from Lake Ontario, migratory butterfly stopover areas and landbird migratory stopover areas are not applicable.



There are two designated deer wintering areas in the northwestern portion of the study area (Figure 1A). The forested area between 10th Line and Peel Street North is designated Stratum 2, and the riparian forest between Bay Street West and Alfred Street West is designated Stratum 1 and 2. Stratum 1 habitats are defined as core wintering areas and Stratum 2 habitats are winter staging areas (MNR 2014).

As discussed in Section 4.4.2, there are numerous forested areas throughout the study area that may provide suitable maternity roost habitat for tree-roosting bats. In addition, the karst topography in the southeast corner of the study area may provide potential suitable hibernacula for bats or reptiles.

Although there are several small ponds in the study area, the majority appear to be man-made for use as irrigation ponds, storm water management or in landscaping. These ponds are likely to be shallow and lack the soft, muddy bottoms required for overwintering turtles. One pond north of Fulton Street at 10th Line in Clarksburg, appears to be more naturalized and may be deep enough to provide suitable overwintering conditions for small turtle species such as painted turtle (*Chrysemys picta*) or snapping turtle (*Chelydra serpentina*). Lake of the Clouds in the southeastern corner of the study area (Figure 1F) is deep [i.e., max depth of 4.27 m (MNR 2015)] and may provide suitable overwintering habitat for turtles.

The shoreline of Georgian Bay along the northern boundary of the study area is known to be an important site for shorebirds during migration (NVCA 2013), and is likely to be considered Shorebird Migratory Stopover Area SWH. Areas of this shoreline, particularly at Peasemars Nature Preserve (Figure 1B) and the Silver Creek PSW (Figure 1D) may also provide colonial bird nesting sites.

There is extensive forest adjacent to a large area (~15 ha) of open agricultural field in the southeast corner of the study area east of 3rd Line that may provide suitable raptor wintering area SWH (Figure 1F). However, the fields are surrounded by dense forest and may be too protected from the wind to provide suitable wind-swept fields for winter foraging. Two additional areas in Clarksburg may provide suitable conditions for raptor wintering area, including the deciduous forest (FOD) and adjacent agricultural fields east of Marsh Street, and the large deciduous forest (FOD6-1) and adjacent fields north of Euclid Avenue. However, the agricultural fields are actively planted and managed for row crop, which may reduce overall suitability.

5.9.2 Migration Corridors

The SWHTG (MNR 2000) defines animal movement corridors as elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another. This is generally in response to different seasonal habitat requirements. For example, trails used by deer to move to wintering areas or areas used by amphibians between breeding and summer habitat. To qualify as SWH, these corridors would be a critical link between habitats that are regularly used by wildlife.

There are no designated migration corridors in the study area. Several of the riparian corridors associated with the major watercourses in the study area may function as movement corridors for a variety of wildlife, including large mammals such as deer, as well as amphibians and reptiles. The Beaver River and associated riparian corridor connects Mill Pond at the north end of the study area with the Clendenan Reservoir just southwest of the study area (Figure 1) and is likely to provide a critical movement corridor for wildlife through an otherwise open, agricultural landscape. The riparian corridor of Little Beaver Creek may also function as a movement corridor for deer, as the northern end of the creek is part of a designated deer wintering area (Figure 1A).



5.9.3 Specialized Habitats

Specialized habitats are microhabitats that provide a critical resource to some groups of wildlife. Examples include salt licks for ungulates and groundwater seeps for wild turkeys.

The SWHTG (MNR 2000) and Ecoregion 6E Criterion Schedule (MNR 2015b) defines seven specialized habitats that may be considered SWH. They are:

- habitat for area-sensitive species;
- amphibian breeding habitat (woodlands and wetlands);
- turtle nesting habitat;
- specialized raptor nesting habitat;
- waterfowl nesting areas;
- bald eagle and osprey habitat; and
- seeps and springs.

No waterfowl nesting areas were identified in the study area.

There are some large tracts of forest within the study area that provide interior forest habitat and may support area-sensitive forest breeding bird species or woodland raptors, including:

- Forest east of the proposed pumping station upgrades at Camperdown Road;
- FOM/FOD between Arrowhead Road and Alta Road;
- FOM/FOD between Arrowhead Road and Aspen Way;
- Forest between County Road 19 and Osler Bluff Road;
- SWD between County Road 19 and Scenic Caves Road; and
- Forest north and south of County Road 19 between 2nd Line and County Road 34.

Areas of deciduous swamp, vernal pools in other upland forested areas, and the several small ponds in the study area may provide suitable amphibian breeding habitat.

Although no turtle nesting habitat was identified during the site reconnaissance, there are likely to be suitable nesting substrates along the Georgian Bay shoreline, where snapping turtle or painted turtle may nest.

The extensive riparian forest and swamp (FOD6-1, SWD2-2, SWD) along the Beaver River, as well as forested areas along the shoreline of Georgian Bay (e.g. Silver Creek PSW and Peasemarsch Nature Preserve) (Figures 1B; 1C) and Lake of the Clouds (Figure 1F), may provide suitable nesting habitat for bald eagle (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*). In addition, there are occurrence records for bald eagle within the study area (eBird 2012). Osprey has also been observed along the Beaver River in the vicinity of the study area (eBird 2012).



Due to the karst landscape and topography of the study area, there is high potential for seeps and springs to occur within the study area. These features are most likely to be found along the northern slopes of the Blue Mountains or in headwater areas near the karst feature in the southeast corner of the study area.

5.9.4 Rare Habitat

This category includes plant communities that are considered rare in the province. Generally, communities assigned an SRANK of S1 to S3 (extremely rare to rare-uncommon) by the NHIC could qualify. It is assumed that these habitats are at risk and that they are also more likely to support rare species and other features that are considered significant.

No rare plant communities were identified in the study area during the field surveys. However, it is possible for talus slope and cliff ecosites, a rare plant community type, to occur within the larger forested communities on the northern slopes of the Blue Mountains within the study area. There is also potential for sand barrens, another rare plant community type, to occur along the Georgian Bay shoreline in the north end of the study area. Although no old growth forest communities were identified in the field or are known to occur in the study area, the GSCA considers the forest communities at the Peasemash Nature Preserve (Figure 1B) to demonstrate some of the characteristics that define old growth communities (GSCA 2013).

5.9.5 Habitat for Species of Conservation Concern

Habitat for Species of Conservation Concern (SOCC) includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the rest of the world.

Rare species are considered at five levels: globally rare, nationally rare, provincially rare, regionally rare; and locally rare (in the municipality). This is also the order of priority that should be attached to the importance of maintaining species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated SWH. Examples include species vulnerable to forest fragmentation and species such as woodland raptors that may be vulnerable to forest management or human disturbance. The final group of SOCC includes species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions.

The SWHTG (MNR 2000) and Ecoregion 6E Criterion Schedule (MNR 2015b) defines five specialized habitats that may be considered SWH. They are:

- marsh bird breeding habitat;
- open country bird breeding habitat;
- shrub/early successional bird breeding habitat;
- terrestrial crayfish; and
- special concern and rare wildlife species

No suitable marsh, open country, or shrub/early successional bird breeding habitat was identified in the study area. The deciduous swamp (SWD2-2; SWD) along the Beaver River, and other areas of deciduous swamp (SWD) along Monterra Road and Regional Road 34 (Figure 1E) may provide suitable habitat for terrestrial crayfish.



One SOCC, monarch, was observed during the site reconnaissance and was discussed in Section 4.4.1, and a second SOCC, silver lamprey, is known to occur in Silver Creek and was discussed in Section 4.5.2. An additional 19 SOCC were assessed to have moderate or high potential to occur in the study area based on the presence of suitable habitat: western chorus frog (*Pseudacris triseriata*), variegated meadowhawk (*Sympetrum corruptum*), bald eagle (*Haliaeetus leucocephalus*), Canada warbler (*Cardellina canadensis*), common nighthawk (*Chordeiles minor*), eastern wood-pewee (*Contopus virens*), golden-winged warbler (*Vermivora chrysoptera*), grasshopper sparrow (*Ammodramus savannarum*), great black-backed gull (*Larus marinus*), red-headed woodpecker (*Melanerpes erythrocephalus*), wood thrush (*Hylocichla mustelina*), snapping turtle (*Chelydra serpentina*), American hart's-tongue fern (*Asplenium scolopendrium*), rough hawthorn (*Crataegus scabrida*), shining-branch hawthorn (*Crataegus magniflora*), shrubby St. John's-wort (*Hypericum prolificum*) and Smith's bulrush (*Schoenoplectus smithii*).

Western chorus frog, designated threatened under the SARA and not designated under the ESA, was assessed to have a moderate to high potential to occur in the study area. This amphibian breeds in marshes or wooded wetlands, as well as roadside ditches and flooded swales in meadows (Environment Canada 2015b). There are several swamps and forests with potential vernal pools (e.g., FOM4-2/SWT at Peasemars Nature Preserve) that may provide suitable breeding habitat within the study area (Figure 1B). In addition, there are occurrence records of western chorus frog in the vicinity of the study area (Ontario Nature 2017).

Variegated meadowhawk is ranked S3 (Vulnerable) provincially and was assessed to have a moderate potential to occur in the study area. This species is found around ponds and slow streams with sandy or cobble substrates, and occasionally in brackish waters (Abbot 2018). The smaller, slower flowing tributaries in the study area, as well as small ponds and the Thornbury Sewage Lagoons (Figure 1B), may provide suitable habitat for this dragonfly.

Canada warbler, eastern wood-pewee and wood thrush and forest-breeding birds that were assessed to have a moderate to high potential to occur in the study area. Canada warbler and wood thrush are both designated special concern under the ESA and threatened under the SARA, and eastern wood-pewee is designated special concern under both the ESA and SARA. Canada warbler prefers moist, mixed forests and thicket swamps (McLaren 2007), while wood thrush prefers dense mixed or deciduous forest with tall trees and moderate shrub density (COSEWIC 2012a). Eastern wood-pewee breeds in variety of open forests, including mixed, coniferous and deciduous, as well as open suburban woodlands (COSEWIC 2012b). There is extensive forest cover in the study area to support these species, and there are occurrence records for all three species within the study area (eBird 2012).

Bald eagle, designated special concern under the ESA and not designated under the SARA, was assessed to have a moderate potential to occur in the study area. Bald eagle was addressed in Section 5.9.3.

Common nighthawk is designated special concern under the ESA and threatened under the SARA and was assessed to have a moderate to high potential to occur in the study area. Open meadows and fallow fields in the study area may provide suitable habitat for this species which breeds in agricultural fields, gravel pits, open wetlands, alvars and prairies (Sandilands 2007). In addition, there are occurrence records of common nighthawk within the study area (eBird 2012).

Golden-winged warbler is designated special concern under the ESA and threatened under the SARA and was assessed to have a moderate to high potential to occur in the study area. This bird usually breeds in regenerating scrub habitat with dense ground cover and a patchwork of shrubs, usually surrounded by forest (Confer et al. 2011). The cultural savannah (CUS) and young deciduous forest (FOD4-2) along the Georgian Trail



in the northwest corner of the study area (Figure 1A) may provide suitable early successional breeding habitat for this bird.

Grasshopper sparrow is designated special concern under both the ESA and SARA and was assessed to have a moderate to high potential to occur in the study area. Grasshopper sparrow breeds in open grasslands with low herbaceous cover and few shrubs (COSEWIC 2013). There are large grassland habitats, including meadows and hay fields, in the study area that may provide suitable nesting habitat for this species. In addition, grasshopper sparrow has been recorded in the study area (eBird 2012).

Red-headed woodpecker is designated special concern under the ESA and threatened under the SARA and was assessed to have a moderate potential to occur in the study area. There are numerous open woodlands, suburban parks and golf courses in the study area that may provide suitable nesting or perching habitat for this bird.

The shoreline of Georgian Bay provides unique habitat types including rocky outcrops, beach and shoreline marsh, that may support rare species such as great black-backed gull, an S2 (Imperiled) bird species, and Smith's bulrush, an S3 (Vulnerable) plant species. Both rare species were assessed to have moderate potential to occur in the study area.

Snapping turtle is designated special concern under both the ESA and SARA and was assessed to have a moderate to high potential to occur in the study area. Watercourses and ponds in the study area, as well as the Georgian Bay shoreline and the marshy mouth of the Beaver River, may provide suitable aquatic habitat for snapping turtle (Figure 1A). As discussed in Section 5.9.3, there are also potential areas of nesting habitat in the study area. In addition, snapping turtle has been recorded in the study area (Ontario Nature 2017).

American hart's-tongue fern is designated special concern under both the ESA and SARA and is known to occur in the study area (Skelton Brumwell and MacViro 2006).

Two plant species ranked S3 provincially (rough hawthorn and shining-branch hawthorn), and one plant species ranked S2 provincially (shrubby St. John's-wort) were assessed to have a moderate potential to occur in the study area. Forest edges, hedgerows, thickets and open fields may provide suitable growing habitat for these three rare plant species.

6.0 SUMMARY

Based on the assessment and findings discussed above for the study area, the following sensitive natural heritage features were identified within the study area and have potential to be impacted by the proposed Project:

- Several regulated watercourses and waterbodies are located within the study area, including Little Beaver Creek, Beaver River, Indian Brook, Mill Creek, Silver Creek, Black Ash Creek, Lake of the Clouds, Mill Pond, and unnamed tributaries. Permitting through the GSCA and/or NVCA is required for activities within regulated limits.
- Beaver River, Little Beaver Creek, Indian Brook, Silver Creek, Black Ash Creek, Lake of the Clouds, Mill Pond and several other unnamed tributaries (i.e., WC#4, ESR#7, ESR#8/9 and ESR#10) are considered fish habitat. Activities associated with construction of water and sewer servicing within the study area must be planned and designed in such a way as to minimize the potential pathways through which serious harm to



fish and fish habitat may occur. Best management and standard mitigation measures, as described in Section 2.2, must be implemented in detailed design and construction planning to avoid harm or destruction of fish and fish habitat.

- Two species designated endangered under the ESA, American chestnut and butternut, were identified in the study area. The American chestnut individual was planted as a landscaping tree on a residential property and is unlikely a candidate for protection under the ESA. Butternut, and the area within 50 m of the tree, is protected under the ESA.
- Potential habitat for five endangered (little brown myotis, northern myotis, tri-colored bat, eastern small-footed myotis, American ginseng) and five threatened species (barn swallow, bank swallow, bobolink, chimney swift, and eastern meadowlark) was identified within the study area. If habitat will be removed or impacted, additional studies and permitting or registration under the ESA may be required.
- One species designated special concern under the ESA, monarch, was identified in the study area, and a second species designated special concern under the ESA, silver lamprey, is known to occur in Silver Creek within the study area. Potential habitat for 18 additional SOCC (western chorus frog, bald eagle, Canada warbler, common nighthawk, eastern wood-pewee, golden-winged warbler, grasshopper sparrow, great black-backed gull, red-headed woodpecker, wood thrush, snapping turtle, American hart's-tongue fern, rough hawthorn, shining-branch hawthorn, shrubby St. John's-wort and Smith's bulrush) was identified in the study area. Although these species do not receive individual or habitat protection under the ESA, measures to avoid or mitigate harm must be implemented in accordance with the policies of the PPS.

The constraints noted above require consideration during the preliminary design of project components and screening or selection of Project alternatives. Best management practices and standard mitigation can be applied through planning and design to reduce or eliminate the potential for project effects. An impact assessment will be required once preferred Project design has been identified.

7.0 MITIGATION AND RECOMMENDATIONS

During planning, avoidance of sensitive features and fish and wildlife habitat is the most effective way to protect the natural environment. However, avoidance is not always possible and in such cases mitigation measures can be included through design and construction to minimize potential concerns on the natural environment. The following mitigation should be considered during preliminary and detailed design to minimize any potential effects of the Project on natural features.

7.1 Vegetation and Wildlife

- Post-construction planting will be undertaken to restore vegetation cover in all areas disturbed by construction activities, where reasonable.
- All vegetation clearing should occur outside of the breeding bird season (April 15 – August 15). If this is not possible, a nest search should be completed by a qualified biologist in all areas to be cleared prior to clearing activities.



- Rehabilitate, re-stabilize and re-vegetate all disturbed areas upon completion of the construction works to restore the Project footprint to its pre-construction condition, where possible.

7.2 Fish Habitat

The following mitigation measures should be implemented during construction to minimize harm to fish and fish habitat:

- Implement standard and accepted mitigation measures outlined in the Fisheries Protection Policy Statement (DFO 2013a) and Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013c) during construction.
- **Fish Protection:** DFO considers the following measure an appropriate measure to avoid harm to fish and fish habitat: “Retain a qualified environmental professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the Site”. Where it is not possible to relocate in the same waters, all attempts should be made to relocate the fish to waters in the same watershed (DFO 2013b).
- **Timing:** no in-water work will occur between the restriction periods for the applicable thermal regime in southern Ontario [warmwater (March 15 to July 15) and coldwater (October 1 to May 31); DFO 2013d], subject to confirmation with DFO.
- **Erosion and Sediment Control:** An erosion and sediment control plan will be developed to minimize the risk of sedimentation of the Beaver River during all phases of the project. Exposed soils will be stabilized if above the high-water mark and any in-water work will be isolated via turbidity curtains, etc. All sedimentation and erosion control measures will be regularly inspected and adapted to meet needs.
- **Contamination and Spill Management:** A response plan will be developed that will be implemented immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept on site.
- **Operation of Machinery:** Machinery will be operated on land above the high-water mark where possible. All refueling, washing, and servicing of machinery will be completed beyond 30 m of the water courses where fish are present.

8.0 SUMMARY AND CONCLUSIONS

The proposed Project study area has been assessed for presence of natural features, wildlife and species and risk. Broad level ecological impacts relevant to legislation including the ESA, SARA, the *Fisheries Act*, and the MBCA were assessed and considered as potential constraints to the Project. Potential ecological impacts under the Provincial Policy Statement, the policies of the County of Grey and Town of The Blue Mountains Official Plans, and the *Conservation Authorities Act* were also reviewed to provide ecological context to the report and discussion of potential constraints.

Potential impacts to the identified significant natural features or functions within the study area must be assessed during the detailed design and planning phase. It is anticipated that the majority of disturbance activities associated



with the Project will be restricted to the road right-of-way, and the potential for impacts to significant natural features, including SAR, in the study area is generally low. If it is determined that potential habitat for endangered or threatened species, or fish habitat will be impacted, additional studies and permitting or registration under the ESA or *Fisheries Act* may be required. If work is proposed within the regulated limits of the GSCA or NVCA, a permit may be required. Potential impacts, if identified, to the remaining significant natural features or functions in the study area can likely be addressed through implementation of appropriate mitigation measures.



Report Signature Page

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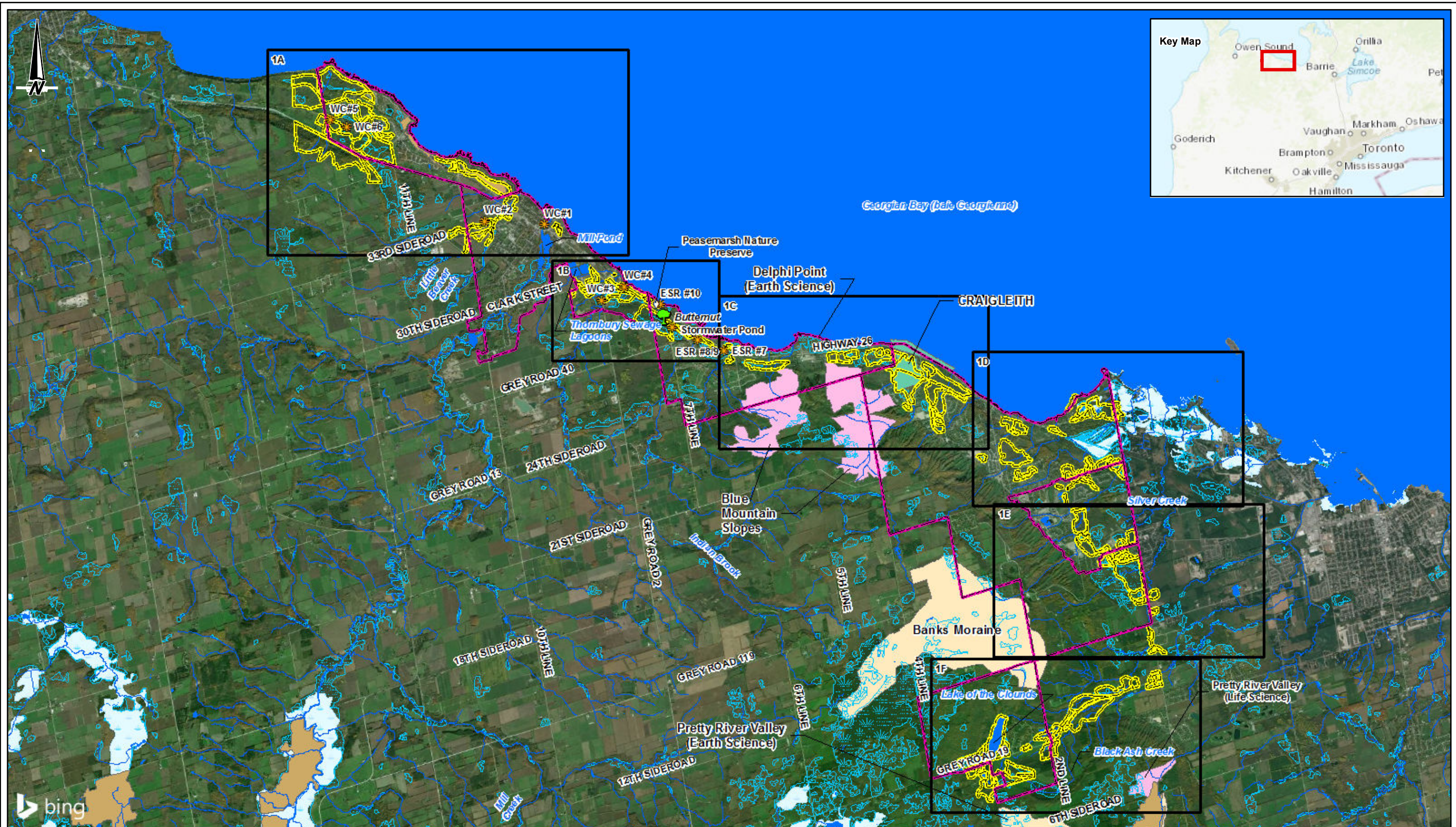


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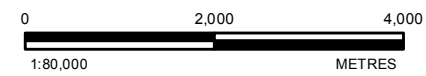
FIGURES



LEGEND

	Endangered Tree		Deer wintering area/yard
	Peasemash Nature Preserve		Provincial Park
	Aquatic Survey Station		ANSI, Earth Science
	Watercourse		ANSI, Life Science
	Waterbody		Ecological Land Classification
	Provincially Significant Wetland		Study Area
	Not Evaluated Wetland		Map Index

REFERENCES
 BASE DATA: MNRF LIO (2017)
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	DESIGN	SFC
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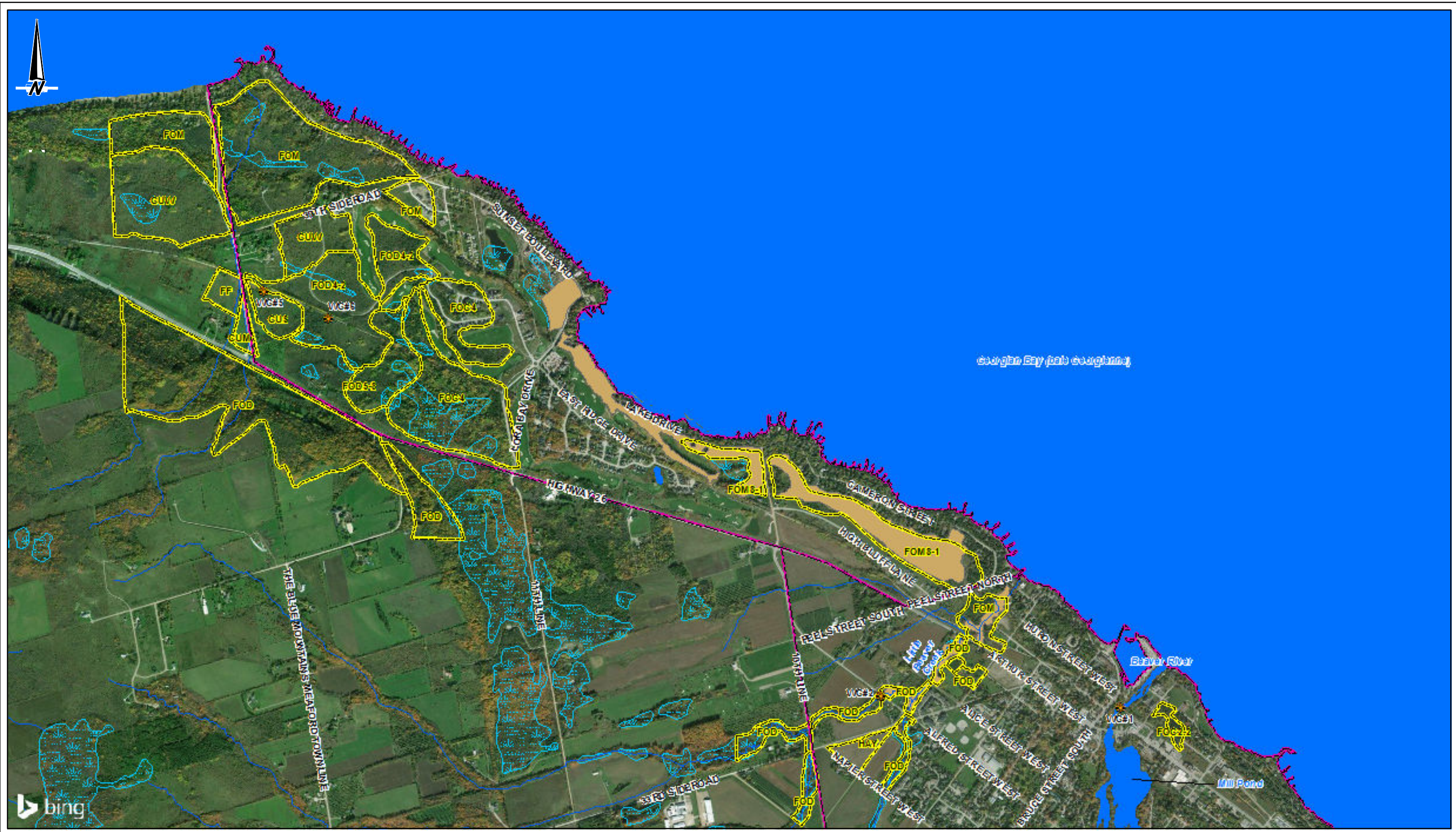
PROJECT
 TOWN OF THE BLUE MOUNTAINS - WATER SUPPLY

TITLE
 ECOLOGICAL LAND CLASSIFICATION AND NATURAL HERITAGE CONSTRAINTS

PROJECT NO. 1778449	PHASE 0.0	REV. A	FIGURE 1
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20mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:



- LEGEND**
- Aquatic Survey Station
 - Watercourse
 - Waterbody
 - Not Evaluated Wetland
 - Deer wintering area/yard
 - Ecological Land Classification
 - Study Area

REFERENCES
 BASE DATA: MNRF LIO (2017)
 BASE MAP: SERVICE LAYER CREDITS- SOURCES- ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY



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PROJECT
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TITLE
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PROJECT NO.	PHASE	REV.	FIGURE
1778449	0.0	A	1A

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- LEGEND**
- Endangered Tree
 - Peasemash Nature Preserve
 - Aquatic Survey Station
 - Watercourse
 - Waterbody
 - Not Evaluated Wetland
 - Ecological Land Classification
 - Study Area

REFERENCES
 BASE DATA: MNRF LIO (2017)
 BASE MAP: SERVICE LAYER CREDITS- SOURCES- ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY



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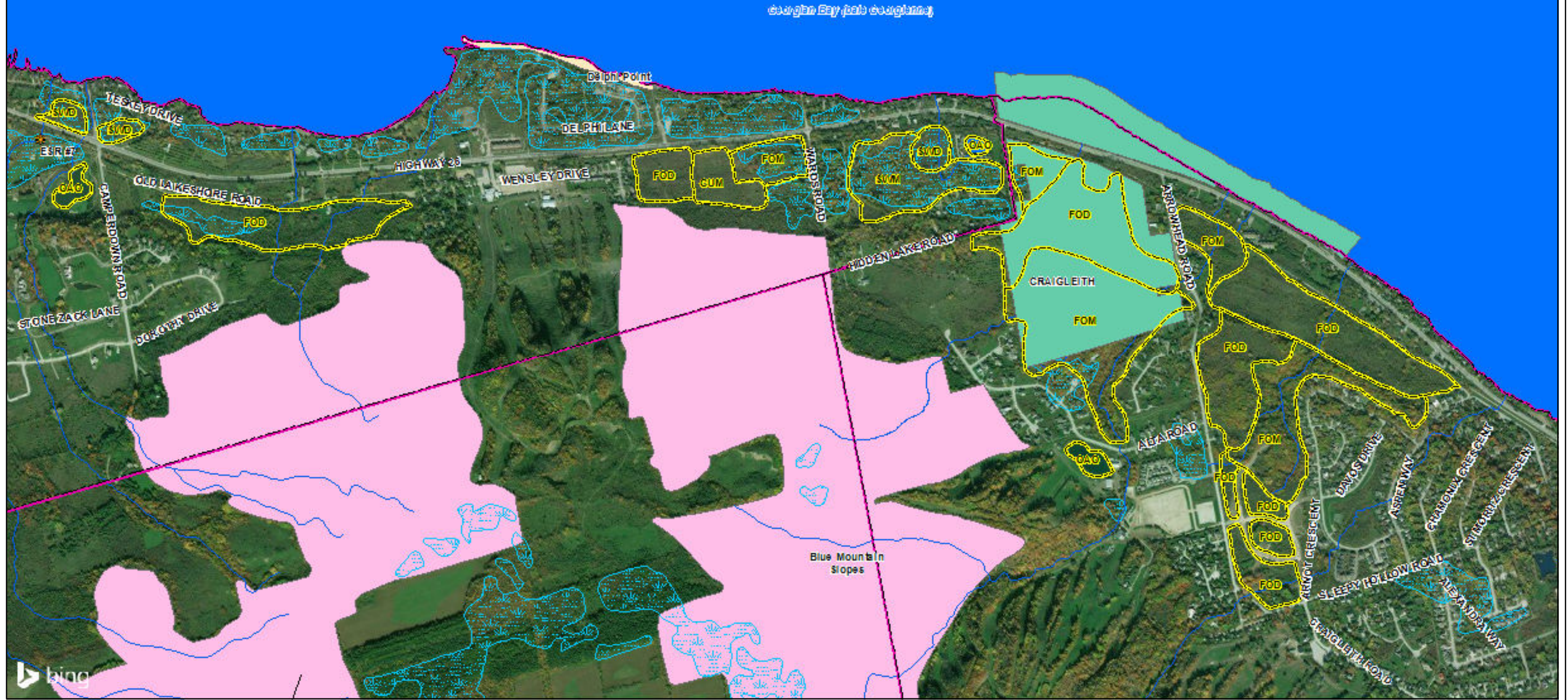
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PROJECT
 TOWN OF THE BLUE MOUNTAINS - WATER SUPPLY

TITLE
ECOLOGICAL LAND CLASSIFICATION AND NATURAL HERITAGE CONSTRAINTS

PROJECT NO.	PHASE	REV.	FIGURE
1778449	0.0	A	1B

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm



LEGEND

Aquatic Survey Station	ANSI, Earth Science
Watercourse	ANSI, Life Science
Waterbody	Ecological Land Classification
Not Evaluated Wetland	Study Area
Provincial Park	

REFERENCES
 BASE DATA: MNRF LIO (2017)
 BASE MAP: SERVICE LAYER CREDITS- SOURCES- ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY



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PROJECT
 TOWN OF THE BLUE MOUNTAINS - WATER SUPPLY

TITLE
ECOLOGICAL LAND CLASSIFICATION AND NATURAL HERITAGE CONSTRAINTS

PROJECT NO.	PHASE	REV.
1778449	0.0	A

FIGURE
1C



- LEGEND**
- Watercourse
 - Waterbody
 - Provincially Significant Wetland
 - Not Evaluated Wetland
 - Ecological Land Classification
 - Study Area

REFERENCES
 BASE DATA: MNRF LIO (2017)
 BASE MAP: SERVICE LAYER CREDITS- SOURCES- ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY



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PROJECT
 TOWN OF THE BLUE MOUNTAINS - WATER SUPPLY

TITLE
ECOLOGICAL LAND CLASSIFICATION AND NATURAL HERITAGE CONSTRAINTS

PROJECT NO. 1778449	PHASE 0.0	REV. A	FIGURE 1D
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LEGEND

Watercourse	Ecological Land Classification
Waterbody	Study Area
Not Evaluated Wetland	
ANSI, Earth Science	

REFERENCES
 BASE DATA: MNRF LIO (2017)
 BASE MAP: SERVICE LAYER CREDITS- SOURCES- ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISS TOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY



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	PREPARED	JMC
	DESIGN	SFC
	REVIEW	AS
	APPROVED	HM

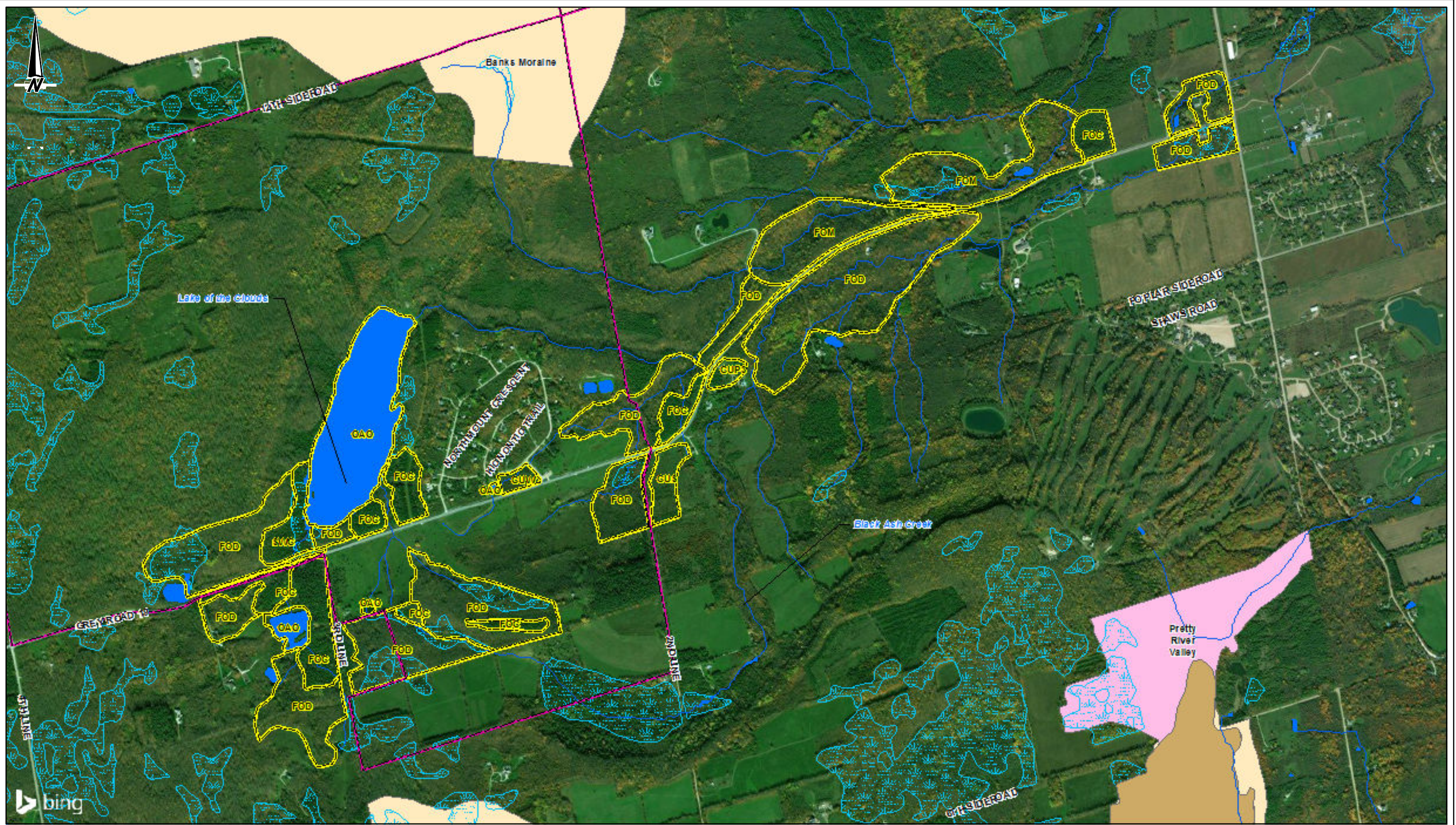
PROJECT
 TOWN OF THE BLUE MOUNTAINS - WATER SUPPLY

TITLE
ECOLOGICAL LAND CLASSIFICATION AND NATURAL HERITAGE CONSTRAINTS

PROJECT NO. 1778449	PHASE 0.0	REV. A	FIGURE 1E
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- LEGEND**
- Watercourse
 - Waterbody
 - Not Evaluated Wetland
 - Deer wintering area/yard
 - Ecological Land Classification
 - ANSI, Life Science
 - ANSI, Earth Science
 - Study Area

REFERENCES
 BASE DATA: MNRF LIO (2017)
 BASE MAP: SERVICE LAYER CREDITS- SOURCES- ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY



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 TOWN OF THE BLUE MOUNTAINS - WATER SUPPLY

TITLE
ECOLOGICAL LAND CLASSIFICATION AND NATURAL HERITAGE CONSTRAINTS

PROJECT NO. 1778449	PHASE 0.0	REV. A	FIGURE 1F
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APPENDIX A

Plant List

Appendix A
Vascular Plant List

Common Name	Scientific Name	Origin ^a	Status ^b	GRANK ^c	SRANK ^c
Trees (29 taxa)					
American chestnut	<i>Castanea dentata</i>	N	END	G4	S1S2
Apple	<i>Malus pumila</i>	I	—	G5	SNA
Balsam fir	<i>Abies balsamea</i>	N	—	G5	S5
Basswood	<i>Tilia americana</i>	N	—	G5	S5
Bitternut hickory	<i>Carya cordiformis</i>	N	—	G5	S5
Black cherry	<i>Prunus serotina</i>	N	—	G5	S5
Black locust	<i>Robinia pseudoacacia</i>	I	—	G5	SNA
Black walnut	<i>Juglans nigra</i>	(N)	—	G5	S4?
Butternut	<i>Juglans cinerea</i>	N	END	G4	S2?
Eastern hemlock	<i>Tsuga canadensis</i>	N	—	G5	S5
Eastern white cedar	<i>Thuja occidentalis</i>	N	—	G5	S5
Freeman's maple	<i>Acer x freemanii</i>	N	—	GNA	SNA
Green ash	<i>Fraxinus pennsylvanica</i>	N	—	G5	S4
Horse-chestnut	<i>Aesculus hippocastanum</i>	I	—	GNR	SNA
Large-toothed aspen	<i>Populus grandidentata</i>	N	—	G5	S5
Manitoba maple	<i>Acer negundo</i>	(N)	—	G5	S5
Norway spruce	<i>Picea abies</i>	I	—	G5	SNA
Red maple	<i>Acer rubrum</i>	N	—	G5	S5
Red oak	<i>Quercus rubra</i>	N	—	G5	S5
Red pine	<i>Pinus resinosa</i>	N	—	G5	S5
Scots pine	<i>Pinus sylvestris</i>	I	—	GNR	SNA
Sugar maple	<i>Acer saccharum</i>	N	—	G5	S5
Sycamore	<i>Platanus occidentalis</i>	N	—	G5	S4
Trembling aspen	<i>Populus tremuloides</i>	N	—	G5	S5
White ash	<i>Fraxinus americana</i>	N	—	G5	S4
White birch	<i>Betula papyrifera</i>	N	—	G5	S5
White elm	<i>Ulmus americana</i>	N	—	G5	S5
White pine	<i>Pinus strobus</i>	N	—	G5	S5
White spruce	<i>Picea glauca</i>	N	—	G5	S5
Small trees, shrubs and woody vines (19 taxa)					
Bunchberry	<i>Cornus canadensis</i>	N	—	G5	S5
Common buckthorn	<i>Rhamnus cathartica</i>	I	—	GNR	SNA
Common juniper	<i>Juniperus communis</i>	N	—	G5	S5
Currant sp.	<i>Ribes</i> sp.	—	—	—	—
Glossy buckthorn	<i>Rhamnus frangula</i>	I	—	GNR	SNA
Gray dogwood	<i>Cornus foemina</i>	N	—	G5?	S5
Highbush cranberry	<i>Viburnum trilobum</i>	N	—	GNR	S5
Lilac	<i>Syringa vulgaris</i>	I	—	GNR	SNA
Maple-leaved viburnum	<i>Viburnum acerifolium</i>	N	—	G5	S5
Poison-ivy	<i>Rhus radicans</i>	N	—	GNR	S5
Prickly rose	<i>Rosa acicularis</i>	N	—	G5	S5
Red osier dogwood	<i>Cornus stolonifera</i>	N	—	G5	S5
Red raspberry	<i>Rubus idaeus</i>	N	—	G5T5	SNA
Riverbank grape	<i>Vitis riparia</i>	N	—	G5	S5
Serviceberry sp.	<i>Amelanchier</i> sp.	—	—	—	—
Staghorn sumac	<i>Rhus typhina</i>	N	—	G5	S5

Appendix A
Vascular Plant List

Common Name	Scientific Name	Origin ^a	Status ^b	GRANK ^c	SRANK ^c
Tartarian honeysuckle	<i>Lonicera tatarica</i>	I	—	GNR	SNA
Virginia creeper	<i>Parthenocissus inserta</i>	N	—	G5	S5
Willow sp.	<i>Salix</i> sp.	—	—	—	—
Bracken fern	<i>Pteridium aquilinum</i>	N	—	G5	S5
Marsh horsetail	<i>Equisetum palustre</i>	N	—	G5	S5
Ostrich fern	<i>Matteuccia struthiopteris</i>	N	—	G5	S5
Common cattail	<i>Typha latifolia</i>	N	—	G5	S5
Reed canary grass	<i>Phalaris arundinacea</i>	N	—	GNR	S5
Alfalfa	<i>Medicago sativa</i>	I	—	GNR	SNA
Aster sp.	<i>Symphyotrichum</i> sp.	—	—	—	—
Bird's-foot trefoil	<i>Lotus corniculatus</i>	I	—	GNR	SNA
Bladder campion	<i>Silene vulgaris</i>	I	—	GNR	SNA
Blue-flag	<i>Iris versicolor</i>	N	—	G5	S5
Bur-cucumber	<i>Sicyos angulatus</i>	N	—	G5	S4S5
Canada anemone	<i>Anemone canadensis</i>	N	—	G5	S5
Chickweed sp.	<i>Cerastium</i> sp.	—	—	—	—
Chicory	<i>Cichorium intybus</i>	I	—	GNR	SNA
Common burdock	<i>Arctium minus</i>	I	—	GNR	SNA
Common buttercup	<i>Ranunculus acris</i>	I	—	G5	SNA
Common dandelion	<i>Taraxacum officinale</i>	I	—	G5	SNA
Common milkweed	<i>Asclepias syriaca</i>	N	—	G5	S5
Common mullein	<i>Verbascum thapsus</i>	I	—	GNR	SNA
Crown vetch	<i>Securigera varia</i>	I	—	GNR	SNA
Enchanter's nightshade	<i>Circaea canadensis</i>	N	—	G5T5	S5
False Solomon's-seal	<i>Maianthemum racemosum</i>	N	—	G5	S5
Common teasel	<i>Dipsacus fullonum</i>	I	—	GNR	SNA
Garlic mustard	<i>Alliaria petiolata</i>	I	—	GNR	SNA
Goat's-beard	<i>Tragopogon dubius</i>	I	—	GNR	SNA
Gray goldenrod	<i>Solidago nemoralis</i>	N	—	G5T5	S5
Grass-leaved goldenrod	<i>Euthamia graminifolia</i>	N	—	G5	S5
Heal-all	<i>Prunella vulgaris</i>	N	—	G5TU	SNA
Heath aster	<i>Symphyotrichum ericoides</i>	N	—	G5T5	S5
Herb-robert	<i>Geranium robertianum</i>	I	—	G5	S5
New England aster	<i>Symphyotrichum novae-angliae</i>	N	—	G5	S5
Ox-eye daisy	<i>Leucanthemum vulgare</i>	I	—	GNR	SNA
Periwinkle	<i>Vinca minor</i>	I	—	GNR	SNA
Ragweed	<i>Ambrosia artemisiifolia</i>	N	—	G5	S5
Red clover	<i>Trifolium pratense</i>	I	—	GNR	SNA
Spotted jewelweed	<i>Impatiens capensis</i>	N	—	G5	S5
Spotted joe-pye weed	<i>Eutrochium maculatum</i>	N	—	G5T5	S5
Spotted knapweed	<i>Centaurea stoebe</i>	I	—	GNR	SNA
Sweet cicely	<i>Myrrhis odorata</i>	I	—	GNR	SNA
Trillium	<i>Trillium</i> sp.	N	—	G5	S5

Appendix A
Vascular Plant List

Common Name	Scientific Name	Origin ^a	Status ^b	GRANK ^c	SRANK ^c
Violet	<i>Viola sp.</i>	—	—	—	—
Viper's bugloss	<i>Echium vulgare</i>	I	—	GNR	SNA
White avens	<i>Geum canadense</i>	N	—	G5	S5
White sweet clover	<i>Melilotus alba</i>	I	—	G5	SNA
Wild carrot	<i>Daucus carota</i>	I	—	GNR	SNA
Wild geranium	<i>Geranium maculatum</i>	N	—	G5	S5
Yellow avens	<i>Geum aleppicum</i>	N	—	G5	S5

^a Origin: N = Native; (N) = Native but not in study area region; I = Introduced.

^b Status: P = Provincial; F = Federal

END= Endangered; SC = Special Concern; THR = Threatened; UN = Undetermined.

^c Ranks based upon determinations made by the Natural Heritage Information Centre (2017).

G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure.

E = Exotic; Q = Taxonomic questions not fully resolved; T = sub-specific taxon (taxa) present in the province.



APPENDIX B

Species at Risk Screening



APPENDIX B
Species at Risk Screening

Taxon	Common Name	Scientific Name	Endangered Species Act ¹	Species At Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
Amphibian	Jefferson X Blue-spotted salamander, Jefferson genome dominates	<i>Ambystoma hybrid pop. 1</i>	—	—	—	S2	In Ontario, Jefferson x blue-spotted salamander prefers moist, well-drained deciduous and mixed forests with a closed canopy. It overwinters underground in mammal burrows and rock fissures, and moves to vernal pools and ephemeral wetlands in the early spring to breed. Breeding ponds are typically located in or near to forested habitats, and contain submerged debris (i.e. sticks, vegetation) for egg attachment sites. Ephemeral breeding pools need to have water until at least mid-summer (mid to late July) (Jefferson Salamander Recovery Team 2010).	Low	Although there are several forested areas in the study area, there does not appear to be suitable breeding ponds in the study area.
Amphibian	Western chorus frog - Great Lakes St. Lawrence / Canadian Shield population	<i>Pseudacris triseriata</i>	—	THR	THR	S3	In Ontario, habitat of this amphibian species typically consists of marshes or wooded wetlands, particularly those with dense shrub layers and grasses, as this species is a poor climber. They will breed in almost any fishless pond including roadside ditches, gravel pits and flooded swales in meadows. This species hibernates in terrestrial habitats under rocks, dead trees or leaves, in loose soil or in animal burrows. During hibernation, this species is tolerant of flooding (Environment Canada 2015).	Moderate – High	There are several wetlands and ponds in the study area that may provide suitable breeding habitat. Vernal pools in the forests at the bottom of the Blue Mountains may also provide breeding habitat. In addition, there are occurrence records in the study area.
Arthropod	Gypsy cuckoo bumble bee	<i>Bombus bohemicus</i>	END	—	—	S1S2	In Ontario, gypsy cuckoo bumble bee is a habitat generalist and is found in several different types of habitats, including open meadows, agricultural fields, urban areas, boreal forest and other woodlands. Gypsy cuckoo bumble bee is a parasitic bee and uses the underground nests of the subgenus <i>Bombus sensu stricto</i> . This bee is a generalist forager, but is often associated with flowering plants close to wooded areas and blueberry fields. Currently this species is only known to occur in Pinery Provincial Park (COSEWIC 2014).	Low	This species has only been recorded in recent years at Pinery Provincial Park, outside of the study area.
Arthropod	Monarch	<i>Danaus plexippus</i>	SC	SC	END	S2N, S4B	In Ontario, monarch is found throughout the northern and southern regions of the province. This butterfly is found wherever there are milkweed (<i>Asclepius</i> spp.) plants for its caterpillars and wildflowers that supply a nectar source for adults. It is often found on abandoned farmland, meadows, open wetlands, prairies and roadsides, but also in city gardens and parks. Important staging areas during migration occur along the north shores of the Great Lakes (COSEWIC 2010).	High	Monarch was observed during the field surveys. There are numerous areas of gardens, meadows, field edges and roadsides that may provide suitable foraging habitat and host plants.
Arthropod	Variiegated meadowhawk	<i>Sympetrum corruptum</i>	—	—	—	S3	In Ontario, variegated meadowhawk is found around ponds and slow streams with sandy or cobble substrates, and occasionally in brackish waters.	Moderate	Potential to occur around ponds and watercourses in the study area.
Arthropod	West Virginia white	<i>Pieris virginiensis</i>	SC	—	—	S3	In Ontario, west Virginia white is found primarily in the central and southern regions of the province. This butterfly lives in moist, mature, deciduous and mixed woodlands, and the caterpillars feed only on the leaves of toothwort (<i>Cardamine</i> spp.), which are small, spring-blooming plants of the forest floor. These woodland habitats are typically maple-beech-birch dominated. This species is associated with woodlands growing on calcareous bedrock or thin soils over bedrock (Burke 2013).	Low	There is limited maple-beech-birch habitat in the study area, or woodlands over thin soil on bedrock.



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Arthropod	Yellow-banded bumble bee	<i>Bombus terricola</i>	SC	—	—	S5	This species is a forage and habitat generalist. Mixed woodlands are commonly used for nesting and overwintering, but it also occupies various open habitats including native grasslands, farmlands and urban areas. It is an early emerging species, making it likely an important pollinator of early blooming wild flowering plants (e.g. wild blueberry) and agricultural crops (e.g., apple). Nest sites are mostly abandoned rodent burrows (COSEWIC 2015).	Low	This species has only been recorded in recent years at Pinery Provincial Park, outside of the study area.
Bird	Bald eagle	<i>Haliaeetus leucocephalus</i>	SC	—	NAR	S2N	In Ontario, bald eagle nests are typically found near the shorelines of lakes or large rivers, often on forested islands. The large, conspicuous nests are typically found in large super-canopy trees along water bodies (Buehler 2000).	Moderate	Forested habitat along major rivers, such as the Beaver River, Silver Creek and Ash Creek, in the study area may provide suitable nesting habitat for this species.
Bird	Bank swallow	<i>Riparia riparia</i>	THR	THR	THR	S4B	In Ontario, bank swallow breeds in a variety of natural and anthropogenic habitats, including lake bluffs, stream and river banks, sand and gravel pits, and roadcuts. Nests are generally built in a vertical or near-vertical bank. Breeding sites are typically located near open foraging sites such as rivers, lakes, grasslands, agricultural fields, wetlands and riparian woods. Forested areas are generally avoided (Garrison 1999).	Moderate	No large exposed, sandy banks or cliff faces were observed during the field surveys. However, stockpiles on aggregate or development properties may provide suitable nesting habitat, and individuals may forage over open waterbodies, meadows and fields in the study area.
Bird	Barn swallow	<i>Hirundo rustica</i>	THR	THR	THR	S4B	In Ontario, barn swallow breeds in areas that contain a suitable nesting structure, open areas for foraging, and a body of water. This species nests in human made structures including barns, buildings, sheds, bridges, and culverts. Preferred foraging habitat includes grassy fields, pastures, agricultural cropland, lake and river shorelines, cleared right-of-ways, and wetlands (COSEWIC 2011). Mud nests are fastened to vertical walls or built on a ledge underneath an overhang. Suitable nests from previous years are reused (Brown and Brown 1999).	Moderate – High	There are numerous potential nesting sites, such as culverts, bridges, and structures in the study area. Individuals may forage over open waterbodies, meadows and fields in the study area. In addition, there are occurrence records in the study area.
Bird	Black tern	<i>Chlidonias niger</i>	SC	—	NAR	S3B	In Ontario, black tern breeds in freshwater marshlands where it forms small colonies. It prefers marshes or marsh complexes greater than 20 ha in area and which are not surrounded by wooded area. Black terns are sensitive to the presence of agricultural activities. The black tern nests in wetlands with an even combination of open water and emergent vegetation, and still waters of 0.5-1.2 m deep. Preferred nest sites have short dense vegetation or tall sparse vegetation often consisting of cattails, bulrushes and occasionally burreed or other marshland plants. Black terns also require posts or snags for perching (Weseloh 2007).	Low	There are no large freshwater marshes in the study area to provide suitable nesting habitat. In addition, there are no occurrence records in the study area.
Bird	Black-crowned night-heron	<i>Nycticorax nycticorax</i>	—	—	—	S3B	This species breeds in colonies in a wide variety of aquatic habitats. However, most colonies are located in shrubs or trees on islands, in swamps or otherwise over water. Also observed nesting in emergent herbaceous vegetation.	Low	There are no suitable islands in the waterbodies or rivers in the study area to provide preferred nesting habitat.



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Bird	Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	THR	S4B	In Ontario, bobolink breeds in grasslands or graminoid dominated hayfields with tall vegetation (Gabhauer 2007). Bobolink prefers grassland habitat with a forb component and a moderate litter layer. They have low tolerance for presence of woody vegetation and are sensitive to frequent mowing within the breeding season. They are most abundant in established, but regularly maintained, hayfields, but also breed in lightly grazed pastures, old or fallow fields, cultural meadows and newly planted hayfields. Their nest is woven from grasses and forbs. It is built on the ground, in dense vegetation, usually under the cover of one or more forbs (Renfrew et al. 2015).	Moderate – High	There are some large grassland habitats, including meadows and hay fields, in the study area that may provide suitable nesting habitat. In addition, there are occurrence records in the study area.
Bird	Canada warbler	<i>Cardellina canadensis</i>	SC	THR	THR	S4B	In Ontario, breeding habitat for Canada warbler consists of moist mixed forests with a well-developed shrubby understory. This includes low-lying areas such as cedar and alder swamps, and riparian thickets (McLaren 2007). It is also found in densely vegetated regenerating forest openings. Suitable habitat often contains a developed moss layer and an uneven forest floor. Nests are well concealed on or near the ground in dense shrub or fern cover, often in stumps, fallen logs, overhanging stream banks or mossy hummocks (Reitsma et al. 2010).	Moderate – High	There are several areas of mixed forest in the study area that may provide suitable nesting habitat. In addition, there are occurrence records in the study area.
Bird	Cerulean warbler	<i>Setophaga cerulea</i>	THR	END	END	S3B	In Ontario, breeding habitat of cerulean warbler consists of second-growth or mature deciduous forest with a tall canopy of uneven vertical structure and a sparse understory. This habitat occurs in both wet bottomland forests and upland areas, and often contains large hickory and oak trees. This species may be attracted to gaps or openings in the upper canopy. The cerulean warbler is associated with large forest tracks but may occur in woodlots as small as 10 ha (COSEWIC 2010). Nests are usually built on a horizontal limb in the mid-story or canopy of a large deciduous tree (Buehler et al. 2013).	Low	Although there are small large tracts of forested habitat in the study area, there are no occurrence records within, or in the vicinity of, the study area.
Bird	Chimney swift	<i>Chaetura pelagica</i>	THR	THR	THR	S4B, S4N	In Ontario, chimney swift breeding habitat is varied and includes urban, suburban, rural and wooded sites. They are most commonly associated with towns and cities with large concentrations of chimneys. Preferred nesting sites are dark, sheltered spots with a vertical surface to which the bird can grip. Unused chimneys are the primary nesting and roosting structure, but other anthropogenic structures and large diameter cavity trees are also used (COSEWIC 2007).	Moderate – High	There are some large tracts of mature forest in the study area that may provide suitable large diameter cavity trees for nesting. In addition, chimneys on older houses and industrial or institutional buildings in the urban areas may provide suitable anthropogenic nesting sites. In addition, there are occurrence records in the study area.
Bird	Common nighthawk	<i>Chordeiles minor</i>	SC	THR	THR	S4B	In Ontario, these aerial foragers require areas with large open habitat. This includes farmland, open woodlands, clearcuts, burns, rock outcrops, alvars, bogs, fens, prairies, gravel pits and gravel rooftops in cities (Sandilands 2007)	Moderate – High	There are suitable open habitats in the study area, including open fields, meadows and the sewage lagoons in Thornbury that may provide suitable nesting and foraging habitat for this bird. In addition, there are occurrence records in the study area.



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Bird	Eastern meadowlark	<i>Sturnella magna</i>	THR	THR	THR	S4B	In Ontario, eastern meadowlark breeds in pastures, hayfields, meadows and old fields. Eastern meadowlark prefers moderately tall grasslands with abundant litter cover, high grass proportion, and a forb component (Hull 2003). They prefer well drained sites or slopes, and sites with different cover layers (Roseberry and Klimstra 1970)	Moderate – High	There are some large grassland habitats, including meadows and hay fields, in the study area that may provide suitable nesting habitat. In addition, there are occurrence records in the study area.
Bird	Eastern whip-poor-will	<i>Antrostomus vociferus</i>	THR	THR	THR	S4B	In Ontario, whip-poor-will breeds in semi-open forests with little ground cover. Breeding habitat is dependent on forest structure rather than species composition, and is found on rock and sand barrens, open conifer plantations and post-disturbance regenerating forest. Territory size ranges from 3 to 11 ha (COSEWIC 2009). No nest is constructed and eggs are laid directly on the leaf litter (Mills 2007).	Low	There does not appear to be any suitable forests on open bedrock or sand sites within the study area to provide suitable habitat. In addition, there are no occurrence records in the study area.
Bird	Eastern wood-pewee	<i>Contopus virens</i>	SC	SC	SC	S4B	In Ontario, eastern wood-pewee inhabits a wide variety of wooded upland and lowland habitats, including deciduous, coniferous, or mixed forests. It occurs most frequently in forests with some degree of openness. Intermediate-aged forests with a relatively sparse midstory are preferred. In younger forests with a relatively dense midstory, it tends to inhabit the edges. Also occurs in anthropogenic habitats providing an open forested aspect such as parks and suburban neighborhoods. Nest is constructed atop a horizontal branch, 1-2 m above the ground, in a wide variety of deciduous and coniferous trees.	Moderate – High	There are several forested habitats in the study area that may provide suitable nesting habitat. In addition, there are occurrence records in the study area.
Bird	Golden-winged warbler	<i>Vermivora chrysoptera</i>	SC	THR	THR	S4B	In Ontario, golden-winged warbler breeds in regenerating scrub habitat with dense ground cover and a patchwork of shrubs, usually surrounded by forest. Their preferred habitat is characteristic of a successional landscape associated with natural or anthropogenic disturbance such as rights-of-way, and field edges or openings resulting from logging or burning. The nest of the golden-winged warbler is built on the ground at the base of a shrub or leafy plant, often at the shaded edge of the forest or at the edge of a forest opening (Confer et al. 2011).	Moderate – High	There are a couple small areas of early successional or shrub habitat that may provide suitable nesting habitat. In addition, there are occurrence records in the study area.
Bird	Grasshopper sparrow <i>pratensis</i> subspecies	<i>Ammodramus savannarum (pratensis subspecies)</i>	SC	SC	SC	S4B	In Ontario, grasshopper sparrow is found in medium to large grasslands with low herbaceous cover and few shrubs. It also uses a wide variety of agricultural fields, including cereal crops and pastures. Close-grazed pastures and limestone plains (e.g. Carden and Napanee Plains) support highest density of this bird in the province (COSEWIC 2013).	Moderate	There are some large grassland habitats, including meadows and hay fields, in the study area that may provide suitable nesting habitat.
Bird	Great black-backed gull	<i>Larus marinus</i>	—	—	—	S2B	This species breeds in colonies mainly along coastal belts on small islands, rocky islets, barrier beaches and dunes. Prefers sites on rock outcrops.	Moderate – High	The shoreline of Georgian Bay along the northern portion of the study area may provide suitable breeding habitat. In addition, there are occurrence records in the study area.



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Bird	Least bittern	<i>Ixobrychus exilis</i>	THR	THR	THR	S4B	In Ontario, least bittern breeds in marshes, usually greater than 5 ha, with emergent vegetation, relatively stable water levels and areas of open water. Preferred habitat has water less than 1 m deep (usually 10 – 50 cm). Nests are built in tall stands of dense emergent or woody vegetation (Woodliffe 2007). Clarity of water is important as siltation, turbidity, or excessive eutrophication hinders foraging efficiency (COSEWIC 2009).	Low	There are no suitable large, open water marshes in the study area to provide suitable nesting habitat. In addition, there are no occurrence records in the study area.
Bird	Loggerhead shrike	<i>Lanius ludovicianus (migrans subsp)</i>	END	END	END	S2B	In Ontario, loggerhead shrike breeds in open country habitat characterized by short grasses with scattered shrubs or low trees. Unimproved pasture containing scattered hawthorns (<i>Crataegus</i> spp.) on shallow soils over limestone bedrock is the preferred habitat. Preferred nest sites include isolated hawthorns or red cedar. Males defend large territories of approximately 50 ha (Chabot 2007)	Low	There are no suitable large, open country habitats with grassland with scattered trees and shrubs in the study area. In addition, there are no occurrence records in the study area.
Bird	Louisiana waterthrush	<i>Parkesia motacilla (formerly Seiurus motacilla)</i>	THR	SC	THR	S3B	In Ontario, Louisiana waterthrush inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps. Trees, bushes, exposed roots, cliffs, banks and mossy logs are favoured nesting spots. Riparian woodlands are preferred stopover sites during migration. Nests are concealed from view at the base of uprooted trees, among mosses, or under logs and in cavities along the stream bank (COSEWIC 2006).	Low	There is limited ravine-like habitat along streams and rivers in the study area. In addition, there are no occurrence records in the study area.
Bird	Peregrine falcon (<i>anatum</i> subspecies)	<i>Falco peregrinus anatum</i>	SC	SC	SC	S3B	In Ontario, peregrine falcon breeds in areas containing suitable nesting locations and sufficient prey resources. Such habitat includes both natural locations containing cliff faces (heights of 50 - 200 m preferred) and also anthropogenic landscapes including urban centres containing tall buildings, open pit mines and quarries, and road cuts. Peregrine falcons nest on cliff ledges and crevices and building ledges. Nests consist of a simple scrape in the substrate (COSEWIC 2007).	Low	The ridge top of the Blue Mountains that may provide nesting habitat is outside of the study area. In addition, there are no occurrence records in the study area.
Bird	Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	SC	THR	THR	S4B	In Ontario, red-headed woodpecker breeds in open, deciduous woodlands or woodland edges and are often found in parks, cemeteries, golf courses, orchards and savannahs (Woodliffe 2007). They may also breed in forest clearings or open agricultural areas provided that large trees are available for nesting. They prefer forests with little or no understory vegetation. They are often associated with beech or oak forests, beaver ponds and swamp forests where snags are numerous. Nests are excavated in the trunks of large dead trees (Smith et al. 2000).	Moderate	There are numerous open woodlands, parks and golf courses in the study area that may provide suitable nesting habitat.
Bird	Wood thrush	<i>Hylocichla mustelina</i>	SC	THR	THR	S4B	In Ontario, wood thrush breeds in moist, deciduous hardwood or mixed stands that are often previously disturbed, with a dense deciduous undergrowth and with tall trees for singing perches. This species selects nesting sites with the following characteristics: lower elevations with trees less than 16 m in height, a closed canopy cover (>70 %), a high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soil, and decaying leaf litter (COSEWIC 2012).	Moderate – High	There are some large forested tracts in the study area, particularly in the eastern portion that may provide suitable nesting habitat. In addition, there are occurrence records in the study area.



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Fish	Lake sturgeon – Great Lakes / Upper St. Lawrence population	<i>Acipenser fulvescens</i>	THR	—	THR	S2	In Ontario, lake sturgeon, a large prehistoric freshwater fish, is found in all the Great Lakes and in all drainages of the Great Lakes and of Hudson Bay. This species typically inhabits highly productive shoal areas of large lakes and rivers. They are bottom dwellers, and prefer depths between 5-10 m and mud or gravel substrates. Small sturgeons are often found on gravelly shoals near the mouths of rivers. They spawn in depths of 0.5 to 4.5 m in areas of swift water or rapids. Where suitable spawning rivers are not available, such as in the lower Great Lakes, they are known to spawn in wave action over rocky ledges or around rocky islands (Golder 2011).	Low	Lake sturgeon is not known to occur in any of the watercourses in the study area. It may occur in Georgian Bay, but this area is outside of the study area.
Fish	Silver lamprey - Great Lakes / Upper St. Lawrence population	<i>Ichthyomyzon unicuspis</i>	SC	—	—	S3	In Ontario, silver lamprey is known to occur in the Great Lakes and its tributaries, St. Lawrence River, Lake Nipissing, Lake-of-the-Woods and its tributaries, and the Ottawa River. Silver lamprey is a parasitic freshwater species that undertake spawning migrations in rivers and streams. They are often confused with sea lamprey. Adults prefer the clear waters of large streams, rivers, and lakes. Adults migrate in flowing water with stoney or gravelly bottom material for nesting. Larvae seek out slow flowing areas initially with thick organic layers where they will grow until moving out into predominantly sandy environments where they reside until they reach adulthood (COSEWIC 2012).	High	Silver lamprey is known to occur in Silver Creek (MNR 2015).
Lichen	Flooded jellyskin	<i>Leptogium rivulare</i>	—	THR	SC	S1	In Ontario, flooded jellyskin is found in the eastern region of the province. This lobed, leaf-like lichen grows on the lower trunks of trees in hardwood swamps where flooding occurs in the spring. The most common tree host is black ash, but it has also been recorded on silver maple, trembling aspen, bur oak and white cedar. Trees must be live to support the lichen. These seasonal pond habitats typically occur over top of calcareous bedrock, such as limestone. There is unlikely to be a minimum size requirement for the area of flooded forest habitat available to the lichen, as long as adequate flooding is present (Environment Canada 2013; COSEWIC 2004).	Low	This species is typically limited to the eastern portion of the province and there is limited swamp habitat with standing water in the study area that would provide suitable habitat.
Lichen	Whiskered camouflage lichen	<i>Melanelixia subargentifera</i>	—	—	—	S1S3	In Ontario, this lichen is found growing on trees and rocks.	Low	There is a single historical occurrence record from the study area along the Georgian Bay shoreline.
Mammal	Gray fox	<i>Urocyon cinereoargenteus</i>	THR	THR	THR	S1	While the Ontario range of this species extends across much of southern and southeastern Ontario, the only known population in the province is on Pelee Island, with very rare sightings elsewhere in the province at points close to the border with the United States. This species inhabits deciduous forests and marshes, and will den in a variety of features including rock outcroppings, hollow trees, burrows or brush piles, usually where dense brush provides cover and in close proximity to water. This species is considered a habitat generalist (COSEWIC 2002).	Low	This species is only currently known to occur on Pelee Island.



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Mammal	Eastern small-footed myotis	<i>Myotis leibii</i>	END	—	—	S2S3	This species is not known to roost within trees, but there is very little known about its roosting habits. The species generally roosts on the ground under rocks, in rock crevices, talus slopes and rock piles. It occasionally inhabits buildings. Areas near the entrances of caves or abandoned mines may be used for hibernaculum, where the conditions are drafty with low humidity, and may be subfreezing (Humphrey 2017)	Moderate – High	There are extensive areas of rock piles, talus slopes and karst topography within the study area that may provide suitable roosting sites and hibernacula.
Mammal	Little brown myotis	<i>Myotis lucifugus</i>	END	END	END	S4	In Ontario, this specie's range is extensive and covers much of the province. It will roost in both natural and man-made structures. Roosting colonies require a number of large dead trees, in specific stages of decay and that project above the canopy in relatively open areas. May form nursery colonies in the attics of buildings within 1 km of water. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (Environment Canada 2015).	Moderate – High	There are several forested habitats throughout the study area that may provide suitable roosting sites. There is also karst topography in the study area that may provide suitable hibernacula.
Mammal	Northern myotis	<i>Myotis septentrionalis</i>	END	END	END	S3	In Ontario, this species' range is extensive and covers much of the province. It will usually roost in hollows, crevices, and under loose bark of mature trees. Roosts may be established in the main trunk or a large branch of either living or dead trees. Caves or abandoned mines may be used as hibernacula, but high humidity and stable above freezing temperatures are required (Environment Canada 2015).	Moderate – High	There are several forested habitats throughout the study area that may provide suitable roosting sites. There is also karst topography in the study area that may provide suitable hibernacula.
Mammal	Tri-colored bat	<i>Perimyotis subflavus</i>	END	END	END	S3?	In Ontario, tri-colored bat may roost in foliage, in clumps of old leaves, hanging moss or squirrel nests. They are occasionally found in buildings although there are no records of this in Canada. They typically feed over aquatic areas with an affinity to large-bodied water and will likely roost in close proximity to these. Hibernation sites are found deep within caves or mines in areas of relatively warm temperatures. These bats have strong roost fidelity to their winter hibernation sites and may choose the exact same spot in a cave or mine from year to year (Environment Canada 2015).	Moderate – High	There are several forested habitats throughout the study area that may provide suitable roosting sites. There is also karst topography in the study area that may provide suitable hibernacula.
Reptile	Blanding's turtle - Great Lakes / St. Lawrence population	<i>Emydoidea blandingii</i>	THR	THR	END	S3	In Ontario, Blanding's turtle will use a range of aquatic habitats, but favor those with shallow, standing or slow-moving water, rich nutrient levels, organic substrates and abundant aquatic vegetation. They will use rivers, but prefer slow-moving currents and are likely only transients in this type of habitat. This species is known to travel great distances over land in the spring in order to reach nesting sites, which can include dry conifer or mixed forests, partially vegetated fields, and roadsides. Suitable nesting substrates include organic soils, sands, gravel and cobble. They hibernate underwater and infrequently under debris close to water bodies (COSEWIC 2005).	Low	Although Blanding's turtle has been recorded in the Silver Creek PSW at the northeastern corner of the study area, there are no suitable open water wetlands or ponds within the study area that would provide suitable aquatic habitat. Rivers in the study area are unlikely to provide preferred habitat. In addition, there are no other occurrence records in the study area.



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Reptile	Eastern hog-nosed snake	<i>Heterodon platirhinos</i>	THR	THR	THR	S3	Eastern hog-nosed snake can be classified as a habitat generalist as it uses a variety of habitats across its range. In Ontario, this snake typically uses habitat with open vegetation cover, including open woodlands, wetlands, fields, forest edges, beaches and dunes, and disturbed sites, most often near water. In the Georgian Bay area, disturbed fields, rock barrens and forests appear to be preferred habitats. This species relies on sandy well drained soils. Hibernation occurs in sandy soils below the frost line. This species has been observed excavating hibernation sites in mixed intolerant upland forests. Nesting and oviposition has been noted in upland sandy areas and rock outcrops under large flat rocks. The majority of their diet is comprised of American toad and Fowler's toad (Kraus 2011).	Low	Although the Georgian Bay shoreline may provide suitable habitat, all records from the study area are historical, and the extensive shoreline development has reduced the overall suitability.
Reptile	Eastern ribbonsnake - Great Lakes population	<i>Thamnophis sauritus</i>	SC	SC	SC	S3	In Ontario, eastern ribbonsnake is semi-aquatic, and is rarely found far from shallow ponds, marshes, bogs, streams or swamps bordered by dense vegetation. They prefer sunny locations and bask in low shrub branches. Hibernation occurs in mammal burrows, rock fissures or even ant mounds (COSEWIC 2012).	Low	There are no suitable large, basin wetlands in the study area to provide preferred habitat conditions. In addition, all occurrence records from the study area are historical.
Reptile	Massasauga rattlesnake – Great Lakes / St. Lawrence population	<i>Sistrurus catenatus</i>	THR	THR	THR	S3	In Ontario, Massasauga rattlesnake occurs in four separate regional populations: eastern Georgian Bay, Bruce peninsula and Manitoulin Island, Wainfleet bog, and the Ojibway Prairie complex in Windsor. This snake species uses a wide variety of habitats across its range, all of which share specific characteristics, including open areas for basking and areas of vegetation and rock for shelter. They are most typically associated with wetlands and damp areas/lowlands during the spring. They forage in shrubby fields and grasslands in the summer months. Hibernation sites are often associated with wetlands or wet depressions, in rock fissures, mammal and crayfish burrows, sphagnum hummocks and tree root systems, where snakes will access the area below the frost line, but above the water table. Gestation habitat includes areas with low canopy closure such as bedrock outcrops with vegetative cover and a large structure such as a table rock for refuge during this period (Massasauga Recovery Team 2005).	Low	Although there are several wetlands in the study area, they lack the exposed bedrock and standing water to provide preferred habitat conditions. In addition, there are no occurrence records in the study area.
Reptile	Northern map turtle	<i>Graptemys geographica</i>	SC	SC	SC	S3	In Ontario, the northern map turtle prefers large waterbodies with slow-moving currents, soft substrates, and abundant aquatic vegetation. Ideal stretches of shoreline contain suitable basking sites, such as rocks and logs. Along Lakes Erie and Ontario, this species occurs in marsh habitat and undeveloped shorelines. It is also found in small to large rivers with slow to moderate flow. Hibernation takes place in soft substrates under deep water (COSEWIC 2012).	Low	The region lacks a large, interconnected system of waterbodies and slow moving watercourses to provide the preferred habitat conditions of map turtle. In addition, there are no occurrence records in the study area.
Reptile	Snapping turtle	<i>Chelydra serpentina</i>	SC	SC	SC	S3	In Ontario, snapping turtle uses a wide range of waterbodies, but shows preference for areas with shallow, slow-moving water, soft substrates and dense aquatic vegetation. Hibernation takes place in soft substrates under water. Nesting sites consist of sand or gravel banks along waterways or roadways (COSEWIC 2008).	Moderate – High	Watercourses and waterbodies in the study area may provide suitable aquatic habitat for snapping turtle. In addition, there are occurrence records in the study area.



APPENDIX B
Species at Risk Screening

Taxon	Common Name	Scientific Name	Endangered Species Act ¹	Species At Risk Act (Sch 1) ²	COSEWIC ³	Provincial (SRank) ⁴	Habitat Requirements ⁵	Potential to Occur in the Study Area	Rationale for Potential to Occur in the Study Area
Reptile	Wood turtle	<i>Glyptemys insculpta</i>	END	THR	THR	S2	In Ontario, wood turtle spends spring and fall in or near waterbodies, including clear rivers and streams with sandy or gravel-sand substrates and moderate to fast current. During the summer, this species is often found on land in habitats with moderate or patchy shrub and tree cover, often more than 500 m from water. Hibernation takes place in substrates under water. Nesting sites are found on sand or gravel-sand beaches and banks with patchy vegetation cover. Other sites less often used include gravel holes, roadsides, railways, utility corridors, farm land and pastures (Ontario Wood Turtle Recovery Team 2010).	Low	There are no occurrence records in the study area, and there is limited suitable aquatic habitat in the study area.
Vascular Plant	American hart's-tongue fern	<i>Asplenium scolopendrium</i>	SC	SC	SC	S3	In Ontario, hart's-tongue fern grows on thin calcareous soils on or near dolomitic limestone of the Niagara Escarpment, and occasionally on open talus/scree slopes. Most populations are found on steep, moderately moist slopes that face north to northeast and are under a hardwood canopy cover (Environment Canada 2013).	High	American hart's-tongue fern was identified in the study area during previous field work.
Vascular Plant	Butternut	<i>Juglans cinerea</i>	END	END	END	S3?	In Ontario, butternut is found along stream banks, on wooded valley slopes, and in deciduous and mixed forests. It is commonly associated with beech, maple, oak and hickory (Voss and Reznicek 2012). Butternut prefers moist, fertile, well-drained soils, but can also be found in rocky limestone soils. This species is shade intolerant (Farrar 1995).	High	Butternut was identified in the study area during field work in 2017.
Vascular Plant	Rough hawthorn	<i>Crataegus scabrida</i>	—	—	—	S3?	Rough hawthorn grows in openings of forests, as well as along forest edges, in meadows and fields.	Moderate	Potential suitable habitat occurs in the study area.
Vascular Plant	Shining-branch hawthorn	<i>Crataegus magniflora</i>	—	—	—	S3	Grows in hedgerows, thickets and woodlands with adequate sun exposure.	Moderate	Potential suitable habitat occurs in the study area.
Vascular Plant	Shrubby St. John's-wort	<i>Hypericum prolificum</i>	—	—	—	S2	Shrubby St. John's-wort grows in fields, thickets, prairies and open woodlands.	Moderate	Potential suitable habitat occurs in the study area.
Vascular Plant	Smith's bulrush	<i>Schoenoplectus smithii</i>	—	—	—	S3	Smith's bulrush grows in moist, sandy or muddy shorelines or beaches	Moderate	Potential suitable habitat occurs in the study area.

NOTES:

¹ *Endangered Species Act* (ESA), 2007 (O.Reg 242/08 last amended 14 Sept 2016 as O.Reg 308/16). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended 2 June 2017 as O. Reg 167/17, s. 1.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern - SC)

² *Species at Risk Act* (SARA), 2002. Schedule 1 (Last amended 2 Nov 2017); Part 1 (Extirpated), Part 2 (Endangered), Part 3 (Threatened), Part 4 (Special Concern)

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

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

⁵ References:

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APPENDIX C

Wildlife List

Common Name	Scientific Name	Status ^a	GRANK ^b	SRANK ^b
Arthropods				
Cabbage White	<i>Pieris rapae</i>	—	G5	SNA
Monarch	<i>Danaus plexippus</i>	P - SC; F - SC	G4	S2N,S4B
Birds				
American Crow	<i>Corvus brachyrhynchos</i>	—	G5	S5B
American Goldfinch	<i>Carduelis tristis</i>	—	G5	S5B
American Robin	<i>Turdus migratorius</i>	—	G5	S5B
Belted Kingfisher	<i>Megasceryle alcyon</i>	—	G5	S4B
Black-capped Chickadee	<i>Poecile atricapilla</i>	—	G5	S5
Blue Jay	<i>Cyanocitta cristata</i>	—	G5	S5
Canada Goose	<i>Branta canadensis</i>	—	G5	S5
Cedar Waxwing	<i>Bombycilla cedrorum</i>	—	G5	S5B
Common Merganser	<i>Mergus merganser</i>	—	G5	S5B,S5N
Common Raven	<i>Corvus corax</i>	—	G5	S5
Common Yellowthroat	<i>Geothlypis trichas</i>	—	G5	S5B
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	—	G5	S5B
Downy Woodpecker	<i>Picoides pubescens</i>	—	G5	S5
Eastern Phoebe	<i>Sayornis phoebe</i>	—	G5	S5B
European Starling	<i>Sturnus vulgaris</i>	—	G5	SNA
Field Sparrow	<i>Spizella pusilla</i>	—	G5	S4B
Gray Catbird	<i>Dumetella carolinensis</i>	—	G5	S4B
Great Blue Heron	<i>Ardea herodias</i>	—	G5	S4
Green Heron	<i>Butorides virescens</i>	—	G5	S4B
Hairy Woodpecker	<i>Picoides villosus</i>	—	G5	S5
Hooded Merganser	<i>Lophodytes cucullatus</i>	—	G5	S5B,S5N
House Finch	<i>Carpodacus mexicanus</i>	—	G5	SNA
House Wren	<i>Troglodytes aedon</i>	—	G5	S5B
Killdeer	<i>Charadrius vociferus</i>	—	G5	S5B, S5N
Mallard	<i>Anas platyrhynchos</i>	—	G5	S5
Merlin	<i>Falco columbarium</i>	—	G5	S5B
Mourning Dove	<i>Zenaida macroura</i>	—	G5	S5
Northern Flicker	<i>Colaptes auratus</i>	—	G5	S4B
Red-breasted Nuthatch	<i>Sitta canadensis</i>	—	G5	S5
Ring-billed Gull	<i>Larus delawarensis</i>	—	G5	S5B,S4N
Ruby-crowned Kinglet	<i>Regulus calendula</i>	—	G5	S4B
Song Sparrow	<i>Melospiza melodia</i>	—	G5	S5B
Turkey Vulture	<i>Cathartes aura</i>	—	G5	S5B
White-breasted Nuthatch	<i>Sitta carolinensis</i>	—	G5	S5
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	—	G5	S5B
Mammals				
Beaver	<i>Castor canadensis</i>	—	G5	S5
Eastern Chipmunk	<i>Tamias striatus</i>	—	G5	S5
Ermine	<i>Mustela erminea</i>	—	G5	S5
Grey Squirrel	<i>Sciurus carolinensis</i>	—	G5	S5
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	—	G5	S5
Herpetofauna				

Common Name	Scientific Name	Status ^a	GRANK ^b	SRANK ^b
Northern Leopard Frog	<i>Lithobates pipiens</i>	—	G5	S5

^a Ranks based upon determinations made by the Ontario Natural Heritage Information Centre

G = Global; S = Provincial; Ranks 1-3 are considered imperiled or rare; Ranks 4 and 5 are considered secure. SNA = Not applicable for Ontario Ranking (e.g. Exotic species)

^b Status: P = Provincial; F = Federal

END= Endangered; SC = Special Concern; THR = Threatened; UN = Undetermined.

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